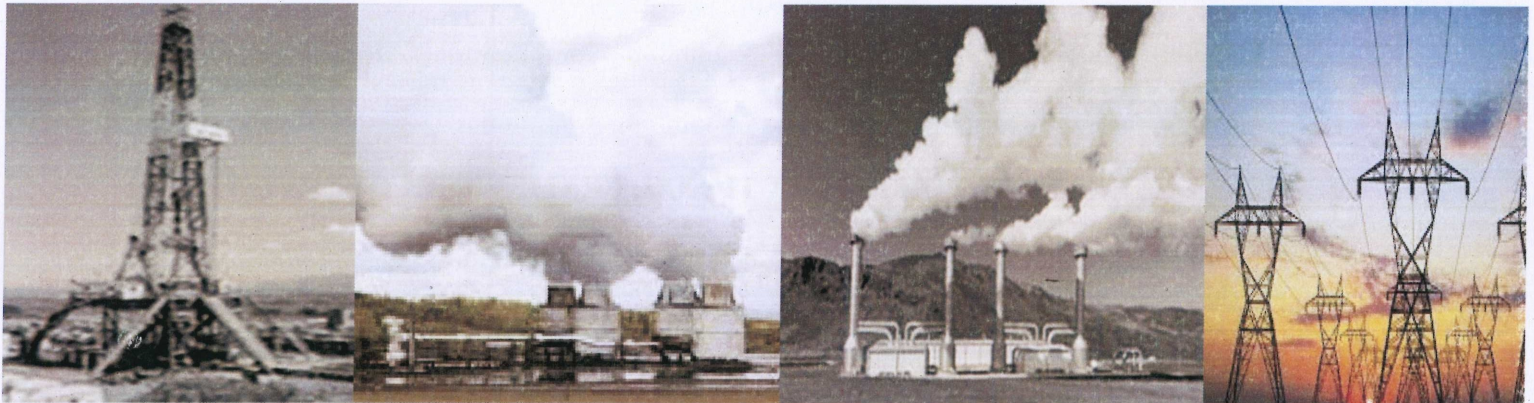




GEOHERMAL DEVELOPMENT COMPANY STRATEGIC PLAN FY 2018/19-2022/23

Lowering the cost of power in Kenya



APRIL 2018

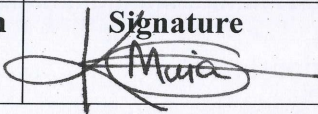
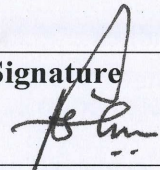
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ABBREVIATIONS AND ACRONYMS

AFD	Agence Francaise de Developpement	KRA	Kenya Revenue Authority
AfDB	African Development Bank	Ksh.	Kenya Shillings
AGM	Annual General Meeting	KwH	Kilowatt hour
CRM	Customer Relationship Management	LCPDP	Least Cost Power Development Plan
CSR	Community Social Responsibility	MD&CEO	Managing Director & Chief Executive Officer
EIB	European Investment Bank	MTEF	Medium Term Expenditure Framework
EMS	Environmental Management System	MTP	Medium Term Plan
ERC	Energy Regulation Commission	MUSD	Million USD
ERP	Enterprise Resource Planning	MW	Megawatt (1000 kilowatts)
ESIA	Environmental Social Impact Assessment	MWh	Megawatt hours
ET	Energy Tribunal	NOCK	National Oil Corporation of Kenya
GDC	Geothermal Development Company	PESTEL	Political Economic Social Technological Environmental Legal
GRMF	Geothermal Risk Mitigation Facility	PISSA	Project Implementation and Steam Supply Agreement
GTI	Geothermal Training Institute	PIT	Project Implementation Team
HR	Human Resource	PPA	Power Purchase Agreement
ICT	Information Communication & Technology	PPIAF	Public Private Infrastructure Advisory Facility
IDC	Interest During Construction	PPP	Public Private Partnership
IPPs	Independent Power Producers	PPRA	Public Procurement Regulatory Authority

ISCS	International Supply Chain Solution	QMS	Quality Management System
ISO	International Organization for Standardization	SGS	Steam Gathering System
JICA	Japan International Cooperation Agency	SWOT	Strengths Weaknesses Opportunities Threats
JV	Joint Venture	TNA	Training Needs Assessment
KETAWU	Kenya Electrical Trades and Allied Workers Union	USAID	United States Agency for International Development
KETRACO	Kenya Electricity Transmission Company	USD	United States Dollars
KNEB	Kenya Nuclear Electricity Board	USTDA	United States Trade and Development Agency
SAP	Systems Applications products	SGPU	Strategic Geothermal Planning Unit
SDGs	Sustainable Development Goals		
SEZ	Special Economic Zones		

ACKNOWLEDGEMENTS

The Geothermal Development Company (GDC) acknowledges all the stakeholders who have supported the development of this strategic plan that outlines GDC's roadmap towards the achievement of its set mandate in the next five years.

GDC especially wishes to recognize the National Treasury, the Ministry of Energy, Japan International Cooperation Agency (JICA) and the World Bank for their contribution towards the development of this strategic plan. The strategic plan has referenced from National Geothermal Strategy (World Bank, 2017) GDC's 10 year Business plan (World Bank, 2017), the National Power Generation and Transmission Master Plan (2016), the Government of Kenya's Infrastructure Sector Medium Term Plan III (2018-2022), and the Baringo – Silali Field Development Master Plan Report (JICA) amongst others.

Finally, GDC appreciates the valuable contribution by its employees who participated in the development of this five year strategic plan.

FOREWORD

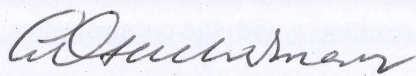
The Geothermal Development Company's (5) five year strategic plan provides the roadmap for the achievement of our mandate. This strategic plan is aligned to the Kenya's Vision 2030, the Government of Kenya's Infrastructure Sector Medium Term Plan III (2018-2022), the Government's Big Four Agenda whose pillars are; manufacturing, food security, affordable health care and housing. Inexpensive and reliable energy has been identified as a key enabler for the realisation of the Government's economic, social and political transformation agenda.

As detailed in GDC's 2018/19 – 2022/23 strategic plan, GDC will not only play a central role in the development of geothermal resources in Kenya, but will also take the lead in ensuring a reduction in the cost of power. This strategic plan details the road map towards the realization of the country's aspirations of an economy that is powered by affordable and environmentally benign, renewable geothermal energy.

This strategic plan focuses on realising high-level efficiency in resource utilization, direct uses of geothermal resources, innovative designs in expanding and strengthening new portfolios for income generation as well as expanding GDC's geothermal drilling operations. These broad areas of focus are crystallized under seven (7) strategic goals that together, position the company optimally to carry out its mandate.

We are cognizant of the diversity of stakeholders who are critical to the success of this strategy. We have conducted a stakeholder analysis through which we will be able to involve, engage and work more closely with all our key stakeholders to ensure the delivery of our strategic objectives.

I am confident that through this strategic plan, we will be able to expeditiously deliver on our corporate targets, meet our shareholders expectations and ensure that the country realises its mid-term and long-term energy goals.



Mr. Gershom O. Bw'Omanwa,
CHAIRMAN, GDC BOARD

PREFACE

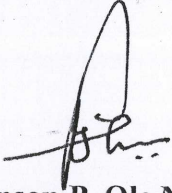
The Geothermal Development Company is a leading developer of green energy in Kenya from geothermal resources, and is playing a pivotal role in supporting the Government of Kenya meet its projected energy needs. The continued successful development of the geothermal sector will ensure that the country, through GDC, will be able to offer the Kenyan citizenry, affordable and reliable power.

In the course of the next five years, GDC aims to grow its revenue streams by not only commissioning Phase 1 of the Menengai Geothermal Project (105MW) but also through the full commercialization of the by-products of geothermal steam. This is over-and-above the revenues earned from the GDC-owned wells in the Olkaria Geothermal Field that currently contribute close to half of the total geothermal power produced in the country.

We believe that GDC will be able to make significant contribution to Kenya's economic transformation agenda, through the (7) seven strategic goals and associated activities outlined in this strategic plan. The cost of power will be impacted directly once the generation from the Independent Power Producers commences in the Menengai. Owing to the proximity of all our operation sites to key transit corridors such as the LAPPSET corridor that cuts through the Baringo – Silali Geothermal Prospect and the Suswa Inland Container Depot, we believe that our contribution to industrialization will be significant not only as a source of direct power and heat supply, but also by accomodating these industries in our operation sites.

GDC is keen to positively impact communities residing in its areas of operation in an environmentally sustainable manner. Through its Geothermal Centre of Excellence, and with support from its development partners, GDC will endeavour to build technical capacity in all aspects of geothermal resource development where its operations are domiciled. It is from this pool of trained geothermists that the company will then focus its recruitment drives. Moreover, to maximize on the knock-on effect to the community, GDC will establish the 'GDC Foundation', through which the company will be able to interact more closely with the communities and thereby be more proactive to their needs and requirements.

We are grateful to the Ministry of Energy, the National Treasury, all our development and business partners, host communities and our dedicated staff for their invaluable support and look forward to continued collaboration.

A handwritten signature in black ink, appearing to read 'J. P. Ole Nchoe', written in a cursive style.

Eng. Johnson P. Ole Nchoe
MANAGING DIRECTOR & CEO

EXECUTIVE SUMMARY

GDC is a state agency tasked with the development of geothermal resources in Kenya which will play a crucial role in enabling Kenya's Vision 2030 plan by developing geothermal power generation capacity.

Established in 2008, during the unbundling of the energy sector, GDC has since carved out its own unique identity of unlocking the potential of geothermal resources in the country. GDC is committed to: de-risking and developing geothermal resources; promoting direct uses; supporting private sector and early power generation using wellhead generating units. Being a 100% state-owned company, GDC has at its core integrity and professionalism as its values.

The recent commissioning of two power plants and several well head generation units producing a total of 320MW at the Olkaria Geothermal Project using GDC's steam, has resulted in the reduction of electricity to USD cents 7/kwh and overall 36% reduction in retail tariff to the consumer.

In 2017, the GDC MD & CEO, Eng. Johnson Ole Nchoe initiated the development of this strategic plan 2018/19-2022/23, *Lowering the Cost of Power in Kenya*. The plan is rooted on GDC's national mandate and informed by the need to enable the realization of the national *Big Four* agenda. This plan outlines what GDC must do to ensure continued development of the national geothermal resources.

The previous strategic plan covered the period 2013-2018 and contained strategic issues and objectives that have propelled GDC to its current status where it is not only a key player in geothermal development in the country but also considered as Kenya's long term solution to power supply.

The strategic plan 2018/19-2022/23 was developed after a review of achievements to date, assessment of the key risks, and evaluation of the organizational strengths, weaknesses, opportunities and threats. Consequently, PESTEL and SWOT analyses were used to identify key issues and develop strategies to mitigate and resolve the issues. The key strategic issues identified include:

- Timely delivery of projects to secure market success
- Efficient drilling of geothermal wells to lower the cost of power generation
- Development, motivation and engagement of human resources to achieve the goals
- Business continuity and continuous improvement of internal systems and processes to ensure operational efficiency and continuity
- Managing stakeholders and engaging shareholders to enhance their support of GDC goals
- Developing and sustaining revenue sources to support external financing

This strategic plan is built upon GDC’s progressive achievements and anchored on its mission to develop 1065MW from geothermal resources by year 2030. The plan drives seven key strategic goals for GDC as follows:

- Goal 1. Enhancing **Governance and Regulatory Compliance** to ensure achievement of goals
- Goal 2. **Human Resource Development and Management** to facilitate the organizational performance and optimization of human capital strategy towards achievement of goals
- Goal 3. **Steam Resource Development** to accelerate development of 485MW of geothermal steam and ensure effective management of geothermal resources
- Goal 4. **Drilling and Infrastructure** to facilitate infrastructure development and ensure efficient drilling of geothermal wells
- Goal 5. **Corporate Support Systems and Processes** to ensure efficient systems support and effective stakeholder management towards achievement of goals
- Goal 6. **Strategy, Research and Development** to ensure alignment to GDC strategic direction, enhance mobilization of capital and enhance stakeholder support towards achievement of goals
- Goal 7. **Financial Sustainability** to enhance financial prudence and maximize revenue for self-sustenance

During the planning period 2018/19-2022/23, GDC intends to maximise the use of its resources – personnel, equipment and finances to generate revenue while lowering the cost of power in Kenya. Following the completion of the steam supply geothermal project in Olkaria 320MW in 2014, this strategic plan provides the way forward in developing GDC’s current projects namely:

- 465MW Menengai Geothermal project by 2030
- 300MW Lake Baringo – Silali Geothermal Project by 2027
- 300MW Suswa Geothermal Project by 2030

In the course of the strategic plan period, GDC will fast track connection of 205MW of power to the grid by completing and commissioning Menengai Phase 1, Menengai Phase 2 and 3x10 wellhead generating units in Paka, Korosi and Menengai. The company will also develop infrastructure for all its geothermal projects and commence drilling in Lake Baringo – Silali and Suswa prospects. A total of 485MW of steam equivalent is planned by the end of the planning period. Additional 485MW of steam equivalent is planned for development by 2023. Approximately 139 additional geothermal wells will be drilled in the period.

GDC will deploy an average of 7 drilling rigs in the planned period to accelerate development of the geothermal projects. All GDC rigs will be used for drilling. Two hired rigs will be mobilised for two years to drill L. Baringo – Silali geothermal prospect from 2018.

GDC will continue to seek funds from the exchequer, development partners (loans & grants), steam sales revenue and energy sales revenue from wellhead generation units. The company has received commitments and pledges from several financiers totalling USD 619 million. Financing from and through the Government of Kenya will continue to be the main source of funding in the planned period. The long term objective is to diversify sources of financing to include; (i)

commercial loans, (ii) listing GDC at the Nairobi Securities Exchange(NSE), (iii) partnering with host communities to invest in power plants and (iv) the clean development mechanism. GDC expects to be self-sustaining by 2024.

The key corporate risks associated with the strategic plan have been identified and assessed at the gross level. In the planning period, these risks shall be monitored and appropriate mitigation measures considered.

The implementation of this Strategic Plan requires full involvement, effort and commitment from all stakeholders. The balanced scorecard system will be used to monitor and evaluate performance of the execution of this strategic plan. A comprehensive implementation plan that ensures GDC's communication, internal systems and other business processes aligned to the execution of the strategic plan will be undertaken.

The strategic plan is organised logically to inform of GDC's experience and strategies as follows; Chapters 1, 2, 3, 4 and 5 – GDC in Context. These sections outline GDC's overall fit in the energy sector, presents a summary of its achievements to date, current mandate, mission, vision, values, corporate objectives, and stakeholder expectations.

Chapters 6, 7 and 8 – Technical Operations and Way Forward. These describe GDC's progress to date and the plans for additional geothermal resource development. It describes GDC's focus for the next several years (up to 2030) including the staffing levels. It also describes the business models available to GDC.

Chapter 9 – GDC's financing Plan. This section describes the capital costs, operating costs, revenue projections and funding gaps. It also outlines the funding requirements and the sources of funding available to GDC.

Chapters 10 and 11 – Strategy Implementation and Risks. These sections describes the strategic goals and associated strategic initiatives and the implementation methods to be used to achieve the strategic goals. It also describes the risks that may hinder the implementation of the strategic plan and mitigation measures.

1. INTRODUCTION

1.1. Preamble

The Government of Kenya (GOK) has identified four key pillars of national development for the period 2018-2022. These are, affordable health care, affordable housing, manufacturing and food security. As such, energy has been cited as a critical enabler for the government to achieve the ‘Big Four’ agenda. Within the same period, Kenya’s installed electricity capacity is expected to increase from 2,275MW (2017) to 5,221MW (2022) under the vision scenario (Draft Medium Term Plan, 2018 – 2022) Table 1. A part of this projected growth has been attributed to geothermal energy that has been identified as the preferred least-cost and environmentally benign choice for new electricity generation (LCPDP Report, 2016).

Generation Mix	2017	2018	2019	2020	2021	2022
Hydro	824	852	872	896	898	917
Geothermal	652	662	1,019	1,149	1,149	1,565
Wind	26	336	336	436	606	826
Biomass	28	42	77	105	105	185
Solar	0	62	112	202	402	442
Thermal	745	745	745	689	634	560
Coal	0	0	0	0	0	328
Import	0	0	400	400	400	400
Total MW (excluding off grid)	2,275	2,699	3,561	3,876	4,192	5,221
Peak Demand MW	1,860	1996	2,558	2880	3107	3348
Reserve (MW)	471	438	1,046	1,031	989	1,614
Reserve (%)	26%	19%	42%	36%	31%	45%

Table 1:2018-2022 generation capacity expansion programme (Medium Term Plan – 2018 – 2022).

In 2008, the Government of Kenya (GoK) through the Ministry of Energy (MoE) established the Geothermal Development Company (GDC), a state-owned entity, with a key mandate to fast track the development of the country’s geothermal resources for power generation. Since its inception, GDC has recorded several major achievements;

- 2009 – 2010: GDC drilled 59 wells in Olkaria I and IV. The wells have a capacity of 412MWe and a total output of 320MW which is connected to the grid.
- 2011 – 2017: GDC successfully conducted surface exploration studies and exploration drilling in the Menengai geothermal field realizing a total capacity of 169MWe from 42 geothermal wells (as at March 2018). GDC also successfully contracted three Independent Power Producers (IPP’s) to separately finance, construct and operate three 35MW power plants in the Menengai Caldera.

- 2016 – 2018: GDC commenced the development of the ‘Lake Baringo – Silali’ geothermal prospect. In these fields, the company has conducted detailed surface exploration studies and developed a robust infrastructural system to support the envisaged drilling programme. GDC has been able to undertake these projects, because of the immense goodwill it has received from the Government of Kenya (GoK) and development partners in form of budgetary allocation and concessional loans respectively, as well as the requisite goodwill from the host communities to operate in their lands.

1.2. Purpose and background

In the recent past, the geothermal sector has experienced dynamic growth resulting in the need to develop a National Geothermal Roadmap. The key drivers for this roadmap have been;

- Enhanced interest by the private sector in participating in geothermal development,
- The need for geothermal sub-sector planning and coordination,
- Multiplicity of roles between government institutions.

GoK with the support from the World Bank (WB) has since developed a National Geothermal Strategy that proposes various modes of commercializing geothermal fields in Kenya. In addition, GDC has also received technical assistance from JICA to come up with a field development plan for Lake Baringo – Silali geothermal prospects.

The purpose of this Strategic Plan is therefore fourfold as it intends to;

- Set out the overall corporate goals and objectives for GDC for the next 5 years,
- Develop an implementation plan for the achievement of the company’s corporate goals and objectives,
- Align the corporate goals and objectives with those outlined in the broader National Geothermal Strategy,
- Outline the mechanism and measures for monitoring and evaluating GDC’s progress in achieving the set goals.

1.3. Geothermal Resource Development Status

The electricity generation capacity in Kenya expanded by 32% between 2013 and 2017 from 1,768MW to 2,333MW (including offgrid) respectively. This excludes 120MW that was curtailed within the same period for emergency power. Of this, 400MW is attributed directly to the geothermal resource making geothermal energy the key growth element in Kenya’s energy mix which is currently dominated by hydropower, geothermal power and diesel thermal power generators. Hydropower and geothermal contribute 35.2% and 27.9%, respectively while diesel thermal plants constitute 33.2% of the existing effective capacity as indicated on Table 2 below.

Source	Mar 2013		April 2017		
	Installed MW	Effective MW	Installed MW	Effective MW	% (Effective)
Hydro	816.2	766.9	823.73	797.52	35.4
Geothermal	251.4	244.9	652.00	644.00	28.6
Thermal (MSD)	466	447.5	716.32	690.12	30.6
Temporary Thermal –grid	120.0 ¹	120.0	0.00	0.00	0.0
Thermal (GT)	60.0	27.0	60.00	55.00	2.4
Wind	5.1	5.1	25.50	25.50	1.1
Biomass	26	22	28.00	23.50	1.0
Interconnected System	1,745	1,633	2,306	2,236	99.2
Off grid thermal	22.1	18.7	26.33	17.87	0.8
Off grid wind	0.55	0.20	0.55	0.02	0.0
Off grid solar	0.22	0.50	0.64	0.51	0.0
Imports	0.00	0.00	0.00	0	0.0
Total Capacity MW	1,768	1,652	2,333	2,254	100.0

Table 2: Increase in installed generation capacity between 2013 and 2017 (Medium Term Plan – 2018 – 2022).

Geothermal development in Kenya has consistently registered tremendous growth in the last five (5) years. A total of 127 wells were drilled countrywide with a combined output of 739 MWe of steam in both the Olkaria and Menengai geothermal fields. The Menengai Phase 1 geothermal project accounts for 165MWe of this total. To further expedite geothermal developmental activities in the country, GoK, through GDC and KenGen, has acquired a total of 10 deep drilling rigs (GDC owns seven out of the ten) with an aim of increasing the capacity for exploration and production drilling.

1.4. Developing the Strategic Plan

The process of preparing this strategic plan adopted both participatory and collaborative approaches. The process began by reviewing GDC’s previous strategic and business plans in order to determine levels of achievement of the strategic objectives contained therein and the constraints (if any) in the implementation of the strategies. Most important was identifying the lessons learnt during the implementation of the objectives of the previous strategic plan. The 2018/19 – 2022/23 corporate strategy therefore incorporates the findings of this review of strategic goals and objectives in the mapping out of GDC’s new strategic direction.

Further, a situation analysis was conducted in the form of a SWOT and PESTEL analysis. These tools were critical in identifying both the internal and external factors that are either favourable or unfavourable to achieving the company’s set strategic goals and objectives. An analysis of the risks associated with the identified strengths and opportunities. This was augmented with a

separately conducted corporate-wide risk survey. This risk-survey was conducted by KPMG. A financing plan that is based on an internally generated financial model, the financial plan for the strategy was developed along with the company's five-year staffing programme. Finally, an implementation programme was developed, which is meant to facilitate not only in the deployment of the strategy within the company, but also to give guidelines on the communication of the strategy to staff as well as the monitoring and evaluation processes that will ensue, soon after deployment.

2. KENYA ENERGY SECTOR INSTITUTIONAL FRAMEWORK OVERVIEW

Since the mid-1990's, reforms in the energy sector have been undertaken to increase efficiency and reliability of electricity generation, supply and distribution. These reforms and operational modifications culminated in the enactment of the Energy Act of 2006 which saw the transformation of the sector from a vertically integrated monopoly, to a liberalized sector with multiple players, each of which plays a key role in the delivery of quality electricity to the end consumer.

2.1. Vision 2030

Vision 2030 is the country's development blueprint that covers the period between 2008 and 2030. It aims to transform Kenya into a newly industrialising country through an economic development programme that will result in an average Gross Domestic Product of 10% per annum. Energy is a key enabler of economic growth and geothermal energy has been cited as not only being a critical component of Kenya's energy mix moving forward, but also the preferred least-cost and environmentally safe choice for new electricity generation.

The blueprint forecasts future growth in electricity demand. This demand is quantified in the Least Cost Power Development Plan (LCPDP, 2016), which puts forth three growth scenarios;

- Reference Scenario: Probable development of increase of electricity demand based on the historical development,
- Vision Scenario: Increase in electricity demand assuming all flagship projects were implemented successfully and 100% connectivity achieved by 2020,
- Low Scenario: More conservative projection of the increase in demand for electricity relative to the reference and vision scenario.

Under the Vision scenario, which is the scenario that GoK has adapted as the template for energy production, the electricity demand is expected to increase by an average of 12% annually. Consequently, geothermal energy will contribute approximately 3,580MW by 2035 under the LCPDP projections Figure 1.

2.2. Economic Transformation Agenda 'The Big Four'

The Government's 2018-2022 development plan dubbed as economic transformation agenda is focused on strengthening the economy of Kenya and laying a solid foundation for industrialization as envisaged in the Vision 2030 blueprint.

This economic agenda aims to accelerate industrialization by addressing the bottlenecks that continue to hold the economy from achieving its full potential. The targets for this agenda are;

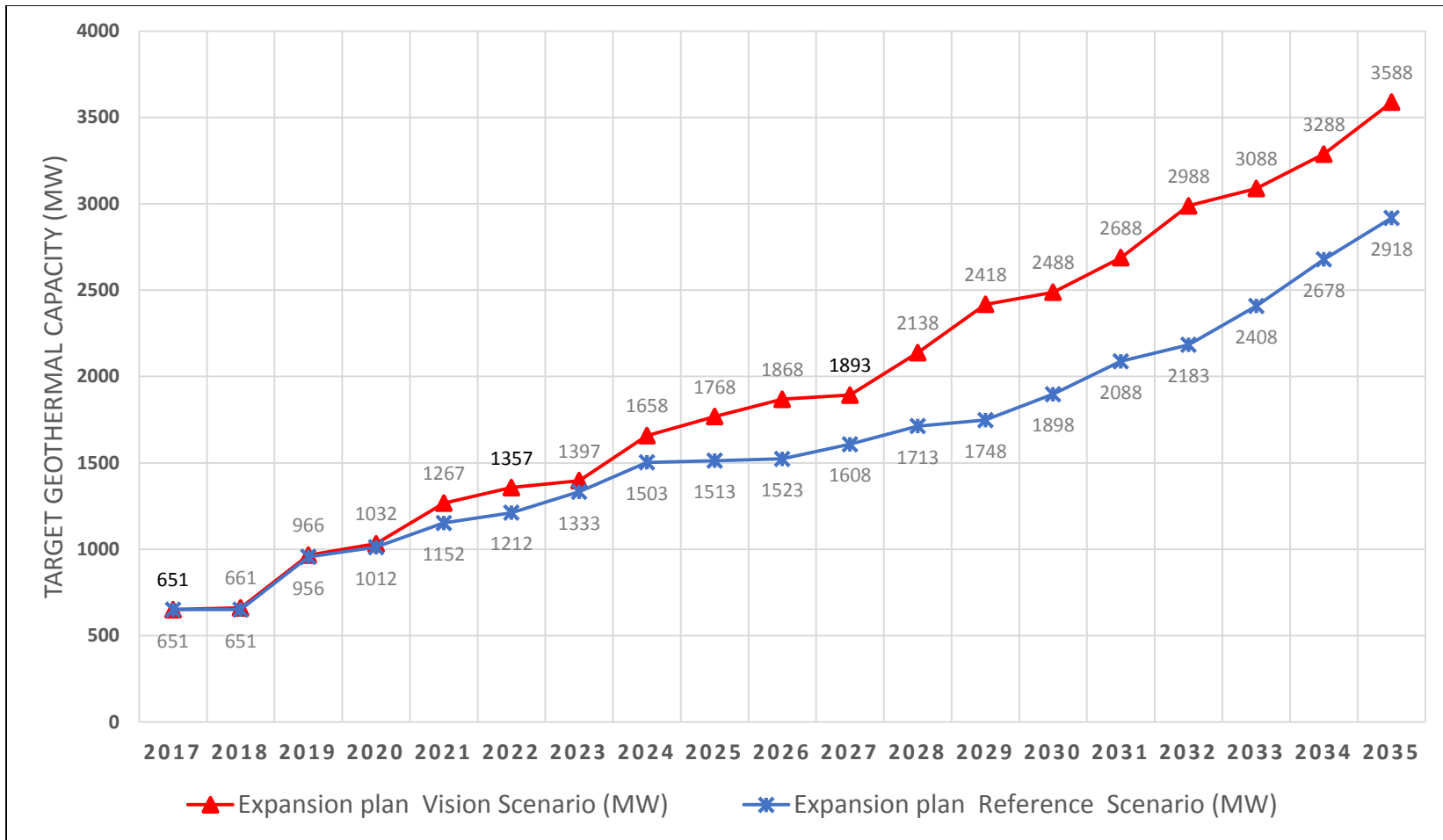


Figure 1: Growth projections of geothermal power under the Vision Scenario and the Reference Scenario from 2017 to 2035.

- i. Support value addition and raise the manufacturing sector's share to GDP to 15% by 2022,
- ii. Focus on initiatives that guarantee food security and nutrition to all Kenyans by 2022 through expansion of food production and supply, reduction of food prices to ensure affordability and support value addition in the food processing value chain,
- iii. Provide Universal Health Coverage thereby guaranteeing quality and affordable healthcare to all Kenyans,
- iv. Provide at least five hundred thousand (500,000) affordable new houses to Kenyans by 2022, and thereby improve the living conditions for Kenyans.

Energy has been identified as an enabler to achieve “The Big Four” agenda. Towards this end, GDC will in the course of this strategic plan, significantly contribute to the realization of this plan principally with focus on the manufacturing and food security agenda.

a) Manufacturing sector.

GDC will support the growth of manufacturing sector by attracting private sector investment through engagement of private developers to fast track generation of affordable electricity. Geothermal power is critical to the country's generation mix. It has a low feed-in-tariff of \$0.088/kwh and is the most reliable renewable energy source. Enhanced geothermal development activities will lead to lower electricity tariffs for consumers and increased productivity hence economic growth.

For the ‘Big Four’ agenda to succeed, it is necessary to provide subsidized power to bulk users in the planned industrial parks. Industrial parks have been determined through various studies as the most effective catalysts for enhancing the outputs within the manufacturing sector. In the region, Ethiopia has made significant strides in the manufacturing sector through the industrial parks that are located in the country's six industrial zones. GDC will support the manufacturing sector by not only supplying subsidized power to the bulk energy consumers but also in setting up industrial parks in its key installations in the Menengai Geothermal field.

An addition advantage is that all of GDC's operation areas are located close to major evacuation routes. The LAPPSET corridor cuts through the Lake Baringo – Silali geothermal prospect area south of the Paka Volcano, while the Standard Gauge Railways' inland container depot (ICD) is located at the foot of the Suswa Volcano. These evacuation routes will become critical for the manufacturing sector with regard to the distribution of processed commodities. A detailed description of GDC's contribution to the manufacturing sector is contained in Chapter 10 – Strategic Goals and Objectives.

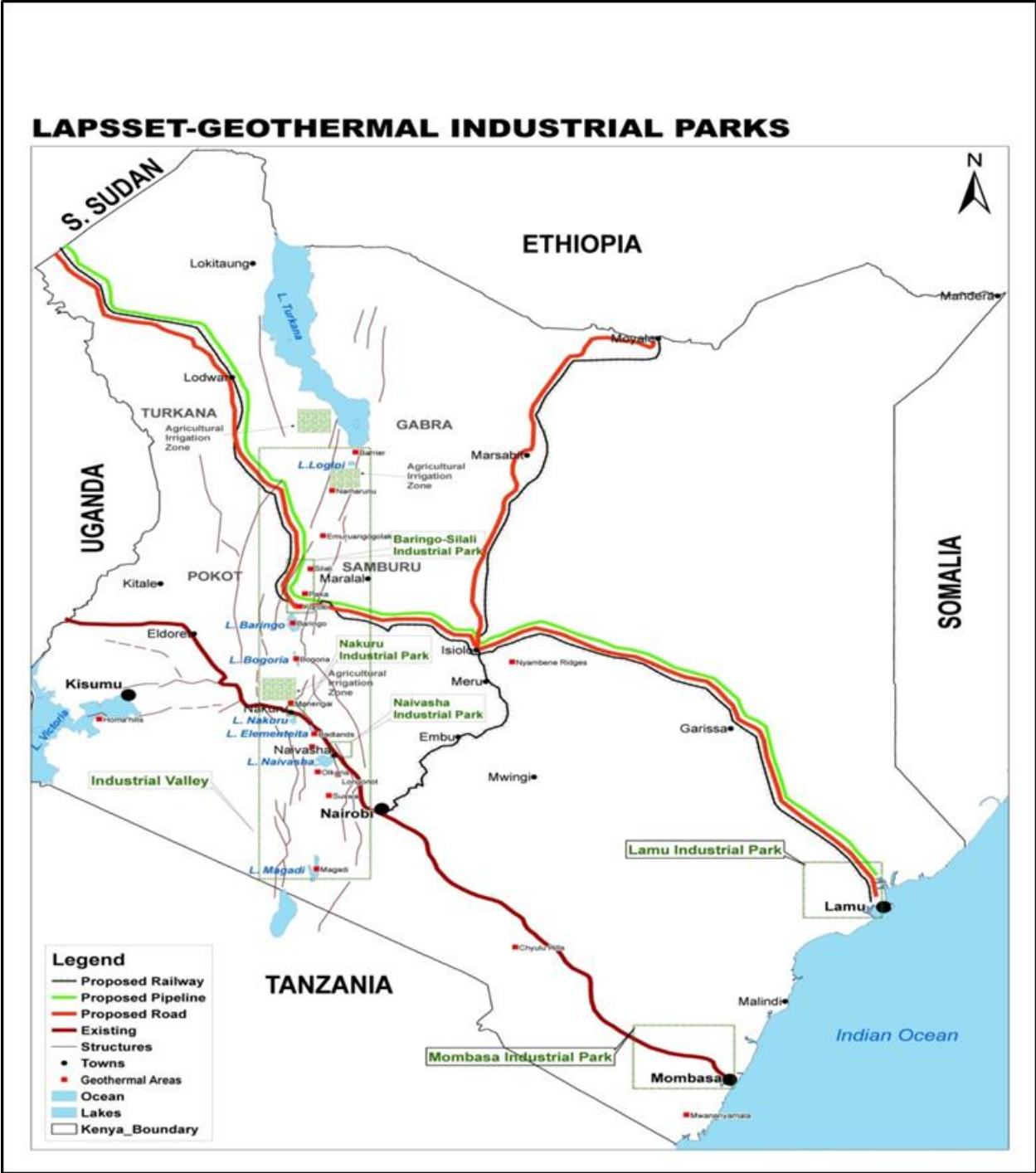


Figure 2: Proposed Geothermal powered industrial parks along LAPPSET corridor.

b) Food Security

Traditionally, geothermal energy has been used predominantly for electricity production. However, the low energy steam component can also benefit the agricultural sector. GDC has in the past successfully piloted different projects that showcase the direct utility of low energy steam. These include; textiles (laundry mart), milk pasteurization, aqua-culture and horticulture. Other areas that low temperature steam can be directly utilized include, balneology (recreational use), soil sterilization, grain drying, gold mining amongst others. In the life of this strategic plan, GDC, in partnership with the private sector shall roll-out on a commercial basis some of these applications as highlighted in Chapter 10 – Strategic Goals and Objectives.

