付属資料

１．要請書
２．Minutes of Meeting（M/M）
３．Record of Discussions（R/D）
４．事業事前評価表
５．面談者リスト
６．収集資料リスト

GDC Geothermal Development Company
Powering the Vision

9TH FLOOR, TAJ TOWER, UPPER HILL
P.O.BOX 100746-00101, NAIROBI
TEL: (254) 20 2427516/0719036000
info@gdc.co.ke/www.gdc.co.ke

MD/BD/JICA/01/pkn **July 30, 2012**

Mr. Patrick Nyoike, CBS
The Permanent Secretary,
Ministry of Energy
Nyayo House
NAIROBI

Dear Sir,

APPLICATION FORM FOR EXPERTS IN THE AREA OF GEOTHERMAL DEVELOPMENT

We have been holding meetings with Japan International Cooperation Agency (JICA) for grants in support of GDC.

JICA have indicated that they can provide a grant in the form of Technical Support.

This is to request for your support in recommending and submitting the official request to JICA through Treasury.

We hereby attach the duly-filled application form for your recommendation and onward forwarding to Treasury for their official application to JICA.

Yours Sincerely

Dr. Silas M. Simiyu, MBS
MANAGING DIRECTOR & CEO

APPLICATION FORM FOR JAPAN'S TECHNICAL COOPERATION

1. **Date of Entry**: Day 17 Month 07 Year 2012

2. **Applicant**: The Government of KENYA

3. **Project Title**: 400 MW MENENGAI PHASE I PROJECT

4. **Implementing Agency**: GEOTHERMAL DEVELOPMENT COMPANY
   Address: P.O. BOX 100746-00101 NAIROBI
   Contact Person: MR. PAUL NGUGI
   Tel. No.: +254 719 036000 Fax No. n/a
   E-Mail: pngugi@gdc.co.ke

5. **Background of the Project**

(Current conditions of the sector, Government's development policy for the sector, issues and problems to be solved, existing development activities in the sector, etc.) Kenya is endowed with a huge potential of high temperature resource estimated at between 7000 to 10000 MWe that largely remains untapped. Geothermal is the least cost (most economic) source of electric power for Kenya. Despite the fact that geothermal is the best option for Kenya and that the Country has had a long geothermal development period spanning over 50 year, only 210 MW is being utilized. This slow development is attributed to the fact that geothermal development requires large upfront financing which the existing public entities may not support by their balance sheets, and high upstream development risks that have deterred private sector participation.

The aspiration of the Kenya Vision 2030 is to transform Kenya into a newly industrialized "middle income" country providing quality life for all its citizens by the year 2030. Electricity has been identified as one of the major enablers for the Vision 2030.

According to the LCPDP, the current growth on power demand stands at 8% and is projected to increase to over 10% upon successful implementation of Vision 2030 initiative. The current peak power demand stands at about 1,200 MW and is projected to grow to about 19,000 MW over the next 20 years. It is planned that the increased demand will be met by 5,000 MW capacity from geothermal and the remainder from various other sources of energy including imports, nuclear, coal and hydro.

The electricity sub-sector is facing challenges of; rapidly growing demand for

electricity, high dependence on hydroelectric power which has become unreliable due to frequent drought, high cost of supply, low access rate (about 23%), compounded by the additional risk of climate change and high petroleum price variability. Together, hydro and oil based thermal contribute over 80% power supply making our system very vulnerable to oil price variations and weather changes.

Geothermal power has numerous advantages over other sources of power; it is not affected by drought and climatic variability, it has the highest availability factor at about 95 percent and it is low cost therefore making it suitable for base load; it is green energy with no adverse effects on the environment, it is indigenous and readily available in Kenya unlike fossil thermal energy that relies on fuel imports.

The 400 MW Menengai Phase I Project development is being undertaken by the Geothermal Development Company Limited (GDC), a parastatal wholly owned by the Government, which is under the oversight of the Ministry of Energy. GDC is mandated to accelerate the development of geothermal in the country through prospecting for, exploring, assessing, developing and marketing geothermal energy and to support the Government initiative to raise the requisite development funds.

The Project is of national priority as it has been selected as a vision 2030 flagship project to meet the 5000MW targeted from geothermal resources in line with the Least Cost Power Development Plan.

6. Outline of the Project

(1) Overall Goal

The overall goal of this project is to access expert services and acquire the skills required to assess and manage the geothermal resource in Menengai and replicate the same in other upcoming projects

(2) Project Purpose

The following results are expected to be achieved; knowledge in geothermal reservoir modeling, geothermal laboratory management, knowledge in economic and financial analysis and project management skills,

(3) Outputs

The outputs expected to be realized from the project includes;

- Skilled workforce in geothermal reservoir modeling, project management, economic and financial analysis and laboratory management
- A modeling unit A simulation model
- A geothermal laboratory

(4) Project Activities

- On the job Training by the experts
- Development of a simulation model Establishment of a geothermal laboratory
- Data management
- Resource assessment

(5) Input from the Recipient Government

GDC will provide the following facilities to the experts;

- Office space
- Access to the project area,
- Data and reports
- Trainees/ counterpart staff
- Internet and e-mail services(connection within GDC system)

(6) Input from the Japanese Government

- The Japanese Government is requested to meet the remunerations and travel for the following required experts;

No.	Field of Expertise	No. of Experts	Equipment	Period
1	Geothermal Reservoir Modelling	2	Modelling Software	3 years
2	Geothermal Laboratory Management (geology, geochemistry, geophysics)	1	-	3 years
3	Economic/Financial Analysis	2	-	3 months
4	Project Management	1	-	6 months
TOTAL		7		

The programme will entail the experts coming to project site at intervals. The experts especially those on three year period will be expected to conduct a session for a maximum period of six months.

7. Implementation Schedule

Month September Year 2013 ~ Month December Year 2016

8. Implementing Agency

GDC is in the process of acquiring the six drilling rigs required for the project. Four rigs are already at site and two are expected by July, 2013. The total project cost is projected at USD 847 million. The financing of the 400MW Menengai Phase I Project is complete with both the Government and Development Partners partnering together to fund the project activities as outlined in the table below;

The expected rate of return for GDC is 15% and for the IPP is 18%.

The Payback Period is twelve (12) years

The project financing plan is outlined below;

STEAM DEVELOPMENT (GDC)	
Financing Source	**Million USD**
AfDB	120
EIB	36
AFD	170

World Bank	100
SREP	40
GoK/ GDC**	381
Total Financing	**847**

CONSTRUCTION OF POWER PLANT	
Financing Source	**Million USD**
IPP	1200

TRANSMISSION LINE	**Million USD**
KETRACO	–

** GoK/GDC financing from Exchequer and revenues from steam

9. Related Activities

(Activities in the sector by the recipient government, other donors and NGOs)

Geothermal Development Company Limited (GDC) will own and implement the project. GDC will enter into a steam sales/supply contract and may in addition sign an investment contract with the IPPs. In addition, GDC will enter into an agreement with KPLC for compensation of supplied steam and a wheeling contract with KETRACO.

Ministry of Energy (MOE)-will offer coordination & supervisory role to all players.

Energy Regulatory Commission (ERC) –will ratify the Power Purchase Agreements and the Tariff.

Kenya Power and Lighting Company (KPLC) -will enter into Power Purchase Agreements with IPP & offtake the power. In addition, KPLC will enter into a

wheeling power contract with KETRACO and a steam compensation agreement with GDC.

Kenya Electricity Transmission Company Ltd (KETRACO)-will construct the evacuation facilities and enter into a wheeling contract with KPLC.

Independent Power Producers (IPPs): The IPPs will enter into a steam sale agreement and an investment contract with GDC. The IPPS will also enter into a Power Purchase Agreement with KPLC and acquire a generation license from ERC.

The Government of Kenya (through the Ministry of Finance)-will finance the project through budgetary allocations and support from development partners. It will also provide securities and facilitate guarantees.

10. ***Gender Consideration***

(Any relevant information of the project from gender perspective.)

The project will avail equal training opportunities for both the female and male staff from GDC. The experts may be of either gender. There is no preference/discrimination.

11. Environmental and Social Considerations

(Please fill in the attached screening format.)

12. Beneficiaries

(Population for which positive changes are intended directly and indirectly by implementing the project and gender disaggregated data, if available)

The project stakeholders will accrue benefits from the implementation of the project as outlined below;

a)The Public

The country will benefit from the project through the injection of additional competitively-priced electric power to the national grid aimed at meeting public power needs.

b) GDC

GDC will accrue revenue from the project which will be re-employed in further geothermal development.

c)The Private Sector

The Private Sector will accrue return on investment

d) Local Community

There will be job creation and enhanced security for the local community.