2.3. Legal and Regulatory Framework

The Legal and Regulatory framework that applies to the energy sector comprises rules, regulations and policies meant to accelerate the exploration, development and production of various sources of energy. They are developed by the Ministry of Energy and enforced by Energy Regulatory Commission. The legal and regulatory frameworks specific to geothermal development in Kenya include: the Geothermal Resources Act, Energy Act 2006 and other laws that include the National Environmental Management and Coordination Act, 1999; The Water Act, 2002; The Physical Planning Act, 1999; Penal Code; Cap 69; Wildlife (Conservation & Management) Act; Cap 376 and the Forest Act, 2005; Public Procurement and Disposal Act, 2005; Employment Act, 2007; The Electric Power (Electrical Installation Work) Rules, 2006; The Electric Power (Complaints and Disputes Resolution) Rules, 2006; Investment Promotion Act of 2004; The Foreign Investment Protection Act, Land Act 2012; The Standards Act, Land Registration Act 2012; National Land Commission Act 2012; County Governments Act, 2012; and The Public Financial Management Act, 2012.

Energy Bill, 2017

Kenya's Energy Policy is in the process of being updated to align the energy sector operations with the Constitution promulgated in 2010 and to clarify the much-needed further reforms in the sector. Areas of clarity for GDC include the guidance on the supply of the power to bulk energy consumers. This will be a shift from the current where the generation and transmission functions are exclusively conducted by separate government entities. In addition, the bill once enacted will shed light on revenue sharing processes and procedures that are currently unclear or not enforceable by law. GDC will continue to monitor and once enshrined in law, move forward as guided legislative initiatives at the county level that pertain to geothermal activities.

2.4. Kenya Energy Sector Overview

Ministry of Energy (MoE) is responsible for electrical energy policy formulation and development as well as planning and sequencing of power development projects to ensure that there is quality and affordable energy for national development. The ministry sets the strategic direction for the growth of the sector, and provides a long-term vision for all sector players.

Energy Regulatory Commission (ERC) is responsible for regulation of the energy sector. The key functions include tariff setting and oversight, coordination of the development of indicative energy plans, monitoring and enforcement of sector regulations. ERC was established as a single sector regulator.

Geothermal Development Company (GDC) is a fully government-owned entity with the mandate to accelerate holistic geothermal development in the country by reducing the upfront exploration risks, undertaking the initial geothermal resource assessment in prospective areas, developing and managing of proven steam fields and the managing the sale of steam to independent power producers (IPPs).

Energy Tribunal (ET) is an independent legal entity that was set up to arbitrate disputes in the sector.

Rural Electrification Authority (REA) is mandated to increase the pace of rural electrification based on the developed rural electrification master plan. REA's current focus is to supply electricity to all public primary schools in the country as a necessary infrastructure for the implementation of the school digital learning programme. This has been implemented through grid extension and installation of solar PVs in areas away from the existing grid network.

Kenya Electricity Generating Company (KenGen) is an electric generation company in Kenya. KenGen generates electricity from numerous sources including hydro, geothermal, thermal and wind. The company is listed on the Nairobi Stock Exchange though GoK still holds 70% of the shares.

Kenya Power (formerly Kenya Power and Lighting Company) is currently the only electricity off-taker in the power market. The company's mandate is to purchase bulk electricity from generators, transmit, distribute and retail electricity to end-use customers throughout the country. The company is listed on the Nairobi Stock Exchange, with the Government of Kenya holding 50.1% of the company's shares and private shareholders holding 49.9%.

Kenya Electricity Transmission Company (KETRACO) key mandate is to plan, design, construct, own, operate, and maintain new high-voltage (132kV and above) electricity transmission infrastructure that will form the backbone of the National Transmission Grid and facilitate the development of regional power interconnections.

Kenya Nuclear Electricity Board (KNEB) is charged with the responsibility of developing a comprehensive legal and regulatory framework for nuclear energy use in Kenya.

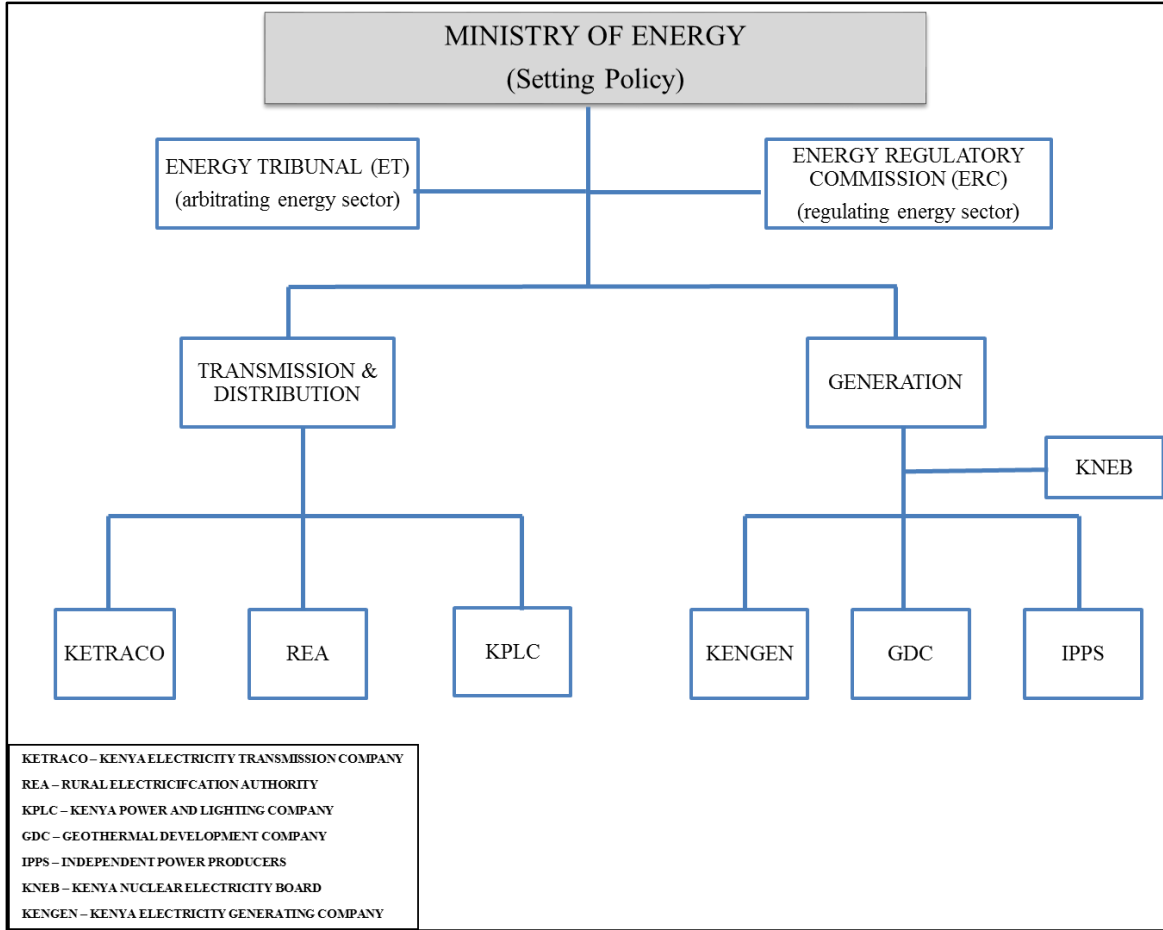


Figure 3: Kenya electricity sub-sector structure (Ministry of Energy – 2018)

3. GDC'S MISSION, VISION AND VALUES

3.1. GDC's Mandate

GDC's mandate as captured in the Sessional Paper No. 4 of 2004 includes;

- i. Removing upfront risks and reducing costs through infrastructural development, exploration works and production drilling
- ii. Promoting direct uses of geothermal resources
- iii. Developing human capacity for geothermal development,
- iv. Supporting GoK in fund mobilization.
- v. Supporting private sector entry and sell steam to power producers.
- vi. Early power generation through installation of well head generating units.

GDC has a clear mandate and succinctly stated vision and mission statements that are meant to guide the implementation of its strategic objectives.

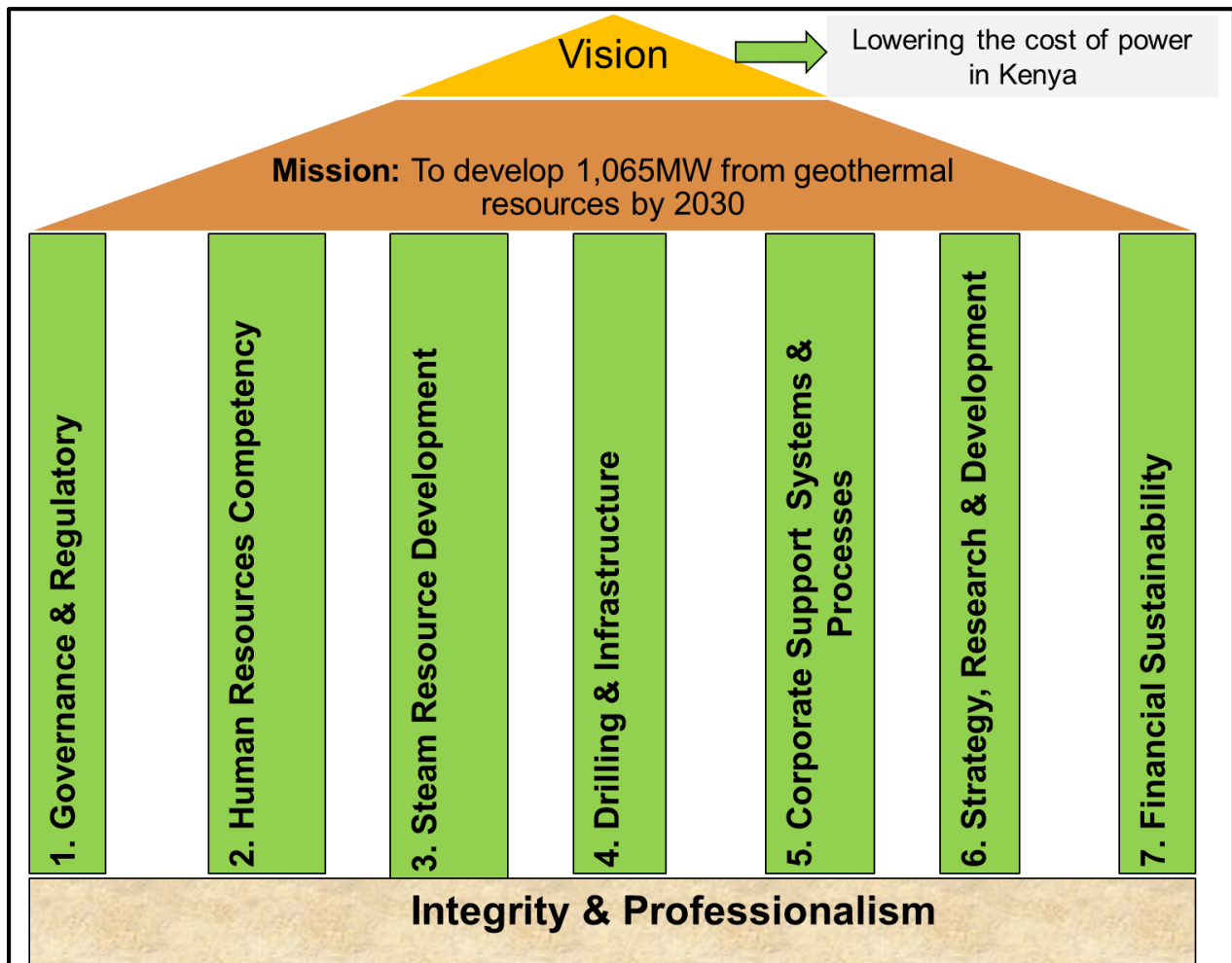


Figure 4: GDC's Vision and Mission statements and accompanying Strategic Goals and Core Values.

3.2. Vision

Lowering the cost of power in Kenya.

3.3. Mission

To develop 1065MW from geothermal resources by 2030.

3.4. Corporate Philosophy

Green Energy for Kenya.

3.5. Core Values

To accomplish and realize the above Mission and Vision, GDC shall embrace the following Core Values:

- Integrity
- Professionalism

Integrity

GDC places integrity at the core of all its activities. Our staff and customers will be required to observe the highest standards of moral and ethical values. To this effect, the following shall be expected of all employees, business partners and stakeholders: honesty, reliability, consistency, trustworthiness, accountability and diligence in all undertakings within the workplace.

Professionalism

At GDC, we consider professionalism to be a key strength in our pursuit of excellence in geothermal development. We will strive to ensure all our staff are reliable and competent as outlined in the GDC Human Resource Policies and Procedures.

3.6. Corporate Motto

GDC One Team; One Team GDC.

4. REVIEW OF THE 2013 – 2018 STRATEGIC PLAN

4.1. Key GDC Activities

GDC's operational focus can be broadly divided into the following four areas;

- De-risking of geothermal development through; Exploration and Resource Assessment; Discovery and Appraisal Drilling; Development / Production Drilling; and Steamfield / Reservoir Management. Through this approach the risks for private investors will be reduced and overall investments in geothermal energy is expected to increase.
- Steam Sales- GDC's main revenue-generating activity will be the sale of steam to the operators of power plants. GDC's responsibility will be steam delivery, reinjection, and steam field management. GDC will serve as field operator and transmit steam to the power plant operator (either KenGen or an IPP). KPLC will be the off-taker, paying both the plant operator and GDC on the basis of net generation.
- Direct Use/Holistic Development of Geothermal- GDC is actively seeking partnership with energy users "beyond the grid," including industrial power consumers and aggregated communities. Currently, GDC is piloting four direct use projects in Menengai Field. The projects include: geothermal heated aqua ponds, geothermal heated greenhouse, milk pasteurization and geothermal heated Laundromat.
- Consultancy Services and Capacity Building- These initiatives are designed to increase GDC's capabilities in the geothermal market by: developing laboratories for its own use and for other geothermal developers, offering consultancy services on geo-scientific studies, specialized drilling services and integrated project management. GDC has established the Geothermal Centre of Excellence to provide training on geothermal matters to staff from Kenya and the East African region.

4.2. Extent of Implementation of Strategic Plan and Constraints

The previous strategic plan covered the period 2013-2018 and contained strategic issues and objectives that have propelled the company to its current status where GDC is not only a key player in geothermal development in the country but is also considered by majority of the development partners as Kenya's long term solution to power supply. The strategic objectives in the previous strategic plan were;

a) Mobilization of capital and unlocking the potential of assets to maximize revenue for self-sustenance.

This objective was aimed at;

- i. Aggressively and proactively pursuing funds from GoK
- ii. Sustained fundraising activities
- iii. Maximizing revenue generation
- iv. Diversifying sources of funding.
- v. Prudent financial management
- vi. Continuously implement cost efficiency measures

In the period 2013-2017, GDC received budgetary support from GoK and steam sales totaling to Ksh. 23.25 billion. Under the same period, GDC received a total of Ksh. 9.81 billion from the following development partners; AfDB, AFD, EIB, World Bank, GRMF and Kfw. In addition, grants and technical assistance support were received from the following development partners; JICA, USTDA, USAID and PPIAF.

To optimize revenue generation, GDC entered into steam sales agreement with Kengen for the supply of steam from its 59 geothermal wells in Olkaria. The revenue arising from this agreement amounts to approximately Ksh. 3 billion annually. Moreover, GDC signed Project Implementation and Steam Supply Agreements (PISSA) with three (3) Independent Power Producers (IPPs) for the development of three (3) 35MW power plants in the Menengai geothermal field. Upon completion, revenue will be generated from these power plants.

With regard to diversifying the sources of revenue, GDC set-up a direct use demonstration centre at Menengai aimed at attracting investors interested in utilizing low enthalpy steam for industrial applications. In addition, GDC also established a consultancy wing within the Strategy Research and Innovation Division to offer geothermal consultancy services within the region as well as the Geothermal Training Institute that is intended to offer geothermal development training courses from its headquarters in Naivasha to both local and international student participants.

Through the support of the World Bank (Public/Private Infrastructure Advisory Facility (PPIAF)), a financial appraisal of the GDC financial management systems was undertaken. This enabled GDC to develop a finance policy and procedures manual that, to date, outlines GDC's preferred corporate standards for prudent financial management.

b) Acceleration of steam development through efficient system management

This objective was geared towards;

- i. Proactive management of operational risks and losses
- ii. Utilization of management tools that are at GDC's disposal to identify areas of weakness as well as utilizing the human resources available to develop solutions
- iii. Effectively managing key internal business processes

To address corporate risks and potential losses, GDC put in place a Risk Management Policy and a Project Management Framework to streamline operational processes and procedures. In addition, GDC set up a fully-fledged department charged with equipment maintenance. This department ensures our key assets (drilling rigs) are properly maintained and are operating at optimum capacity.

Moreover, to effectively manage internal business processes, GDC instituted a performance appraisal mechanism based on the balanced score card to cascade responsibilities to all staff and measure their performance. This mechanism also identifies areas of weakness through a staff appraisal process.

GDC is also ISO 9001:2008 certified. This certification is the ultimate global benchmark for quality management and is critical for boosting the company's profitability, market value and potential. The company is currently in the process of upgrading this certification to ISO 9001:2015

to further improve on staff service and performance, streamline efficiency within the corporation and enhance cost containment measures as well as other internal business processes put in place by management.

In addition, to accelerating the development of steam, GDC within the period covered by the last strategic plan implemented several initiatives that include: constituting Project Implementation Teams (PIT) for each of GDC geothermal fields (Menengai, Baringo-Silali and Suswa), contracting specialized drilling services to fast track its drilling operations (such as top-holing, directional drilling services), and out-sourcing of man-power. GDC also procured consultancy services for drilling operations management and supervision and transaction advisory services to effectively manage operational risks and capacity building. GDC has also continuously updated its geothermal reservoir model as drilling progresses and procured consultancy services to undertake feasibility studies at Menengai geothermal field. Table 3 below illustrates the drilling status of the previous strategic plan.

FINANCIAL YEAR	2009	2010	2011	2012	2013-2018						2018
	- 2010	- 2011	- 2012	- 2013	2013 2014	2014 2015	2015 2016	2016 2017	2017 2018	- 2019	
Rigs	2	5	7	6	8	12	12	12	12	11	
Target Wells Per Year	18	35	35	33	40	60	60	60	60	55	
<i>Cumulative Wells (2013-2018)</i>					40	100	160	220	280		
<i>Actual Wells (2013-2018)</i>			6	6	8	7	7	6	2		
<i>Actual Wells (2013-2018)- Cumulative</i>			6	12	20	27	34	40	42		
Wells/Rig/Year	9	7	5	5.5	5	5	5	5	5	5	
Target MWe	0	0	100	140	240	100	100	300	200	100	
<i>Target Cumulative MWe (2013-2018)</i>					240	340	440	740	940		
<i>Actual MWe(2013-2018)- Cumulative</i>			18	50	70	134.6	136.9	157.8	164.7		

Table 3: Comparison of previous Strategic Plan and actual achievement (Modified from GDC Business plan 2013-2023)

c) Enhance Working Relationship with Shareholders and Stakeholders for Effective Stakeholder Management

The objective was geared towards;

- i. Sustainable Stakeholder Management
- ii. Enhancing Customer Service delivery
- iii. Creating and sustaining strategic partnerships

The previous strategic plan recognized the role of its stakeholders in the development of geothermal energy and put in place a number of initiatives aimed at stakeholder management. Among these initiatives were; timely project progress reports to our key stakeholders and development partners, project site tours, educational seminars and symposiums and participation in national trade fairs.

Furthermore, to build stakeholder confidence during the last strategy period, GDC undertook the following activities; regular provision of project briefs to the relevant stakeholders, facilitation of donor coordination meetings, development of stakeholder engagement policies, participation in key stakeholder engagements and meetings (Kenya Vision 2030, LCPDP, FiT, MoE), and participation in formation of relevant legislation and policies e.g. Geothermal Greenfields Policy, Policy on Provision of Government Support Measures for Infrastructure Projects Development and the Energy Bill 2017.

d) Human Resource Management

In order to achieve its objectives in the previous strategic plan, GDC committed to enhance and retain topnotch professional human resources. To this end, GDC set-up a training calendar, that was supported by different development partners, for all of its staff members. The training was majorly skewed towards the enhancement of the GDC staff's technical competence in the geosciences and drilling technology. GDC also put in place effective appraisal and motivational workforce management approaches, reviewed and implemented the HRPP policy, allowed for the recognition of the staff Union (KETAWU), reviewed the organizational structure and career progression guidelines.

Group/ Category	PhD	Masters	Degree	Diploma	Certificate	Government Trade Test	Driving License	Certified Public Accountant (Kenya)	Kenya Certificate of Secondary Education
Field/Technical	2	19	85	182	91	20	9	--	103
Support	1	42	180	125	32	9	30	8	16
Managers	1	22	13	2	--	--	--	--	--
Total	4	83	282	289	122	29	34	8	119

Table 4: Table summarizing professional competence in the company (GDC Human Resource & Administration Division)

4.3. Emerging Issues

During the period covered by the last strategic plan, the following emerging issues were noted and documented;

- The preference by GoK for Public Private Partnerships (PPP) as a financing option for geothermal projects which implies the need to review the business models deployed by GDC for geothermal development.
- Increased awareness on safety, health and environmental and also requirement to comply with statutory directions during project implementation and operation that could impact project delivery timelines.
- Long lead times for development partners to conclude financing discussions
- Development of alternate sources of energy including fossil fuel and other renewables. Power produced from liquefied natural gas (LNG) could be more competitive than geothermal steam.
- Community related issues have necessitated the redesign of project components. For instance, there has been need to incorporate supply of water to communities around areas earmarked for drilling.
- The multi-layered nature of project approval system in the Kenya owing to the existence of county governments. This process now has a time-component that must be factored in during project planning
- Shifts in Government strategies and policies. The Energy Bill (2017), the National Geothermal Strategy, the 5000+MW in 40-months program and the draft Geothermal Greenfields policy, which have different and sometimes conflicting implications for GDC, have all been proposed in the last five years.

4.4. Challenges, Mitigation and Lessons Learned

The implementation of the previous plan experienced a number of challenges. Several internal and external challenges were identified and are highlighted below:

4.4.1. Internal Challenges

Some of the internal challenges encountered include:

- The financing for the previous Strategic Plan was premised on expected disbursements from GoK and key development partners. This mobilization of funds was however not fully realized.
- Geothermal resource assessment – risks on well siting, limited internal technical capacity in reservoir numerical modeling and reservoir management.
- Drilling operation – difficult geological formation which resulted in slow pace of drilling.
- Human resource – inadequate qualified technical personnel (reservoir experts), necessitated the re-training of personnel and outsourcing of some services such as top-holing. The overall effect was a delay in project delivery and increase of project costs.

- Ineffective Monitoring and Evaluation (M&E) System - this led to a diminished project control mechanism and consequently a reduced capacity to provide progress information promptly as well as put in place remedial measures when required. A project management department has since been established to ensure effective project monitoring and control.
- The strategic plan was not effectively communicated to staff. This meant that the strategic plan did not benefit from the input of staff neither did it get the requisite acceptance or act as a reference point to business implementation as envisaged.

4.4.2. External Challenges

Some of the external challenges encountered included:

- Government approval/decision making processes delayed the speed with which initiatives could be implemented despite having a proper plan of activities.
- Delayed disbursement from the exchequer impaired project implementation
- Long lead times of negotiations with development partners also impaired project implementation
- Losses due to fluctuations in currency exchange rates and price hikes in commodity prices rendered some key projects to delay.

5. SITUATIONAL ANALYSIS

5.1. PESTEL ANALYSIS

For the purposes of this strategic plan, the PESTEL framework was used to analyze the external environment that impacts the operations of the organization and related strategic objectives. The PESTEL covers the Political, Economic, Social, Technological, Environmental, and Legal factors as shown in Table 5 below.

Political Factors	<ul style="list-style-type: none"> • Political stability and vibrant democratic space. • Political goodwill exists which enhances the deliverability of projects. • Devolution of Government to the county level requires that the company considers the counties as a key stakeholder in project implementation. • International agreements such as the Regional Power Pool could reduce the competitiveness of geothermal power. • Regional integration will increase the demand for power.
Economic Factors	<ul style="list-style-type: none"> • Reduced budgetary allocation due to competing government priorities. • Changes in tax policies & administration have an impact on project costs. • High rate of inflation will lead to increased project costs. • High cost of land will lead to higher capital costs for future projects. • Fluctuations in exchange rate may affect the committed funding amounts leading to challenges in funding projects according to the planned programmes.
Social Factors	<ul style="list-style-type: none"> • Requirement to factor special interest groups in the procurement process could affect project deliverability • Social expectations of the community may determine acceptance or resistance of the project. • Company staff and local community interactions may lead to positive outcome for the company or bring about conflicts. • New lifestyle changes due to increased economic activity around the project area. • Limited skills/knowledge on geothermal development in the areas of operation could reduce project acceptance.
	<ul style="list-style-type: none"> • Advances in technology could result in other sources of energy becoming cheaper than geothermal sources.

Technological Factors	<ul style="list-style-type: none"> • Advances in technology could lead to improved efficiency in steam generation and conversion to power that could result in lower cost of power. • Highly automated processes risk becoming targets for cyber-attack. • Availability of wellhead power plants in the market may lead to competition from other geothermal developers. • Installation of wellhead power plants for early generation of power and long-term well testing. • New innovations in the field of direct use could impact the supply of geothermal steam for power generation. • The high cost ICT software and hardware which requires frequent updates could increase the cost of doing business • Advances in technology will necessitate the re-training and re-tooling of personnel.
Environmental Factors	<ul style="list-style-type: none"> • Changes in weather patterns may adversely affect operations. • The Lobbyists/Pressure Groups demanding compliance on social & environmental requirements. • Re-classification of geothermal prospect sites as protected areas may delay project implementation
Legislation Factors	<ul style="list-style-type: none"> • Decision to adopt the Energy Auction system and PPP mode of engagement will result in greater reduction of the tariff cost and higher private sector participation, which will result in faster development of geothermal resources. • The Energy Bill (2017) currently in parliament will allow for power generation to segregated power consumers. • The legal rights of stakeholders in regard to use of land for energy resources which are specified in the Energy Bill (2017) could have an impact in GDC operations. • National and International laws on environmental protection will have to be adhere to. <p>Government law and policy changes</p>

Table 5: PESTEL Analysis

5.2. SWOT Analysis

The achievement of strategic objectives will largely depend on how GDC enhances its internal strengths, exploits the existing opportunities, and manages the weaknesses in its operations, while mitigating against those factors that pose a threat to the achievement of its planned programs and

activities. In developing this strategic plan, the company conducted an extensive situation analysis of its Strengths, Weaknesses, Opportunities and Threats, focusing on the stakeholders, the geothermal resource, corporate governance, human resource management, company assets, the company's financial resources, consultancy capacity and scientific data.

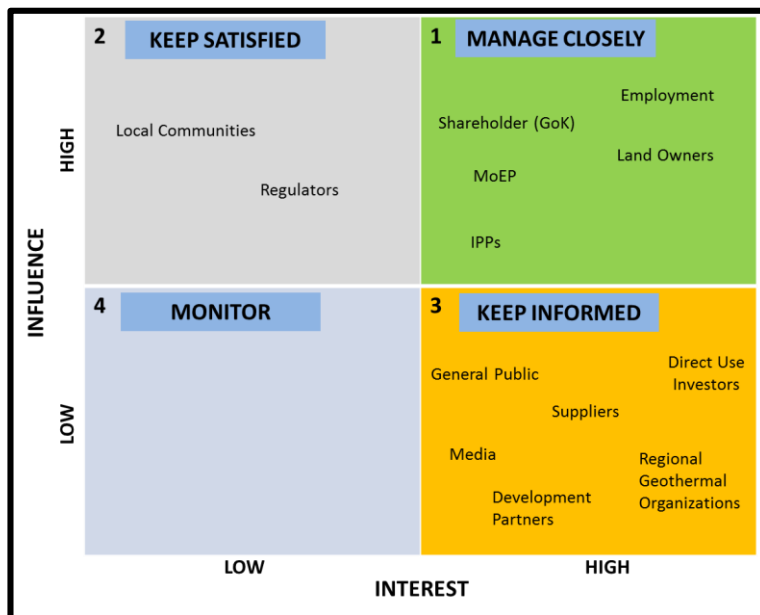
Strengths	<ul style="list-style-type: none"> • High potential geothermal resources • Established organisational structure • Robust Internal Policies & Procedures • Established Systems – QMS, EMS & SAP • Well trained and highly skilled workforce • Low staff turnover • Relatively new equipment including drilling rigs & scientific equipment • High operational & maintenance standards & procedures on equipment • Political goodwill • Identification of GDC projects as government flagship projects • Continued financial support from Government and Development Partners • African Geothermal Centre of Excellence identified GDC as partner in regional capacity building.
Weaknesses	<ul style="list-style-type: none"> • Reliance on external funding • Long lead time from exploration to power production • Limited customer base • Low level of workforce engagement • Inadequate marketing of GDC consultancy services
Opportunities	<ul style="list-style-type: none"> • Abundance of unexploited resource • High regional demand for training and consultancy services • Leasing out of GDC Assets – Integrated Project Management • Direct Utilization of Geothermal Resources • Early Revenue generation using wellhead technology • Adoption/Application of various business models • Influence geothermal policy development • Increase in electricity demand in the country. • Goodwill to finance geothermal development from development partners

Threats	<ul style="list-style-type: none"> • Unfavourable geological formation at project site • Emergence of alternative sources of energy i.e solar, wind, hydro, nuclear, coal, power imports • Power storage technology • Complex land policy/law • Lengthy negotiations with Development Partners • Change in Government policies • Insecurity in project areas • Inability for Power up-taker to absorb new energy by power producers • Bureaucratic government procedures • Costly litigation • Sourcing of labour from same pool – few geothermal experts

Table 6: SWOT Analysis

5.3. Stakeholder Analysis

GDC has a number of both internal and external stakeholders, who have varied interests in the company and functional relationships within the company where they have different roles and capacities (Table 6 and Appendix 1) provides an in-depth analysis of these stakeholders and their roles within the company as well as the management approach that GDC will employ for each



stakeholder.

Figure 5: Stakeholder Mapping Matrix

6. GDC'S FIELD DEVELOPMENT PLAN

The ¹National Geothermal Strategy has considered the long-term demand projections from geothermal sources based on the Vision Scenario and Reference Scenario.

- The Reference Scenario with a target of 2,849 MW geothermal capacity in 2035; and
- The Vision Scenario with a target of 3,589 MW in 2035.

The National Geothermal Strategy recommends that development of geothermal adopts: the exploration and evaluation of multiple geothermal fields simultaneously, step-wise installation of power plants and parallel development of geothermal fields to fast-track development and reduce risks.

GDC targets the development 1065MW of installed geothermal power generation by the year 2030 from Menengai, Lake Baringo-Silali and Suswa geothermal fields. To achieve this capacity, GDC will employ the portfolio exploration and parallel development initially and then stepwise expansion thereafter. The steam capacity developed will include excess steam requirement of at least 20%.

The field development will be undertaken prudently as per good practice where a single rig will be mobilized for exploration and appraisal drilling stages while two (2) to three (3) rigs will be mobilized for production drilling.

6.1. Geothermal Resource Exploration and Development

From 2009, GDC has undertaken detailed geothermal exploration investigations in ten prospects, widely spaced surveys in two and reconnaissance studies in three prospects. The geo-scientific investigations adopted a multi-disciplinary approach involving different methodologies so as to accurately develop a geothermal model. Integrated results were used to produce a suitability model which forms a foundation for exploratory well siting.

The exploration methods applied by GDC include;

- Geological field mapping,
- Hydrogeological surveys and structural analysis,
- Geophysical techniques such as; transient electromagnetic (TEM), magnetotellurics (MT), seismics, gravity and magnetics.
- Geochemical surveys including sampling of gas and steam condensate from fumaroles, and
- Surface heat loss surveys.