13. Security Conditions

The project site is secure. The geothermal experts will enjoy security availed by GDC at the project site. No security incidences reported at site to date.

14. Others

Screening Format

Question 1 Address of a project site The Menengai prospect (Fig. 1) is located on the outskirts of Nakuru Town, the fourth largest town in Kenya, situated about 180 Km west of Nairobi. It is associated with a large elliptically shaped caldera measuring about 11.5 km and 7.5 km in its major and minor axis respectively and an area of about 70 km². Most of the area is well served by a network of earth roads and all weather roads through the western and eastern parts. The project area is within 5 -10 km from all weather roads. The Nairobi –Kisumu Railway line and Trans-Africa highway passes through the southern and western part of the area. Electricity and telephone service lines serve most of the habitation and farm land surrounding the project area. The project area is within 15 km from the Uganda HV 132 Kv line and about 30 km to the Lanet substation serving

Question 2 Outline of the project

The objective of the project is to access expert services and acquire the skills required to assess and manage the geothermal resource in Menengai and replicate the same in other upcoming projects. GDC desires to equip its staff with the right skills from initial stages of geothermal development in order to apply them in the development of upto 5,000MW by 2030. A well-managed laboratory is critical as data management is key. Reservoir modelling is a skill that will enhance accuracy of data necessary for engagement of the private sector.

√

2-1 Does the project come under following sectors?

☐Yes ☐No

If yes, please mark corresponding items.

☐Mining development

☐Industrial development

☐Thermal power (including geothermal power)

☐Hydropower, dams and reservoirs

☐River/erosion control

yesPower transmission and distribution lines -**Yes**

☐Roads, railways and bridges

☐Airports

☐Ports and harbors

☐Water supply, sewage and waste treatment

☐Waste management and disposal

☐Agriculture involving large-scale land-clearing or irrigation

☐Forestry

☐Fishery

☐Tourism

2-2 Does the project include the following items?

☐Yes ☐No

If yes, please mark following items.

☐Involuntary resettlement (scale: households, persons)

☐Groundwater pumping (scale: m3/year) **Yes**

yesLand reclamation, land development and land-clearing (scale: hectors)

yes

☐Logging (scale: hectors)

2-3 Did the proponent consider alternatives before request?

☐Yes: Please describe outline of the alternatives

( )

☐No **no**

2-4 Did the proponent have meetings with related stakeholders before request?

☐Yes ☐No

If yes, please mark the corresponding stakeholders.

☐Administrative body **Yes**

☐Local residents **Yes**

☐NGO **Yes**

☐Others ( )

Question 3

Is the project a new one or an on-going one? In case of an on-going one, have you received strong complaints etc. from local residents?

☐New ☐On-going(there are complaints) ☐On-going (there are no complaints) **Yes**

☐Others [ ]

Question 4 Name of laws or guidelines:

Is Environmental Impact Assessment (EIA) including Initial Environmental Examination (IEE) required for the project according to laws or guidelines in the host country?

☐Yes ☐No

If yes, please mark corresponding items.

☐Required only IEE (☐Implemented, ☐on going, ☐planning)

☐Required both IEE and EIA (☐Implemented, ☐on going, ☐planning)

☐Required only EIA **Yes** (☐Implemented, **Yes** ☐on going, ☐planning)

☐Others: ( )

Question 5

In case of that EIA was taken steps, was EIA approved by relevant laws in the host country?

If yes, please mark date of approval and the competent authority.

☐Approved: without a supplementary condition	☐Approved: with a supplementary condition **Yes**	☐Under appraisal

(Date of approval: 2009 Competent authority: NEMA)

☐Not yet started an appraisal process

☐Others:( )

Question 6

If a certificate regarding the environment and society other than EIA, is required, please indicate the title of certificate.

☐Already certified ☐Required a certificate but not yet done

Title of the certificate :( )

☐Not required not required

☐Others ( )

Question 7

Are following areas located inside or around the project site?

☐Yes ☐No no ☐Not identified

If yes, please mark the corresponding items.

☐National parks, protected areas designated by the government (coast line, wetlands, reserved area for ethnic or indigenous people, cultural heritage) and areas being considered for national parks or protected areas

☐Virgin forests, tropical forests

☐Ecological important habitat areas (coral reef, mangrove wetland, tidal flats)

☐Habitat of valuable species protected by domestic laws or international treaties

☐Likely salts cumulus or soil erosion areas on a massive scale

☐Remarkable desertification trend areas

☐Archaeological, historical or cultural valuable areas

☐Living areas of ethnic, indigenous people or nomads who have a traditional lifestyle, or special socially valuable area

Question 8

Does the project have adverse impacts on the environment and local communities?

☐Yes ☐No - no ☐Not identified

Reason: [ ]

Question 9

Please mark related environmental and social impacts, and describe their outlines.

☐Air pollution
☐Water pollution
☐Soil pollution
☐Waste
☐Noise and vibration
☐Ground subsidence
☐Offensive odors
☐Geographical features
☐Bottom sediment
☐Biota and ecosystem
☐Water usage
☐Accidents
☐Global warming
☐Involuntary resettlement

☐Local economy such as employment and livelihood etc.
☐Land use and utilization of local resources

Outline of related impacts:

[ ]

☐Social institutions such as social infrastructure and local decision-making institutions

☐Existing social infrastructures and services

☐The poor, indigenous of ethnic people

☐Maldistribution of benefit and damage

☐Local conflict of interests

☐Gender

☐Children's rights

☐Cultural heritage

☐Infectious diseases such as HIV/AIDS etc.

☐Others (　　)

Question 10

Information disclosure and meetings with stakeholders

10-1 If the environmental and social considerations are required, does the proponent agree on information disclosure and meetings with stakeholders in accordance with JICA Guidelines for Environmental and Social Considerations?

☐Yes -yes ☐No

10-2 If no, please describe reasons below.

[ ]

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF KENYA
ON
DETAILED PLANNING SURVEY
FOR
THE PROJECT FOR CAPACITY STRENGTHENING FOR GEOTHERMAL DEVELOPMENT IN KENYA

The Project Detailed Planning Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Hideo EGUCHI visited the Republic of Kenya (hereinafter referred to as "Kenya") from 22nd May to 11th June 2013 for the purpose of conducting a project formulation of the Project for Capacity Strengthening for Geothermal Development in Kenya (hereinafter referred to as "the Project").

During its stay in Kenya, the Team had a series of discussions and exchanged views with Geothermal Development Company of Kenya and other authorities concerned of the Government of Kenya (hereinafter referred to as "the Kenya side") over the matters for the successful implementation of the Project.

As a result of the discussions, both sides recognized the matters referred to in the document attached hereto.

Nairobi, 30th May, 2013

Mr. Hideo EGUCHI
Chief Representative
JICA Kenya Office
Japan

Dr. Silas M. SIMIYU
Managing Director & CEO
Geothermal Development Company
Kenya

Witnessed by

Mr. Patrick M. NYOIKE
Permanent Secretary
Ministry of Energy
The Republic of Kenya

ATTACHEMENT

1. PROJECT TITLE

Both sides agreed to change the project title from the original title in the request form submitted by the Kenya side on 7th July, 2012 to "the Project for Capacity Strengthening for Geothermal Development in Kenya".

2. FRAMEWORK OF THE PROJECT AND RECORD OF DISCUSSIONS

Based on the series of discussions between the Kenya side and the Team, the framework of the Project was formulated and the draft Record of Discussion (hereinafter referred to as "R/D") was prepared and agreed upon by both sides. After confirmation by the Kenya side and JICA Headquarters, R/D shall be signed by the Managing Director & CEO of the Geothermal Development Company of Kenya and the Representative of JICA and countersigned by the Permanent Secretary Ministry of Energy and Petroleum prior to the implementation of the Project. Draft R/D might be changed subject to approval process of both sides.

The draft R/D is attached in ANNEX.

3. OTHER RELEVANT ISSUES

The Kenya side and the Team mutually recognized and agreed to the issues below:

(1) Area of the Project
Both sides agreed that area of the project shall be Nairobi, Menengai I and II, Suswa, and other geothermal prospects in Kenya.

(2) Bogoria-Silali block
Both sides agreed that Lake Bogoria, a world heritage site, shall be excluded from the focus of the Project.

The prospects within Bogoria-Silali block would be included in the focus if the negative environmental and social impact is negligible. This decision will be made at the second batch of the mission for the detailed planning survey which is scheduled in late June 2013 (hereinafter referred to as "the second mission").

(3) Equipment for the project
Both sides agreed that GDC would provide drilling rig, all necessary peripheral equipment, spare parts and materials for the drilling equipment to properly operate including the rig operation and maintenance personnel necessary for the drilling OJT conducted for the Project.

Both sides agreed that the equipment and/ or materials input by JICA would be finalized during the second mission.

Consumables for drilling operation for the first year of drilling OJT will be provided by GDC considering its timely implementation. JICA will fill in the deficit later and provide consumables for second and third year of drilling OJT.

(4) Area of capacity development through training
Both sides agreed that area of capacity development through training would be conceptual modeling, well siting, drilling operation, wellbore data analysis, reservoir evaluation, data management, environmental planning & monitoring, plant engineering, and public/ private scheme planning.

(5) Coverage of training in Japan
The Kenyan side requested training programs in Japan. Both sides agreed that these programs will cover "drilling techniques" and "reservoir evaluation".

(6) Multi-purpose use of geothermal energy
Both sides agreed that promoting multi-purpose use of geothermal energy other than power generation to be included as one of the scopes of the Project.

(7) Liabilities and Indemnities
JICA shall indemnify and hold GDC and all of GDC's officers, agents, representatives, servants, subsidiaries, and employees or any of them, harmless from any loss, damage, liability or expenses on account of damage to property and injuries, including death, to employee(s) of JICA, JICA's clients and/or of JICA's subcontractors arising out of any causes relating to performance hereof, and at JICA's expenses shall defend any suits or other proceedings brought against GDC, GDC's representatives, officers, agents, servants, subsidiaries and employees, or any of them on account thereof , and shall pay all expenses and satisfy all judgment which may be incurred by or rendered against them or any of them, in connection therewith.

GDC shall indemnify and hold JICA and JICA's clients and all of JICA's officers, agents, representatives, servants, subsidiaries, and employees or any of them, harmless from any loss, damage, liability or expenses on account of damage to GDC's property, and injuries including death, to employee(s) of GDC, DGC's clients and any third parties, and/or of GDC's subcontractors arising out of any causes resulting to performance hereunder and at GDC's expense shall defend any suits or other proceedings brought against JICA, JICA's clients, their officers, agents, representatives, servants, subsidiaries and employees, or any of subcontractors of JICA's clients on account thereof, and shall pay all expenses and satisfy all judgments which may be incurred by or rendered against them, or any of them, in connection therewith.

(8) Insurances
GDC shall procure and maintain at GDC's cost the insurances of the GDC personnel in the project and ensure that the equipment and GDC subcontractors are insured.

JICA shall secure and maintain all necessary insurances at JICA's cost for JICA's personnel and/or JICA's subcontractor other than GDC's crew and specialist.

(9) Result of drilling
JICA shall not guarantee success of any of the wells drilled. GDC shall indemnify and hold JICA and JICA's consultants and all of JICA's officers, agents, representatives, servants, subsidiaries, and employees or any of them, harmless from any loss, damage, liability or expenses on account of damage to GDC's property, arising out of any causes relating to the failure and/or defects of test drilling hereunder and at GDC's expense shall defend any suits or other proceedings brought against JICA, JICA's consultants, their officers, agents, representatives, servants, subsidiaries and employees, or any of subcontractors of JICA's consultants on account thereof, and shall pay all expenses and satisfy all judgments which may be incurred by or rendered against them, or any of them, in connection therewith.

(10) Treatment of the final report
Both sides agreed that the final report of the Project would be opened to the public after both sides inspect and approve.

(11) Long-term training in Japan
GDC requested JICA to provide long-term training opportunity in Japan for Master's or PhD program. Both sides agreed that 1 or 2 staff of GDC to be provided with this opportunity. Candidates to be identified by JICA experts through the implementation of the projects.

(Draft)
RECORD OF DISCUSSIONS
ON
THE PROJECT FOR CAPACITY STRENGTHENING FOR GEOTHERMAL DEVELOPMENT IN KENYA
IN
THE REPUBLIC OF KENYA
AGREED UPON AMONG
MINISTRY OF ENERGY AND PETROLEUM
AND
GEOTHERMAL DEVELOPMENT COMPANY
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Japan International Cooperation Agency (hereinafter referred to as "JICA") had a series of discussions with Kenyan authorities on desirable measures to be taken by JICA and the Government of the Republic of Kenya (hereinafter referred to as "Kenya") for the successful implementation of the "Project for Capacity Strengthening for Geothermal Development in Kenya" (hereinafter referred to as "the Project") .

As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of Kenya, signed in Nairobi on 29th April, 2004 (hereinafter referred to as "the Agreement"), both sides agreed on the matters referred to in the document attached hereto

Nairobi, XX July, 2013

Mr. Hidetoshi IRIGAKI
Director General
Industrial Development and Public Policy Department
Japan International Cooperation Agency

Principal Secretary
Ministry of Energy and Petroleum
The Republic of Kenya

Dr. Silas M. SIMIYU, MBS
Managing Director & CEO
Geothermal Development Company

Based on the minutes of meeting of the Detailed Planning Survey on the Project for Capacity Strengthening for Geothermal Development in Kenya (hereinafter referred to as "the Project") signed on 30 May, 2013 between Geothermal Development Company (hereinafter referred to as "GDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") held a series of discussions with GDC and relevant Government organizations to develop a detailed plan of the Project.

Both parties agreed the details of the Project and the main points discussed as described in the Appendix 1 and the Appendix 2 respectively.

Both parties also agreed that GDC, the counterpart of JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant Government organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Kenya.

The Project will be implemented within the framework of the Agreement on Technical Cooperation signed on 29 April, 2004 (hereinafter referred to as "the Agreement") and the Note Verbales exchanged on 01 February 2013 between the Government of Japan (hereinafter referred to as "GOJ") and the Government of Kenya (hereinafter referred as "GOK").

Appendix 1: Project Description

PROJECT DESCRIPTION

I. BACKGROUND

Kenya is endowed with a huge potential of high temperature geothermal resource estimated at between 7,000 to 10,000 MW that largely remains untapped. Geothermal resource is one of the least cost sources of electric power in Kenya. Despite the fact that geothermal is the best option for Kenya and that the country has had a long geothermal development period spanning over 50 years, only 210 MW is being utilized. This slow development is attributed to the fact that geothermal development requires large upfront financing which the existing public entities might not support by their weak balance sheets, and high upstream development risks that have deterred private sector participation.

Geothermal power has numerous advantages over other resources of power; it is not affected by drought and climatic variability, it has the highest availability factor at about 95% and it is low cost therefore making it suitable for base load; it is green energy with no adverse effects on the environment, it is indigenous and readily available in Kenya unlike fossil thermal energy that relies on fuel imports.

GDC is a Special Purpose Vehicle wholly owned by the Government under the oversight of the Ministry of Energy and Petroleum. GDC is mandated to accelerate the geothermal development in the country through prospecting, exploring, assessing, developing and marketing geothermal energy. GDC support the Government initiative to raise the requisite development funds.

The Project is one of the national priority projects as it has been selected as a vision 2030 flagship project to meet the 5,000MW targeted from geothermal resources in line with the LCPDP.

II. OUTLINE OF THE PROJECT

1. Title of the Project

"Project for Capacity Strengthening for Geothermal Development in Kenya"

2. Overall Goal

Geothermal development in Kenya will be accelerated.

3. Objective

To enhance human resources of GDC which contribute to risk mitigation in geothermal development.

4. Outputs

1. Capacity in developing conceptual models of reservoirs and siting successful drilling locations will be improved.
2. Capacity to identify and strike drilling targets will be improved.

3. Capacity in interpreting wellbore data, establishing calibrated reservoir models and evaluating geothermal resources will be improved.
4. Capacity to prepare economically and environmentally viable business plans as a steam provider will be enhanced.
5. Capacity in multi-purpose use of geothermal energy will be enhanced.

5. Activities

1-1. Training in conceptual modeling
1-2. Training in well siting
2-1. Training in drilling operation
2-2. Training in drilling logistics management
2-3. Training in health, safety and environment
2-4. Training in Japan in theory of drilling techniques
3-1. Training in wellbore data analysis
3-2. Training in reservoir evaluation
3-3. Training in Japan in theory of reservoir evaluation
3-4. Training in database development and management
4-1. Training in environmental planning & monitoring
4-2. Training in plant engineering
4-3. Training in public/ private scheme planning
4-4. Training in structuring agreement and negotiating with IPPs
5-1. Promoting multi-purpose use of geothermal energy.