¹ Final Report, National Geothermal Strategy, December 2017

Integration of all the geoscientific data assists in the development of a geothermal model to define the heat source, the size of resource, the recharge of the system, the structures that control the geothermal system and the depth to the reservoir(s).

GDC has undertaken scientific studies in several geothermal prospects in order to determine the level of development in each of the prospects. GDC has undertaken scientific studies in the fields listed below;

1. Menengai
2. Suswa
3. Silali
4. Paka
5. Korosi
6. Lake Baringo
7. Chepchuk
8. Arus
9. Homa hills
10. Mwanayamala
11. Maji moto
12. Chyulu Hills
13. Nyambene

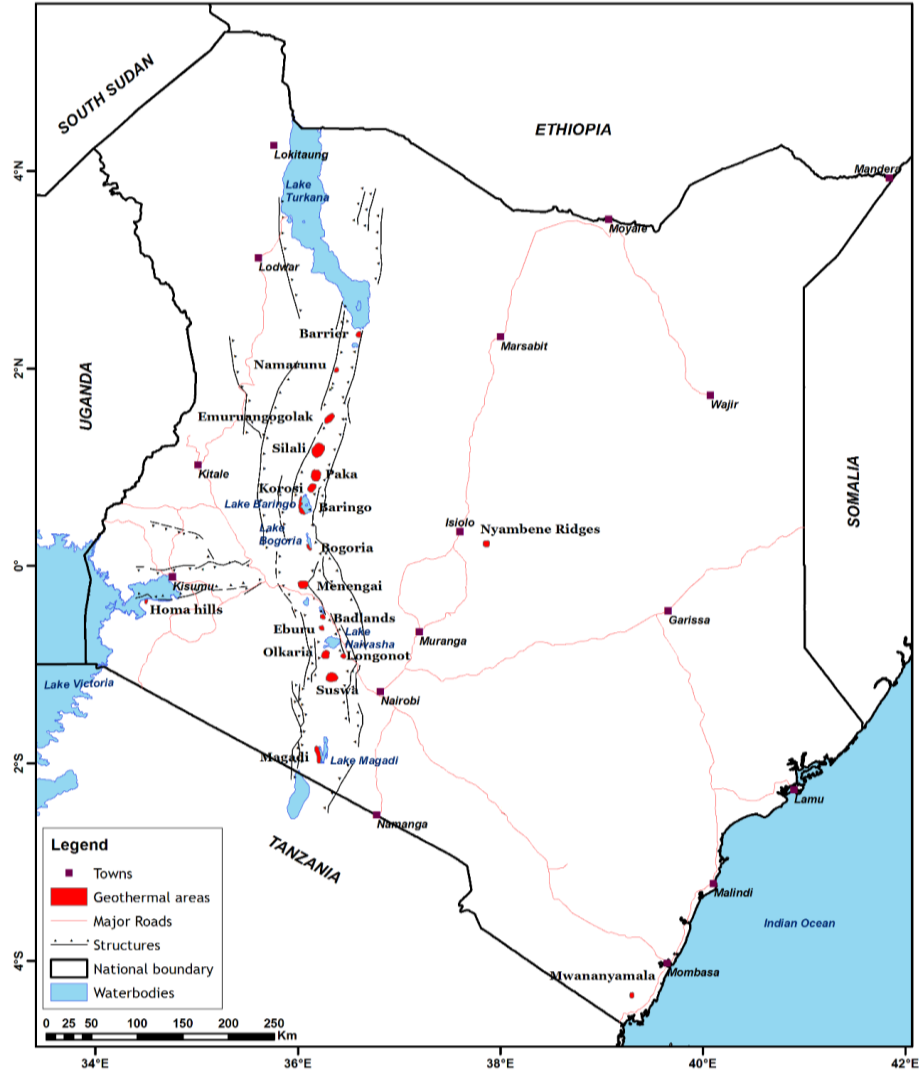


Figure 6: Geothermal prospects and projects in the Kenya

FIELD	ESTIMATED RESOURCE POTENTIAL (MW)	STUDIES CARRIED OUT BY (DATE)
Greater Menengai geothermal field	1,600	GDC (2012)
Paka	3,000	GDC (2012)
Korosi		
Silali		
Suswa	750	GDC (2012)

Table 7: Resource Potential of Geothermal Fields.

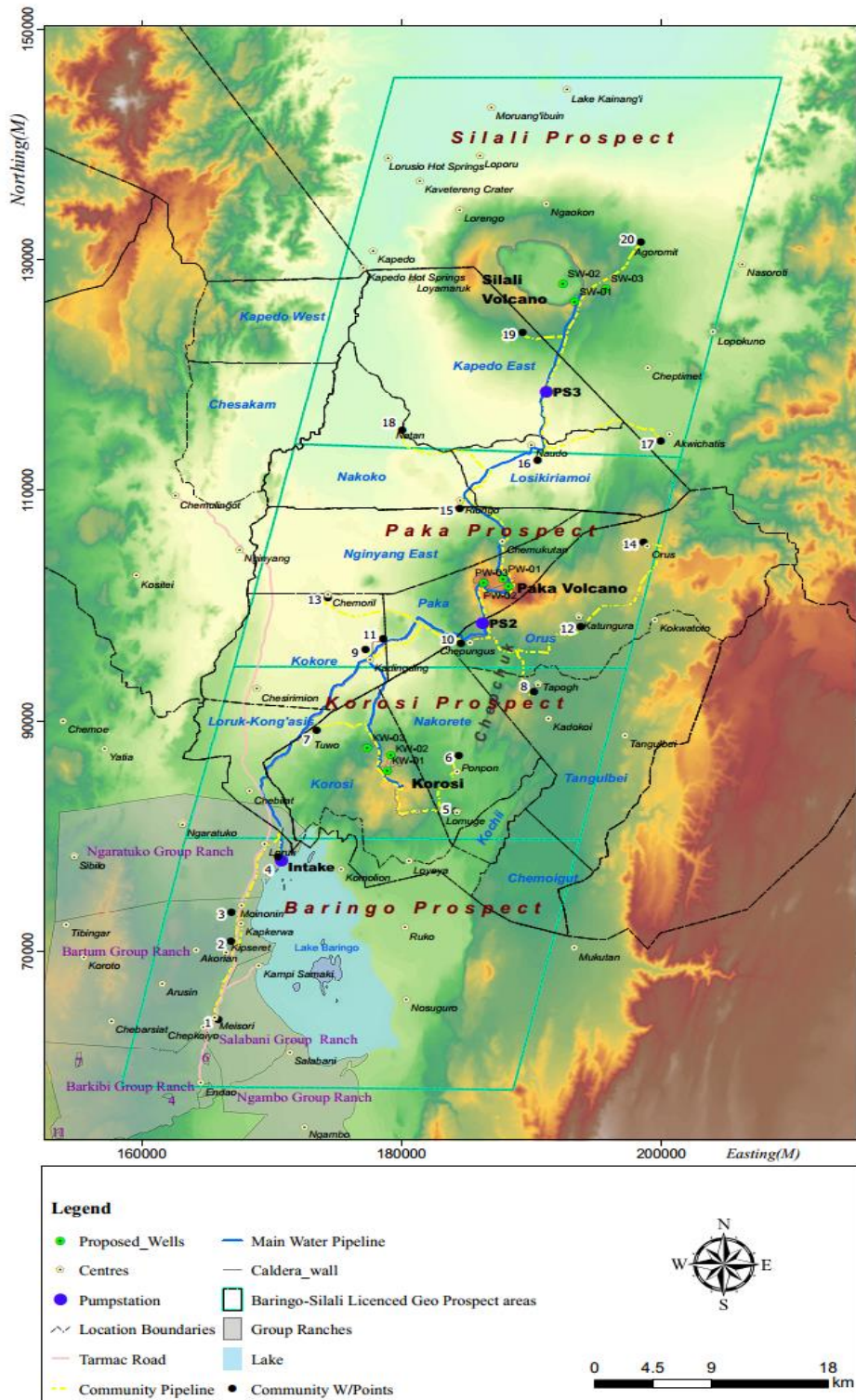


Figure 7: Lake Baringo-Silali geothermal prospect

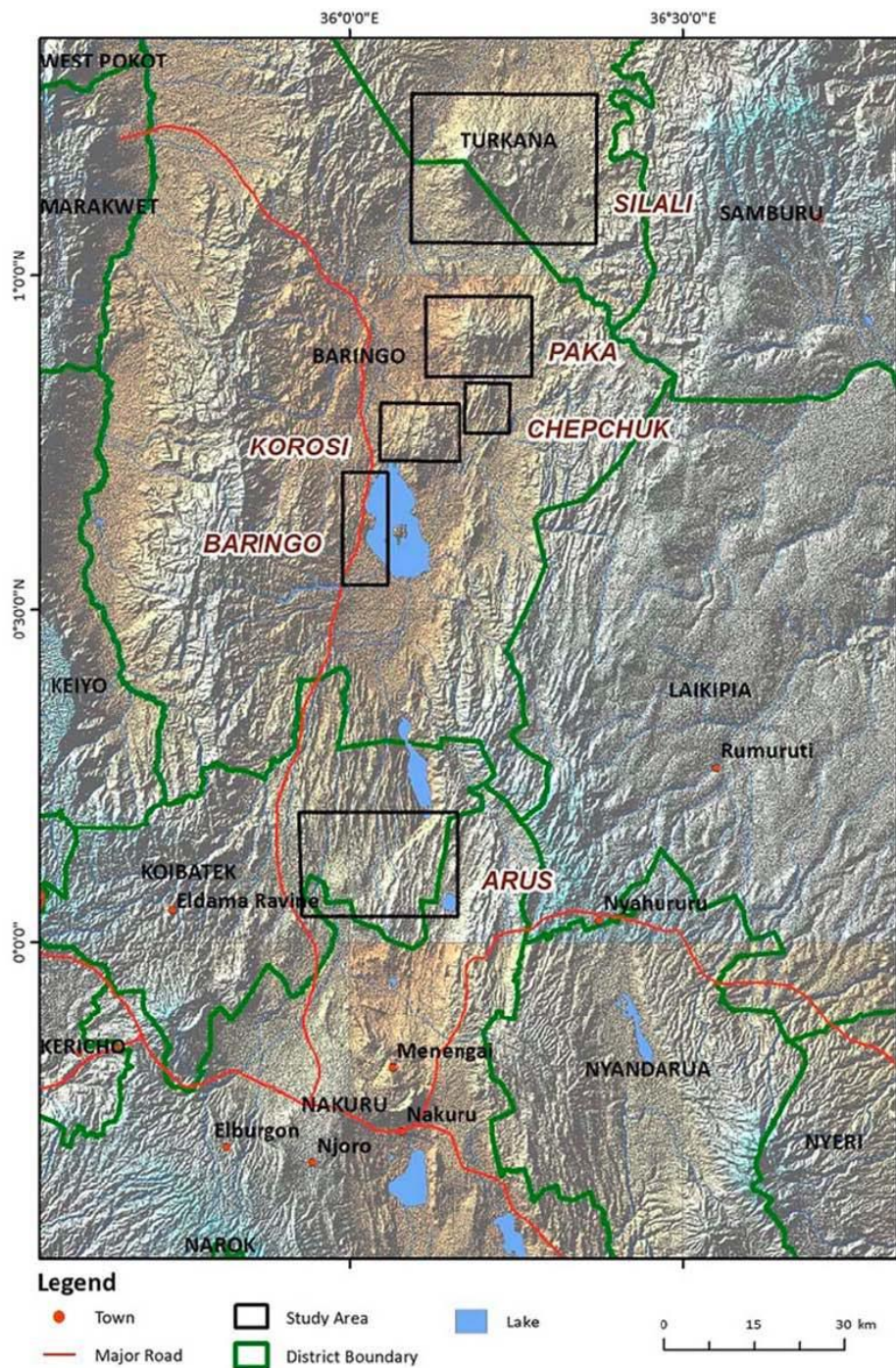


Figure 8: Lake Baringo-Silali geothermal blocks.

Field Name	Exploration			Drilling					Field Capacity	Power Generation			Direct Use		Comments										
	Reconnaissance Exploration Completed? (Y/N)	Focused Exploration Completed? (Y/N)	Remaining Exploration Activities	Number of wells completed	Number of wells heating up or being tested	Number of wells drilling now	Number of productive wells	Current estimated production capacity (MW)	Current GDC Estimate (MW)	Early Generation		Large-Scale Power (MW)	Planned for or already operating at this field? (Y/N)	Description of direct use											
										Planned for this field? (Y/N)	Description of plan and/or options					Generation Increments (e.g., 140, 4 x 100, etc.)									
Olkaria I	Y	Y	None	59	0	0	59	280+	1000 (entire field, incl. Olk II and III)	Y, KenGen will install some 5-10 MW units	NA	2 x 140 MW	Y	Flower farms	Steam sales represent 1st major revenue for GDC										
Olkaria IV																									
Menengai I	Y	Y	Geophysics in certain areas	41	12	2	20	157	465	N	NA	3x 35 MW	Y	Fish farming Green house heating Milk pasteurization	4 GDC rigs drilling IPP ground breaking for first 105 MW to be announced early 2018										
Menengai II																5	NA	NA	NA	8	N	Not known yet	35 MW	Y	Menengai North west/Ol Rongai
Menengai III/IV/V																Y	Y	In fill studies in Geology, Geophysics, Geochemistry	Drilling yet to start						

Field Name	Exploration	Drilling	Field Capacity	Power Generation	Direct Use	
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	Reconnaissance Exploration Completed? (Y/N)	Focused Exploration Completed? (Y/N)	Remaining Exploration Activities	Status	Current GDC Estimate (MW)	Early Generation		Large-Scale Power (MW)	Planned for or already operating at this field? (Y/N)	Description of direct use	Comments	
						Planned for this field? (Y/N)	Description of plan and/or options					Generation Increments (e.g., 140, 4 x 100, etc.)
Baringo	Y	Y	Infill studies in Geology, Geochemistry Geophysics	Drilling yet to start	200	Y	A few 5-10 MW units	2X35 MW	Y	Some/all of the above		
Chepchuk					90	Y	A few 5-10 MW units	2X35 MW	Y		Drilling deferred at present	
Arus					121	Y	A few 5-10 MW units	2 x 35 MW	Y		Drilling deferred at present	
Chyulu (near Mombasa)	Y -wide-spaced resistivity, geochem sampling	N	Detailed geoscientific surveys		For direct use	N	NA		Y	Space cooling, irrigation, honey purification	Drilling deferred at present	
Homa Hills (Nyanza Rift)	Y	Y			For direct use	N	NA		Y	Space cooling, fish drying		
Mwanayama	Y- wide-spaced resistivity, geochem sampling	N			For direct use	N	NA		NA	Y		Space cooling, fruit drying
Maji Moto	Reconnaissance studies				N	To be decided						N
Chyulu hills	Reconnaissance studies		N			To be decided						
Nyambene	Reconnaissance studies	N	To be decided									

Table 8: Detailed summary of exploration and project development Status as of February 2018

6.2. Project Status

a) Menengai Geothermal Field

Power Plants

GDC has since contracted three Independent Power Producers (IPP's) to finance, construct and operate 35MW power plants. The IPPs have also signed Power Purchase Agreements with Kenya Power.

One of the IPPs has engaged their financiers and are working on attaining financial closure as at February 2018. The target date for attaining financial closure and ground breaking is scheduled tentatively for June 2018. Commissioning of the power plant is planned for December 2019. The other two IPPs are still working with GDC to fulfill the conditions precedents.

Steam Gathering System

The Steam Gathering System was over 95% complete as at March 2018.

Transmission line

The transmission line and sub-station was implemented by KETRACO. The sub-station has been commissioned and energized from the Soilo Substation.

b) Baringo- Silali Prospects

Following completion of detailed surface studies in 2012, financing for the project begun in 2014. The project is financed by Government of Kenya and KfW. GoK financed development of infrastructure, which included access roads and drill pads. To date over 120km of roads have been constructed. Up to date six drill pads have been constructed three in Korosi and three in Paka.

A loan agreement of 80MEUR was signed with KfW on 10th July 2014. The loan was secured to finance the steam-field development and includes the components: Water supply system, drilling of fifteen (15) to twenty (20) geothermal wells, feasibility study, and transaction advisor and implementation consultant.

The construction of the water system has since commenced and is due for commissioning by May 2018. Drilling will be carried out by a drilling services contractor as soon as the water system is commissioned.

6.3. Power Plant Schedule

The power plants development schedule for the period 2019-2030 is indicated in Table 9. In the period 2019-2023 a cumulative of 205MW electricity generation capacity will be developed and connected to the grid inclusive of 30MW of wellhead generation. In the second period 2023-2030, a cumulative of 880MW electricity generation capacity is expected to be developed and connected to the grid while 20MW of wellhead generation is decommissioned. The main power plant capacity configurations considered for deployment are; 5MW and 35/70MW for wellhead generation units and large-scale power plants respectively. These projections are based on the studies conducted by various consultants including WesJEC, UNEP and ICIEDA.

	Year	1	2	3	4	5	6	7	8	9	10	11	12
FIELD	PROJECT	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Menengai	Phase I - 105MW	105											
	Phase II - 70MW			35	35								
	Phase III - 70MW				10		70						
	Phase IV - 70MW												70
	Phase V - 70MW												
Field Total		105	0	35	45	0	70	0	0	0	0	0	70
Baringo-Silali	Paka I		10						140		70	70	40
	Korosi I			10						70			70
	Silali I									70			70
Field Total		0	10	10	0	0	0	0	140	140	70	70	180
Suswa	Phase I										70		
	Phase II												70
	Phase III												
Decommission Wellhead Units													-20
Field Total		0	0	0	0	0	0	0	0	0	70	0	70
Installed Capacity (MW)		105	10	45	45	0	70	0	140	140	140	70	320
Cumulative Capacity (MW)		105	115	160	205	205	275	275	415	555	695	765	1065

Table 9: Power plant schedule for period 2019-2030

6.4. Drilling Plan

GDC owns seven (7) drilling rigs of which four (4) are actively drilling at Menengai. Four (4) additional rigs will be hired to begin drilling in the fields of the Lake Baringo - Silali and Suswa blocks in the FY 2018/19 and FY 2020/21 respectively. Finally, to maintain the pace of drilling, three GDC rigs: two rigs will be assigned to Baringo-Silali geothermal fields; and one will be assigned to Suswa Geothermal field. Four (4) GDC rigs will continue drilling in Menengai.

Two hired rigs at Lake Baringo-Silali will be released in 2019/20 and one in 2020/21, while the hired rig at Suswa will drill for only one-year. This schedule and the resulting number of wells are shown in Table 10 and *Existing wells and steam capacity

Table 11.

Project	Rig Type	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Menengai Phase 2	GDC Rig	3	3	1	1								
	Hired Rig												
Menengai Phase 3	GDC Rig	1	2	2	2	1	1	1					
	Hired Rig												
Menengai Phase 4	GDC Rig	1	1	1	1	1	1	1	1	1			
	Hired Rig												
Menengai Phase 5	GDC Rig										1	1	1
	Hired Rig												
Paka 1	GDC Rig			1	1	2	2	2	1	1	3	3	3
	Hired Rig	1	1										
Korosi 1	GDC Rig			1	1	1	1	1	2	2	1	1	2
	Hired Rig	1	1										
Silali 1	GDC Rig	1	1	1		1	1	1	1	1	1	1	
	Hired Rig				1								
Suswa Phase 1	GDC Rig				1		1	1	1	1			
	Hired Rig			1									
Suswa Phase 2	GDC Rig								1	1	1	1	1
	Hired Rig												
HOOSL Rigs													
India Exim funded rig													
Italian Fund Rig													

Table 10: GDC's Rig Mobilization Schedule and drilling Plan

FINANCIAL YEAR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
TOTAL RIGS		8	9	8	8	7	7	7	7	7	7	7	7
TOTAL WELLS/YEAR	43*	27	30	28	28	26	26	26	27	27	27	27	27
CUM. WELLS	43	70	100	128	156	182	208	234	261	288	315	342	369
WELLS/RIG/YEAR		3	3	4	4	4	4	4	4	4	4	4	4
ANNUAL STEAM MWe		88	101	99	106	91	91	74	79	83	90	95	102
CUM. STEAM MWe	164*	252	353	452	558	648	739	813	892	975	1065	1159	1262

*Existing wells and steam capacity

Table 11: Summary of projected number of wells and steam developed

6.4.1. Menengai Geothermal Field

The Menengai geothermal field will be developed in five (5) phases. The long-term goal in Menengai geothermal field is to develop 465MW of geothermal power generation capacity.

i. Menengai Phase I

Construction of the power plants is scheduled to commence in March 2018 and target commissioning date is December 2019.

ii. Menengai Phase II

The Menengai Phase II project is located at the eastern sector of the Menengai Caldera. The geo-scientific studies and exploratory well drilled in this sector, well MW-18A, indicated the existence of another up-flow area that should be committed to further drilling to confirm the extent and increase steam capacity for Menengai phase II towards the generation of additional 70MW.

GDC Drilling rigs will be available to drill both vertically to 2,200-2,500m depths, with a final completion diameter of 8.5 inches.

The number of drilling pads planned are nine (9) for production wells and two (2) for reinjection wells. Drilling pads for reinjection wells should be situated at elevations lower than the separator stations to transport the brine to the reinjection wells by gravity. The drilling targets for reinjection wells should be separated from the production zone around 1 km to avoid the breakthrough of reinjected water that could cause cooling of the high temperature reservoir. Furthermore, constructed pads will be available for future drilling of make-up wells during the power plant operation. The planned layout for Menengai Phase II is shown in Figure 9.

Fresh water for well drilling and power plant operation can will be supplied from boreholes at the eastern part of the Menengai caldera by pumping through a steel pipeline to the 4,000 cubic meters storage tanks. In addition, fresh water should be distributed to pads from water storage tanks.

For Menengai Phase II, GDC it is planned to develop the power plant in two-stages of 35MW each using the steam sales model and the other fully owned GDC respectively.

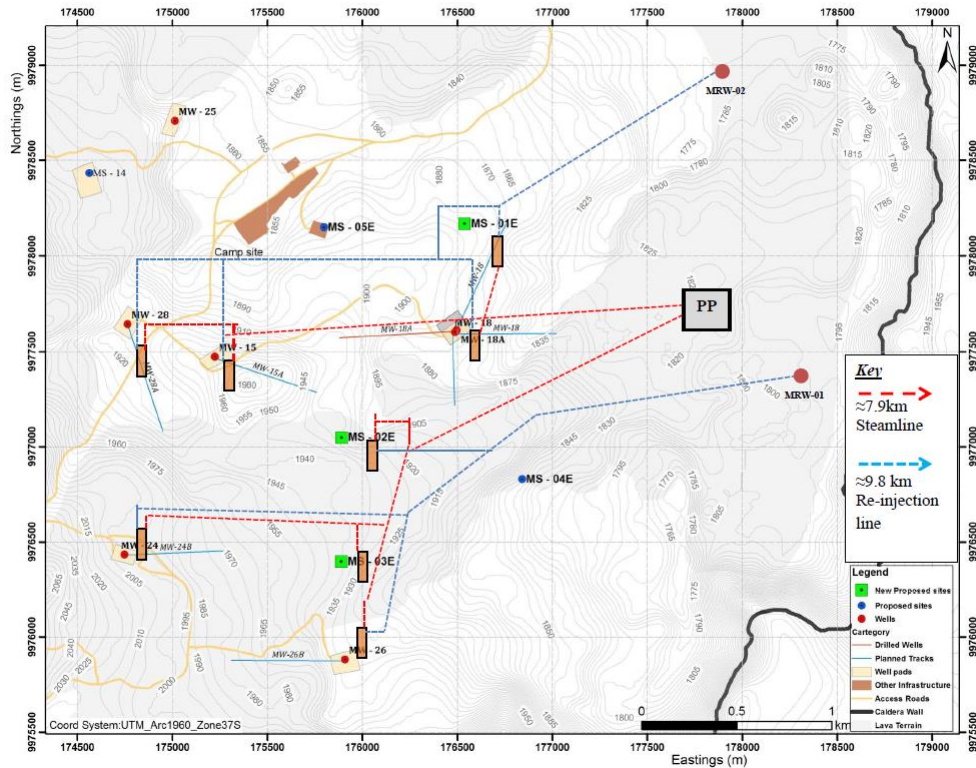


Figure 9: Layout for the development of Menengai Phase II

The proposed power plant location is on the eastern side of Menengai geothermal field at a lower elevation compared to the production wells. The topography is a relatively flat terrain and access to site is available through a murrum road. The area is located in a no impact zone on the geohazard map of Menengai geothermal field.

The power generated from Menengai Phase II project will be evacuated through the Menengai 400KV substation currently being undertaken by KETRACO. This substation is approximately 6 kilometers from the project site.

iii. Menengai Phase III

The Menengai Phases III is located to the greater Northern West of the Menengai caldera as indicated in Figure 10.

Preliminary geoscientific studies undertaken in the Menengai North West indicated a robust geothermal resource with associated surface manifestations and young volcanic activity. The geochemical analysis from samples in the prospect area measured high values of radon and carbon

dioxide measured in the Ol'Rongai area suggesting the area has good permeability. This preliminary study estimated the potential to be 300MWe.

Towards the further development of the three phases, exploratory wells have since been sited. However, more infill geoscientific work has been planned to be done to further refine the drilling targets for the exploratory wells.

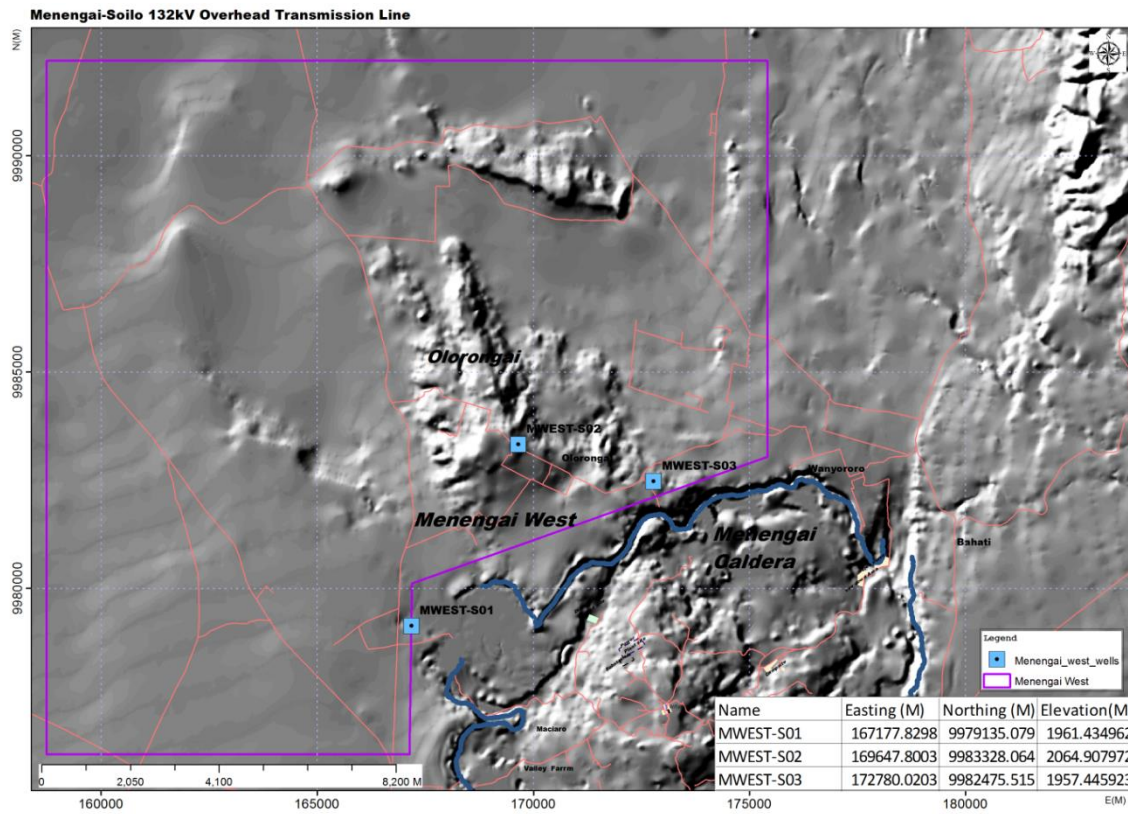


Figure 10: Proposed area for the development of Menengai Phase III

6.4.2. Lake Baringo – Silali Geothermal Block

The Baringo – Silali geothermal block comprises of several geothermal fields as enumerated earlier. GDC will prioritize the development of three (3) fields in the next five years namely; Paka, Korosi and Silali. The long-term goal of GDC is to develop at least 300MW from this geothermal block by 2030.

i. Paka Geothermal Project

The output capacity of geothermal power plant for the Paka field is proposed based on the estimated resource potential. The type of power plant was selected to be a conventional flash steam cycle (condensing type).

Based upon the possible power plant development schedule for 320MW Flash type geothermal power generation at Paka, it is proposed to develop the initial 140MW by 2026.

According to the conceptual model of the geothermal system, total drilling depth will vary from 1,800m to 2,300m in depth for both production wells and reinjection wells. In order to minimize the number of required drilling pads and to allow multiple targets to be drilled from same pad, directional drilling will be adopted. To avoid interference among wells, the targets are located at intervals of around 300m. In addition, detailed drilling depths and well profiles for the development production/reinjection wells should be planned based on the up-date geothermal conceptual model reflecting the results of exploration/appraisal wells drilling and testing.

The planned layout of Paka geothermal project is shown in Figure **11**. Two power plants location have been proposed at the eastern and western parts of the Paka caldera with associated infrastructure for transporting two-phase geothermal fluid, brine and condensate. Drilling pads for production wells are located on the upper sector of the Paka field while the reinjection drill pads are situated at lower elevations to allow transportation of separated brine to the reinjection wells. The drilling target for reinjection wells is necessarily separated from the production zone with a distance of around 1 km to avoid the fast return of reinjected water that yields cooling of the reservoir. Newly two reinjection pads are planned to be located on the north side of the production zone.

Fresh water for well drilling and power plant operation will be supplied from Lake Baringo to the project site by utilizing a steel pipe line for water transportation. In addition, fresh water should be distributed to each pads from water tanks with around 4,000 cubic meters capacity, which will be installed close to power plant.

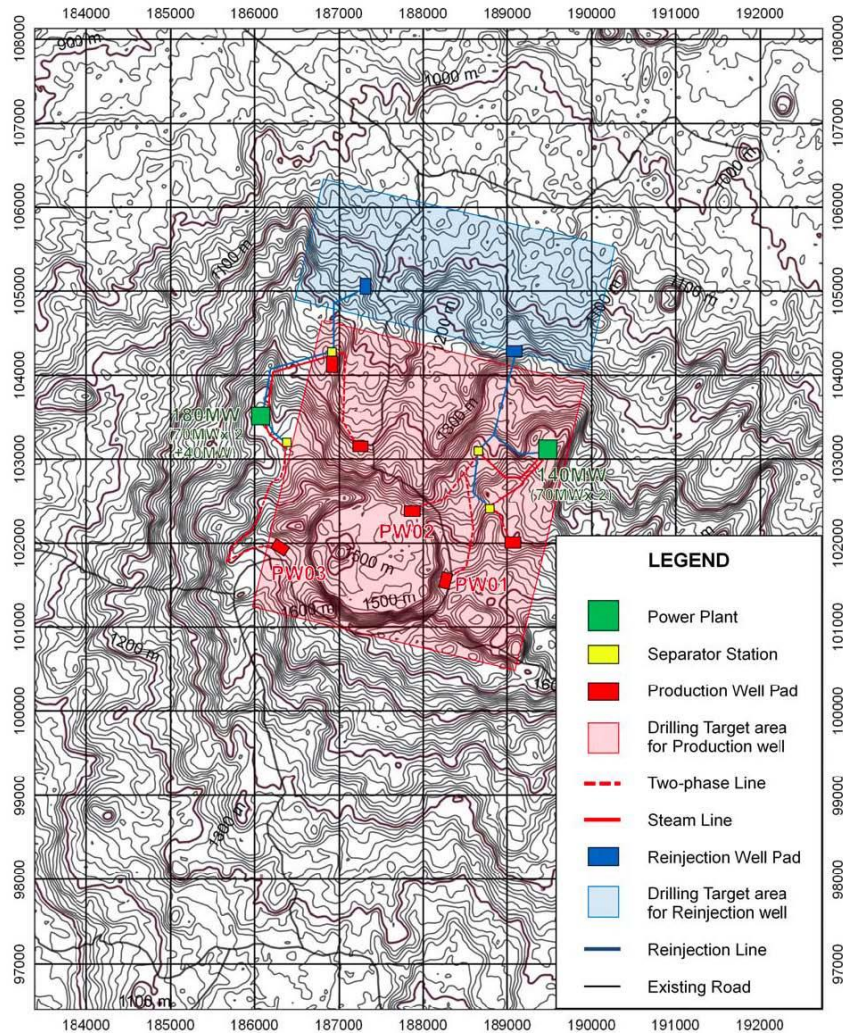


Figure 11: Proposed layout for development of Paka

Two geothermal power generation plants, on the east and west of the Paka project area are proposed. The west power plant would comprise two single flash units of 70MW (2x70MW) and one unit of 40MW and, the east power plant, two units of 70 MW each (2x70MW). In principle, although all units or both Plants are suggested to be of the single flash type, different plant size or the utilization of other generation technology shall not be ruled out until better knowledge of the potential and characteristics of the geothermal fluid is achieved.