6. Input

(1) Input by JICA

(a) Dispatch of Experts

i. Well Siting
ii. Training Program Planning
iii. Geologist
iv. Geochemist
v. Geophysicist
vi. Data Integration/ Reservoir Simulation
vii. Drilling Operation Management
viii. Drilling Supervisor
ix. Reservoir Evaluation
x. Wellbore Survey
xi. Discharge Testing
xii. Reservoir Simulation
xiii. Economic Evaluation
xiv. Business Administration
xv. Environmental and Social Safeguard
xvi. Power Plant Engineering
xvii. Finance
xviii. Multi-purpose Use of Geothermal Energy
xix. Project Coordinator

(b)Training

i. Drilling Techniques
ii. Reservoir Evaluation

(c)Machinery and Equipment
Necessary Machinery and Equipment to the Project

In case of importation, the machinery, equipment and other materials under II-6 (1) (c) above will become the property of GDC upon delivery C.I.F. (cost, insurance and freight) to the Kenyan authorities concerned at the ports and/or airports of disembarkation.

Inputs other than indicated above will be determined through mutual consultations between JICA and GDC during the implementation of the Project, as necessary.

(2) Input by the Kenyan side
The Kenyan side will take necessary measures to provide at its own expense:
(a) Services of GDC's counterpart personnel and administrative personnel as referred to in II-7;
(b) Suitable office space with necessary equipment;
(c) Supply or replacement of machinery, equipment, instruments, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA;
(d) Information as well as support in obtaining medical service;
(e) Credentials or identification cards;
(f) Available data (including maps and photographs) and information related to the Project;
(g) Running expenses necessary for the implementation of the Project;
(h) Expenses necessary for transportation within Kenya of the equipment referred to in II-6 (1) as well as for the installation, operation and maintenance thereof; and
(i) Necessary facilities to the JICA experts for the remittance as well as utilization of the funds introduced into Kenya from Japan in connection with the implementation of the Project.

7. Implementation Structure
The Project organization chart is given in the Annex III. The roles and assignments of relevant organizations are as follows:

(1) GDC
(a) Managing Director and CEO of GDC will be responsible for overall administration and implementation of the Project as Project Director.
(b) Chief Manager, Business Development, GDC will be responsible for project implementation and coordination with JICA experts as Project Manager.

(2) JICA Experts
The JICA experts will give necessary technical guidance, advice and recommendations to GDC on any matters pertaining to the implementation of the Project.

(3) Joint Coordinating Committee

Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held at least once a year and whenever deemed necessary. JCC will approve an annual work plan, review overall progress, conduct monitoring and evaluation of the Project, and exchange opinions on major issues that arise during the implementation of the Project. A list of proposed members of JCC is shown in the Annex IV.

8. Project Site(s) and Beneficiaries

(1) Project Site

Nairobi, Menengai I and II, Suswa, and other geothermal prospects in Kenya

(2) Beneficiaries

Direct beneficiaries will be staff of GDC. The Project will also be contributing directly and indirectly to the people of Kenya and in the economic growth of Kenya.

9. Duration

The Project duration would be 48 (forty eight) months. The commencement date is to be recognized from the first arrival of JICA Experts in Kenya.

Month	1	-	12	-	24	-	36	-	47	48
Project	━━━	━━━	━━━	━━━	━━━	━━━	━━━	━━━	━━━	━━━
Report	▲ IcR		▲ ItR		▲ PR		▲ PR		▲ DfR	▲ FR

Notes: IcR: Inception Report, ItR: Interim Report, PR: Progress Report, DfR: Draft Final Report, FR: Final Report

10. Reports

JICA will prepare and submit the following reports to GDC in English in hard and soft copy.

(1) 10 copies of Inception Report at the commencement of the first work period in Kenya

(2) 10 copies of Interim Report at the time about 12 months after the commencement of the first work period in Kenya

(3) 10 copies of Progress Report at the time of 24 months and 36 months after the commencement of the first work period in Kenya

(4) 10 copies of Draft Final Report at the end of the last work period in Kenya.

(5) 10 copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report

Note: GDC will provide JICA with the comments on the Draft Final Report within one month of receipt.

11. Environmental and Social Considerations

GDC agreed to abide by 'JICA Guidelines for Environmental and Social

Considerations (April, 2010)' in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. UNDERTAKINGS OF GDC

1. GDC will take necessary measures to:

   (1) ensure that the technologies and knowledge acquired by the Kenyan nationals as a result of Japanese technical cooperation contributes to the economic and social development of Kenya, and that the knowledge and experience acquired by the personnel of GOK from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and

   (2) grant privileges, exemptions and benefits to members of the JICA experts referred to in II-6 (1) above, and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in Kenya.

2. Other privileges, exemptions and benefits will be provided in accordance with the Agreement signed on April 29, 2004 between the Government of Japan and the Government of Kenya.

IV. EVALUATION

JICA and GDC will jointly conduct the following evaluations and reviews.

1. Mid-term review at the middle of the Project period
2. Terminal evaluation during the last six (6) months of the Project period

JICA will conduct the following evaluations and surveys to mainly verify sustainability and impact of the Project and draw lessons. GDC is required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, GDC will take appropriate measures to make the Project widely known to the people of Kenya.

VI. MUTUAL CONSULTATION

JICA and GDC will consult each other whenever any major issues arise in the course of the Project implementation.

VII. AMENDMENTS

The record of discussions may be amended by the minutes of meetings between JICA and GDC.

The minutes of meetings will be signed by authorized persons of each side. The signatories to the minutes of meeting may be different from the signatories of the record of discussions.

Annex I Logical Framework (Project Design Matrix: PDM)
Annex II Tentative Plan of Operation
Annex III Project Organization Chart
Annex IV A List of Proposed Members of Joint Coordinating Committee and Technical Working Group

Annex I

Logical Framework (Project Design Matrix: PDM)

Project Design Matrix (PDM) ver.1 (29 May, 2013)
Project Name: the Project for Capacity Strengthening for Geothermal Development in Kenya

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Geothermal development in Kenya will be accelerated.	5,000 MW generated by geothermal power plants by 2030	Report from Ministry of Energy and Petroleum and GDC	
Project Purpose To enhance human resources of GDC which contribute to risk mitigation in geothermal development	Number of GDC staffs who are necessary for the targeted level of geothermal development	Checklist for GDC's human resources management	● Kenyan energy policies are not changed ● GDC raises funds for geothermal development.
Outputs 1. Capacity in developing conceptual models of reservoirs and siting successful drilling locations will be improved. 2. Capacity to identify and strike drilling targets will be improved. 3. Capacity in interpreting wellbore data, establishing calibrated reservoir models and evaluating geothermal resources will be improved. 4. Capacity to prepare economically and environmentally viable business plans as a steam provider will be enhanced. 5. Capacity in multi-purpose use of geothermal energy will be enhanced.	1-1. Number of GDC's staffs for conceptual modeling which is necessary for the targeted level of geothermal development 1-2. Number of GDC's staffs for well siting which is necessary for the targeted level of geothermal development 2-1. Number of GDC's staffs for drilling operation which is necessary for the targeted level of geothermal development 2-2. Number of GDC's staffs for drilling operation which is necessary for the targeted level of geothermal development 3-1. Number of GDC's staffs for wellbore data analysis which is necessary for the targeted level of geothermal development	1-1. Checklist for GDC's human resources management on conceptual modeling. 1-2. Checklist for GDC's human resources management on well siting 2-1. Checklist for GDC's human resources management on drilling operation 2-2. Checklist for GDC's human resources management on wellbore data analysis 3-1. Checklist for GDC's human resources management on	● GDC provides its own necessary training to its staff

	4-1. Number of GDC's staffs for environmental monitoring & planning which is necessary for the targeted level of geothermal development 4-2. Number of GDC's staffs for plant engineering which is necessary for the targeted level of geothermal development 4-3. Number of GDC's staffs for public/private scheme planning which is necessary for the targeted level of geothermal development 5-1. Number of GDC's staffs who are familiar with multi-purpose use of geothermal energy	wellbore data analysis 3-2. Checklist for GDC's human resources management on reservoir evaluation 4-1. Checklist for GDC's human resources management on environmental monitoring & planning 4-2. Checklist for GDC's human resources management on plant engineering 4-3. Checklist for GDC's human resources management on public/private scheme planning 5-1. Checklist for GDC's human resources management on multi-purpose use of geothermal energy	