By 2030 GDC targets to develop a total of 320MW from the Paka field. The initial power plants of 140MW will be commissioned in 2026 while the additional units of 70MW will be commissioned by 2030. One hired rig will drill the initial exploration and appraisal wells upto 2019, thereafter an average of two GDC rigs will be deployed to ramp up the pace of drilling. After steam has been proven, a wellhead generation unit will be installed to support drilling operations.

The power generated by the Paka east power plants units will be evacuated through Paka west power plant switchyard and a dedicated substation to be constructed at the neighborhood of the west Plant, cutting in the 400kV transmission line to be built between Rongai, currently at the end of the Kenyan grid, and the Silali prospect.

ii. Korosi Geothermal Project

The development scale, the output capacity of geothermal power plant for the Korosi field is proposed based on the estimated resource potential. The type of power plant was selected to be a conventional flash steam cycle (condensing type).

Based upon the possible power plant development schedule for 210MW Flash type geothermal power generation at Korosi, it is proposed to develop 70MW in ten-years.

According to the conceptual model of the geothermal system, total drilling depth will vary from 1,800m to 2,300m in depth for both production wells and reinjection wells. In order to minimize the number of required drilling pads and to allow multiple targets to be drilled from same pad, directional drilling will be adopted. To avoid interference among wells, the targets are located at intervals of around 300m. In addition, detailed drilling depths and well profiles for the development production/reinjection wells should be planned based on the up-date geothermal conceptual model reflecting the results of exploration/appraisal wells drilling and testing.

The planned layout of Korosi geothermal project is shown in Figure 12. A total of three Drilling pads for production wells have already been constructed by GDC; KW01, KW02 and KW03.

Production well pads are located to the east side of proposed power plant location. Reinjection drill pads are situated at lower elevations to allow transportation of separated brine to the reinjection wells. The drilling target for reinjection wells is necessarily separated from the production zone with a distance of around 1 km to avoid the fast return of reinjected water that yields cooling of the reservoir. Newly two reinjection pads are planned to be located on the north side of the production zone.

Fresh water for well drilling and power plant operation will be supplied from Lake Baringo to the project site by utilizing a steel pipe line for water transportation. In addition, fresh water should be distributed to each pads from water tanks with around 4,000 cubic meters capacity, which will be installed close to power plant.

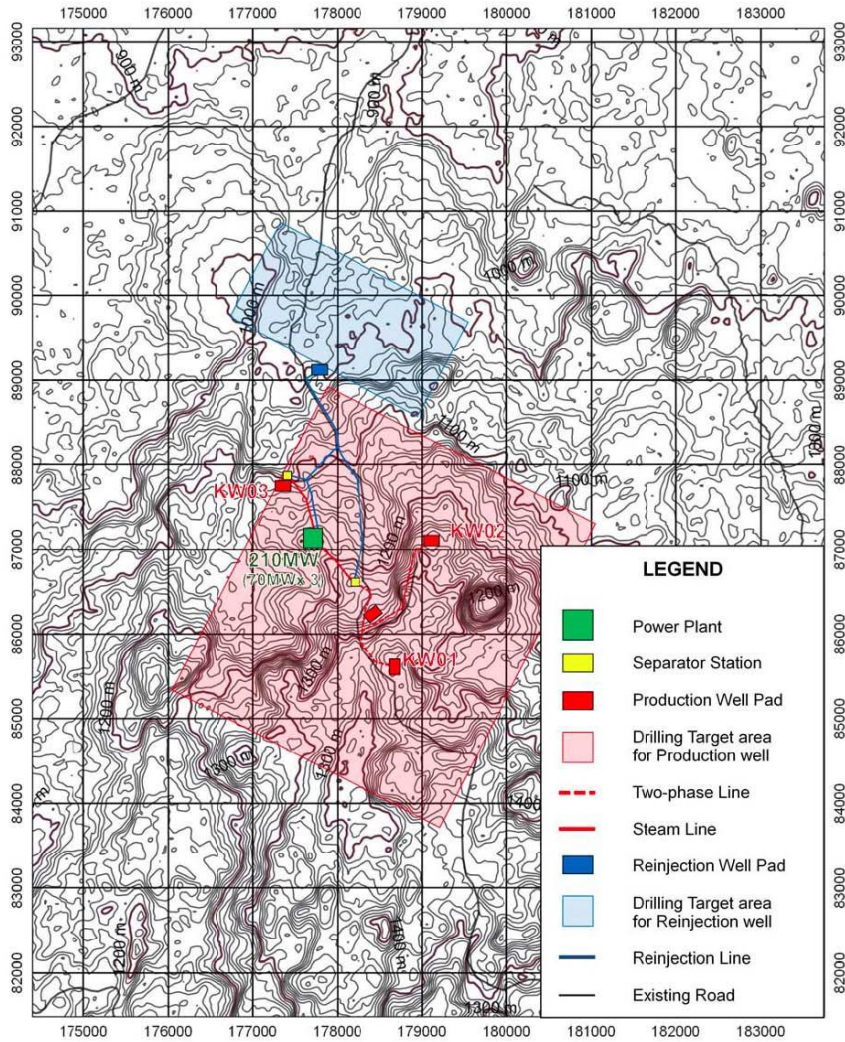


Figure 12: Proposed layout for development of Korosi

By 2030 GDC targets to develop a total of 140MW from the Korosi field. The initial power plant of 70MW will be commissioned in 2027 while an additional unit of 70MW will be commissioned in 2030. One hired rig will drill the initial exploration and appraisal wells upto 2019, thereafter one GDC rig will be deployed to continue the pace of drilling. After steam has been proven, a wellhead generation unit will be installed to support drilling operations.

The power generated at the Korosi power plants units will be evacuated through a dedicated substation to be constructed in the neighborhood of the prospect cutting in the 400kV transmission line to be built between Rongai, currently the end of the Kenyan grid, and the Silali prospect.

iii. Silali Geothermal Project

The development scale, the output capacity of geothermal power plant for the Silali field is proposed based on the estimated resource potential. The type of power plant was selected to be a conventional flash steam cycle (condensing type).

Based upon the possible power plant development schedule for 180MW Flash type geothermal power generation at Silali, it is proposed to develop 70MW in ten-years.

According to the conceptual model of the geothermal system, total drilling depth will vary from 1,300m to 2,300m in depth for both production wells and reinjection wells. In order to minimize the number of required drilling pads and to allow multiple targets to be drilled from same pad, directional drilling will be adopted. To avoid interference among wells, the targets are located at intervals of around 300m. In addition, detailed drilling depths and well profiles for the development production/reinjection wells should be planned based on the up-date geothermal conceptual model reflecting the results of exploration/appraisal wells drilling and testing.

The planned layout of Silali production and reinjection drilling pads is shown in Figure 13 total of six drilling targets for production wells have already been identified, two to the south-east and four to the south of the Silali. Approximately four drilling pads may be required to drill the six drill targets from outside the caldera extensively utilizing directional drilling technique. The drilling targets proposed are indicated in Figure 13 as; 1a, 1b, 2a, 2b, 3a and 3b.

The drilling target for reinjection wells is necessarily separated from the production zone with a distance of around 1 km to avoid the fast return of reinjected water that yields cooling of the reservoir. Two reinjection pads are planned to be located one on the north side and the other to the north-east of the Silali caldera.

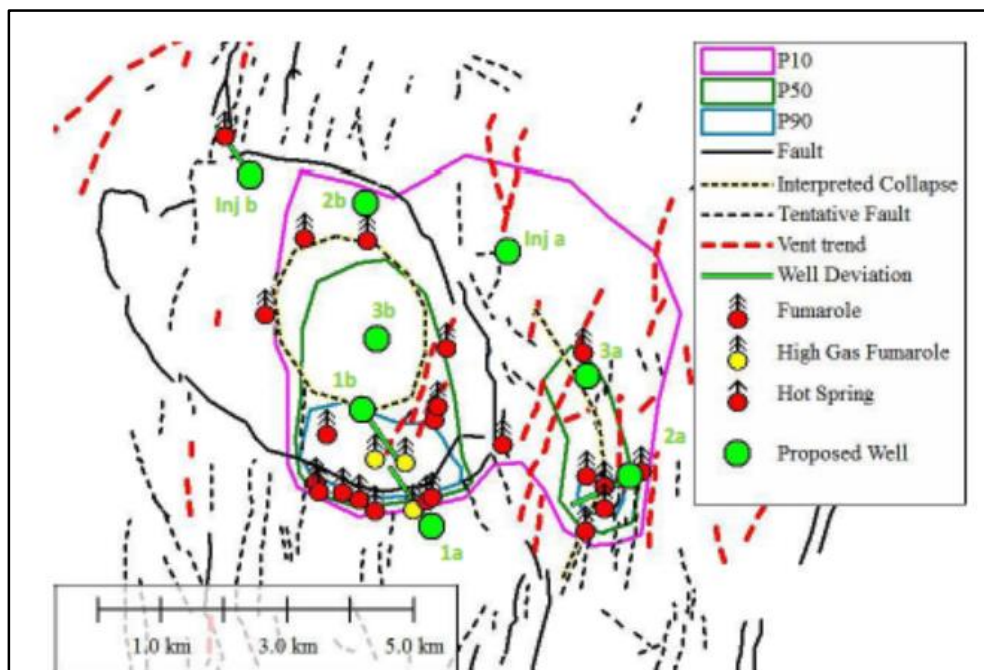


Figure 13: Proposed drilling targets for Silali (UNEP-GDC report, 2014)

Fresh water for well drilling and power plant operation will be supplied from Lake Baringo to the project site by utilizing a steel pipe line for water transportation. In addition, fresh water should be distributed to each pads from water tanks with around 4,000 cubic meters capacity, which will be installed close to power plant.

GDC targets to develop a total of 140MW from the Silali field. The initial power plant of 70MW will commissioned in 2027. The additional unit of 70MW is planned to be commissioned in 2030. One rig will be deployed to drill both the initial exploration/appraisal and production wells. The power generated at the Silali power plants units will be evacuated through a dedicated substation to be constructed in the neighborhood of the prospect feeding into the 400kV transmission line to be built between Rongai, and the Silali prospect.

6.4.3. Suswa Geothermal Field

Expected reservoir conditions may support commercial geothermal well flow rates from wells drilled directionally into part of the inner caldera due to difficult terrain. Later wells will be drilled to targets in the northern outer caldera or at high angle into a possible steam zone.

The planned output capacity of geothermal power plant for the Suswa field is proposed based on the estimated resource potential. The type of power plant was selected to be a conventional flash steam cycle (condensing type).

Based upon the possible power plant development schedule for 300MW Flash type geothermal power generation at Suswa, it is proposed to develop an initial 70MW in 2028 and a second 70MW in 2030. Hence by 2030 a total of 140MW of generation capacity is expected in Suswa geothermal prospect.

According to the conceptual model of the geothermal system, total drilling depth will vary from 1,500m to 2,500m in depth for both production wells and reinjection wells. A drilling sequence is planned to take early advantage of targets with low resource risk and then apply results from initial wells to improve the chances of success in later (currently riskier) wells as reservoir configuration becomes more evident. The first two recommended wells are targeted into the inner caldera from pads on the rim east and north of the inner caldera.

In order to minimize the number of required drilling pads and to allow multiple targets to be drilled from same pad, directional drilling will be adopted. To avoid interference among wells, the targets are located at intervals of around 300m. In addition, detailed drilling depths and well profiles for the development production/reinjection wells should be planned based on the up-date geothermal conceptual model reflecting the results of exploration/appraisal wells drilling and testing.

The planned layout of Suswa production drilling pads is shown in Figure 14. A total of five drilling targets for exploration and production wells have already been identified to the north of the Suswa caldera. The drilling targets proposed are indicated in Figure 14 as; 1, 2, 3A, 3B and 4.

The power generated at the Suswa power plants units will be evacuated through a dedicated substation to be constructed in the neighborhood of the prospect feeding into the 400kV transmission line already existing near the Suswa geothermal field.

6.5. Summary of GDC Development Plan

A summary of the development plan and the expected outcomes for the various geothermal fields are shown in **Figure 15**, **Figure 16** and **Figure 17**.

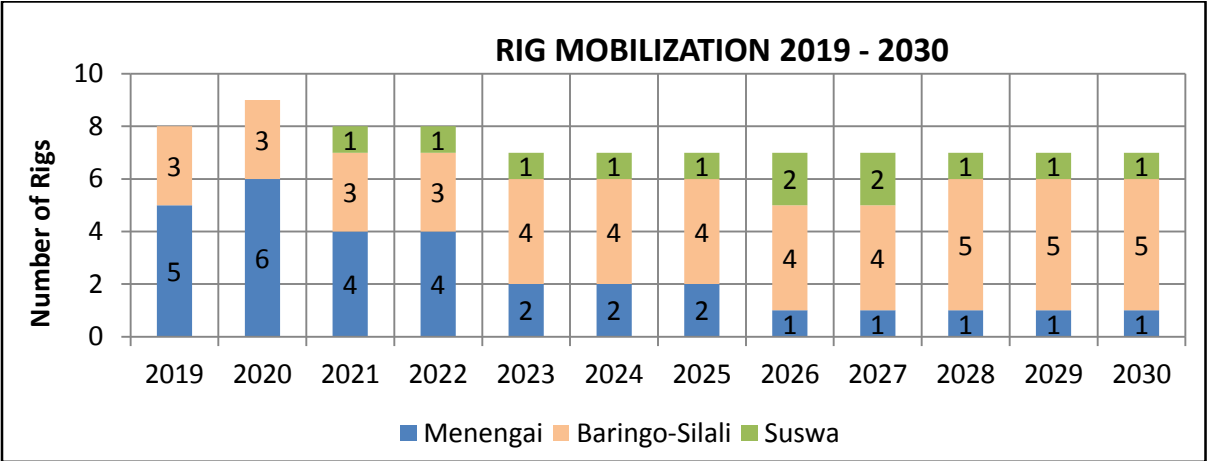


Figure 15: Planned annual rig mobilization per field

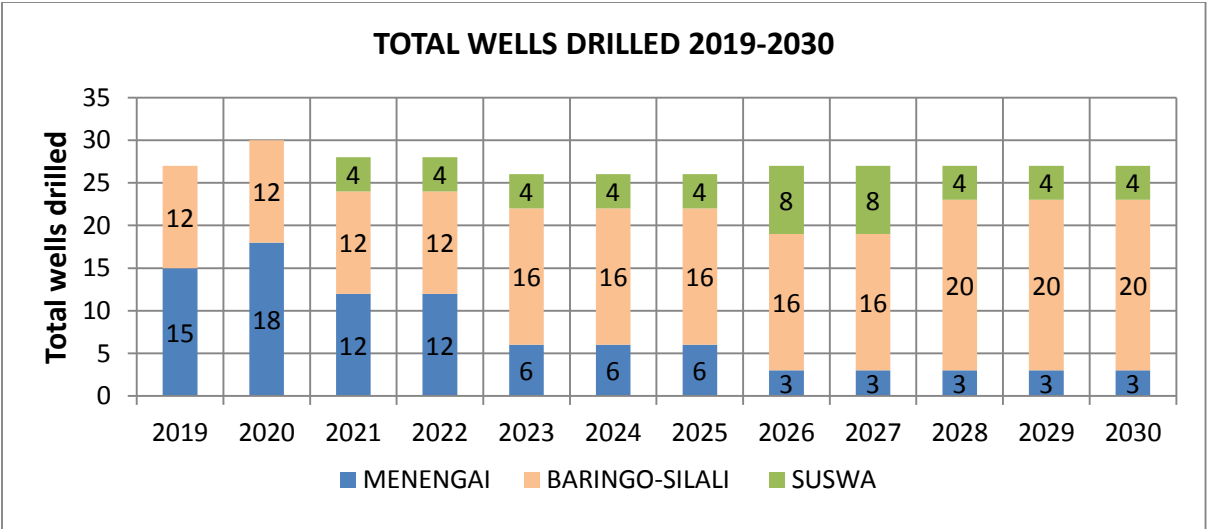


Figure 16: Planned annual wells drilled for each field

By 2030, GDC plans to develop a cumulative steam capacity of approximately 1262MW. Additional 485MW of steam equivalent will be developed by 2023 resulting to a total cumulative of 648MWe of steam equivalent. Approximately 139 additional geothermal wells will be drilled

in the period. Out of these, 205MW of generation capacity is planned to be connected to the grid within the period up to 2023.

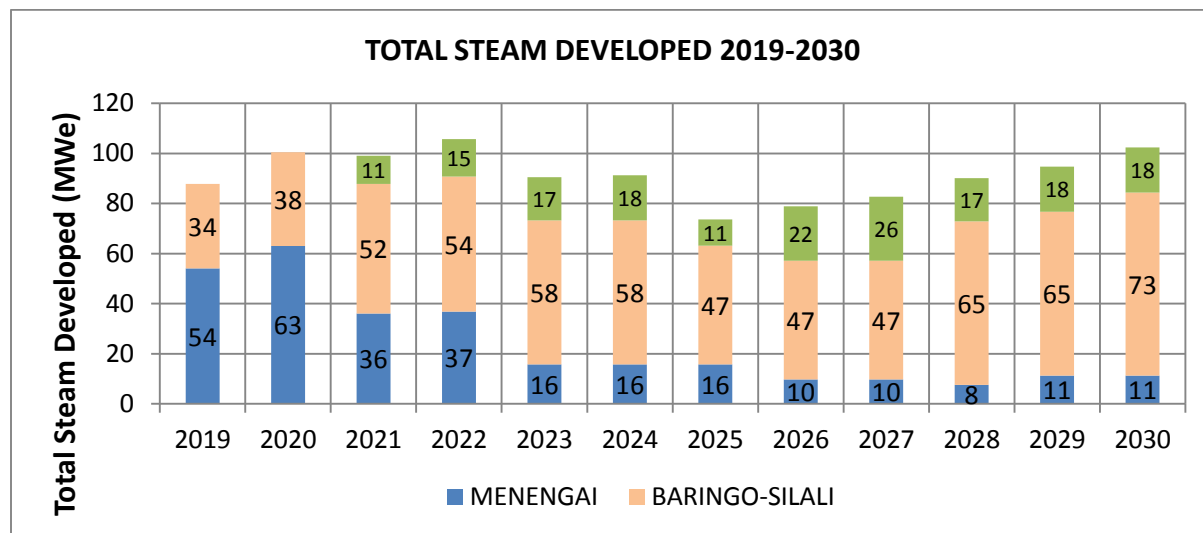


Figure 17: Planned annual steam capacity for each field

6.6. Geothermal Resource Utilization and Management

6.6.1. Early Generation Using Modular Power Plants (Well Head Generation Units)

GDC plans to undertake “early generation” using small, modular power plants (often referred to as “wellhead units”) that can utilize geothermal fluids from one or more wells on a single well pad. The power can be used locally (*e.g.*, to supply drilling and field camps) and/or sold into the market. Thus, early generation can either offset GDC’s operating costs or provide some early revenue. In addition, it provides a means of testing the reservoir and observing its response to production and injection, particularly if suitable observation wells are available and properly instrumented.

The early generation concept has been utilized historically in several countries, typically with small (~5 MW) non-condensing or “back-pressure” flash-steam generation units; this concept has been used in Mexico, Central America, Indonesia and Papua New Guinea. More recently, several small (~3-6 MW) condensing units have been developed and installed at Olkaria, to provide power to the grid in advance of constructing the large power plants. Early generation using binary power plants is also possible, since most such plants are modular by design.

GDC’s concept is to install early generation units in one sector of a developing field, using it to supply the drilling rig, personnel camp and water pumping requirements. After building a large power plant, the early generation unit(s) can be moved to other sectors of the same field or to other fields. A small electrical network may be required to conjoin the power from several well pads,

and a transmission interconnection or local power user would be needed, both of which may be feasible in certain fields.

GDC will develop 6x5MW well head plants in Korosi, Paka and Menengai.

6.6.2. Direct Use

GDC is actively seeking relationships with energy users “beyond the grid,” including industrial power consumers and aggregated communities (who would require a “mini-grid” to interconnect them). This is part of a deliberate strategy to engage directly with energy consumers who are located near geothermal resources, thus building cooperation and participation beyond the major load centers.

Similarly, GDC is pursuing the direct uses of high and low enthalpy geothermal steam or brine to create new business opportunities for the communities near the geothermal resource, which promotes local economic growth and helps to increase the level of acceptance of a geothermal project. Regardless of the nature of the system, direct use is of strategic importance to GDC.

Direct use projects can be stand-alone or developed together with power production. After the steam has been separated and sent to the power plant turbine, the remaining geothermal fluid (sometimes called the “waste brine”) can be used directly (if the chemical quality is suitable) or its heat can be transferred to fresh water in heat exchangers. Evaporation, refrigeration, drying of fish and timber, extraction of salt by evaporation, and fresh water distillation are possible at temperatures above 100°C. At lower temperatures, space heating is a common geothermal direct use.

Geothermal prospects with temperatures that are too low for power generation are well suited for direct use projects such as space heating for residential and commercial buildings, district heating projects, greenhouses, spas, tourism and recreational use (balneology), fish farms and aquaculture facilities, food processing facilities, dehydration, soil sterilization, textiles, gold mining operations, and a variety of other applications.

The significant potential for direct use is demonstrated in Table 12, which GDC has identified as possible uses of geothermal heat identified.

1. INDUSTRIAL APPLICATION		
Application	Geographical locations	Potential Customers
Leather treatment	North Rift (Baringo, Bogoria, Turkana); South Rift (Magadi, Suswa); Central rift (Nakuru)	Bata - Limuru; Nakuru Tanners; Kenya Tanning Extract; Bulleys – Thika
Soda ash processing	Lake Magadi	Magadi Soda Company – Magadi (mines and processes Trona from lake Magadi)
Dairy processing	Nakuru	Brookside and KCC - Nakuru; Molo Milk; Egerton University – Njoro
Honey processing	Baringo; Turkana; Eburru	
Egg hatching and brooding	Eburru; Menengai	Kim’s Poultry Farm; Eburru Community; Kenchic; Muguku Poultry Farmers; Others to be determined
Refrigeration, cold storage and air conditioning	North Rift	Offices, schools, industries, hotels
2. AGRICULTURAL APPLICATION		
Aquaculture	Kisumu; Baringo; Coastal Kenya; Lake Turkana	
Greenhouses	Many parts of the country.	
Irrigation	Most areas along the rift	Perkerra Irrigation scheme
Drying of cereals	Nakuru	NCPB; Lesiolo Grain Handlers; Unga Ltd
Processing Aloe Vera	Marigat	Baringo Aloe Bio-Enterprise Project, Koriema Nursery and Factory
3. TOURISM		
Balneology, bathing and swimming	Bogoria; Nakuru; Magadi; Kapedo; Lake Turkana	Lake Bogoria Spa Resort; Other tourist hotels/spas

Table 12: Summary of Direct Use Applications by Zone and Customer (2013-2018 GDC Strategic Plan, 2013)

6.7. GDC Success Factors

The proposed geothermal field development when accomplished, will bring forth immense value to Kenya by lowering cost of energy. The essential success factors for geothermal development include;

- Geothermal technology such as exploration technology, steam development technology, power generation technology, and operation and maintenance technology.
- Development financing GDC can receive financing from various countries or agencies as well as absorb technologies and concessional financing. GDC will accumulate experience and knowledge and become a “center of excellence” for geothermal development in the region.
- Commitment of the government of Kenya to allow the growth of geothermal development through favorable policies. GDC has received overwhelming support from GoK and this support is critical going forward.

To successfully accomplish the envisaged field development, GDC will strengthen the acquisition of exploration and steam development technologies to make them available within the country and support geothermal development. This will be accomplished by strengthening the development of its human resources capacity.

7. CORE COMPETENCE, MANAGEMENT AND ORGANIZATION

7.1. Organization and Internal Structure

The GDC structure is composed of Board of Directors (BoD), senior management team, mid-level managers, unit supervisors and technical team. The Senior Management team is composed of the Managing Director & CEO and the Head of Directorates-General Managers.

The organization structure is designed around the company's mission, which puts into consideration coherent and functional synergies while ensuring a lean span of control. As a result, this approach ensures effectiveness.

7.1.1. Governance and Management Structure

The GDC's structure is shown in the Figure **18** below as realigned in 2018. It is part of an ongoing process to streamline company operations and enhance inter-departmental communication.

GEOHERMAL DEVELOPMENT COMPANY ORGANIZATION STRUCTURE

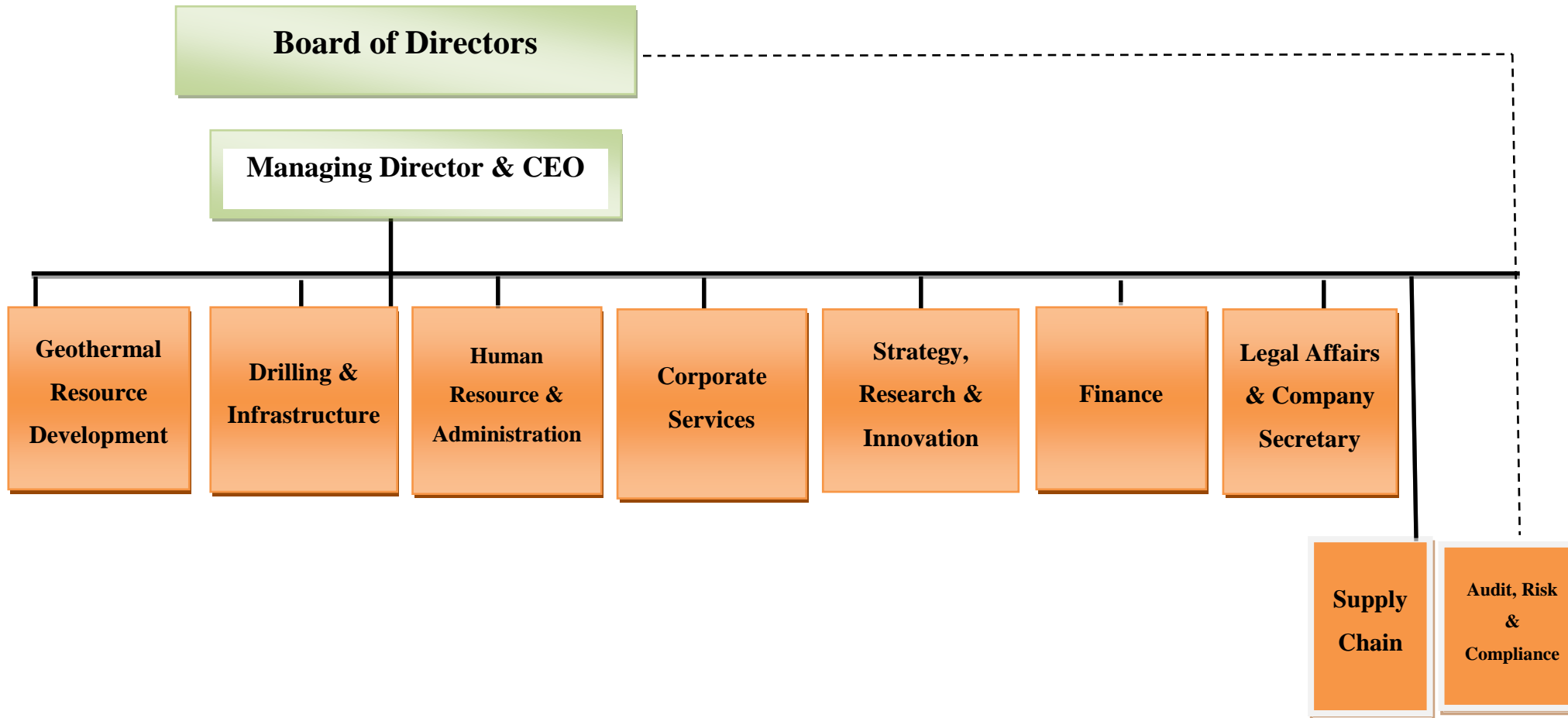


Figure 18: GDC Organizational Chart

The Managing Director has nine (9) direct reports. This span of control is envisaged to have a positive impact on the organization's performance as it allows the executive management ample time to concentrate on the overall business framework and strategy implementation.

The organization structure enables management to take more responsibility for day-to-day operations, training, mentoring, coaching, and solutions management. In addition, this approach identifies clear career paths, enhancing staff retention and providing for succession planning.

The organizational structure has been developed by GDC to meet the following requirements:

- Attainment of GDC's objectives through proper coordination of all activities thus optimizing the value of the organization;
- Keeping the conflicts between individuals over jurisdiction at a minimum;
- Eliminate overlapping and duplication of work and decreasing the likelihood of "runarounds:" thus achieving process efficiency and clarity of responsibilities;
- Facilitation of promotions of personnel and aid in wage and salary administration;
- Facilitation of succession planning while allowing controlled change to occur hence enabling the achievement of optimum workflow and productivity;
- Easier communication at all levels of organizational hierarchy;
- Provision of a sound basis for effective planning;
- It encourages innovation & creativity;
- The adopted structure has enhanced the introduction of new skills, experience, knowledge, and enhances the flow in both upward and downward communication and collaboration across the team, and is a deliberate tactic that better positions GDC to support and achieve its strategic goals

7.1.2. Board of Directors

The Board of Directors (BoD) is comprised of the Board Chairman appointed by the President and Board members appointed by the Cabinet Secretary. It has diverse complimentary skills and relevant experience to carry out its duties. The BoD provides strategic direction and guidance to the organization.

7.1.3. Management Team

The GDC Management Team is comprised of the Managing Director & CEO and the heads of Directorates. The team provides critical leadership towards the success of this strategy.

GDC takes pride in a competent management team that is well versed in the technical aspects of geothermal energy development. The team also possess wide-ranging expertise in contract negotiation, economics, finance, fund-raising, corporate law, corporate governance, human resources management, marketing and communications, strategy, planning, and management of environment and social issues.

The functions of the Management Team are as follows:

- The Managing Director & CEO reports to the Board of Directors and is responsible for ensuring the implementation of the strategic leadership, guidance & plans and policies

established by the Board. He is also responsible for enhancing the institutional capacity, management and administration of the organization.

- The General Managers are responsible for the planning, coordination, and management of all activities within their respective directorates.
- The line-Managers are responsible for operations and implementation of the activities in their various departments.

7.1.4. Other Senior Staff

Supporting the direct reports to the CEO are one hundred (100) senior staff members, including engineers, drilling superintendents, and geoscientists. These employees typically have MSc degrees and over five years of experience in geothermal development. They are the leaders of field teams in exploration, infrastructure development, drilling operations, and resource management.

The other staff in Technical Services includes approximately thirty (30) individuals with expertise in infrastructure engineering, drilling engineering, geosciences, and reservoir engineering.

GDC's staff are well-prepared critical to the success of the strategy:

Significant management experience;

- Appropriate functional division to enhance the focus on field and necessary support activities;
- Subsurface technical expertise; and a commitment to mentor young professionals.

These attributes are equally matched by the staff in the support Directorates/Departments which include the following list.

- Strategy Research & Innovation
- Finance
- Legal Affairs
- Human Resources & Administration
- Audit, Risk & Compliance
- Supply Chain Management
- Corporate Performance Management & Security
- Corporate Communication & Marketing

7.2. Staffing Levels

7.2.1. Current Situation

GDC is currently supported by a staff establishment of approximately 1084, competence growth in the workforce has been achieved through adequate and timely acquisition of qualified human resources, continuous staff training and development both in the technical and support departments, and effective retention strategies. In combination, these staffing strategies have

supported the acceleration of the geothermal resource development in Kenya and the East African region.

The technical departments consist of approximately 70% while the support departments stand at 30% of the total human resources. This is consistent with GDC's highly technical mission and nature of operations.

No.	DIRECTORATE	IN POST
1.	MANAGING DIRECTOR & CEO's Office	78
2.	GEOTHERMAL RESOURCE DEVELOPMENT	161
3.	DRILLING & INFRASTRUCTURE	427
4.	STRATEGY, RESEARCH & INNOVATION	62
5.	LEGAL AFFAIRS & COMPANY SECRETARY	35
6.	HUMAN RESOURCE & ADMINISTRATION	130
7.	FINANCE	94
8.	CORPORATE SERVICES	97
	TOTAL	1084

Table 13: Current Staffing Levels per directorate

7.2.2. Scale-Up Requirements

GDC's scale-up strategy is to acquire staff that is best suited for achieving its goals and objectives. However, GDC's faces staff retention threats posed by competition from other drilling companies in the region that demand similar expertise.

In response, GDC has implemented retention strategies that include well defined staff mortgage scheme, staff car loan, career progression guidelines, talent management programs, and continuous training and development. These strategies are aimed at improving the Company's ability to develop and manage its geothermal resources, and provide continuity to these important corporate functions.