	Inputs		
Activities 1-1. Training in conceptual modeling 1-2. Training in well siting 2-1. Training in drilling operation 2-2. Training in drilling logistics management 2-3. Training in HSE 2-4. Training in Japan in theory of drilling techniques 3-1. Training in wellbore data analysis 3-2. Training in reservoir evaluation 3-3. Training in Japan in theory of reservoir evaluation 3-4. Training in database development and management 4-1. Training in environmental planning & monitoring 4-2. Training in plant engineering 4-3. Training in public/private scheme planning 4-4. Training in structuring agreement and negotiating with IPPs 5-1. Promoting multi-purpose use of geothermal energy	Japan *Experts* ● Well Siting ● Training Program Planning ● Geologist ● Geochemist ● Geophysicist ● Data Integration/ Reservoir Simulation ● Drilling Operation Management ● Drilling Supervisor ● Reservoir Evaluation ● Wellbore Survey ● Discharge Testing ● Reservoir Simulation ● Economic Evaluation ● Business Administration ● Environmental and Social Safeguard ● Power Plant Engineering ● Finance ● Multi-purpose Use of Geothermal Energy ● Project Coordinator *Machinery/ Equipment* *Training in Japan* ● Drilling Techniques ● Reservoir Evaluation	Kenya Counterparts ● Coordinator ● Geologists ● Geochemists ● Geophysicists ● Drilling Engineers ● Well Logging Engineers ● Production Test Engineers ● Reservoir Simulation Engineers ● Economic Evaluation ● Business Administration ● Environmental and Social Safeguard ● Power Plant Engineering ● Finance ● Multi-purpose Use of Geothermal Energy Machinery/ Equipment ● Laboratories ● Drilling Rigs ● MT equipment ● Project office and office equipment.	● GDC hires a certain amount of people ● GDC procures machinery/equipment which is necessary for the project. Pre-condition ● Trainers for the project are secured. ● Preparation for drilling is done. ● Sites in Kenya for OJT are decided.

*** Checklist should be formulated by the project, not only because it is helpful to monitor the project, but also because it is useful for GDC to manage the human resources after this project end.**

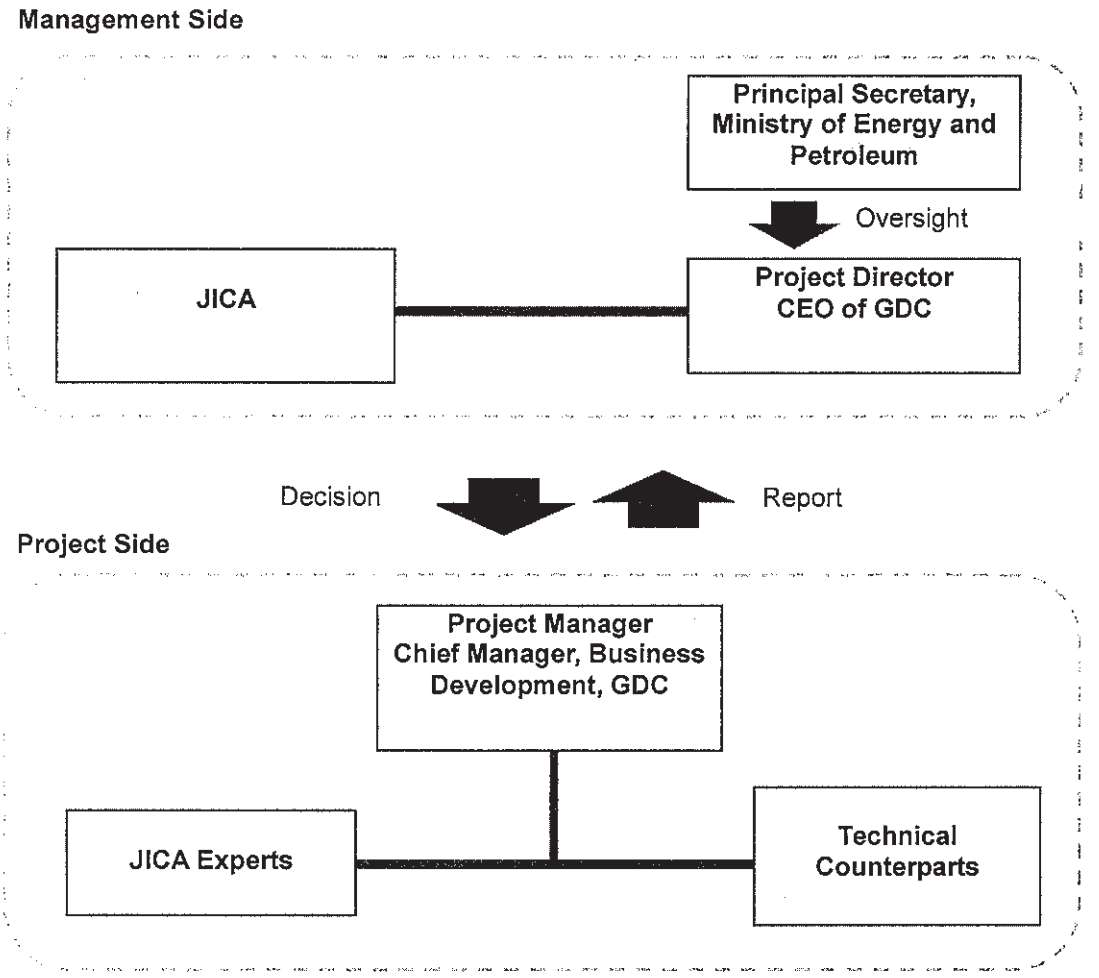
Annex II

Tentative Plan of Operation

Activity	2013				2014												2015												2016												2017							
	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Output 1. GDC's ability of developing conceptual models of reservoirs and siting successful drilling locations will be improved.																																																
1-1. Training in conceptual modeling																																																
1-2. Training in well siting																																																
Output2. GDC staff will be able to hit drilling targets within shorter time and with less troubles.																																																
2-1. Training in drilling operation																																																
2-2. Training in drilling logistics management																																																
2-3. Training in HSE																																																
2-4. Training in Japan in theory of drilling techniques																																																
Output3. GDC staff will be able to interpret wellbore data and establish calibrated reservoir models in order to evaluate geothermal resources more accurately.																																																
3-1. Training in wellbore data analysis																																																
3-2. Training in reservoir evaluation																																																
3-3. Training in Japan in theory of reservoir evaluation																																																
3-4. Training in database development and management																																																
Output 4. GDC's capacity to prepare economically and environmentally viable business plans as a steam provider.																																																
4-1. Training in environmental planning & monitoring																																																
4-2. Training in plant engineering																																																
4-3. Training in public/private scheme planning																																																
4-4. Training in structuring agreement and negotiating with																																																
Output 5. GDC's activities in multi-purpose use of geothermal energy will be diversified.																																																
5-1. Promoting multi-purpose use of geothermal energy																																																

Annex III

Project Organization Chart



A List of Proposed Members of Joint Coordinating Committee and Technical Working Group

<JCC>

a. Chair: Principal Secretary or designated person, Ministry of Energy and Petroleum
b. Vice Chair: Chief Executive Officer, GDC
c. Members: Chair of the Technical Working Group
Secretary of Technical Working Group
JICA representatives

d. Observer: Other organizations can participate in JCC if necessary

*Participants to be limited to top management level or any designated person by top management.

e. Functions
1) To steer and advise the Project team
2) To appraise the results of the Project
3) To facilitate the necessary endorsement procedures of the Project outputs
4) To coordinate and give policy direction to existing and on-going sector plans

<Technical Working Group>

a. Chair: Chief Manager, Business Development, GDC
b. Co-chair : Leader, the JICA team
c. Secretary: designated person by Chair, GDC
d.
e. Members : Staff of GDC
Any other relevant organizations can participate as Chair requires

f. Functions
1) To update members on the Project progress.
2) To share the challenges in the Project.
3) To harmonize the project activities with other relevant agencies.
4) To prepare reports for presentation to the JCC.

*If there is such existing mechanism, it would be utilized.

RECORD OF DISCUSSIONS
ON
THE PROJECT FOR CAPACITY STRENGTHENING FOR GEOTHERMAL DEVELOPMENT IN KENYA
IN
THE REPUBLIC OF KENYA
AGREED UPON AMONG
MINISTRY OF ENERGY AND PETROLEUM
AND
GEOTHERMAL DEVELOPMENT COMPANY
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Japan International Cooperation Agency (hereinafter referred to as "JICA") had a series of discussions with Kenyan authorities on desirable measures to be taken by JICA and the Government of the Republic of Kenya (hereinafter referred to as "Kenya") for the successful implementation of the "Project for Capacity Strengthening for Geothermal Development in Kenya" (hereinafter referred to as "the Project") .