In addition, GDC has developed a succession and carrier progression plan that is clearly supported by its recent organizational realignment, and is aimed at ensuring that there are sufficient numbers of adequately trained staff in all key positions at all times this provides staff with a clear career path.

Maintaining well-trained staff in key positions through these career paths and training approaches is aimed at ensuring that all key processes continue without interruption. Although GDC has already implemented an extensive training regime, capacity building is an ongoing process to equip the team with the latest critical knowledge in the market.

Key barriers to continued GDC growth are being addressed through encouraging staff to challenge the *status quo* with rewards for raising identified issues. The senior management staff recognizes the need for continued demonstration of their appreciation of staff who are innovative, learn from errors and develop more effective business processes. Similarly, the various management levels within the organization are endeavoring to present clear and continued evidence that challenging the *status quo* does not limit careers, but instead presents evidence of self-awareness,

understanding of the corporate mission, and leadership skills. This type of encouragement will continue to enhance professional and organizational development within GDC.

7.2.3. Staff Establishment

The staffing plan is based on the projected utilization of both GDC owned and hired drilling rigs, well testing, operation of steam gathering system, operation of wellhead and central power plants. The staffing process is designed to have the right staff available at the right time to facilitate operations. The staffing plan relative to the above activities is shown in Table 14 below.

Year	2018	2019	2020	2021	2022	2023	2030
Number of Rigs		8	9	8	8	7	7
Technical Staff		135	110	25	60	10	
Support Staff		44	35	8	19	3	
Annual Additional Staff		179	145	33	79	13	
Cumulative Additional Staff		179	324	357	436	450	932
GDC Establishment	1084	1263	1408	1441	1520	1534	2010

Table 14: GDC Staffing Plan 2019 – 2030

7.2.4. Staff Capacity Development

GDC is committed to sustaining and improving the skills, competences and knowledge required in managing and growing the company by providing employees with individual trainings, internal knowledge transfers, on-the-job trainings, experiential, group trainings, leadership development programs, coaching/mentoring, simulator trainings, consultancy assignments, collaboration with well-established geothermal drilling institutes/companies and schools (including the Geothermal Training Institute), facilitating self-learning that adds value, is cost effective and addresses the needs of both individuals and the company.

The Company is developing its staff capacity through collaboration with the United Nations University’s Geothermal Training Programme (UNU-GTP) in Iceland, University of Auckland (New Zealand), University of Kyushu (Japan), BRGM (France), BGR (Germany), IRIS (USA), ICS-UNIDO (Trieste & Pisa, Italy), University of Manila (Philippines), University of Aberdeen (Scotland) and University of Potsdam (Germany).

GDC has also established the Geothermal Training Institute (GTI) for capacity building of staff on geothermal exploration, field development and geothermal resource management.

Continued investment in this Institute is key to ongoing R&D, and to attract, motivate and retain staff.

7.3. Internal Management Systems

GDC has established a series of management tools to monitor operations and management activities. The GDC team has developed and documented numerous important internal processes, including:

- Planned management meetings at regular dates;
- Periodic revision of the organization's Business Plan;
- Department head performance contracts outlining the commitment to complete certain activities in the upcoming year;
- A balanced score card for each department and a roll-up to the organization to report on their progress; and
- A number of regular field operating reporting processes to monitor activities in the field.

As described herein, GDC has structures in place to enable each department to contribute to the strategic plan, and a means for each department to measure and achieve its commitment. These are all essential management tools for a successful organization, permitting the senior management team to ensure the correctness of the plan and to monitor success.

GDC is set up with the necessary and appropriate reporting and monitoring tools, and the management team is actively taking responsibility to use these tools in appropriate ways. For example, assessment of the potential for missing deadlines, and developing solutions that re-direct activities as needed are the subject of management meetings.

7.3.1. Business Processes

Successful organizations rely on carefully planned and fully documented business processes to support the key activities responsible for revenue generation, reporting results, reporting costs, and ensuring communications that support these processes across functional lines. GDC has in place a number of procedures that govern the responsibilities for each key business process. For example, the Supply Chain department has a well-conceived and effective process for moving through the process of acquiring services and products, recognizing that GDC's external sources of funding operate at their own particular pace. Another example is for the supervision of contractors in the field. The Company is ISO 9001 certified, an indication of well-documented and refined processes.

7.3.2. Corporate Culture and Values

In addition to the core values described in Section 3.5, GDC fosters honesty, respect, openness, truthfulness and accurate information and communication in dealing with both its employees and other stakeholders. GDC also advances a robust culture of excellence and innovation. Employee appraisals focus on these attributes as well as the departmental Performance Contract for each year. These tools are being used effectively and fairly to build a strong organization. Managers are open and honest with staff, providing objective appraisals and expectations for career growth.

7.3.3. Succession Planning

The organizational structure is focused on improving succession planning. Several key personnel, including the Managing Director / CEO, are vital to the successful operation of GDC and achievement of the strategic plan. Another key to the succession plan is continued investment in

staff training and development, including training in use of the internal management tools and controls to identify good performers, re-orient poor performance, and encourage the use of business metrics in their management of staff. To enhance the succession plan, GDC is identifying among its existing senior staff the key personnel who can potentially fill the core positions necessary for continued success, and is focusing on appropriate training opportunities.

7.4. Internal Communications

GDC has a robust internal communications regime. GDC issues a bi-weekly in-house publication (*Geonews*) that informs employees about company-related news and information. The publication includes a message from the CEO and information regarding technical progress, challenges, successes and events. All messages are oriented toward the employees, emphasizing the importance of their roles.

The subject matter in these bi-weekly internal publications include:

- Updates on drilling status in various fields;
- News on the delivery of equipment;
- Community engagement activities;
- Corporate activities and events;
- Updates on new members of the Board of Directors; and
- Updates on funding by government and development partners.

GDC also circulates a daily internal bulletin (*Connect*) via e-mail that is sent directly to each employee. The purpose of this daily message is to enhance employee engagement and pride in the company. The daily e-bulletin serves as a forum for disseminating highlights of GDC's media coverage and other news relevant to the energy sector. This helps staff to understand the world around them with regard to development in the energy sector, both locally and internationally.

The strategy behind these internal communication initiatives is multi-fold: they inform the staff, promote communications between departments and within departments, and facilitate the dissemination of accurate information outside the organization. Other mechanisms for internal communication include: meetings, memos, emails, and noticeboards.

8. BUSINESS MODELS

In 2015, the GoK through the Ministry of Energy requested support from the World Bank Energy Sector Management Assistance Program (ESMAP) to develop a National Geothermal Strategy to identify a means by which Kenya's least cost renewable resource – geothermal energy, could be developed to supply a projected base load demand of 3,589MW by 2035. Similarly, GoK, in an effort to strengthen its capacity in geothermal development in the country sought support the Japan International Cooperation Agency (JICA) which in its final report outlined different business models that can be employed to realize its projected electrical output of +5000MW as captured in Kenya's development blue-print, Vision 2030.

For hastened geothermal development, there is need for both the public and private sector participation, where private sector investment will complement the use of public funds in geothermal development while also focusing on affordability of power to the end-consumers. Consequently, the strategies that have been developed to fast-track geothermal resource development in the country, revolve around business models that differ mainly on the level of uptake of resource risk by either the private or public sectors and the contribution of each to the capital outlay required for the development works.

For the purposes of this strategic plan, only the five business models that will be employed are highlighted, these are;

- i. Exploration Drilling Model,
- ii. Feasibility Study Model,
- iii. Steam Sales Model,
- iv. Joint Venture Model
- v. Fully Public Model

8.1. Public Private Partnership Frame work

The Kenyan PPP framework provides legal considerations based on each business model's legal and commercial structure. The extent to which a business model may be easily implemented under the Kenyan PPP legal framework is an important consideration in evaluating the comparative advantages and disadvantages of each business model hence the inclusion of this section.

The Republic of Kenya adopted the Public Private Partnership Act No. 15 of 2013 (the “PPP Act”) and related regulations (2014) (the “PPP Regulations”, and together with the PPP Act, the “PPP Legislation”) based on the Government of Kenya’s Policy Statement on PPP adopted in November 2011. The PPP Legislation provides for participation of the private sector in infrastructure projects of the Government through a contractual arrangement (a “Public Private Partnership” or “PPP”).

The PPP Legislation establishes protocols and procedures for certain contracts (defined in the PPP Act as “project agreements”) between certain governmental entities or a state corporation, such as GDC (each defined as a “contracting authority”), whereby the private party undertakes to a perform a public function or provide a service, receives a benefit for performing the public function, and is generally responsible for risks relating to its performance under the project agreement. In order to engage in a PPP transaction, the protocols and procedures include;

- (i) Determination by a contracting authority on whether to undertake a PPP;
- (ii) Conducting an assessments and studies and preparing reports relating to the PPP,
- (iii) Solicitation of competitive bids from private parties in connection with the project agreement, as well as privately initiated proposals;
- (iv) Evaluation of responses by private parties relating to such bids;
- (v) Terms to be included in, and negotiation of, the project agreement; and
- (vi) Approval by Government of the project agreement, including the Cabinet and, in some circumstances, approval by Parliament.

The Draft PPP Manual states that a contracting authority can request funding from the Project Facilitation Fund established under the PPP Act to conduct various studies and GDC as a contracting authority can determine whether it wishes to request such funding in implementing any PPP arrangements it could get into for activities such as conducting feasibility studies in any chosen project that will involve a private partner.

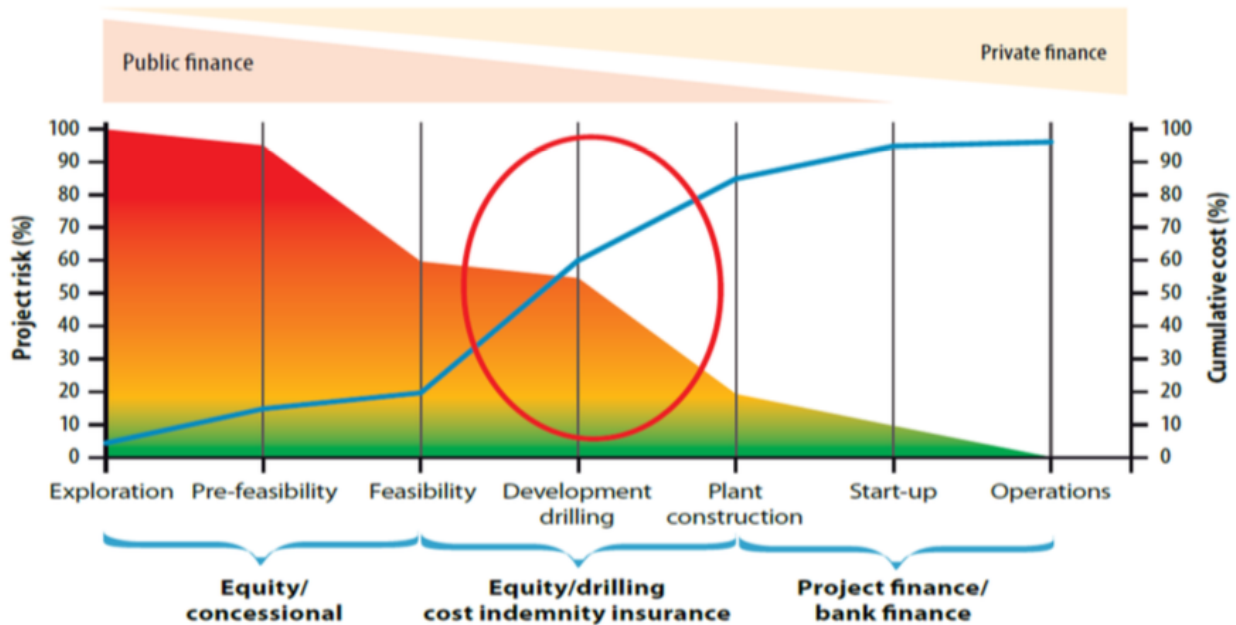


Figure 19: Geothermal development project risks and financial requirements (Parhelion and GeothermEx (2014) and ESMAP (2012)).

8.2. Business Models.

International experience shows that there has been no single model for development of geothermal resources. To this end, GDC shall endeavor to prove the viability of each project in each of the geothermal fields and propose the most appropriate business model that shall have the greatest impact on reduction of the electricity tariff whilst juxtaposing this to the capital outlay required from both the public and private sectors. The determination of the appropriate business model to be deployed will be based on advanced financial modeling for which GDC has already acquired the relevant tools and training from the different development partners (JICA, EAGER and GreenMax).

8.2.1. Exploration Drilling Model (Turkish Model)

In this model, GDC carries out the exploration works in any of its geothermal prospects and drill a total of 3-4 wells to confirm the existence of a geothermal system in the subsurface. The field is subsequently auctioned off to the private sector for development upto the power plant stage. This model would find applicability principally where GDC wishes to carry out exploration in multiple sites and minimize resource risk.

		1	2	3	4	5	6
		Greenfield	Exploration Drilling	Feasibility Study	Steam Sale	Joint venture	Public Model
Resource assessment	Preliminary Survey	P u b l i c	P u b l i c				
	Detailed Surface Exploration			P u b l i c			
	Exploration Drilling and Well Testing				P u b l i c		
	Appraisal Drilling and Well Testing						
	Flow Testing/Well Head	P r i v a t e				P r i v a t e	P u b l i c
	Feasibility Study		P r i v a t e				P u b l i c
Implementation	Production Drilling			P r i v a t e			P u b l i c
	Steam Gathering System						
	Power Plant Construction				P r i v a t e		
Operation	Power Plant O&M						
	Reservoir Management		P u b l i c				
International Application		USA, Turkey, Indonesia, Kenya (Akira & AGILE)	Turkey, USA, Kenya (Olkaria)		Philippines, Guatemala, Kenya (Menengai)	Indonesia	Italy, Mexico, Japan, Iceland, Kenya (Olkaria)

Figure 20: Business models to be employed by GDC to develop geothermal

8.2.2. Feasibility Study Model

This model involves GDC proving the existence, capacity and characteristics of the geothermal resource in a prospect. To do this, GDC will drill exploration and appraisal wells and confirm the medium-to-long-term production capability of the reservoir by either running a wellhead unit (5 to 10 MW) or by performing long-term flow tests for one or two years. By collecting and evaluating information about the reservoir – including its location, potential, and fluid chemistry – the technical risks in further development of the field are significantly reduced. Subsequently, a

feasibility study is prepared and the field is offered to the private sector under a competitive process.

This model will result in a lower generation tariff as the resource risk will have been greatly reduced for any up-takers of the field. Moreover, several fields can be developed simultaneously and subsequently offered to private developers at an accelerated rate, resulting in the rapid development of geothermal resources. This model is attractive to GDC as there is a higher likelihood of attracting investors once the resource is proven while at the same time GDC has the opportunity to establish itself as a recognized steam field manager in the region. This is in addition to the fact that this model can be deployed in a relatively short period of time.

8.2.3. Steam Sales (Menengai Model)

This model involves GDC carrying out surface exploration studies, drilling exploration and appraisal wells, conducting a feasibility study on the resource potential of the field and putting in place a steam gathering system for the collection and direction of steam to a common selling point. The model also involves identifying Independent Power Producers (IPPs) to finance, construct, own and operate a power generation plant to which GDC will supply steam at a cost. This model has been successfully deployed as Phase 1 of the Menengai Geothermal Project, where GDC has developed the steam field, put in place a state of the art steam gathering system, conducted a feasibility study and contracted 3 IPP's to construct 35MW power plants each.

8.2.4. Joint Venture

Here GDC carries out the exploration stage from surface survey to the resource confirmation stage. GDC together with a private company will consequently establish a special purpose company (SPC) to continue the drilling of the production and reinjection wells stage, through the construction of field facilities and eventually to the construction of and operation of the power plant. GDC will transfer the exploration results to the SPC and recoup its initial investment during the operational phase of the power plant. This is a model that has not been used elsewhere but is similar to the public-private joint LaGeo venture in El Salvador. A detailed process flow of the privatization process is contained as Annex 1 – GDC Menengai Task 3 Report: Comparative Analysis of Geothermal Development Models.

8.2.5. Full Public Model

In this model, GDC carries out all development stages ranging from the surface survey, the resource exploration, confirmation and appraisal, construction of the field facility and the power plant. The risk is borne entirely by the public sector and is reduced through funding from the exchequer and concessionary loans. The burden on the public finances is only reduced by the revenues earned from the sale of electricity and through grants from development partners. This model has the greatest impact on reducing the cost of power and has been successful in Kenya, Ethiopia and Costa Rica.

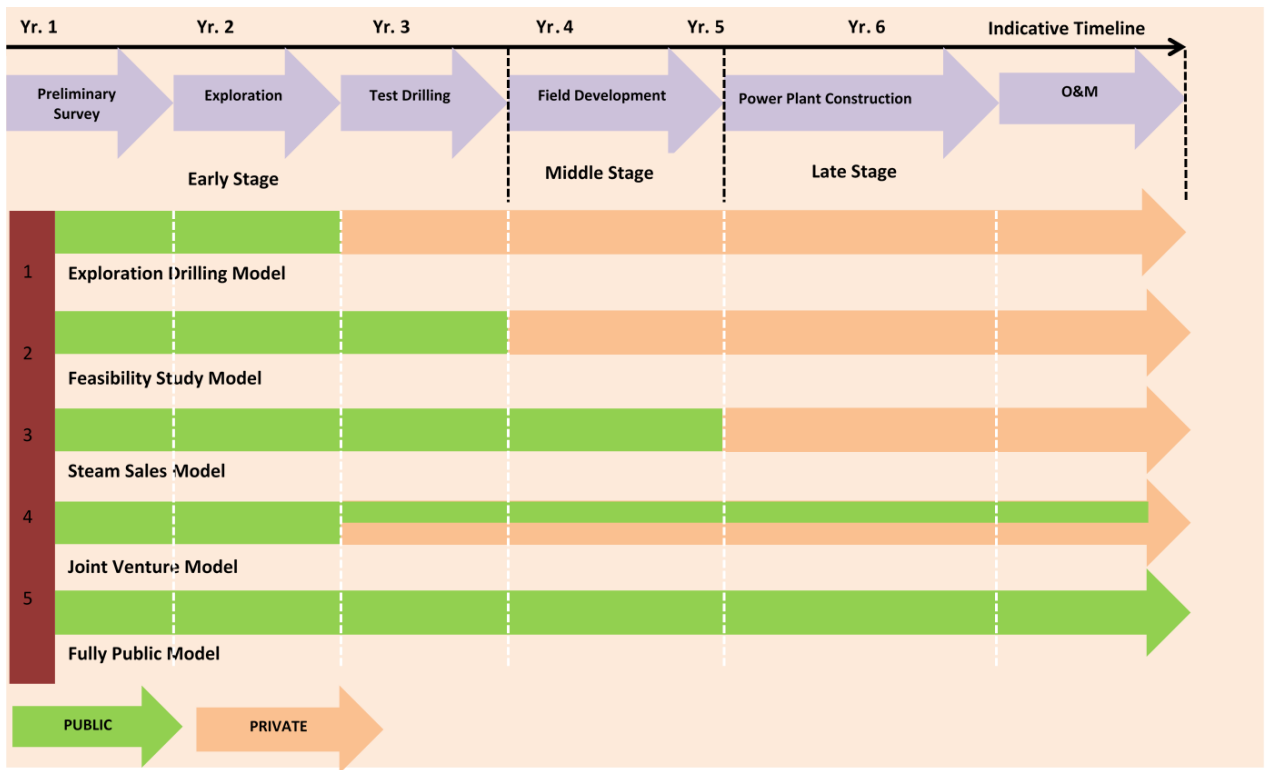


Figure 21: Business models and geothermal project life cycle (Source: Modified from Gehringer and Loksha, 2012)

8.3. Tariffs based on Business Model

To adequately determine the best business model to deploy in the respective prospects, the following defining parameters were chosen and their relative impacts on the different business models were assessed.

i. Internal rate of return (IRR)

The IRR is the discount rate that makes the net present value of the project cash flows equal to zero.

ii. Debt Service Coverage Ratio (DSCR)

The DSCR is a metric used to measure the ability to service debt. For the purposes of this strategic plan a ratio of 1.4 has been used.

iii. Capital Requirement

The capital requirement is the equity that GDC will be required to invest. A ratio of 70% - debt and 30% - equity has been used.

iv. Tariff

Highlighted below is the eventual generation tariff charged for the electricity under each business model is provided in the comparative analysis below.

Business Model	Electricity Tariff (USD/MWh)	Capital Requirement USD '000'	IRR to GDC	Minimum DSCR	Average DSCR	Target DSCR
All private model ²	95	118,565.77	22.99%	1.67	2.18	1.4
Feasibility Model	88	120,498.49	19.05%	1.5	1.96	1.4
Joint Venture Model	83	66,781.00	21.25%	1.42	1.85	1.4
Steam Sales Model ³	95	62,030.11	18.08%	1.51	1.62	1.4
Fully Public	65	110,992.61	16.13%	1.79	1.91	1.4

Table 15: Comparative analysis of target tariffs based on business model deployed (Source: GreenMax (DEC, 2017), Task 3 Report: Comparative Analysis of Geothermal Development Models⁴.)

² The capital requirement and IRR in all private model relate to the private investor, not to GDC and are only shown for comparison purposes.

³ The electricity tariff for the steam sale model is comprised of \$3.5/MWh of steam supply as calculated in the financial model plus an assumed \$50/MWh for steam conversion by the IPP

⁴ The electricity tariff for the steam sale model is comprised of \$3.5/MWh of steam supply as calculated in the financial model plus an assumed \$50/MWh for steam conversion by the IPP

Note: The electricity tariff for the steam sale model is comprised of \$3.5/MWh of steam supply as calculated in the financial model plus an assumed \$50/MWh for steam conversion by the IPP.

Below is a schedule that shows the distribution of business models across the breadth of the GDC's asset portfolio.

No.	Field	Project	Proposed Business Model	Justification
1	Menengai	Phase I 105MW	Steam Sales Model	Available skilled experts and state of the art equipment for carrying out geothermal exploration and development up to steam gathering stage.
		Phase II Unit 1 35MW		
		Phase III 100MW		
		Phase II Unit 2 35MW	Fully Public Model	Easier to achieve a low tariff due to lower return expectations of public funds and through GoK access to cheaper long term financing from Development Finance Institutions (DFIs)
		Phase IV 100MW	Feasibility Model	<ul style="list-style-type: none"> Several fields can be developed simultaneously and subsequently offered to private developers, thereby accelerating resource development. Reduce financing needs as the private developer bares the financing of production drilling, steam field development, construction and operation of the power plant.
		Phase V 100MW		
2	Baringo-Silali	Paka Unit 2 70MW	Fully Public Model	Easier to achieve a low tariff due to lower return expectations of public funds and through GoK access to cheaper long term financing from Development Finance Institutions (DFIs)
		Silali Unit 1 70MW		
		Paka Unit 1, 3 & 4 (210MW)	Steam Sales Model	Lower tariffs for power supply since GDC has covered all exploration risks which in turn limits private capital to the low risk activity of converting steam to electricity.
		Korosi Unit 1 & 2 (140MW)		
		Silali Unit 2 70MW	Feasibility Model	<ul style="list-style-type: none"> Several fields can be developed simultaneously and subsequently offered to private developers, thereby accelerating resource development. Reduce financing needs as the private developer bares the financing of production drilling, steam field development, construction and operation of the power plant
3	Suswa	Phase I 100MW	Feasibility Model	<ul style="list-style-type: none"> Reduce financing needs as the private developer bares the financing of production drilling, steam field development, construction and operation of the power plant
		Phase II 100MW		
		Phase III 100MW		

Table 16: Proposed business models for each field

9. FUNDING AND FINANCIALS

9.1. Funding

9.1.1. Current Funding Status

From inception, the government has supported GDC in financing its geothermal development activities. Given that the gestation period of a geothermal project is lengthy, the government support is expected to continue into the 2018/19-2022/23 strategic plan to enable GDC realise its objectives under the Vision 2030 and MTP III planning for the country.

The financing of the GDC development plan is from three main sources;

- The Exchequer funding
- Development Partner loans & grants
- Revenue from steam sales

The Government has continued to support GDC through exchequer allocation every financial year in support of project development and recurrent activities. The Government has also on-granted loans and grants in support of GDC projects through funding from development partners.

Revenue from steam sales was first realised in the 2014/15 financial year from the 280MW Olkaria I & IV Project. The average revenue received from sale of steam is estimated at Three (3) billion Kenya shillings per year. So far, GDC has received a total of USD 8.9 million as revenue from steam sales as at December 2017.

GDC's development partners have disbursed a total of \$217 million worth of financial assistance as at December 2017. The company is currently seeking to close on substantial new funding commitments and negotiating additional funding with specific partners in order to develop the three projects namely Menengai, Baringo-Silali and Suswa. Diversification of financing sources is also an option that GDC will pursue in the strategy.

Funding Source	Amount (million US\$)
GoK Equity	420
Development Partner	217
Steam Sales	89
Total	726

Table 17: GDC Funding as of December 2017

9.1.2. Overview of Status of GDC Financing Resources

a) Government of Kenya

The GoK has invested approximately \$420 million (42 billion KES) between 2009/10 and 2017/18 to support the GDC's projects. Given that most of GDC activities are on green fields, the government has continued to support GDC since inception by providing revenue to cover GDC's operations and project development mainly project preparation activities including infrastructure in the project areas.

Financial Year	Amount (MUSD)
2009/10	56,178
2010/11	67,750
2011/12	71,522
2012/13	52,681
2013/14	57,239
2014/15	34,044
2015/16	32,504
2016/17	33,137
2017/18	14,778
Total	419,834

Table 18: GoK Funding Support at December 2017

GDC financing strategy includes government support for the strategic plan 2019/2023. It is projected that GDC will receive exchequer funding estimated at USD 381 million during this planning period.

b) Steam Sales Revenue

The financial year 2014/15 marked a great milestone for GDC in terms of income generation. GDC received its first revenue from steam sales at the Olkaria Field paid through KenGen. GDC drilled 59 wells under the 280MW Olkaria I & IV Project availing steam to KenGen for generation. So far, GDC has received approximately USD 8.9 million as shown in Table 19 below;

Financial Year	Amount (Kshs "000")
2014/15	2,534,774
2015/16	3,160,664
2016/17	2,901,862
2017/18	306,711
Total	8,904,011

Table 19: Revenue received from steam sales as at December, 2017

c) Development Partners

GDC has benefitted from the support of the following development partners; the Africa Development Bank (AfDB), Climate investment Fund (SREP), the French Development Agency (AFD), the German Development Bank (KfW), U.S. Trade and Development Agency (USTDA), the World Bank (WB), the European Investment Bank (EIB), the Japan International Cooperation Agency (JICA), Nordic Development Fund (NDF), Geothermal Risk Mitigation Fund (GRMF) and export credit agencies such as India Exim Bank and China Exim bank. The bar chart below shows the committed funds from the development partners.

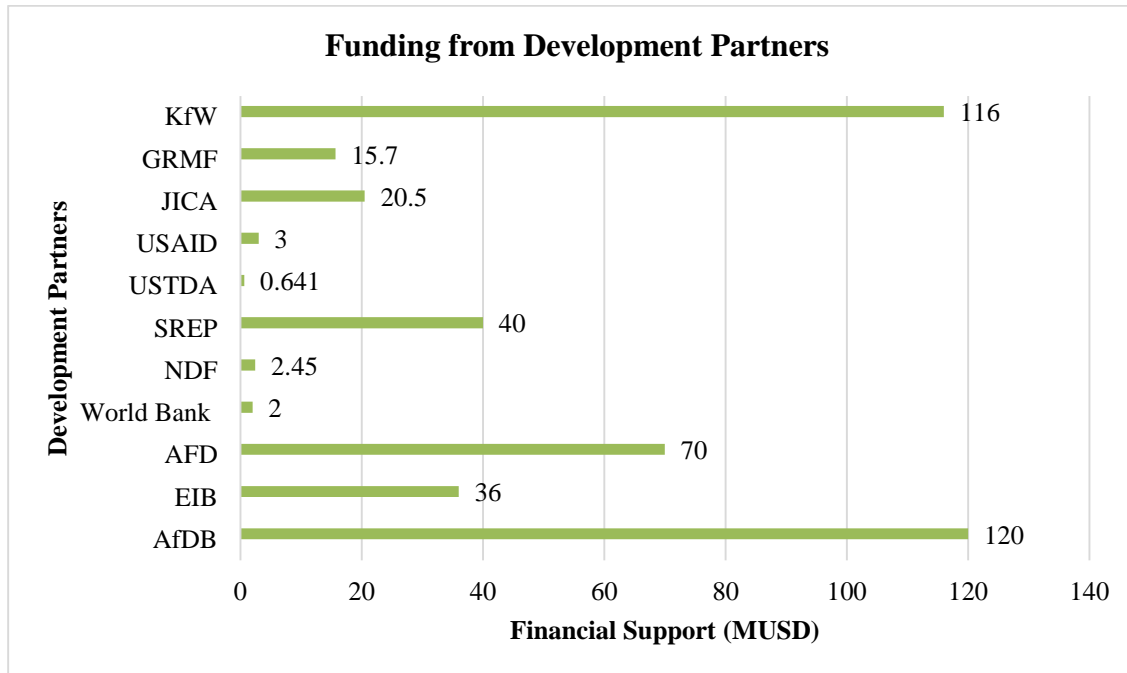


Figure 22: Committed Funds by Development Partners

Committed Funds

The total commitment from development partners to date is USD 426 million. The funding was structured per project and the description is shown below;

i. Olkaria Project

- Kreditanstalt für Wiederaufbau (KfW)

In 2010, KfW financed the drilling of 10 wells with a 25-year \$16 million concessional loan provided to the GDC (via the GoK) at a 0.75% interest rate for Olkaria field. The loan was fully disbursed by the end of the year 2012.

- China Exim Bank

The Exim Bank of China provided GDC with a 20-year \$95 million loan at a 2% interest rate to fund drilling services for 26 wells. By the end of 2012, the loan had fully been disbursed.

ii. Menengai Geothermal Project

The Menengai Project received financing support from the Government and various Development Partners. The support is in form of loans, grants and technical assistance.

- African Development Bank (AfDB)

The AfDB has provided loans and grants to the GoK with GDC as the implementing agency. On July 12, 2012, GDC benefitted from an additional 40-year \$120 million loan at a 0.75% interest rate for the procurement of drilling rigs, drilling materials, and technical advisory services for the Menengai Project. On March 12, 2012, the AfDB, acting as the implementing entity of the strategic climate fund (Scaling-up Renewable Energy Program or SREP) provided a grant of \$17.5 million for the procurement of equipment, well drilling, and consultancy services related to the development of the Menengai project. Furthermore, under the SREP, the AfDB provided a 40-year \$7.5 million loan at a 0.75% interest rate to finance drilling services. The SREP is a under the Climate Investment Funds.

The AfDB funding is currently at 80% rate of disbursement and it is anticipated that the total funds will be disbursed by June 2018 when the funding comes to an end.

- The French Development Agency (AFD)

The Government received USD 70 million loan facility from AFD at 2% below the EUROBOR interest rate for the Menengai Project in April 05, 2011. The funded components include; purchase of 2 rigs, business and strategic plan update and capacity building. The deadline for utilization of funds was December 31, 2015.

- European Investment Bank (EIB)

The GDC via the GoK has received a \$36 million grant from the EIB for the purchase of diesel fuel for rigs at the Menengai site. The grant became effective December 15, 2012 and expected to be fully used by December 2013. The funding is complete and the savings were utilised to carry out audit of the use of funds by GDC.

- World Bank

On September 3, 2010, the World Bank provided a 40 year \$2 million concessional loan at a 0.75% interest rate to KenGen. From this loan, GDC received grant funding of USD 2 Million to finance a feasibility study of the 400 MW Menengai Phase I Project. The feasibility study has been completed and funds disbursed.

- Japan International Cooperation Agencies (JICA)

GDC received financial support from JICA as a technical assistance grant financing of USD 20.5 million to undertake the Capacity Strengthening Project (USD 18.5 Million) and The Project for Reviewing GDC's Geothermal Development Strategy in Kenya (USD 2.0 Million).

The financing support is up to March, 2019.

- United States Agency for Development (USAID)

USAID provided funding to GDC for technical assistance of approximately USD 3 million for Direct Use Programs. The Pre-feasibility studies and funding have been completed.

- US Trade Development Agency (USTDA)

The USTDA provided a USD 0.641 million grant to the GDC on August 2, 2010 for consultancy services regarding investor engagement, transactional documents, and economic & financial modelling. The funding is complete.

- Nordic Development Fund (NDF)

The NDF is supporting GDC to a tune of EURO 1.98 million in capacity building for drilling staff. The funding is divided into two (2) components; training needs assessment (TNA) and training program. The financing is up to 2018.

iii. Baringo-Silali Project

The Baringo-Silali Project received financing support from various Development Partners. The support is in form of loans and grants.

- Kreditanstalt für Wiederaufbau (KfW)

The Government signed a loan agreement with KfW in July 2014 for the Baringo-Silali Project amounting to EUR 80 million for the water reticulation system, drilling services for 15-20 wells and consultancy services. The fields to be developed include Paka, Korosi and Silali.