As a result of the discussions, and in accordance with the provisions of the Agreement on Technical Cooperation between the Government of Japan and the Government of Kenya, signed in Nairobi on 29th April, 2004 (hereinafter referred to as "the Agreement"), both sides agreed on the matters referred to in the document attached hereto

Nairobi, 28 June, 2013

Mr. Hidetoshi IRIGAKI
Director General
Industrial Development and Public Policy Department
Japan International Cooperation Agency

Hon. Davis CHIRCHIR
Cabinet Secretary for Energy and Petroleum

Dr. Silas M. SIMIYU, MBS
Managing Director & CEO
Geothermal Development Company

Based on the minutes of meeting of the Detailed Planning Survey on the Project for Capacity Strengthening for Geothermal Development in Kenya (hereinafter referred to as "the Project") signed on 30 May, 2013 between Geothermal Development Company (hereinafter referred to as "GDC") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") held a series of discussions with GDC and relevant Government organizations to develop a detailed plan of the Project.

Both parties agreed the details of the Project and the main points discussed as described in the Appendix.

Both parties also agreed that GDC, the counterpart of JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant Government organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Kenya.

The Project will be implemented within the framework of the Agreement on Technical Cooperation signed on 29 April, 2004 (hereinafter referred to as "the Agreement") and the Note Verbales exchanged on 01 February 2013 between the Government of Japan (hereinafter referred to as "GOJ") and the Government of Kenya (hereinafter referred as "GOK").

Appendix 1: Project Description

PROJECT DESCRIPTION

I. BACKGROUND

Kenya is endowed with a huge potential of high temperature geothermal resource estimated at between 7,000 to 10,000 MW that largely remains untapped. Geothermal resource is one of the least cost sources of electric power in Kenya. Despite the fact that geothermal is the best option for Kenya and that the country has had a long geothermal development period spanning over 50 years, only 210 MW is being utilized. This slow development is attributed to the fact that geothermal development requires large upfront financing which the existing public entities might not support by their weak balance sheets, and high upstream development risks that have deterred private sector participation.

Geothermal power has numerous advantages over other resources of power; it is not affected by drought and climatic variability, it has the highest availability factor at about 95% and it is low cost therefore making it suitable for base load; it is green energy with no adverse effects on the environment, it is indigenous and readily available in Kenya unlike fossil thermal energy that relies on fuel imports.

GDC is a Special Purpose Vehicle wholly owned by the Government under the oversight of the Ministry of Energy and Petroleum. GDC is mandated to accelerate the geothermal development in the country through prospecting, exploring, assessing, developing and marketing geothermal energy. GDC support the Government initiative to raise the requisite development funds.

The Project is one of the national priority projects as it has been selected as a vision 2030 flagship project to meet the 5,000MW targeted from geothermal resources in line with the LCPDP.

II. OUTLINE OF THE PROJECT

1. Title of the Project

"Project for Capacity Strengthening for Geothermal Development in Kenya"

2. Overall Goal

GDC will be able to provide stable steam to power generation utilities.

3. Objective

To enhance human resources of GDC which contribute to technical risk mitigation in geothermal development.

4. Outputs

1. Training program for GDC staff will be established.
2. Capacity in developing conceptual models of reservoirs and siting successful drilling targets will be improved.

3. Capacity to strike drilling targets will be improved.
4. Capacity in interpreting wellbore data, establishing calibrated reservoir models and evaluating geothermal resources will be improved.
5. Capacity to prepare economically and environmentally viable business plans as a steam provider will be enhanced.
6. Capacity in implementing projects of multi-purpose use of geothermal energy will be enhanced.
7. GDC's internal mechanism to improve and continue training program will be established.

5. Activities

1-1. Assessment of GDC's human resource development plan and staff capacity
1-2. Abstracting challenges GDC has and compiling measures to improve
1-3. Suggesting to GDC top-management and determining the direction of training program
1-4. Planning training programs
1-5. Developing training materials
1-6. Developing check lists and assessment sheet of GDC's staff capacity in necessary skills required for geothermal development
1-7. Identifying base-line of GDC's staff capacity and setting targets
2-1. Training in conceptual modeling
2-2. Training in well siting
3-1. Training in drilling operation
3-2. Training in procurement and logistics management for drilling related equipment
3-3. Training in health, safety and environment (HSE)
3-4. Training in theory of drilling techniques
4-1. Training in wellbore data analysis
4-2. Training in reservoir evaluation
4-3. Training in theory of reservoir engineering
4-4. Training in database development and management
5-1. Training in environmental planning & monitoring
5-2. Training in plant engineering
5-3. Training in public/ private scheme planning
5-4. Training in structuring agreement and negotiating with IPPs
5-5. Workshop with power generating utilities for exchanging views
6-1. Identifying multi-purpose uses of geothermal energy applicable in Kenyan geothermal prospects
6-2. Training in planning pilot projects of multi-purpose use of geothermal energy
6-3. Training in implementing pilot projects of multi-purpose use of geothermal energy.
7-1. Abstracting faults in training materials and programs
7-2. Improving training materials and programs
7-3. Suggesting revised training programs to GDC top-management and reconfirming GDC's human development policy
7-4. Integrating training programs into GDC's human resource development program

6. Input

(1) Input by JICA

(a) Dispatch of Experts

i. Chief Advisor/ Geothermal Development Planning
ii. Well Siting
iii. Geologist
iv. Geochemist
v. Geophysicist
vi. Data Integration
vii. Reservoir Simulation
viii. Drilling Operation Management
ix. Drilling Supervisor
x. Reservoir Evaluation
xi. Wellbore Survey
xii. Discharge Testing
xiii. Economic Evaluation
xiv. Business Administration/ Finance
xv. Partnership with Power Utilities
xvi. Environmental and Social Safeguard
xvii. Power Plant Engineering
xviii. Multi-purpose Use of Geothermal Energy
xix. Project Coordinator

(b)Training

i. Drilling Techniques
ii. Reservoir Evaluation

(c)Machinery and Equipment

Necessary Machinery and Equipment to the Project

In case of importation, the machinery, equipment and other materials under II-6 (1) (c) above will become the property of GDC upon delivery C.I.F. (cost, insurance and freight) to the Kenyan authorities concerned at the ports and/or airports of disembarkation.

Inputs other than indicated above will be determined through mutual consultations between JICA and GDC during the implementation of the Project, as necessary.

(2) Input by the Kenyan side

The Kenyan side will take necessary measures to provide at its own expense:

(a) Services of GDC's counterpart personnel and administrative personnel as referred to in II-7;
(b) Suitable office space with necessary equipment;
(c) Supply or replacement of machinery, equipment, instruments, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA;
(d) Information as well as support in obtaining medical service;

(e) Credentials or identification cards;
(f) Available data (including maps and photographs) and information related to the Project;
(g) Running expenses necessary for the implementation of the Project;
(h) Expenses necessary for transportation within Kenya of the equipment referred to in II-6 (1) as well as for the installation, operation and maintenance thereof; and
(i) Necessary facilities to the JICA experts for the remittance as well as utilization of the funds introduced into Kenya from Japan in connection with the implementation of the Project.

7. Implementation Structure

The Project organization chart is given in the Annex III. The roles and assignments of relevant organizations are as follows:

(1) GDC
(a) Managing Director and CEO of GDC will be responsible for overall administration and implementation of the Project as Project Director.
(b) Chief Manager, Business Development, GDC will be responsible for project implementation and coordination with JICA experts as Project Manager.

(2) JICA Experts
The JICA experts will give necessary technical guidance, advice and recommendations to GDC on any matters pertaining to the implementation of the Project.

(3) Joint Coordinating Committee
Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held at least once a year and whenever deemed necessary. JCC will approve an annual work plan, review overall progress, conduct monitoring and evaluation of the Project, and exchange opinions on major issues that arise during the implementation of the Project. A list of proposed members of JCC is shown in the Annex IV.

8. Project Site(s) and Beneficiaries

(1) Project Site
Nairobi, Menengai I and II, Suswa, Silali, Paka, Arus, Korossi, Chepchuk, and other geothermal prospects in Kenya

(2) Beneficiaries
Direct beneficiaries will be staff of GDC. The Project will also be contributing directly and indirectly to the people of Kenya and in the economic growth of Kenya.

9. Duration

The Project duration would be 48 (forty eight) months. The commencement date is to be recognized from the first arrival of JICA Experts in Kenya.

Month	1	-	12	-	24	-	36	-	47	48
Project										
Report	▲ IcR		▲ ItR		▲ PR		▲ PR		▲ DfR	▲ FR

Notes: IcR: Inception Report, ItR: Interim Report, PR: Progress Report, DfR: Draft Final Report, FR: Final Report

10. Reports

JICA will prepare and submit the following reports to GDC in English in hard and soft copy.

(1) 10 copies of Inception Report at the commencement of the first work period in Kenya
(2) 10 copies of Interim Report at the time about 12 months after the commencement of the first work period in Kenya
(3) 10 copies of Progress Report at the time of 24 months and 36 months after the commencement of the first work period in Kenya
(4) 10 copies of Draft Final Report at the end of the last work period in Kenya.
(5) 10 copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report

Note: GDC will provide JICA with the comments on the Draft Final Report within one month of receipt.

11. Environmental and Social Considerations

GDC agreed to abide by 'JICA Guidelines for Environmental and Social Considerations (April, 2010)' in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. UNDERTAKINGS OF GDC

1. GDC will take necessary measures to:

(1) ensure that the technologies and knowledge acquired by the Kenyan nationals as a result of Japanese technical cooperation contributes to the economic and social development of Kenya, and that the knowledge and experience acquired by the personnel of GOK from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and

(2) grant privileges, exemptions and benefits to members of the JICA experts referred to in II-6 (1) above, and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in Kenya.

2. Other privileges, exemptions and benefits will be provided in accordance with the Agreement signed on April 29, 2004 between the Government of

Japan and the Government of Kenya.

IV. EVALUATION

JICA and GDC will jointly conduct the following evaluations and reviews.

1. Mid-term review at the middle of the Project period
2. Terminal evaluation during the last six (6) months of the Project period

JICA will conduct the following evaluations and surveys to mainly verify sustainability and impact of the Project and draw lessons. GDC is required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, GDC will take appropriate measures to make the Project widely known to the people of Kenya.

VI. MUTUAL CONSULTATION

JICA and GDC will consult each other whenever any major issues arise in the course of the Project implementation.

VII. AMENDMENTS

The record of discussions may be amended by the minutes of meetings between JICA and GDC.
The minutes of meetings will be signed by authorized persons of each side. The signatories to the minutes of meeting may be different from the signatories of the record of discussions.

Annex I Logical Framework (Project Design Matrix: PDM)
Annex II Tentative Plan of Operation
Annex III Project Organization Chart
Annex IV A List of Proposed Members of Joint Coordinating Committee and Technical Working Group

Annex I

Logical Framework (Project Design Matrix: PDM)

Project Design Matrix (PDM) ver.2 (19 June, 2013)
Project Name: the Project for Capacity Strengthening for Geothermal Development in Kenya

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal GDC will be able to properly provide steam to power generation utilities.	Number of steam purchase contract signed between power generation utilities and GDC	Copy of steam purchase contracts	
Project Purpose To enhance human resources of GDC which contribute to technical risk mitigation in geothermal development	Success rate of steam development Reduction in work period required for steam development	GDC's drilling reports GDC's work reports	● Geothermal resources suitable for power generation exist in planned development areas.
Outputs 1. Training program for GDC staff will be established. 2. Capacity in developing conceptual models of reservoirs and siting successful drilling targets will be improved. 3. Capacity to strike drilling targets will be improved. 4. Capacity in interpreting wellbore data, establishing calibrated reservoir models and evaluating geothermal resources will be improved. 5. Capacity to prepare economically and environmentally viable business plans as a steam provider will be enhanced. 6. Capacity in implementing projects of multi-purpose use of geothermal energy will be enhanced. 7. GDC's internal mechanism to improve and continue training program will be established.	1-1. Development of check lists and assessment sheet for GDC's staff capacity 1-2. Development of training materials and programs 2-1. Number of GDC's staff who accomplished the target level in the capacity checklist for necessary skills in conceptual modeling 2-2. Number of GDC's staff who accomplished the target level in the capacity checklist for necessary skills in well siting 3-1. Number of GDC's staff who accomplished the target level in the capacity checklist for necessary skills in drilling operation 4-1. Number of GDC's staff who accomplished the target level in the capacity checklist for necessary skills in wellbore data	1-1. Check lists 1-2. Training materials 2-1. Capacity checklist for necessary skills in conceptual modeling . 2-2. Capacity checklist for necessary skills in well siting 3-1. Capacity checklist for necessary skills in drilling operation 4-1. Capacity checklist for necessary skills in wellbore data analysis 4-2. Capacity checklist for necessary skills in reservoir evaluation 5-1. Capacity checklist for necessary knowledge and skills in environmental and social safeguard 5-2. Capacity checklist for necessary knowledge and	● Necessary amount of water for drilling will be mobilized

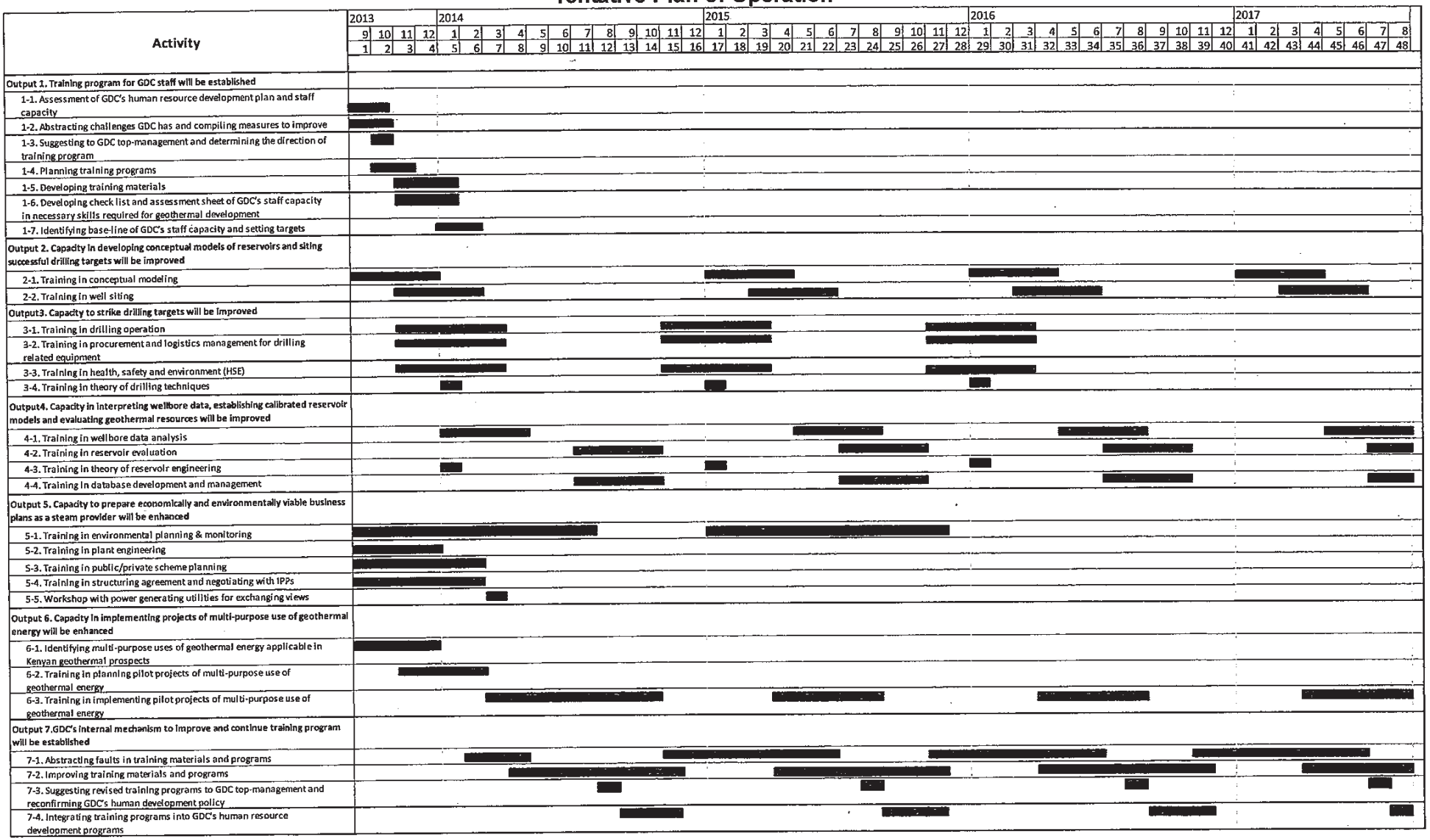
	analysis 4-2. Number of GDC's staff who accomplished the target level in the capacity checklist for necessary skills in reservoir evaluation 5-1. Number of GDC's staff who accomplished the target level in the capacity checklist for necessary knowledge and skills in environmental and social safeguard 5-2. Number of GDC's staffs who accomplished the target level in the capacity checklist for necessary knowledge and skills in plant engineering 5-3. Number of GDC's staffs who accomplished the target level in the capacity checklist for necessary knowledge and skills in public/private scheme 6-1. Number of GDC's staffs who accomplished the target level in the capacity checklist for necessary knowledge in planning and implementation of multi-purpose use of geothermal energy 7-1. Number of training materials revised by GDC staff 7-2. Number of training programs conducted by GDC staff	skills in plant engineering 5-3. Capacity checklist for necessary knowledge and skills in public/private scheme 6-1. Capacity checklist for necessary knowledge in planning and implementation of multi-purpose use of geothermal energy 7-1. Revised training materials 7-2. Training programs conducted by GDC	