The loan is effective at 22% of the total funds is disbursed. The loan agreement will end by 1st August, 2019.

- Geothermal Risk Mitigation Facility (GRMF)

The Geothermal Risk Mitigation Fund (GRMF) approved a grant of USD 15.7 million for exploration drilling (2 wells) and infrastructure for Paka, Korosi and Silali projects. GDC is finalizing on Conditions Precedent before disbursement.

iv. Suswa Geothermal Project

- Italian Development Cooperation Agency (AICS)

The Italian Agency for Development Cooperation (AICS) has approved a loan of EUR 40 million to the government for the Suswa project. The components to be funded are drilling services, water supply system, project management and capacity building to be implemented by GDC.

9.1.3. Financing Plan

Development Partners

In order to fund future activities on geothermal development, GDC will continue to pursue various sources on-granted loans and grants. The envisaged funding for the strategic plan 2018/19-2022/23 is described below;

i. Concessional Loans

The African Development Bank (AfDB) has committed to fund the steam gathering system for the 60MW Project at the Menengai Field. In this respect, a loan agreement amounting to USD 25 million is expected to be signed between the Government and AfDB with GDC as the implementing agency.

Kreditanstalt für Wiederaufbau (KfW) are at an advanced stage on additional financing to the Baringo-Silali Project. The funds, amounting to USD 100 million, will be channeled towards production drilling at the Paka Field.

The French Development Agency (AFD) and GDC are negotiating on the financing of the Baringo-Silali field. The funds will be channeled to the production drilling phase of the Korosi project after the feasibility study has been done. The amount is USD 100 million.

The India Exim bank is appraising a proposal from GDC for the Baringo-Silali Project to fund drilling of 10 wells, infrastructure, two (2) wellhead units and training. The amount in discussion is USD 100 million. An additional USD 100 million has been sought for Suswa to fund drilling, infrastructure and wellheads.

GDC applied for accreditation to the Green Climate Fund (GCF) on recommendation of the National Designated Authority (the National Treasury). GDC is also pursuing funding for its projects as an implementation agency through an accredited entity. UNEP has agreed to collaborate with GDC under the “Readiness Programme” to pursue GDC accreditation and a grant financing of USD 146 million for the 100MW Menengai Phase III.

ii. Technical Assistance

International Renewable Energy Agency (IRENA) and the Renewable Energy Performance Platform (REPP) are in discussions with GDC on moving the pre-feasibility studies to feasibility on direct-use programs. JICA will continue with the capacity strengthening program which has been a real boost to capacity building at GDC.

East Africa Geothermal Energy Facility (EAGER) is a facility which seeks to cover gaps in government role to support geothermal development by removing barriers and speeding progress. The support that GDC has requested is for its business plan simulation and the assistance has been approved.

The GeoFutures Facility is similar to GRMF and is aimed at supporting up-stream activities of geothermal development in East Africa with Kenya and Ethiopia as pilot counties. This facility will cover legal & regulatory framework, exploration drilling (upto six wells), community engagement, peer review and any other activity required to boost the progress of geothermal development in East Africa. The setting up of the fund is underway.

Financier	Facility	Amount (MUSD)	Project	Funding Component	Status
AfDB	Loan	25	Menengai Phase II	Steam Gathering System	Approved. Awaiting signing
KfW2	Loan	100	Baringo Silali-Paka	Production drilling	Discussions at advanced stage
AFD	Loan	100	Baringo Silali-Korosi	Production drilling	Discussions at advanced stage
AICS	Loan	48	Suswa	Drilling, water system, project management, capacity building	Approved. Awaiting signing
India Eximbank	Loan	100	Baringo-Silali	Drilling (10 wells) infrastructure, two (2) wellhead units and training	Proposal under appraisal by the Indian Government
		100	Suswa	Drilling (10 wells), infrastructure and two (2)wellheads units	Proposal under appraisal by the Indian Government
GCF	Loan	146	Menengai Phase III	Drilling materials and scientific equipment	UNEP collaborating with GDC on accreditation and project financing
IRENA	Technical Assistance	N/A	GDC	Direct use	Discussions ongoing

EAGER	Technical Assistance	N/A	GDC	Business plan simulation	Approved. Conceptualization underway
GEOFUTURES	Technical Assistance	N/A	GDC	To be determine	Fund set-up ongoing
TOTAL		619			

Table 20: Summary of project financing sources and respective status

Other options for funding the strategy

iii. Clean Development Mechanism (CDM)

Kenya is signatory to, and has ratified, the Kyoto Protocol; therefore, qualified projects in the country are eligible to earn certified emission reduction (CER) credits through the Clean Development Mechanism (CDM). CERs⁵ can then be traded and sold in carbon markets. Projects receive CERs for a defined crediting period that may not exceed the operational life of the project. The crediting period is usually limited to seven years with the potential to be renewed up to two times.

Currently, the National Environment Management Authority (NEMA) is the Designated National Authority (DNA) for the CDM in Kenya. As such, NEMA has the ability to authorize and approve participation in CDM projects. To be registered as CDM projects, projects must be approved by the CDM Executive Board in addition to receiving approval from NEMA.

Based on an examination of registered CDM projects in Kenya and the rules for the CDM, it seems likely that GDC will be able to successfully register its projects with the CDM and receive CERs, at least in the near to medium term. Over time, as the generation mix changes to favor geothermal and other clean generation as is planned by the GoK, GDC may find it increasingly difficult to pass the CDM baseline and “additionality” tests required to register and receive associated CERs.

Oversupply of CERs related to heavy renewables development in the European Union (EU), combined with slowing EU industrial demand and uncertainty about possible changes to eligibility

⁵ 1 CER = 1 ton of avoided CO₂ emissions.

rules, has resulted in a CER price collapse since 2008, when prices in regulated CER markets were in the \$20/ton range, to approximately \$0.30/ton in December 2012.

At an anticipated crediting ratio of 0.5 ton/MWh and a price of \$0.30/ton, GDC could receive at most \$0.15/MWh (or its equivalent for steam used for electricity production), which would not make a significant contribution to GDC's revenues. Therefore, while the possibility of a CER market recovery constitutes significant upside, GDC will not factor CER sales as a component of its revenue streams.

iv. Investment by host communities

The amount of land required for geothermal project development can be substantial and can disrupt the lifestyle of the land owners. Most indigenous communities inhabiting areas with geothermal resources have a special cultural or spiritual connection with the geothermal. For that matter conflicts with land owners in geothermal project development is real.

Complicating matters, in Kenya the government owns the rights of sub-surface resources which may lead to conflicts between the surface right owners and the sub-surface rights owners (government or project developer).

The disruptions and delays for geothermal projects can be minimized if the project developer and the host communities partner in the project. The partnership can include; giving the host community shares in the companies investing power plants and leasing directly the land where the power project infrastructure is located. In addition, the host community can invest in smaller geothermal power plants where GDC provides the steam. The involvement of host communities in geothermal projects shall take cognizance of the prevailing national legislation and revenue-sharing mechanisms.

v. Listing in the Stock Exchange

For GDC to be listed in the securities exchange would be a great milestone for the company. It would create opportunities to access additional capital for projects through issuance of stock and also, enhance the public image of GDC. It will also reduce the cost of capital as banks view publicly traded companies as less of a credit risk as they have access to other capital.

According to the NSE listing manual, the decision to list a company needs to be made once a realistic assessment has been done on its management, resources, stage of development, long-term strategy, goals and future prospects. GDC would also need to consider the timing of a listing in terms of market conditions and where the business is at that point in time. GDC would also be required to appoint advisors such as stockbrokers/investment bank, legal team, accountants, marketers etc. The appointed advisers would also play their part in making sure the company satisfies the rules and regulations and meets the market expectations. In addition, Public companies have to adhere to certain rules and regulations, which differ according to the market the company joins, and also have to meet accepted standards of corporate governance.

The NSE listing guide 2011 demonstrated that there are three (3) principal ways of going Public;

- i. Introduction – a market where no new money is raised
- ii. Initial Public Offering (IPO) - where institutions and private individuals are invited to subscribe
- iii. Private placing - in which shares are offered for sale on a selective basis, primarily to institutional investors.

GDC's choice depends on the nature of its business and capital requirements. For GDC, the best option would be focus on the IPO as a means of going public.

There are three major factors that determine a company's choice to go public:

- i. The stock market valuation of other firms in the same industry,
- ii. The company's size and
- iii. The destination or use of raised funds.

GDC's strategic direction towards being listed in the stock exchange is to achieve sustainability and good governance. The competitive advantage GDC has in attracting investors is the fact that GDC is a green energy producer. By increasing the installed geothermal capacity in the national grid, GDC will become more attractive to public investors when GDC shares are floated in the stock exchange.

In order to increase its competitive edge in the market, GDC will engage energy users "beyond the grid" including industrial power consumers located close to the geothermal projects in a bid to increase the utilization of the geothermal power and heat. The implementation will include setting up of industrial parks in all project areas. It's envisaged that this industrial park will attract large, energy intensive industries that are capable of directly taking up power and high or low enthalpy steam produced in all project areas. This will reduce their cost of doing business and consequently bring down the cost of goods and services. Direct use of geothermal resources is strategic importance to GDC as it creates new business opportunities for the communities near the geothermal resource

9.2. Financials

A financial model based on the strategic period has been developed to estimate the financial requirements of the strategic plan. The focus of the projected financial statements is to flexibly forecast revenue and expenses for GDC as a corporate entity, producing pro forma financial statements.

Programme Name/Project Title	Steam (MWe)	Wells	Estimates cost of project - Steam Dev. + SGS (Kshs. Millions)	Source of Financing		Timeline	
				GOK	Development Partner	Start date	Expected completion date
Menengai Geothermal Development Project	465	157	115,926	90,845	25,081	Jan-10	Aug-27
Bogoria-Silali Geothermal Projects	300	97	78,029	46,940	31,089	Jun-10	Jun-28
Suswa Geothermal Project	300	97	78,029	62,332	15,698	Jan-14	Mar-29
Africa Geothermal Centre of Excellence (AGCoE)	-	-	1,790	1,790	-	Nov-14	Jun-21
Total	1,065	351	273,774	201,906	71,868	-	-

Table 21: Table summing up the total cost of GDC’s Projects under implementation

9.2.1. Key Assumptions

Production Assumptions

GDC’s financial planning begins with a bottom-up cost and revenue forecast using its corporate financial model, in order to identify additional funding needs. The cost and revenue forecasts rely on key assumptions about GDC’s core activities: drilling wells, producing steam, and producing electricity. Together, these are referred to herein as production assumptions. Historical values for production activities, as well as for costs and revenues, are provided together with going-forward assumptions, for reference. All costs and revenue assumptions (and hence forecast results) are stated in US dollars (USD) as modeled, unless otherwise stated.

Cost Assumptions

Description	Amount	Unit
Surface Studies	2	MUSD/Project
Infrastructure Costs	0.5	MUSD/Well
Feasibility Study	2	MUSD/Project

Steam Gathering	0.4	MUSD/MW
Wellhead Generation Unit	3	MUSD/MW
Power Plant	1.7	MUSD/MW
Labour	1,700	USD/Staff/Month
Steamfield O & M	1.00	USD/MWh
Wellheads O&M	2.50	USD/MWh
Drilling Cost Per Well (Own Drilling Rigs)	3.5	MUSD/Well
Drilling Cost Per Well (Hired Drilling Rigs)	6	MUSD/Well
Success Rates		
Exploration Success Rate	50%	
Appraisal Success Rate	75%	
Production Wells Success Rate	90%	
Steam Sustainability Wells		
Steam Wells Used For Re-Injection	35%	
Number Of Reinjection Well To Production Wells	20%	
Excess Steam At Startup	20%	
Exchange Rate	105	Kes/USD
Contingency	10%	

Table 22: Cost assumptions used in financial analysis in Million US dollars

9.2.2. Key financial analysis

Cost Analysis

The major categories of non-financing costs that GDC faces are operating costs and capital expenditure (CapEx) costs. GDC will finance the project using 100% GoK on-granted equity. The capital expenditure incurred over the strategy period will be amortized over 25years using straight line depreciation. The cost incurred to date represents the steam development costs funded by GoK and Development Partners from FY2009/2010 to Q1 FY2017/18.

Capital Expenses

GDC capital expenses have been summarized in the table below. GDC will develop Menengai, Baringo – Silali and Suswa. Surface studies for the initial phases has been conducted. The costs represented include;

Infrastructure: This represent the initial field development costs not incurred to date. The costs include access roads, water line and well pads estimated at \$ 0.5 Million per well.

Drilling costs: Capitalized drilling costs include drilling materials and consumables, consultancies related to drilling such as drilling rig move and directional drilling services and direct labor. GDC will drill using the 7 owned rigs at \$3.5 Million per well and hire rigs at \$ 6.0 Million per well. The drilling plan and the rig mobilization schedules are discussed in the earlier chapters.

Wellhead Power Plant Cost: GDC will own and operate wellhead generating units amounting to 30MWe. The cost of the wellhead is \$3.0 Million per MW representing the equipment and installation costs; steam gathering costs; transmission costs and consultancies owing to installation of the wellheads.

Power Plant Cost: GDC will own and operate power plants generating 53MW from Menengai, 70MW from Paka and 70MW from Silali. The cost of conventional power plants is estimated at \$1.7 Million per MW for the equipment and installation and \$0.4 Million per MW for the steam gathering system.

Operating Expenses

GDC's operating costs comprise all of those costs related to maintaining GDC's ongoing activities. These costs have been summarized as;

Labour costs; this represent the staff costs at the rate of \$1,700 per staff per month.

Steam Field O & M: this represent the cost of maintaining the steam field and the steam gathering infrastructure on GDC projects at \$ 1.0 Million per MWh

Wellhead O & M: this represent the cost of maintaining GDCs owned wellheads and power plants at the cost of \$ 2.5 Million per MW

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capital Costs														
<i>Incurring Costs to date</i>		796	-	-	-	-	-	-	-	-	-	-	-	-
Infrastructure	-	51	14	15	14	14	13	13	13	14	14	12	14	14
Drilling Costs (Own Rigs)	-	-	67	77	84	84	91	91	91	95	95	81	95	95
Drilling Costs (Hired Rigs)	-	-	48	48	24	24	-	-	-	-	-	-	-	-
Wellhead Power Plant	-	-	-	30	30	30	-	-	-	-	-	-	-	-
GDC Power Plant	-	-	-	-	-	74	-	-	-	147	147	-	-	-
Contingency	-	5	13	17	15	23	10	10	10	26	26	9	11	11
Total Capex	796	56	141	187	167	248	114	114	114	281	281	101	119	119
Cummulative Capex		56	197	384	551	799	913	1,028	1,142	1,423	1,703	1,804	1,923	2,042
Operation Costs														
Labour	-	23	24	26	31	36	37	38	42	43	46	49	51	54
Steam Field O & M	-	-	-	1	1	2	2	3	3	4	6	7	8	11
Well Head O & M	-	-	-	0	0	1	1	1	1	3	5	5	5	5
Total Opex	-	23	24	27	33	39	41	42	46	50	56	61	65	71
Total Costs		78	165	214	200	287	155	157	160	330	337	163	184	189

Table 23: Capital and operating Costs Breakdown (\$'000,000)

Revenue Analysis

GDC will generate revenue mainly from sales of steam and sales of electricity. Other revenues will be generated through provision of consulting services and direct use applications. GDC will also sell Paka Unit 5 after appraisal.

Steam Sales: GDC will sell steam to IPPs and other generators, including KenGen, at a starting price of \$ 2 per MWh in real US dollars. The price is indexed in subsequent years to US dollar consumer price inflation (CPI) of 3 %. 20% of the tariff will be escalated from year 1 to 12 and 15% from year 13. The steam sales revenue include the sale of out of the vested wells at Olkaria.

Electricity Sales: GDC will sell power to KP starting at \$ 7 per MWh and indexed by consumer price inflation in the subsequent years.

Consultancy and Direct uses: GDC offers training and consultancy services as the Geothermal Centre of excellence and will promote direct uses of geothermal.

Sale of Paka 5 after appraisal drilling; GDC will develop the Paka 5 unit up to appraisal drilling by conducting surface studies, infrastructural works drilling 9 wells and conducting a feasibility study. The Capex estimated at \$40 million will be recouped at 20% mark-up over 10 years from 2030.

	YEAR													
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy Revenue	-	-	-	5.55	11.17	36.54	36.77	37.01	37.26	77.93	119.17	120.03	120.92	121.83
Steam Revenue(Other Fields)	-	-	-	16.66	22.34	22.48	22.63	34.17	34.40	46.18	58.13	81.97	94.37	142.63
Steam Revenue (Olkaria)	29.18	29.37	29.56	29.75	29.95	30.16	30.37	30.59	30.82	31.05	30.67	30.86	31.05	31.25
Training and Consultancy	-	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Direct Utilization	-	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Lease of Paka 5 After Appraisal Drilling	-	-	-	-	-	-	-	-	-	-	-	-	-	4.80
Total Revenue	29.18	29.43	29.62	52.02	63.53	89.24	89.83	101.83	102.54	155.22	208.04	232.92	246.40	300.57

Table 24: Projected Revenues from energy sales, steam sales and other products (\$'000,000)

Cost – Income Analysis

The revenue forecast provided in the table above shows revenues, expenditures and the cumulative cash position of GDC by year. As can be seen, with revenues exceeding expenditures (including GDC's aggressive capital investment program), the cumulative net cash position begins to head towards the positive in 2026.

	YEAR													
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Costs	78.24	164.61	214.14	200.17	287.12	154.97	156.83	159.99	330.47	336.52	162.60	183.56	189.36	
Revenue	29.43	29.62	52.02	63.53	89.24	89.83	101.83	102.54	155.22	208.04	232.92	246.40	300.57	
Gross Profit	6.73	5.81	24.88	30.56	50.17	49.26	59.41	56.94	105.25	152.02	171.52	181.64	230.01	
Net Profit	-17.57	-19.63	-9.87	-10.66	-1.18	-8.13	-3.94	-8.58	22.32	47.92	54.43	58.94	89.77	
Cashflows	34.70	48.92	78.03	113.16	163.83	216.58	277.68	338.30	433.98	565.46	713.65	870.03	1061.57	

Table 25: Cost-Income analysis indicating the projected costs, revenues and cashflows (\$'000,000)

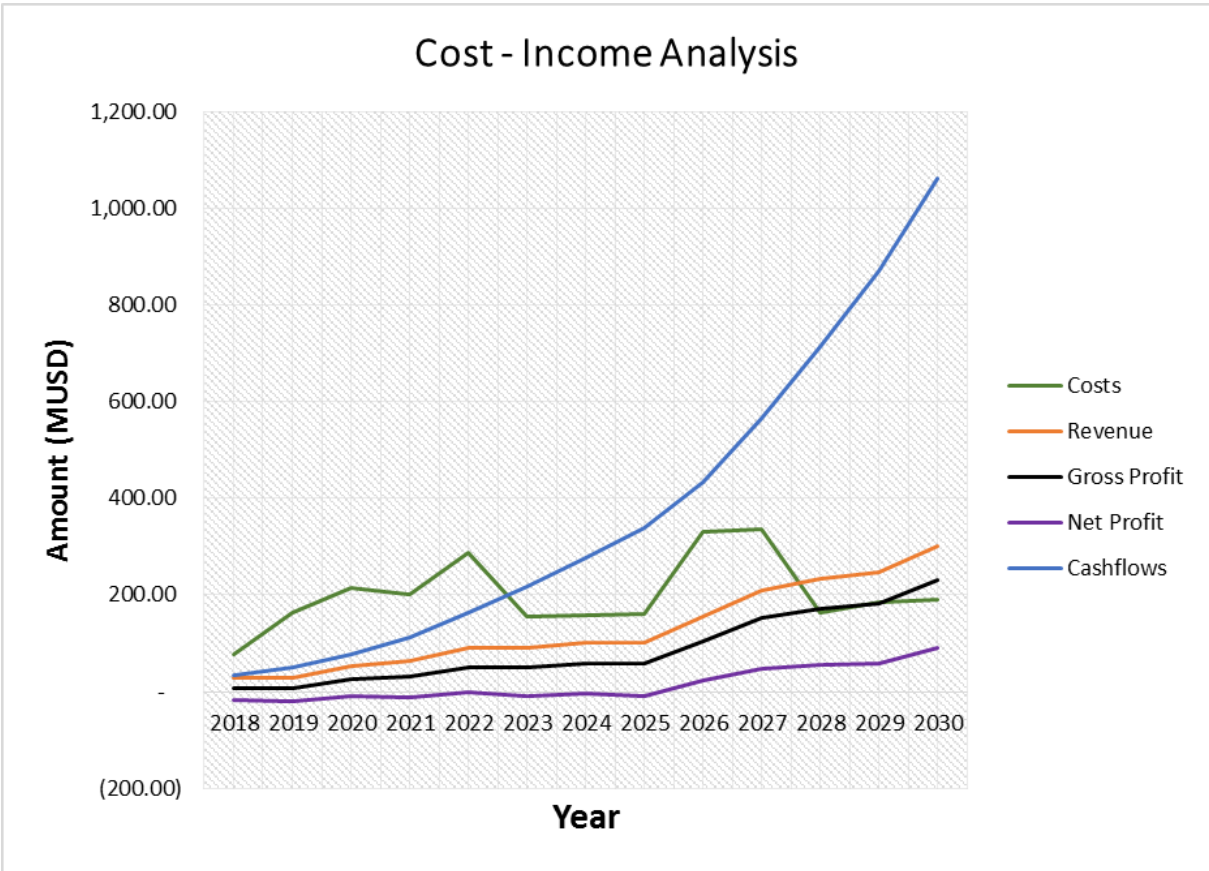


Figure 23: Cost-Income analysis indicating the projected costs, revenues and cashflows (\$'000,000)

Table 26 below shows how GDC plans to meet the financing requirements. GDC expects to meet most funding needs through revenues from GDC projects, equity investments by the GoK, as well as on-granted loans to the GoK from development lenders and ECAs.

Funding Source	Year												
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Revenue	29.62	52.02	63.53	89.24	89.83	101.83	102.54	155.22	208.04	232.92	246.40	300.57	
Devt Partners	35.68	63.50	43.56	106.35	21.29	17.88	25.18	150.17	105.29	28.36	15.59	6.15	
GoK Capital	75.51	72.61	61.86	55.58	6.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
GoK Recurrent	23.81	26.01	31.23	35.95	37.35	37.11	32.28	25.08	23.19	0.00	0.00	0.00	
Total Receipts	164.61	214.14	200.17	287.12	154.97	156.82	159.99	330.47	336.52	261.29	261.99	306.72	

Table 26: Breakdown of annual funding for each financing source

The figure below compares the sources of funds available for GDC. Revenue streams are expected to grow owing to GDC owning wellheads and power plants.

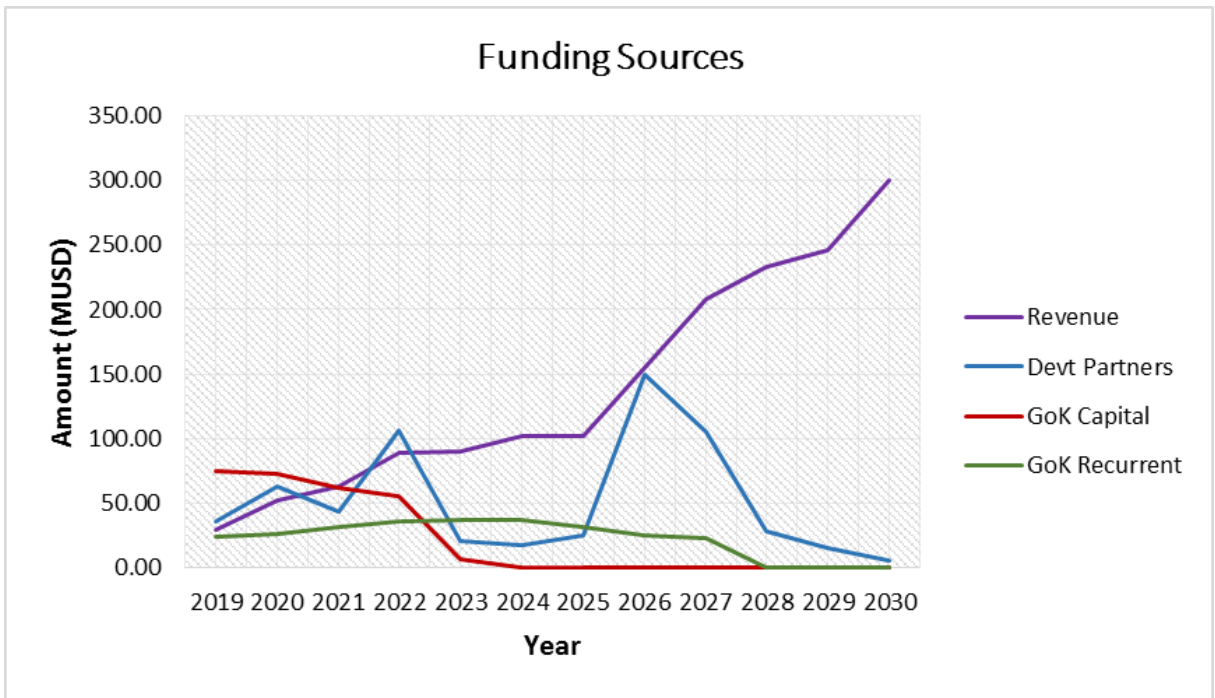


Figure 24: Annual funding trend for each financing source

10. STRATEGIC GOALS, OBJECTIVES AND RISKS

Over the years, the energy mix in the country has evolved significantly with geothermal energy playing a significant role in this evolution. As highlighted above, the generation capacity expanded by 32% between 2013 and 2017 from 1,768MW to 2,333MW respectively. Approximately 400MW of this increase is sourced from geothermal sources. Nonetheless, a drive by the private sector to play a more substantive role in the geothermal development value chain, emphasis on power production from diverse renewable sources, technological advancements in power production, government processes that are outpaced by the requirements of geothermal development are among other factors that require a focused strategy for GDC to maintain its competitive advantage. This chapter focuses on the strategic goals, objectives and strategies for GDC that will ensure that such competitive advantage is maintained and advances are made in new areas of geothermal resource monetization. These strategies are aligned to the overall GoK development blueprint – Vision 2030, GoK’s MTP III (2018 – 2022) still in draft form, Session Paper No. 4 of 2004 and the Energy Bill 2017.

GDC long-term plan is to develop additional 1065MWe equivalent of steam by 2030. The medium term plan is to develop additional 485MWe of steam by 2023 by drilling approximately 139 geothermal wells. This strategy will be executed under the period 2018/19 – 2022/23.

The key performance indicators (KPIs) that will measure the success of GDC in implementing this strategy are;

- i. Amount of Steam Energy Developed
- ii. Number of geothermal wells drilled
- iii. Amount of Power connected to grid
- iv. Amount of Revenue generation
- v. Capacity Built (GDC and Region)

The overall strategic goal to accomplish is;

“To Lower the Cost of Electricity in Kenya”

10.1. Strategic Issues

10.1.1. Financial Perspective

The Geothermal Development Company (GDC) is involved in capital-intensive projects and as such, the company is required to mobilize financial resources from multiple sources in order to deliver on its mandate. According to the national plans such as the MTP III and MTEF, GDC will be involved in three main activities namely power generation, development of steam and drilling of geothermal wells. These are also the key performance indicators of the company. In order to carry out its activities, GDC will utilize funds sourced from:

- The Exchequer through the National Budget
- Loans and grants from Development Partners
- Revenue from sale of steam
- Revenue from power generation from well head technology

10.1.2. Customers Focus

Currently, GDC's main product is steam that is to be converted to electricity for power generation by another entity. Consequently, the uptakers of the steam (our customers) are critical in the overall execution of our mandate and there is therefore a greater need to focus on our customers in the coming five years. GDC will achieve this by having a more inclusive approach to stakeholder engagement. Our goal of diversifying our product portfolio will also require a greater engagement with the new customers.

10.1.3. Business Processes Perspective

As highlighted above, GDC is a project-oriented company and our key performance indicators are commonly time and budget bound. As such efficiency is critical for the delivery of our mandate. A critical look at our internal processes was conducted as part of the SWOT and PESTEL analysis and the key outputs of that analysis are highlighted in this document.

10.1.4. Learning and Growth

In order to increase staff skills and competencies, GDC encourages Learning and Growth within the organization. Learning and growth is of great importance towards achieving the company's objectives. This can be achieved through capacity building i.e. training and certification, conferences and symposiums.

10.2. Strategic Goals and Objectives

The strategic goals were derived from the review of the previous strategic plan, stakeholders' consultations, PESTEL and SWOT analyses.

Seven (7) strategic goals were identified for GDC to focus on in five years are:

- Goal 1:** Governance and Regulatory Compliance
- Goal 2:** Human Resource Development and Management
- Goal 3:** Steam Resource Development
- Goal 4:** Drilling and Infrastructure
- Goal 5:** Corporate Support Systems and Processes
- Goal 6:** Strategy, Research and Development
- Goal 7:** Financial Sustainability

Goal 1: Governance and Regulatory Compliance

Strategic Objective 1: To enhance legal and regulatory compliance

The recently adopted organizational structure is focused on improving succession planning. This is aimed at ensuring that the organization fosters an environment of research, innovation and also talent Management. Succession planning & Management is vital in warranting that there is no gap during in business management, at the same time facilitating successful operations of GDC and achievement of the strategic plan. Part of the strategic succession plan enhancement during 2012 and early 2013 has been to advance certain staff to the General Managers positions while ensuring that related activities are grouped at proximity to facilitate smooth operation. Another key to the succession plan is continued investment in staff training and development, including leadership development programs and training in use of the internal management tools and controls to identify good performers, re-orient poor performance, and encourage the use of business metrics in their management of staff. With the speed at which technology is moving, it is critical to reskill and retool our staff to be in tandem. To enhance the succession plan, GDC is identifying among its existing senior staff the key personnel who can potentially fill the core positions necessary for continued success, while focusing on appropriate training opportunities.

For this strategy to succeed, robust and strategic communication has been strongly factored in. GDC will develop comprehensive communication strategy and policy that will be key enablers of the greater corporate strategy. The core purpose of the communication strategy is to build the right image and reputation for GDC so as to attract support from the different stakeholders. GDC will also enhance community participation including mutually beneficial community projects while at the same time strengthening existing stakeholder engagement.

GDC will also seek to enhance legal and regulatory compliance through enhancing governance. The company will embed ethical principles and good corporate governance across its business operations. This will be through adherence of sound policies and procedures within the organisation as well as compliance with the constitution of Kenya. GDC will uphold and promote the highest ethical business practices. The Board of Directors and Senior Management shall take

responsibility for upholding these ethical principles of good corporate governance to ensure sustainability of the organizations activities now and beyond the envisaged period in the corporate strategic plan.

GDC will also enhance land acquisition processes in its projects. GDC will ensure continued regulatory compliance and engage with our regulators to ensure a fair business environment is maintained at all times and throughout the project cycle.

On the same note, GDC shall ensure compliance with all the relevant local and international laws, policies, regulations and treaties ratified by Kenya. The company will also enhance contract administration and management

Goal 2: Human Resource Development and Management

GDC realizes that its human resource is the force behind the achievement of its strategy. The objective of this goal is to have the right people, well placed, motivated and highly skilled and in an enabling environment which will facilitate the organizational performance and optimization of Human capital strategy by facilitating equality, equity, and efficiency in service delivery through the;

- Development of dynamic Human resource policies in consultation with stakeholders
- Development of an organization structure that allows coherent synergies and capabilities to be optimally utilized and ensure job security and professionalism
- Development of a career guidelines that is predictive and supportive to staff advancement
- Development of an open performance management policy framework that rewards hard work, initiatives and results.

Strategic Objective 1: To acquire the right human capital

Recruiting is a crucial part of developing and maintaining an effective, cutting-edge team. Good recruitment conveniently cuts down or eliminates wasted time and money that would otherwise have to be used for extensive training and correcting errors made by unqualified employees. GDC will therefore employ the following strategies to acquire its staff;

- Internal Recruitment –this is aimed at targeting potential employees, whom the company has valuable invested in in terms of training and development. This strategy will make sense as it is a way to reward organization loyalty, good performance and will effectively motivate employees.
- External Sourcing, here the company will ensure that it gets a pump of fresh blood into its systems. Embracing both internal & external strategies ensures that the organization does not have inbreeding which negatively affects performance.

- Attraction-this will include headhunting of top talent. This is especially important owing that geothermal is growing within the region and both public and private companies are sourcing within the same labour pool.
- Secondment - being a public organization, GDC may identify a critical talent within the sector. Where the talent will be required for a specific period, the company will use this mode of acquisition.

The company will ensure that all staff are rightly placed in terms of their professional expertise, know-how and skills.

Strategic Objective 2: To Increase staff motivation

This will be achieved through an enhanced organizational structure, good policies and procedures, employee engagement, an effective communication strategy, a robust reward system, elaborate career paths, and effective performance management systems.

GDC will align its organizational structure taking into consideration the functional Synergies and ensuring an effective span of control. GDC have in place Human Resources Policies and Procedures which are very significant as they provide structure, control, consistency, fairness and reasonableness in the organization. They also ensure compliance with employment legislation and inform employees of their responsibilities and the Company's expectations. In addition, they also provide transparency in how various HR processes will be managed. The company shall ensure that they are easily accessible by all team leaders and employees, this is aimed at improving staff relations. As is best HR practice the policies and procedures may be reviewed after every three years.

GDC will strive to ensure happy employees through provision of a Mortgage, Medical scheme, adequate working space and ensuring that employees achieve a work life balance.

GDC has an effective communication strategy which is geared towards ensuring that there is both vertical and horizontal communication within the organization. This will ensure that management and unionsable employees have virtuous relations.

The company will re-model its values, beliefs and behavior of the organization with a view of fostering a culture of performance. This will be achieved through honesty, respect, openness, truthfulness and accurate information and communication in dealing with both its employees and other stakeholders.

Further, there will be in place a Career Progression Guideline (CPG) that is designed to provide career management and development during the life of an employee in the company.

The guideline fundamentally embodies the career and grading structure, duties and responsibilities, qualifications and experience required for the various levels within the grading structure. It informs an employee on what he/she should expect from the employer in return for effective performance, efficiency and productivity. Further, it is a guide on the competencies required at each level that inform recruitment, promotion, training and development and performance management. The guideline includes the Job Description, Job Specifications and competences requirement for each job. This document may be reviewed as per HR best practice after every three years.

Performance management essentially involves measuring, reporting and managing progress in order to improve performance, both at an individual level, and at a corporate level. GDC will use a combination of performance tools to manage performance. This will include the Balance Score Card (BSC), management dash board and the company's mission and vision as a tool for measuring staff performance.

Strategic Objective 3: To Increase Staff Competencies and Skills

GDC is committed to sustaining and improving the skills, competences and knowledge required in managing and growing the company by providing employees with individual trainings, internal knowledge transfers, on-the-job trainings, Experiential, Group trainings, Leadership development programs, Coaching/Mentoring, simulator trainings, consultancy assignments, collaboration with well-established geothermal drilling institutes/companies and schools (including the Geothermal Training Institute), facilitating self-learning that adds value, is cost effective and addresses the needs of both individuals and the company.

The company's internal capacity will be built in areas of Drilling, Steam field development, field operation and reservoir management, power plant construction maintenance and operation, power purchase negotiations and customer relations amongst others. In the next five years, GDC will specifically seek to increase the competencies and skills through training & certification, leadership development programs, organizing and facilitating conferences and symposiums exchange programs, continued competence development through experiential training and working towards a successful corporate culture. Towards this end, GDC will embrace a holistic

human resource capacity building as it scales up its personnel requirements and also conduct employee satisfaction surveys to ensure consistency of service provision to its staff.

This objective of this goal is to have the right people, well placed within the organization and highly motivated to do their daily tasks. GDC has adopted the slogan “*GDC, One Team*”, “*One team, GDC*”.

Goal 3: Steam Resource Development

Strategic Objective 1: Connect 205MWe to the Grid by June 2023

GDC targets to connect 205MW of electricity to the national grid from Menengai Phase I and II by June 2023. This will be achieved by commissioning the following power plants; Menengai Phase 1 (105MW), Menengai Phase 2 (70MW) and wellhead generation units (30MW).

GDC will facilitate the construction of 105MW by 2019 by: establishing and operationalizing the steamfield operations and maintenance team; completing the Menengai Phase I steam gathering system and commissioning of the three Units Menengai Phase I power plants.

For Menengai Phase II power plants, GDC will undertake to; carry out feasibility study, construct steam gathering system, construct and commission the power plant. To this end, GDC will strategically develop two 35MW unit power plants for Menengai Phase 2. To realize the first unit, GDC will partner with private investor(s) to construct, own and operate a 35MW power plant by 2021. For the second unit, GDC will fund, construct and operate a 35MW power plant by 2022.

GDC will also install wellhead generating units of 30MW in Menengai and Baringo-Silali geothermal fields within the planning period. Commissioning of wellhead power generation of total capacity 30MW will be undertaken in the following project sites; Menengai (10MW), Korosi (10MW) and Paka (10MW). To accomplish this strategic objective, GDC will undertake the following activities: carry out ESIA, project feasibility study (including power grid studies); PPA negotiation; procure, install and commission generation units.

To ensure sustainability of steamfield operations, GDC will deliberately implement resource management programs. GDC will adopt comprehensive, effective and efficient resource management solutions that adhere to best practices to ensure sustainable exploitation and increase availability of the reservoir and surface equipment. Towards this, GDC will; build capacity of its personnel to ensure effective steamfield management, develop steamfield management plan (this includes the geothermal reservoir) and develop steamfield operations and maintenance procedures. In addition, GDC will pursue the acquisition of geothermal resource licenses.

Strategic Objective 2: To realize 485MW of geothermal steam equivalent by June 2023

GDC aims to develop and realize geothermal steam equivalent of 485MWe in Menengai, Korosi, Paka, Silali and Suswa project areas by June 2023. The steam development plan and capacity targets for the various projects are as indicated in the field development plan.

GDC will strive to site and target high productive zones of the reservoir. The following well strategies will be applied to identify productive drill targets;

- Drill below fumaroles with high temperature gas chemistry
- Drill extensional zones in fault irregularities where these zones are expected to continue to reservoir depth. Target depths should include consideration of stratigraphy, mechanics, and possible altered cap rock.
- Drill complex structure based on surface fault mapping where secondary fracture permeability is consistent with alteration and thermal areas
- Drill steam cap targets.
- Drill conceptual model zones with especially hot, permeable, thick, and low risk targets. Specifically consider conceptual tests that can affect future targets.
- Drill multiple specific targets or conceptual alternatives in each well.
- A fault is not a target on its own. Most fault localities are not permeable. Additional justification is required to improve the likelihood of success.

To realize this level of steam capacity, GDC will: carry out geo-scientific infill surface studies in Menengai, Korosi, Paka, Silali and Suswa geothermal fields; review and update the conceptual models after every surface studies and/or completion of every well; select and locate highly productive geothermal well targets based; and undertake feasibility studies after confirmation of viable geothermal reservoir in each of the project areas.

Goal 4: Drilling and Infrastructure

Strategic Objective 1: Improve Drilling Efficiency by 10%

GDC targets to increase its drilling efficiency by 10% in the course of the next five years. This efficiency will be measured by the number of days it takes to drill a well and drilling downtime. Currently it takes approximately 100 days to drill one well but with synchronized and aligned project management, taking productivity improvement measures, enhancing supply chain efficiency, increasing personnel capacity and implementing in-time maintenance, GDC will cap the maximum number of drilling days to less than 90 days, save for exogenous occurrences that cannot be avoided.

A separate but related objective is with regard to the automation of the procurement process and having an integrated operations plan in place for all drilling activities. This process will enhance

the collation of a materials requirement list, up to delivery of the requisite drilling commodities. Having this system in place will also have an indirect effect of reducing drilling downtime that has previously been occasioned by lack of drilling materials onsite during the drilling process by reducing materials and spare-parts stock-outs to 0%.

A separate initiative under this process will be the development of a one stop facility at Kabarak. This will have a positive effect on the operational efficiency as all the drilling process will be coordinated from a central point and staff will be collocated at the same facility. Previously, there have been lapses that are attributed to the spatial distribution of the GDC network. An envisaged secondary effect will also be the reduction of the amounts that are utilized in form of rent and leases for our facilities in Nakuru and Naivasha.

Strategic Objective 2: Drill geothermal wells for 485MW Steam Equivalent by June 2023

GDC aims to drill geothermal wells towards the production of 485MWe total steam equivalent. To achieve this objective, GDC will optimally mobilize rigs and other resources to Menengai, Korosi, Paka, Silali and Suswa project areas by June 2023. The rig mobilization and drilling program for these project areas will be as indicated in the field development plan. The main activities that will be undertaken include; development of supporting infrastructure (such as roads, water supply pipelines) and drilling of geothermal wells. The Table 27 below summarizes the envisaged steam development in the respective project areas.

Field/Project	Number of wells to drill	Steam Development Target (MWe)
Menengai	63	206
Baringo-Silali	64	235
Suswa	12	44
Total	139	485

Table 27: Summary of planned steam development in the various geothermal projects

In the quest of enhancing the management of the geothermal programs and projects, GDC will enhance the monitoring and evaluation of programs/projects. Towards this end, GDC will build sufficient and relevant capacity of its personnel, develop an effective program and projects monitoring and evaluation policy and ultimately develop in-house tools that will be deployed in monitoring, evaluating and controlling the programs and projects execution.

Goal 5: Corporate Support Systems and Processes

Strategic Objective 1: To increase efficiency of business systems and processes to 100% by June 2023

GDC aims to increase efficiency of its business systems and processes to 100% by June 2023. To achieve this objective, the following systems and processes shall be enhanced;

- Automation
- ICT infrastructure
- Safety management systems
- Processes and quality management systems
- Business continuity systems

GDC is committed to implementing business process improvement programmes. GDC will hence upgrade the current ISO 9001:2008 certification to ISO 9001:2015. The ISO 9001 certification is expected to; improve GDC's corporate image, enhance customer satisfaction, create continuous improvement culture and enhance engagement of employees.

GDC guarantees to uphold the safety of all staff. To achieve a safe working environment, GDC will; document on-the-job project site safety procedures, train staff on implementation of safety procedures, continuously improve and monitor effectiveness of safety procedures and acquire OHSAS 18001 Certification.

ICT has played a vital and integral part to GDC in carrying out day to day task and this is envisaged to be the case through the planning period. ICT will allow employees across the organization to access shared data and enable generation of synchronized reports on key business metrics. Immediate access to data is significant to take timely decisions.

GDC will henceforth aim to enhance ICT infrastructure by undertaking the following activities; upgrade the network firewall, bandwidth management and network intelligence, upgrade of PABX and upgrade/maintenance of local & wide area network equipment.

GDC targets to enhance its business continuity systems. This is envisaged to be accomplished by; performing a business impact analysis, developing a business continuity policy and acquiring IT and infrastructure recovery areas.

Strategic Objective 2: To increase Community and Stakeholder Participation

GDC will also seek to increase community and stakeholder participation. GDC believes that community and stakeholder engagement is crucial from a sustainability perspective, as it supports our understanding of emerging risks and opportunities, and facilitates the mitigation of these risks as well as the realisation of opportunities. Our Stakeholder Engagement Framework reflects the view that it is vitally important to integrate a stakeholder engagement component into all aspects of our business, encompassing all the phases from project planning to implementation, management and decommissioning. This will be achieved through meetings with all the stakeholders.

GDC will further review the CSR policy and continue to implement CSR programs anchored on the Sustainable Development Goals (SDGs) and develop robust community engagement

framework. Ultimately, in the course of the period of this strategic plan, GDC will establish GDC Foundation to focus on community investment opportunities. GDC Foundation aims to foster sustained relations with host communities thereby ensuring sustained development of the geothermal resources. GDC will channel its corporate social responsibility programs through the foundation. Funding for the foundation will be sources from regular donations from; profits derived from steam sales, voluntary donations from development partners and stakeholders. The GDC foundation will apply companywide in all areas of Company operations. The foundation will focus on the following areas; (i) Water: clean and accessible (ii) Education: enhance the quality of education and; (iii) Health: health infrastructure, for local communities neighboring geothermal projects. In addition other focus areas will include; economic empowerment for youth, women and PWDs, environmental conservation, culture and sports to foster peace among host communities.

GDC will enhance environmental and social management by complying with the existing Environmental laws (Environmental Management and Co-Ordination Act, 1999) and regulations made thereunder and incorporate all other relevant local and international laws, policies and regulations in all its operation areas so as to have sustainable development projects. GDC will ensure protection of the environment by;

- Carrying out environmental and social impact assessment (EISAs)
- Undertake environmental audit in line with the relevant laws and policies
- Undertake monitoring activities aimed at Implementing the various Environmental & Social Management Plans emanating from the project ESIA studies relating to different projects within GDC's operation areas
- Undertake environmental rehabilitation/restoration and conservation activities during the project operation and decommissioning phases in all its areas of operation in liaison with all other stakeholders and the project community for sustainability purposes

GDC will also improve on inter/ intra communication with its stakeholders. GDC will adopt various media platforms to communicate its strategy, operations, progress and achievements both internally and externally.

Communication will remain a critical pillar in enabling the successful implementation of this strategic plan. The GDC communication strategy is designed to reach out to different stakeholder and the most opportune time. To this end, strategic messaging and positioning will be undertaken to enable GDC to communicate its strategy, clarify where needed, inform, explain, and educate. A strategy reaching out to both internal and external stakeholders has been designed. Ultimately, GDC will anchor on its strategic communication to gain the trust, confidence and support of stakeholders. Communication will construct the right images and reputation for the organization.

The Chief Executive Officer remains the main company spokesperson. This function will get support from the Manager Corporate Communication & Marketing or any designated officer apt for the matter.

External communication will involve all correspondences outside GDC this will include and not limited to official corporate letters, proposals, official speaking opportunities in seminars and fora. Critically, external communication will involve using the mass media to reach out to a wide audience especially the general public. GDC will strive to have a mutually beneficial and respectful relationship with the media. The CCM will publish quarterly magazine Steam to complement its communication. Other opportunities also include the corporate documentaries and exhibitions. The corporate website remains a primary source of communication to the external stakeholder.

For purposes of marketing, GDC will seek to publicize its key portfolio to strategic audiences like investors, financiers or potential students. GDC will use road shows, meetings, exhibitions, media campaigns like adverts or free publicity, below the line communication materials like brochures, posters or fliers, promotional video documentaries to reach out to the external market.

GDC has a comprehensive internal communications protocol. It has a strong and experienced management team in place, and is developing strategies to attract and retain experienced staff. GDC has embraced top-tier strategies in communication, marketing, information technology, and performance management. These functions are required to support the technical tasks of geothermal development. The company uses Intranet- MS SharePoint to send all internal communication. Corporate Communications Strategy is in place.

The company also deals with external communication extensively. This is role majorly is played by CCM with assistance with the ICT Department. This enables GDC stakeholders to be informed of the progress of the projects and future plans.

Intranet- MS SharePoint is there to ensure all internal communication can be shared. Voice Over Internet Protocol run using broad band internet connection which offers an easy way of interlinking all GDC websites is in place. MS Outlook offers official communication platform.

Employees form a critical stakeholder for GDC. Employees are also special considering that they are a unique set of audience that will engage in internal communication. Thus, internal communication will be critical in many fronts to clarify issues, to articulate policies and decisions, to inform and to educate. For this strategy to succeed, timely communication to the internal stakeholders will remain sacrosanct. Employees who are in constant communication with the management tend to be more productive, exercise a high degree of pride and therefore ownership and will be useful as brand ambassadors.

GDC has established a vibrant internal communication infrastructure and systems that will avail the relevant information across the internal stakeholders. While the department of Corporate Communication & Marketing takes lead in internal communications, other leaders in their own right are required to keep on communicating with staff.

The following platforms are available for internal communication: emails, intra-net, noticeboards, meetings, Steam magazine, Geonews publications and Connect.

CCM will work closely with ICT to develop modern and efficient technological platforms for communication. The department will also revise critical strategies, policies and standards of

internal communication that will be supportive of this strategy. CCM will monitor internal communication systems and provide technical advisory services to management.

For strategic reasons, the MD&CEO will continuously indulge the staff on major corporate policy and developmental issues. The CEO will do this through meetings, memos, write-ups in internal bulletins, emails, or through audio-visual recordings. Other leaders will also communicate in a timely manner through the various platforms. CCM will remain a core facilitator of ensuring a vibrant internal communicative.

Goal 6: Strategy, Research and Development

Strategic Objective 1: Mobilize Kes 90 Billion by June 2023

GDC has in the past benefitted from immense support from both GoK and development partners that seek to enhance the utility of green energy. In the next five years, GDC will step up its resource mobilization efforts by actively pursuing exchequer funding through its full participation in GoK strategy formulation and implementation forums. GDC will also crystallize its vision and proposed roadmap into development proposals for our development partners with the aim of attracting more green energy enthusiasts to support the company's projects under competitive terms and conditions.

In the next five years the company expects to mobilize Ksh. 90 billion which will be from the following sources; external sources (Ksh. 50 billion), exchequer funding (Ksh. 20 billion), and the balance from partnerships with investors. The externally sourced funds and exchequer funding are aimed at sustaining the development of company projects and ensuring business continuity. The construction of the 60MW power plant will lead to increased revenue streams for GDC through strategic partnerships with KenGen or IPPs.

GDC will further undertake analysis of the applicable business models for the various project phases in Menengai, Baringo-Silali and Suswa geothermal projects. The analysis of the business models will assist in determining the most appropriate model for each of the project phases for the purpose of guiding decision-making.

Strategic Objective 2: Develop four (4) additional Products by June 2023

As part of its revenue generation diversification strategy, GDC will develop four (4) additional products to its portfolio. These products target a wide-ranging clientele who will utilize GDC's expertise and products such as steam and electricity.

The first strategy targets to institutionalize and operationalize the Geothermal Training Institute, which will provide capacity building services both locally and internationally. GDC has established the Geothermal Training Institute (GTI) to facilitate training and transfer of knowledge, especially in highly specialized technical areas related to geothermal exploration, field development and geothermal resource management. GDC will utilize the resource in the GTI to establish and maintain a well-trained human resource base and enhance the capacity of its employees over time.

The Second approach GDC plans to attract bulk energy users “beyond the grid” to location near the geothermal projects. This strategy is to increase uptake of brine, steam and direct electricity from power plants. The implementation will include setting up an industrial park in Menengai. This strategy will help the manufacturers to cut their cost of doing business and consequently bring down the cost of goods and services. Direct use of geothermal resources is of strategic importance to GDC as it creates new business opportunities for the communities near the geothermal resource. GDC will pursue the direct uses of geothermal fluid listed in Table 28 below for each of the geothermal fields.

	Location	Industry
1	Menengai	<ul style="list-style-type: none"> • Milk pasteurization • Grain drying • Aqua-culture • Green House • Balneology
2	Suswa	<ul style="list-style-type: none"> • Milk pasteurization • Grain drying • Aqua-culture • Green House
3	Lake Baringo - Silali	<ul style="list-style-type: none"> • Hides and skins treatment (leather industry) • Honey processing • Aloe-vera processing

Table 28: Direct uses projects to be implemented in respective project location

The third product is Integrated Geothermal Project Management services and consultancies. In this strategy, GDC will provide a wide range of geothermal expertise services to companies in the region either on piece-meal or as turnkey basis. Services to be provided will include, but not limited to: hire of drilling and scientific equipment; provision of technical services and geothermal consultancy in areas such as project design, transaction advisory services, stakeholder engagement, environmental management, laboratory testing services and legal advisory services, amongst others.

The fourth product is the implementation of the wellhead generation units programme that shall be deployed in Menengai and Baringo-Silali projects. The wellhead generation units will provide

a source of power for the drilling operations and water pumping, and may also supply excess energy into the national grid or bulk power consumers.

To succeed in actualizing this product portfolio, GDC will employ robust strategic communication and marketing efforts for awareness, stakeholder support and investor buy-in. Further, each technical unit will find their alignment to the four key portfolios, and develop and implement key strategies going forward.

GDC will enhance Research & Innovation to ensure sustainability of its business. This strategy shall foremost activate the research and innovation unit that will identify and develop areas with potential cost cutting and commercialization opportunities. These areas include use of hydro-fracturing techniques, measurements while drilling technologies and directional drilling methods. This strategy further aims to consolidate existing collaborations and engage new ones, bring together multi-disciplinary teams to work on operational challenges and monitor and report annually on performance of all innovations.

Goal 7: Financial Sustainability

Strategic Objective 1: Earn Revenue of USD 84 Million from steam sales

GDC currently generates revenue from steam sales from the 280MW Olkaria I & IV Project. In the next five years, GDC plans to grow this revenue stream by connecting 175MW to the national grid from Menengai Phase I (105MW) and Menengai Phase II (70MW). A projected annual revenue in excess of Ksh. 1.7 billion (approximately USD 16.8 million) from these sources is expected within the planning period.

Strategic Objective 2: Earn 6% of Revenue from other sources beyond steam sales

GDC will strive to generate additional funds from other sources including the use of the wellhead generation technology that will be deployed to productive wells that are yet to be linked to specific development phases. In the planning period, the target is 30MW of electricity; 10MW from Menengai and 20MW from the Baringo-Silali Project. The surplus electricity generated will be connected to the grid. The projected revenue generated within the planning period is USD 5 million.

In the period of this strategic plan (2018/19 – 2022/23), GDC will also offer training and consultancy services in geothermal development and develop direct use projects of steam as alternate revenue generating avenues. The projected revenue from these sources is USD 0.24 million.

Strategic Objective 3: To become Financially Sustainable

To achieve financial sustainability, GDC will apply various strategies in its daily operations to achieve this goal. GDC will continue to adopt strong Financial Management policies by ensuring financial records are maintained as per International Financial Reporting Standards (IFRS). This will involve proper planning, organizing, controlling and monitoring financial resources in order to achieve organizational objectives. GDC is committed to fiscal prudence. GDC will also ensure compliance with The Public Finance Management Act, 2012 of Kenya.

GDC will enhance the risk management strategy that will lead to a more successful and sustainable business operations through implementation of risk and change management. GDC's Sustainability Risk Management Framework sets out to establish the scope of risk management and improve risk management and control processes. In the planning period, key corporate risks shall be monitored and appropriate treatment approach provided.

STRATEGIC GOALS	STRATEGIC OBJECTIVES	STRATEGIC INITIATIVES
Governance and Regulatory Compliance	To enhance legal and regulatory compliance	<ul style="list-style-type: none"> • Enhance Governance • Enhance Land Acquisition processes • Enhance Compliance with local and international laws, policies and regulations • Enhance contract administration & management
Human Resource Development and Management	To acquire the right human capital	<ul style="list-style-type: none"> • Internal Recruitment • External Sourcing, • Attraction- headhunting of top talent. • Secondment - identify a critical talent within the sector.
	To Increase staff motivation	<ul style="list-style-type: none"> • Ensure happy employees - provision of a Mortgage, Medical scheme, adequate working space • Ensure effective communication both vertical and horizontal • Enhance performance culture - re-model values, beliefs and behavior • Put in place a Career Progression Guideline (CPG)
	To Increase Staff Competencies and Skills	<ul style="list-style-type: none"> • Individual and group trainings, • Internal knowledge transfers, • On-the-job trainings, • Experiential trainings, • Leadership development programs, • Coaching/Mentoring, • Simulator trainings,

STRATEGIC GOALS	STRATEGIC OBJECTIVES	STRATEGIC INITIATIVES
		<ul style="list-style-type: none"> • Consultancy assignments
Steam Resource Development	Connect 205MW to the Grid by June 2023	<ul style="list-style-type: none"> • Commission Menengai Phase I (105MW Power plants) • Commission Menengai Phase II Unit 1 35MW • Commission Menengai Phase II Unit 2 35MW • Commission Well head power generation (30MW) • Implement Resource Management programs
	Realize 485MWe of Geothermal Steam equivalent by June 2023	<ul style="list-style-type: none"> • Develop steam in Menengai geothermal field • Develop steam in Baringo-Silali geothermal fields • Develop steam in Suswa geothermal field • Commercialize Direct Use of Geothermal Energy
Drilling and Infrastructure	Improve Drilling Efficiency by 10%	<ul style="list-style-type: none"> • Reduce drilling days per well • Cap drilling downtime (including safety) • Enhance Supply Chain Efficiency • Develop Kabarak to be a one stop facility • Enhance program/project monitoring and evaluation (M&E)
	Drill geothermal wells for 485MWe of Geothermal Steam by June 2023	<ul style="list-style-type: none"> • Develop steam in Menengai geothermal field • Develop steam in Baringo-Silali geothermal fields • Develop steam in Suswa geothermal field
Corporate Support Systems and Processes	To increase efficiency of business systems and processes to 100% in 2023	<ul style="list-style-type: none"> • Enhance Automation (to increase efficiency) • Enhance ICT infrastructure • Enhance business continuity systems • Enhance Safety Management Systems • Enhance Processes and Quality Management Systems
	To increase Community and Stakeholder Participation	<ul style="list-style-type: none"> • Enhance existing stakeholder engagement strategy • Establish GDC Foundation • Implement CSR Programmes Improve inter/intra communication • Enhance environmental and Social management • Enhance Community Participation
Strategy, Research and Development	Mobilize Kes 90 Billion by 2022	<ul style="list-style-type: none"> • Source for External Funds • Exchequer Funding • Create Strategic Partnerships • Evaluate and prioritise project business models

STRATEGIC GOALS	STRATEGIC OBJECTIVES	STRATEGIC INITIATIVES
	Develop four(4) additional Products by 2023	<ul style="list-style-type: none"> • Operationalize the Geothermal Training Institute • Offer Integrated Project Management services locally and regionally (Consultancy) • Commercialize Direct Use of Geothermal Energy • Generate power utilizing wellhead generation units • Increase product(s) stakeholder participation • Enhance Research and Innovation
Financial Sustainability	Earn Revenue of USD 84 Million from steam sales by 2023	<ul style="list-style-type: none"> • Commission 105MW Phase Menengai I Power Plants • Commission Menengai II Power Plants of 70MW
	Earn 6% of Revenue from other sources beyond steam sales	<ul style="list-style-type: none"> • Earn revenue from early power generation • Offer training and consultancy services in geothermal development • Direct Utilization of Steam
	To become Financially Sustainable	<ul style="list-style-type: none"> • Enhance Financial Management • Implement Risk and Change Management

Table 29: Summary of GDC Strategic Goals, Objectives and Initiatives

10.3. GDC Corporate Risks

The key corporate risks have been identified and assessed at the gross level. In the planning period, these key corporate risks shall be monitored and appropriate treatment approach provided.

The heads of departments (risk owners) will work to identify the controls and other mitigating actions in place to avoid, control, transfer or otherwise reduce the risk to an acceptable level in accordance with the risk appetite and tolerance of GDC. The risk management facilitator, will facilitate and coordinate this process but the HODs will be primarily responsible for identifying and improving the controls.

A summary of GDC strategic risks are enumerated below:

1. Strategy implementation risk

Strategy implementation is critical to GDC’s success, addressing the: who, where, when, and how of reaching the desired goals and objectives. Poor implementation may be caused by inadequate monitoring and evaluation and also inadequate resources to meet the strategic plan's requirements. This risk can be mitigated through defined policies and procedures that guide its respective processes and assigning roles and responsibilities that contribute to the achievement of the respective business process objectives and ultimately the overall strategy.

2. Corporate governance risk

Corporate Governance is the system of rules, practices and processes by which a company is directed and controlled. Corporate governance risk may be caused by lack of defined processes and procedures. This risk can be mitigated through defined Governance structures which include: policies and procedures, reporting structures, organisational structure and corporate organogram that is approved by the Board of Directors.

3. Financial Risk

Financial risk is the possibility that shareholders will lose money when they invest. The main causes of this risk are Inadequate/ limited budgetary allocation, over-reliance on the exchequer for budgetary support and delays in meeting the donor requirements. This risk may lead to failure to achieve corporate objective. This can be eliminated through reprioritising activities and planning GDC's activities as per the allocated funds and quarterly disbursement cycle.

4. Resource risks

Geothermal prospect are determined by the presence of a heat source, recharge, permeability and cap-rock. Failure to have any of these parameters may affect its productivity. This may be caused by lack of appropriate equipment and instruments and also the use of improper parameters. This can be mitigated through estimates of heat-in-place before deep wells are drilled.

5. People risk

Inadequate staff complement in place to carry out respective activities in achieving corporate mandate may negatively affect the achievement of the strategic object. This risk may be caused by freeze on employment by the Government and also Imbalance of staff numbers with requirements of respective roles and departments. This risk may be mitigated through respective departments carry out needs assessments of their staff needs and communicate to the Human Resource department and train them to acquire the necessary skills needed

6. Drilling Risk

Unfavourable rock formations below surface attributable to the geological structure, Inappropriate casing design and cementing, Equipment failure and sticking of drilling tools and equipment in the drilling holes are the major causes of drilling risk. There is the risk that difficult drilling conditions may lead to higher-than-expected costs. This risk can be mitigated by the combination of experience, proper planning, implementation of good drilling practices, and periodic self-assessment of drilling practices, times and results.

7. Health and Safety risks

This risk refers to a potential source of harm or adverse health which may relate to loss of life and injury to staff. The main cause is Non-adherence to health and safety regulations and

requirements. This risk may be mitigated through developing budget proposals based on the unit's needs and prioritisation of the same and also carry out training and awareness on the health and safety laws, regulations and requirements as appropriate to GDC staff.

8. Cyber-security and data loss risk

Weak IT security controls and inadequate investment in robust ICT systems and processes exposes the existing IT infrastructure to vulnerabilities such as compromising data integrity and privacy. Mitigation activities include use of antivirus protection as well as regular updates of patches in the system, Blocking of exe's and zip files and conducting of annual system audits.

9. Compliance risks

GDC is required to comply with Laws and regulations, Policies and procedures guiding and prevailing standards. Failure to comply may result to financial losses from penalties, litigation, Loss of confidence from respective stakeholders, Reputational damage and Withdrawal of funds by respective financiers. Mitigation measure involves GDC through the legal department ensures active monitoring of regulatory & legal changes through weekly review of the Kenya Gazette and ensuring Staff are then sensitised on the same

10. Business continuity risk

Business continuity aim to prevent interruptions to mission-critical services, and re-establish full function to the organization as quickly and smoothly as possible. This risk is caused by inadequate business continuity management, Lack of a disaster recovery plan and failure to test the Disaster Recovery Plan to ensure the procedures are effective and efficient and meet the required targets for restoration. Mitigation measure involves Defined business continuity plan, succession plan in place and defined emergency response plan.

11. Concentration risk

Concentration risk refers to Over-reliance on one major customer. Currently GDC has one major steam sales customer. This risk has been caused by failure to diversify avenues for revenue generation. This may expose GDC to business interruption and loss of revenue in case this major customer default. Mitigation measure involves having IPP on board, direct use and sourcing of funds from development partners such as DFID.

12. Reputational risk

Reputational risk refers to loss of GDC goodwill/ image to the public. This is caused by inadequate corporate communication guidelines and Failure to adhere to good corporate governance principles. The mitigation avenues include Governance practices characterised by operational and reporting structures and a defined communication policy

13. Litigation and regulatory risk

The risk arises due to inadequate awareness on the prevailing legal requirements, inconsistent or lack of clear policies and procedures at GDC to manage compliance risk, breach of contract and also inadequate drafting of contract. This risk exposes GDC to Reputational damage and loss of brand equity, loss of credibility and confidence from various stakeholders, financial loss, and litigation and Business interruption. Mitigation measure may involve Legal opinions and also disciplinary procedures for negligent staff.

14. Environmental risks

Failure to contain and maintain the noise levels within the acceptable and recommended limits especially during drilling and well discharge period and failure to monitor emissions and spills especially during well discharge and oils spills during equipment maintenance are the major causes of environmental risk. Environmental risk impact include, delays in project implementation financial loss due to penalties, Risk of revocation of licences by NEMA relating to particular areas of non-compliance, Litigation and picketing by respective society groups. The mitigation measures include Environment Department conducts an initial Environmental Baseline survey in new areas before other activities commence so as to use the data as a bench mark for planned geothermal activities.

15. Project risks

Project implementation involves time, cost, scope and human capital. A constraint to one or more of these variables will delay the project. Financial constraint such delay in obtaining donor fund, inadequate planning, and lack of required skills will result to project risk. This risk can be minimized by active following up on donor/ development partner requirements to ensure the conditions precedent is met, Planning is undertaken based on the most realistic case taking regard of available funds and also Conducting of market survey's and benchmarking in similar drilling exercise within and without.

16. Social risks

Insecurity in project areas, Community conflicts, Access of war zone and volatile areas, Failure to meet community expectations and Unrealistic community expectations are the major causes of social risks. This risk may bring loss of life of staff, injury, hostility from respective communities, business interruption and reputation damage. All these can be mitigated through Engaging the county and police posts around the areas to provide security oversight, liaising with the community relations department to understand the respective communities and use of security best practices in engaging with the respective communities to get their goodwill and managing the community's expectations through continuous engagement and creating awareness of GDC's role.

11. PERFORMANCE MONITORING AND MANAGEMENT

GDC recognizes that exceptional organizational performance management is key to keeping the organization focused and bringing to life sustainable performance culture. GDC continuously seeks to develop processes that best translate corporate strategy into actionable goals to motivate the organization towards continuous improvement.

GDC operates within a two-tier performance contracting regime that is composed of:

- GDC's internal performance contracting processes coordinated by the department mandated with corporate performance management and
- National performance contracting coordinated by the Performance Contracting & Coordination department based at the Ministry of Devolution.

Performance Contracting is an annual process of establishing targets aligned to GDC's strategy and national goals. This is achieved through identification of specific targets from the strategic plan objectives and marrying them with broad targets from the Performance Contracting and Coordination Department and the Ministry of Energy. The performance plans of GDC's divisions, departments and staff are cascaded from the approved GDC annual organizational targets.

11.1. Strategy Management and Implementation Process

The implementation of this Strategic Plan requires full involvement, effort and commitment from all stakeholders. A comprehensive implementation plan will be undertaken to ensure GDC's communication, internal systems and other business processes are aligned to the execution of the strategic plan. GDC management will be the key driver of the implementation of this strategy. The balanced scorecard (performance contracting) system will be used to monitor and evaluate performance of the execution of this strategic plan and shall act as the central point where;

- These corporate strategies and directions are established and communicated throughout the entire organization
- Annual targets and resource allocation are linked to strategic priorities
- Departmental, team, and individual goals and directions are developed and aligned to the strategic plan goals.
- Feedback is provided to various teams for both cascaded annual targets and the long term strategic targets.
- Its findings, together with other analytical reports shall be the basis of discussions for performance improvement.

11.1.1. The Performance Management Cycle

In the strategic period under review, performance contracting shall focus on the attainment of this Strategic Plan. The performance management cycle follows the pattern of a financial year. For effective performance contracting, the following shall be undertaken;

- At the start of each Financial Year, the department charged with corporate planning will provide annual strategic key focus areas that are in line with this strategic plan. This will be critical in providing the overall strategic direction of the company.
- Corporate performance contract KPIs and targets will be set at the GDC Board level in line with the key strategic focus areas and other relevant public policy objectives. These KPIs and targets together with other high priority KPIs shall be assigned to the MD & CEO's performance contract.
- The Corporate and MD & CEO's KPIs and targets shall be cascaded down to Divisions, Departments and Individuals using the balanced scorecard system. Proper coaching and training will be undertaken prior to and during cascading exercise to ensure all KPIs and targets are effectively disaggregated to the lowest level possible.
- Continuous monitoring, evaluation and timely reporting of the cascaded targets shall be undertaken. Proper Balanced Scorecard appraisal tools shall be adopted to ensure objectivity in the appraisal process which will form a basis for staff rewards and sanctioning. Automation of performance management process which will facilitate objectivity in cascading of targets, monitoring and controlling and appraisal process shall be adopted to guarantee outstanding performance.

11.1.2. The corporate performance management process

Corporate performance management process translates corporate strategy into actionable goals and motivates the organization towards continuous improvement that addresses performance gaps and /or sets new heights to achieve. The process focusses on the following three key activities in its quest to propel the organization achieve higher performance;

- Proper strategy alignment and execution
- Continuous monitoring & evaluation of corporate strategies implementation
- Conducting of periodic strategic progress review and performance meetings

11.1.3. Strategy Execution Model

A proposed Performance Execution model is shown in Table 30 below.

To execute each assigned strategic goal and objectives, the GDC Management focuses the organization to the strategic goals and objectives through the balanced scorecard system and assigns one or two important objectives to each department. The executing departments or teams then determine predictive and influence-able measures to achieve the goals while keeping a compelling scorecard to track progress. Each individual in the teams then commits to contribute to the scorecard by taking up specific activities, execute them and report progress on a weekly or bi-weekly basis for purposes of updating the scorecards. The cascading of the goals, objectives and strategies shall include measurement of the execution of each of the cascaded elements for ease of maintaining the scorecards.

FOCUS	ACT
❖ What are the important goals we need to focus on? (Management)	❖ What are the predictive and influence-able measures that drive results? (Team)
ACCOUNTABILITY	SCORECARD
❖ Departmental team members make commitments, act and report. (Individual Staff)	❖ How will everyone know we are winning? ❖ Continuous updating and communication of the scorecards (Team)

Table 30: Strategic Plan 2018/19-2022/23 implementation focus areas and principles

11.1.4. Strategy Monitoring & Evaluation

For closer monitoring and evaluation of the strategic plan activities and better execution of this strategic plan, a committee comprising members of the Strategic Planning Committee and those charged with evaluating achievement against the performance contract will be put in place. This committee shall be responsible for;

- Holding bi-weekly or monthly performance review meetings to deliberate on monitoring reports and provide relevant recommendations to top management for further action.
- Undertaking periodic evaluations in an effort to ensure achievement of the long plan targets are on course.
- Reporting on the progress of their commitments and their outcomes, review the scorecard and make new commitments for the next cycle of execution (bi-weekly or monthly).

11.2. Strategic Map

Mapping a strategy is an important way to evaluate and make visually explicit GDC’s perspectives, objectives, and measures, and the causal linkages between them. Organizing objectives in each defined perspective, and mapping the strategic relationships among them, serves as a way to evaluate objectives to make sure they are consistent and comprehensive in delivering the strategy.

The strategy map is a visual way to communicate to different divisions or departments how they fit into the overall strategy. It facilitates cascading a balanced scorecard since it can be created at divisional/ departmental levels, and each department’s map can be viewed for alignment with the overall strategy map. This following figure presents a strategic map for this strategic period.

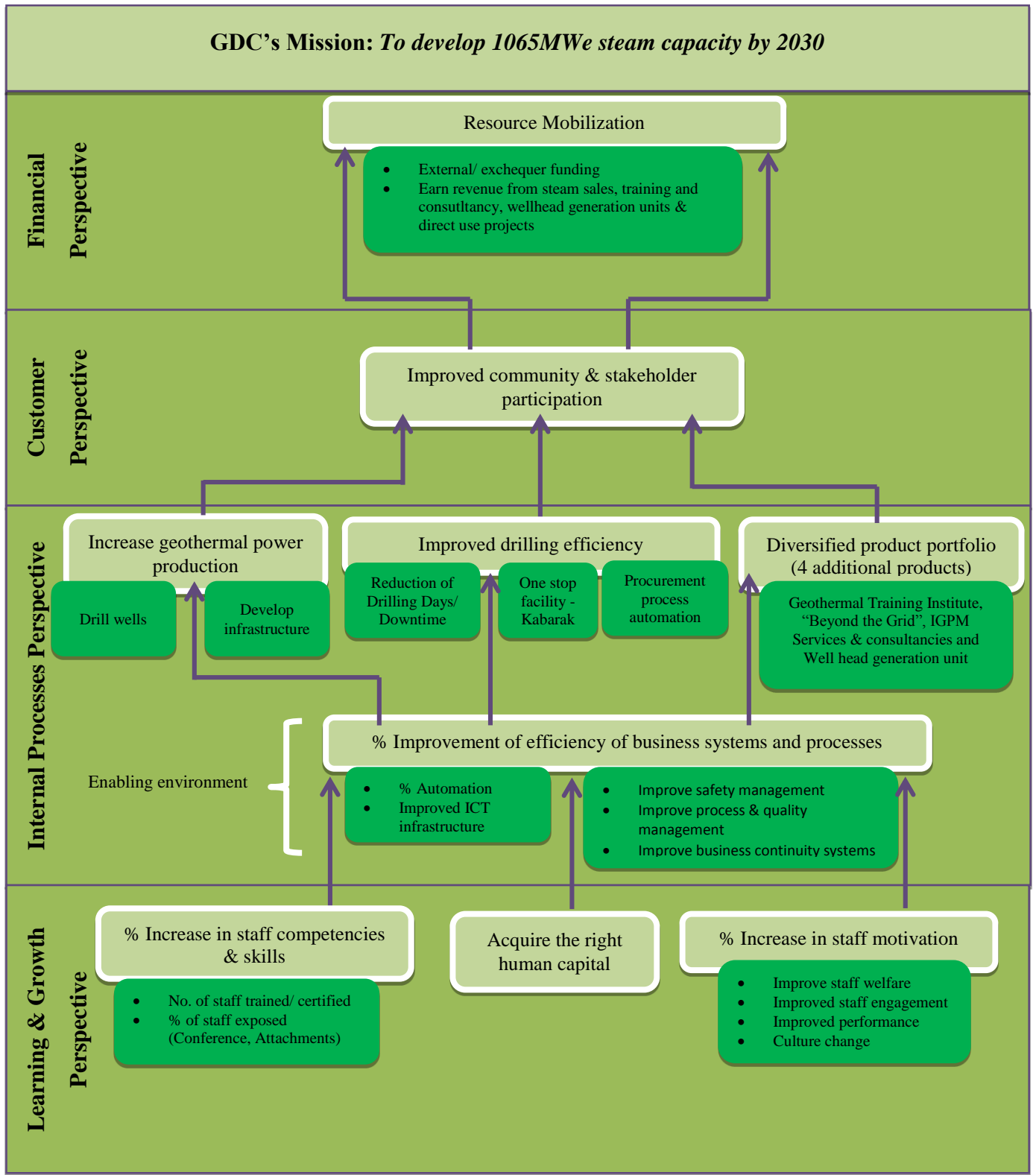


Figure 25: Strategic Map

APPENDIX I: KEY STAKEHOLDERS

No.	Stakeholder	Functional Relationship	Expectation(s) of Stakeholder	Meeting stakeholder expectations	Stakeholder responsibility
1.	Shareholders Ministry of Energy and The National Treasury	Offer financial support and provide policy direction for power generation.	<ul style="list-style-type: none"> • Prudent financial management • Achievement of project objectives • Timely reporting, • Management of partnership relationships • Revenue generation, • Corporate responsibility for the communities near the GDC projects 	<ul style="list-style-type: none"> • Budget absorption • Good corporate governance • Open and timely reporting • Internally generate revenue • Extend benefits to communities that straddle GDC's operation areas. • Prudent management of finances • Good corporate governance practices • Open and timely reporting • Business efficiency 	<ul style="list-style-type: none"> • Timely processing and disbursement of funds • Expedious response to requests for approval.

No.	Stakeholder	Functional Relationship	Expectation(s) of Stakeholder	Meeting stakeholder expectations	Stakeholder responsibility
2.	Development Partners	Mutually beneficial relationship	<ul style="list-style-type: none"> • Sound Strategy • Timely absorption of development funds • Proper utilization of development funds • Timely completion of targeted projects. • Regular reports • Accountability and good corporate governance • Mutually beneficial existence with communities in our areas of operation • Minimal and sustainable impact on the environment 	<ul style="list-style-type: none"> • Timely Budget absorption • Open and timely reporting • Establishment of systems to ensure accountability and good corporate governance are implemented • Development and deployment of a robust community engagement framework • Development and implementation of a clear environment management framework • Open communication and regular reporting 	<ul style="list-style-type: none"> • Mutual respect • Timely monetary disbursements • Timely approval to utilize disbursed funds • Open communication
3.	Kenya's Energy electricity subsector entities (SGPU, KenGen, Kenya Power, KETRACO, REA, NOCK, etc.)	Cooperation, and partnerships	<ul style="list-style-type: none"> • Seamless execution of project activities, • Efficiency in contract management 	<ul style="list-style-type: none"> • Timely project execution • Open communication and delivery of project status reports 	<ul style="list-style-type: none"> • Open communication • Collaboration
4.	Regulators (ERC, NEMA, PPP Unit,	Sector regulation	<ul style="list-style-type: none"> • Compliance with respective directives and regulations 	<ul style="list-style-type: none"> • Compliance to set directives and legislation 	<ul style="list-style-type: none"> • Open communication • Timely approvals

No.	Stakeholder	Functional Relationship	Expectation(s) of Stakeholder	Meeting stakeholder expectations	Stakeholder responsibility
	KRA, & County Governments Parliamentary Committees on Energy		<ul style="list-style-type: none"> Open & timely reporting 	<ul style="list-style-type: none"> Open communication 	
5.	Employees	Employment	<ul style="list-style-type: none"> Attractive remuneration package Career Progression Conducive work environment Training and development 	<ul style="list-style-type: none"> Offer a competitive salary package Implement a clear career growth path Employee engagement program Continuous training & development Implement a robust training & development program 	<ul style="list-style-type: none"> Upholding brand loyalty Sense of duty and commitment to work A positive work ethic and attitude
6.	Investors: Independent power Producers (IPPs), Direct Use, Joint Venture (JV) Partners	Investment in geothermal power plants, direct use projects and techniques, and geothermal resource development	<ul style="list-style-type: none"> Constant supply of good quality steam A favorable PISSA terms Fairness in award of contracts Clarity in process on investing Open communication 	<ul style="list-style-type: none"> Guaranteed supply of adequate and good quality steam Offer IPPs a favorable PISSA conditions Open tendering for power plants and direct use investments Clear marketing of available Direct use projects 	<ul style="list-style-type: none"> Timely execution of awarded power plant contracts Adherence to PISSA requirements Adherence to community engagement framework Submission of satisfactory

No.	Stakeholder	Functional Relationship	Expectation(s) of Stakeholder	Meeting stakeholder expectations	Stakeholder responsibility
					project-report documents <ul style="list-style-type: none"> • Adherence to set timelines upon signing of agreement with GDC • Adherence to community engagement framework
7.	Media	<ul style="list-style-type: none"> • Public watchdog • Dissemination of GDC's information 	<ul style="list-style-type: none"> • Good corporate governance practices • Value to Kenyans through efficient and timely implementation of GDC's mandate 	<ul style="list-style-type: none"> • Open and factual communication • Transparency in communication 	<ul style="list-style-type: none"> • Factual and fair reporting • Check facts with GDC before publication • Availability to cover GDC events • Professional ethics and integrity
8.	Land Owners	Change of land ownership	Fair and timely compensation	<ul style="list-style-type: none"> • Timely development compensation agreements • Expedited negotiation 	<ul style="list-style-type: none"> • Provision of required documentation upon request • Provision of precise and factual information

No.	Stakeholder	Functional Relationship	Expectation(s) of Stakeholder	Meeting stakeholder expectations	Stakeholder responsibility
				<ul style="list-style-type: none"> • Due diligence to establish fair compensation • Due diligence to establish beneficiaries 	<ul style="list-style-type: none"> • Reasonable expectations from GDC
9.	Local community & Administration	Mutual benefits	<ul style="list-style-type: none"> • Regular updates on information • Transparency and fairness • Involvement in selection of CSR projects 	<ul style="list-style-type: none"> • Provide regular updates • Ensure transparency and fairness • Implement a clear community engagement framework 	<ul style="list-style-type: none"> • Have reasonable expectations and demands on compensation • Collaboration and cooperation
10.	Suppliers	Transactional exchange of goods and services	<ul style="list-style-type: none"> • Equitable availability of business opportunities • Efficiency in tendering process • Prompt payment for goods delivered and services provided as per the agreed terms 	<ul style="list-style-type: none"> • Open, transparent and efficient tendering process • Prompt payment for goods and services provided 	<ul style="list-style-type: none"> • Adherence to tendering requirements • Timely delivery of good and services • Integrity
11.	Regional Geothermal Organizations	Consultancy services	<ul style="list-style-type: none"> • Clarity on consultancy products offered by GDC and their terms • Efficient delivery of consultancy services that are 	<ul style="list-style-type: none"> • A clear pricing scheme for the various consultancy products • Detailed marketing materials 	<ul style="list-style-type: none"> • Clarity of requests for consultancy • Timely settlement of payments for consultancy services offered

No.	Stakeholder	Functional Relationship	Expectation(s) of Stakeholder	Meeting stakeholder expectations	Stakeholder responsibility
			competitively priced	<ul style="list-style-type: none"> • Efficiency in the delivery of consultancy services 	
12.	General Public	Provision of steam for electric power generation Employment	<ul style="list-style-type: none"> • Increased supply of affordable steam for electricity generation • Increased supply of power to the grid • Access to employment opportunities 	<ul style="list-style-type: none"> • Accelerated provision of steam through the drilling of more productive wells • Accelerated development of affordable power through installation of well head generators and power plants • Equitable provision of employment opportunities • Prudent management of the environment as we conduct our business 	<ul style="list-style-type: none"> • Mutual respect • Pride in GDC as an indigenous Kenyan company • Application for employment opportunities when announced • Provision of honest feedback

APPENDIX II: STRATEGIC PLAN IMPLEMENTATION MATRIX

Goal 1: Governance and Regulatory Compliance

Strategic Objective 1: To enhance legal and regulatory compliance								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Enhance Governance	<ul style="list-style-type: none"> Develop corporate governance framework for GDC. Alignment of departmental policies and guidelines with the law 	No. of days	90 days	Company Secretary	2023			
Strategy 2: Enhance Land Acquisition processes	<ul style="list-style-type: none"> Implementation of GDC land policy & guidelines. Timely compensation of land owners 	% compliance	100 %	Company Secretary	2023			
Strategy 3: Enhance Compliance with local and international laws, policies and regulations	<ul style="list-style-type: none"> Advice GDC on changes in law as they occur. Provide timely legal opinions, Carry out legal audits. Sensitize staff on legal issues. 	% Compliance	100%	Company Secretary	2023	Kshs. 12.5M		
Strategy 4: Enhance contract administration & management	<ul style="list-style-type: none"> Implementation of contract management policy & guidelines. Monitoring of contract performance and closure. Undertake contract risk assessment. 	% compliance	100%	Company Secretary	2023			

Goal 2: Human Resource Development and Management

Strategic Objective 1: To Increase Staff Competencies and Skills by 10% by June 2023								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Training and Certification	<ul style="list-style-type: none"> • Identification of Training Needs 	TNA report,	5	HR&A	2023	Kshs. 40M		
	<ul style="list-style-type: none"> • Training and Certification; drillers, crane operators 	No. of trainings (increased efficiency)	300			Kshs 50M		
Strategy 2: Conferences and Symposiums	<ul style="list-style-type: none"> • Prepare and present technical papers • Organize symposiums; innovation themes 	No. of technical papers presented	200	HR&A	2023	Kshs. 21M		
Strategy 3: Research and Innovation	<ul style="list-style-type: none"> • Develop and Implement Strategic Initiatives to enhance creativity, innovation and research. • Prepare review and presentation of research papers internally and externally for GDC. • Set up of incubation infrastructure. • Prepare and present technical papers • Organize symposiums; innovation themes 	No. Of research papers	200	SRI	2023	Kshs. 21M		

Strategy 4: Experiential Training	<ul style="list-style-type: none"> Identify the Skills/knowledge to acquire Identify the Companies that possess this Skills/knowledge Liaise with the companies to take some of our staff for a specified period to acquire the skills/knowledge 	Number of staff trained	200	HRA	2022	Ksh. 300M		
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Strategic Objective 2: To Increase Staff Motivation

Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Ensure happy employees	<ul style="list-style-type: none"> Provide mortgage schemes Provide car loans Provide medical schemes Adequate working space Enhance work life balance 	%satisfaction	100%	HR&A	2023	100M		
Strategy 2: Ensure effective communication both vertically and horizontally	<ul style="list-style-type: none"> Enhance communication between management and unionisable employees Ensure transparency of HR processes 	%satisfaction	100%	HR&A	2023	10M		
Strategy 3: Enhance performance culture	<ul style="list-style-type: none"> Undertake a culture baseline survey to assess Current Define desired Culture and set culture change objectives Develop a culture change roadmap 	%satisfaction	100%	MD&CEO	2023	100M		

	<ul style="list-style-type: none"> • Develop a change communication strategy and plan • Implement the change communication plan • Implement change quick-win culture change initiatives • Monitor and scale-up the culture change program • Undertake external re-branding to introduce the new GDC brand to the external stakeholders 							
Strategic Objective 3: To acquire the right human capital								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Internal recruitment	<ul style="list-style-type: none"> • Implement career progression guidelines • Identify the need • Advertise internally for application 	Date	By June 2023	HRA	2019			
Strategy 2: External Sourcing	<ul style="list-style-type: none"> • Identify the need • Advertise for external application's 	Date	By June 2023	HRA	2023			
Strategy 3: Head-hunting of top talent	<ul style="list-style-type: none"> • 	Date	By June 2023	HRA	2023			
Strategy 4: Secondment	Identify specialised short-term skills set required from within the sector.	Date	By June 2023	HRA	2023			

Goal 3: Steam Resource Development

Strategic Objective 1: Connect 205MW to the Grid by June 2023								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Commission Menengai Phase I (105MW Power plants)	<ul style="list-style-type: none"> • Fulfill conditions precedent to the IPP contracts; finalize numerical model • Complete steam gathering system • Establish and operationalize Steam field O&M department; employ personnel, budget • Develop steam supply redundancy of 20% • Power plants commissioning 	% Completion	100%	GRD	2019	USD 15M	85%	
Strategy 2: Commission Menengai Phase II Unit 1 35MW	<ul style="list-style-type: none"> • Undertake Feasibility studies • PPA • Construct steam gathering system • Procure PPP partner • Power plants construction and commissioning 	% Completion	100%	GRD	2021	USD 70M	0%	
Strategy 3: Commission Menengai Phase II Unit 2 35MW	<ul style="list-style-type: none"> • Undertake Feasibility studies • Undertake PPA Negotiations • Construct steam gathering system 	% Completion	100%	GRD	2022	USD 70M	0%	

	<ul style="list-style-type: none"> • Procure power plant • Power plants construction and commissioning 							
Strategy 4 Commission Well head power generation (30MW)	<ul style="list-style-type: none"> • Undertake ESIA study • Undertake feasibility study • Negotiate PPA • Procure wellhead power plants • Install and commission • Power transmission construction 	No. of wellheads	6	SRI	2023	90MUSD	0	
Strategy 5: Implement Resource Management programs	<ul style="list-style-type: none"> • Acquire resource licenses • Develop reservoir and steamfield management plan • Develop steamfield operation and maintenance procedures • Build capacity 	%availability	100%	GRD	2023			

Strategic Objective 2: Realize 485MWe of Geothermal Steam equivalent by June 2023

Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Develop steam in Menengai geothermal field	<ul style="list-style-type: none"> • Carry out Scientific infill studies • Review and update conceptual models • Site high production geothermal well targets 	MW Steam equivalent	206	GRD	2023	USD 221M	0	

	<ul style="list-style-type: none"> • Undertake feasibility studies 							
<p><u>Strategy 2:</u> Develop steam in Baringo-Silali geothermal fields</p>	<ul style="list-style-type: none"> • Carry out Scientific infill studies • Review and update conceptual models • Site high production geothermal well targets • Undertake feasibility studies 	MW Steam equivalent	235	GRD	2022	USD 247M	0	
<p><u>Strategy 3:</u> Develop steam in Suswa geothermal field</p>	<ul style="list-style-type: none"> • Carry out Scientific infill studies • Review and update conceptual models • Site high production geothermal well targets • Undertake feasibility studies 	MW Steam equivalent	44	GRD	2022	USD 53M	0	
<p><u>Strategy 4:</u> Commercialize Direct Use of Geothermal Energy</p>	<ul style="list-style-type: none"> • Carry out Feasibility study • Undertake ESIA study • Marketing of the Direct Use products • Facilitate establishment of an industrial park in Menengai • Collaboration with relevant stakeholders 	No. of projects	3	GRD	2022	Kshs. 15M	4	

Goal 4: Drilling and Infrastructure Development

Strategic Objective 1: Improve Drilling Efficiency by 10%								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Reduce drilling days per well	<ul style="list-style-type: none"> • Synchronized/aligned Project management. • Productivity improvement measures; safety, number of days • Enhance drilling data access, analysis and utilization • Utilize measurements-while-drilling (MWD) technologies • Improve well design 	No. of Days	90 days	D&I	2020	USD 2 Million	100 days	
Strategy 2: Cap drilling downtime (including safety)	<ul style="list-style-type: none"> • Avail drilling materials; logistics • Avail drilling water • Institute in-time and proper maintenance plan • Framework contracting for supplies and services • Provide adequate skilled personnel 	No. of Days	5 days	D&I	2019	Negligible	10 days	
Strategy 3: Enhance Supply Chain Efficiency	<ul style="list-style-type: none"> • Automate processes • Framework contracting • Integrate operations plan materials requirement Forecasting and Planning 	% Stock-outs	0%	SC	2019	Kshs. 20M	10%	

Strategy 4: Develop Kabarak to be a one stop facility	<ul style="list-style-type: none"> Construct GDC offices; Nakuru 	% completion	100%	CS	2023	Kshs. 200M	0%	
Strategy 5: Enhance program/project monitoring and evaluation (M&E)	<ul style="list-style-type: none"> Build capacity – staff training Develop program M&E policy Develop project M&E policy Develop M&E tools Implement M&E process 	No of reports (every quarter)	20	D&I	2022	Ksh. 20 million	0	

Strategic Objective 2: Drill geothermal wells for 485MWe of Geothermal Steam by June 2023

Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Develop steam in Menengai geothermal field	<ul style="list-style-type: none"> Develop infrastructure Drill geothermal wells 	Number of wells	63	D&I	2023	USD 221M	0	
Strategy 2: Develop steam in Baringo-Silali geothermal fields	<ul style="list-style-type: none"> Develop infrastructure Drill geothermal wells 	Number of wells	64	D&I	2023	USD 247M	0	
Strategy 3: Develop steam in Suswa geothermal field	<ul style="list-style-type: none"> Develop infrastructure Drill geothermal wells 	Number of wells	12	D&I	2022	USD 53M	0	

Goal 5: Corporate Systems & Processes

Strategic Objective 1: To increase efficiency of business systems and processes to 100% in 2023								
Strategic Initiatives	Activities	Performance Indicators (outcome)	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Enhance Automation (to increase efficiency)	<ul style="list-style-type: none"> • Upgrade and expand ICT infrastructure • Maximize use of drilling software (RiMbase, RigSense) • Establish Geo –Databases • Optimize use of ERP-SAP modules; Data Management System, Human Resource Management, Plant maintenance, project systems, fleet management, business intelligence • Enhance staff efficiency through mobility and cloud services • Acquire and implement employee self-service and workflows 	% Automation	100%	ICT	2023	Kshs. 500M	70%	
Strategy 2: Enhance ICT infrastructure	<ul style="list-style-type: none"> • Network Firewall upgrade • Bandwidth management and network intelligence • PABX Upgrade • Local and Wide area network equipment upgrade and maintenance 	% Implementation	100%	ICT	2023	Kshs.210M		

Strategy 3: Enhance business continuity systems	<ul style="list-style-type: none"> • Perform a business impact analysis • Develop a business continuity policy • Acquire IT and infrastructure recovery areas 	% Implementation	100%	CS	2023	Ksh.		
Strategy 4: Enhance Safety Management Systems	<ul style="list-style-type: none"> • Document on-the-job project site safety procedures • Train staff on implementation of safety procedures • Implement, monitor effectiveness and improve of safety procedures • OHSAS 18001 Certification 	% Compliance	100%	CS	2023	Kshs.30M	0	Dec 2017
Strategy 5: Enhance Processes and Quality Management Systems	<ul style="list-style-type: none"> • Implement business processes improvements programmes; • Maximize use of ERP-SAP • Implement quality systems improvement programmes. 	% Compliance	100%	CS	2023	Kshs. 100M		

Strategic Objective 2: To increase Community and Stakeholder Participation

Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1	<ul style="list-style-type: none"> • Develop frequent and tailored information updates to stakeholders 	% satisfaction	75%	Company Secretary	2023	50M	6 months	Year 1

Improve inter/intra communication	<ul style="list-style-type: none"> Disseminate GDC multimedia content (documentaries, magazines, brochures, fliers etc) to stakeholders Make use of targeted media and avenues to reach stakeholders Provide an avenue to stakeholders to provide feedback and pose questions 							
<u>Strategy 2:</u> Enhance Community Participation	<ul style="list-style-type: none"> Public (Barazas) Meetings 	No. of meetings	90	CS		Kshs. 20M		
<u>Strategy 3:</u> Enhance existing stakeholder engagement strategy	<ul style="list-style-type: none"> Develop stakeholder engagement framework Workshops/meetings/ baraza with various stakeholders (combine with Strategy C) 	No. of reports	60	CS	2022	Kshs. 50M		
<u>Strategy 4:</u> Implement CSR Programmes	<ul style="list-style-type: none"> Review CSR policy Anchor CSR programmes on SDGs Develop community relations policy Establish GDC Foundation 	No. of projects	6	CS	2022	Kshs. 50M	0	

Goal 6: Strategy, Research and Development

Strategic Objective 1: Mobilize Kes 90 Billion by 2023								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Source for External Funds	<ul style="list-style-type: none"> Develop funding concepts & proposals Compliance with financial standards 	Amount (sustainability)	Kshs. 50 Billion	SRI	2023	Ksh. 15 million		
Strategy 2: Exchequer Funding	<ul style="list-style-type: none"> Participate in MTP, MTEF planning sessions Actively pursue disbursements Get buy-in for strategic plan from relevant stakeholders 	Amount (sustainability, biz continuity)	Kshs. 20 billion	SRI	2023	Negligible		
Strategy 3: Create Strategic Partnerships	<ul style="list-style-type: none"> Partner with Public and Private Sector in Project development Obtain tax concessions 	Amount (enhanced stakeholder participation, biz continuity)	Kshs. 20 billion	SRI	2019	Ksh. 3 million		
Strategy 4: Evaluate and prioritise project business models	<ul style="list-style-type: none"> Undertake analysis of business models for each project Rank and prioritize business models for each project Determine appropriate business model for each project 	No. of Reports	8	SRI	2023	Ksh. 40M	0	
Strategic Objective 2: Develop four(4) additional Products by 2023								

Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1 Operationalize the Geothermal Training Institute	<ul style="list-style-type: none"> • Collaboration • Provide Capacity building both locally and internationally 	Established Institute (sustainability, capacity building)	1	SRI	2023	Kshs. 1.8B	0	
Strategy 2: Offer Integrated Project Management services locally and regionally (Consultancy)	<ul style="list-style-type: none"> • Hiring out of equipment • Offer Technical Services • Engage in geothermal Consultancy • Marketing 	No. of projects (earn revenue, brand identity,)	2	SRI	2023	Kshs. 20M	0	
Strategy 3: Commercialize Direct Use of Geothermal Energy	<ul style="list-style-type: none"> • Feasibility study • Undertake ESIA study • Marketing of the Direct Use products • Facilitate establishment of an industrial park in Menengai • Collaboration with relevant stakeholders 	No. of projects	3	SRI	2023	Kshs. 15M	4	
Strategy 4: Generate power utilizing wellhead generation units	<ul style="list-style-type: none"> • Undertake ESIA study • Install and commission • Negotiate PPA • Power transmission/grid analysis (33kV) (Baringo-Silali) • Power transmission construction 	No. of wellheads	6	SRI	2023	90MUSD	0	

<p>Strategy 5: Increase product(s) stakeholder participation</p>	<ul style="list-style-type: none"> • Enhance tendering efficiency • Ensure prompt payment of suppliers • Enhance product stakeholder engagement • Market products 	<p>% satisfaction (customer satisfaction)</p>	<p>100%</p>	<p>SRI</p>	<p>2023</p>	<p>Ksh. 130M</p>		
<p>Strategy 6: Enhance Research and Innovation</p>	<ul style="list-style-type: none"> • Activate research and innovation department • Set up of incubation infrastructure. • Consolidate and engage existing/or new collaborations • Bring together multi-disciplinary teams to tackle selected operational challenges • Identify and develop areas with potential cost cutting including – hydro-fracking and directional drilling • Monitor and report annually on performance of all innovations 	<p>No. of reports</p>	<p>10</p>	<p>SRI</p>	<p>2023</p>	<p>Ksh. 500M</p>	<p>0</p>	

Goal 7: Financial Sustainability

Strategic Objective 1: Earn Revenue of USD 84 Million from steam sales by 2023								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Commission 105MW Phase Menengai I Power Plants	<ul style="list-style-type: none"> • Fulfill conditions precedent to the IPP contracts; finalize numerical model • Complete steam gathering system • Establish and fund Steam field O&M department; employ personnel, budget • Drill for Steam supply redundancy of 20% Power plants commissioning	Amount	USD 50.3 million	Finance	2023	Negligible	0	
Strategy 2: Commission Menengai II Power Plants of 70MW	<ul style="list-style-type: none"> • Feasibility studies • Partner with Public and Private Sector in Project development • PPA • Construct steam gathering system • Develop power plant development Agreements • Power plants construction and commissioning 	Amount	USD 34 Million	Finance	2023	Negligible	0	
Strategic Objective 2: Earn 6% of Revenue from other sources beyond steam sales								
Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date

Strategy 1: Earn revenue from early power generation	Commission 30 MW of wellhead units	Revenue generated	USD 5 Million	Finance	2023	USD90M (Project cost)	0	
Strategy 2: Offer training and consultancy services in geothermal development	<ul style="list-style-type: none"> Offer training in geothermal Bid and provide consultancy services 	Revenue generated	Kshs. 20 million	Finance	2023	Ksh. 10 million	Kshs 3M	
Strategy 3: Direct Utilization of Steam	<ul style="list-style-type: none"> Commission and operate direct uses in Suswa geothermal fields Commission and operate direct uses in Suswa geothermal fields 	Revenue generated	Kshs. 10 million	Finance	2023	Ksh. 10 million	0	

Strategic Objective 3: To become Financially Sustainable

Strategic Initiatives	Activities	Performance Indicators	Target	Responsibility	Time Frame	Cost	Start Status (Base line)	Review Status/ Date
Strategy 1: Enhance Financial Management	<ul style="list-style-type: none"> Monitor costs Control costs 	Savings		Finance				
Strategy 2: Implement Risk and Change Management	<ul style="list-style-type: none"> Establish the business context(scope of risk management) Risk identification, assessment and quantification Drive risk assessment from gross risk to residual risk 	No of reports	5	ARC	2023	Ksh. 25M	2Risk Assessment Reports	

	<ul style="list-style-type: none">• Improve risk management and control processes• Monitor and report on key risk							
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