	Inputs		
Activities 1-1. Assessment of GDC's human resource development plan and staff capacity 1-2. Abstracting challenges GDC has and compiling measures to improve 1-3. Suggesting to GDC top-management and determining the direction of training program 1-4. Planning training programs 1-5. Developing training materials 1-6. Developing check list and assessment sheet of GDC's staff capacity in necessary skills required for geothermal development 1-7. Identifying base-line of GDC's staff capacity and setting targets 2-1. Training in conceptual modeling 2-2. Training in well siting 3-1. Training in drilling operation 3-2. Training in procurement and logistics management for drilling related equipment 3-3. Training in health, safety and environment (HSE) 3-4. Training in theory of drilling techniques 4-1. Training in wellbore data analysis 4-2. Training in reservoir evaluation 4-3. Training in theory of reservoir engineering 4-4. Training in database development and management 5-1. Training in environmental planning & monitoring 5-2. Training in plant engineering 5-3. Training in public/private scheme planning 5-4. Training in structuring agreement and negotiating with IPPs 5-5. Workshop with power generating utilities for exchanging views 6-1. Identifying multi-purpose uses of geothermal energy applicable in Kenyan geothermal prospects 6-2. Training in planning pilot projects of multi-purpose use of geothermal energy	Japan *Experts* ● Chief Advisor/ Geothermal Development Planning ● Well Siting ● ● Geologist ● Geochemist ● Geophysicist ● Data Integration ● Reservoir Simulation ● Drilling Operation Management ● Drilling Supervisor ● Reservoir Evaluation ● Wellbore Survey ● Discharge Testing ● Economic Evaluation ● Business Administration/ Finance ● Partnership with Power Utilities ● Environmental and Social Safeguard ● Power Plant Engineering ● ● Multi-purpose Use of Geothermal Energy ● Project Coordinator *Machinery/ Equipment* *Training in Japan* ● Drilling Techniques ● Reservoir Evaluation	Kenya Counterparts ● Coordinator ● Geologists ● Geochemists ● Geophysicists ● Drilling Engineers ● Well Logging Engineers ● Production Test Engineers ● Reservoir Simulation Engineers ● Economic Evaluation ● Business Administration ● Environmental and Social Safeguard ● Power Plant Engineering ● Finance ● Multi-purpose Use of Geothermal Energy Machinery/ Equipment ● Laboratories ● Drilling Rigs ● MT equipment ● Project office and office equipment.	Apart from above, following issues exist. These issues to be confirmed at JCC and necessary coordination will be made towards solving issues. ● Some of GDC's equipment are not compatible with other makers' equipment or spare parts as they are not adopting international standards ● GDC lacks some equipment necessary for transferring appropriate technology In addition, if there is a need for interacting with geothermal policy or development plan, issues will be dealt in collaboration with Geothermal Development Master Plan Project which will be implemented concurrently.

6-3. Training in implementing pilot projects of multi-purpose use of geothermal energy 7-1. Abstracting faults in training materials and programs 7-2. Improving training materials and programs 7-3. Suggesting revised training programs to GDC top-management and reconfirming GDC's human development policy 7-4. Integrating training programs into GDC's human resource development programs			

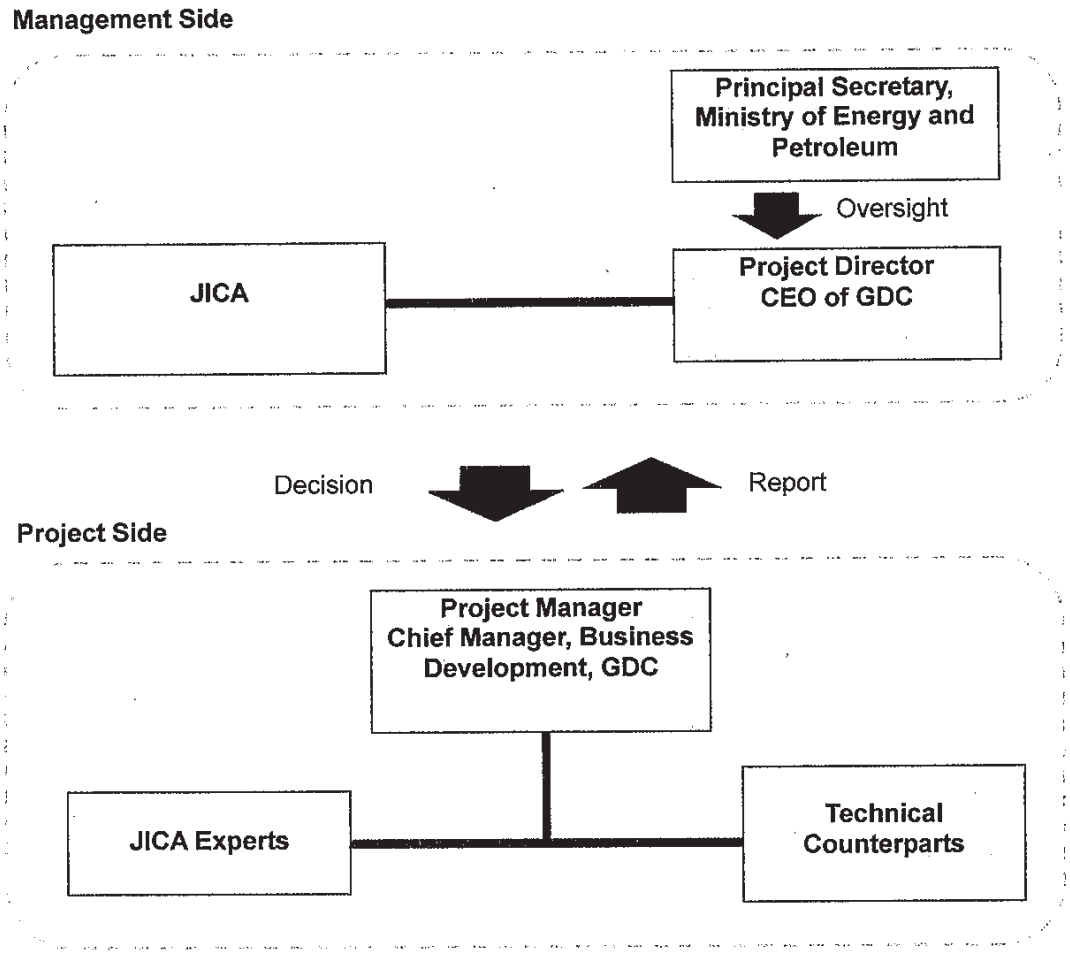
Annex II

Tentative Plan of Operation



Annex III

Project Organization Chart



Annex IV

A List of Proposed Members of Joint Coordinating Committee and Technical Working Group

<JCC>

a. Chair: Principal Secretary or designated person, Ministry of Energy and Petroleum
b. Vice Chair: Chief Executive Officer, GDC
c. Members: Chair of the Technical Working Group
Secretary of Technical Working Group
JICA representatives
d. Observer: Other organizations can participate in JCC if necessary

*Participants to be limited to top management level or any designated person by top management.

e. Functions
1) To steer and advise the Project team
2) To appraise the results of the Project
3) To facilitate the necessary endorsement procedures of the Project outputs
4) To coordinate and give policy direction to existing and on-going sector plans

<Technical Working Group>

a. Chair: Chief Manager, Business Development, GDC
b. Co-chair : Leader, the JICA team
c. Secretary: designated person by Chair, GDC
d. Members : Staff of GDC
Any other relevant organizations can participate as Chair requires
e. Functions
1) To update members on the Project progress.
2) To share the challenges in the Project.
3) To harmonize the project activities with other relevant agencies.
4) To prepare reports for presentation to the JCC.

*If there is such existing mechanism, it would be utilized.

技プロ用

事業事前評価表

国際協力機構 産業開発・公共政策部
資源・エネルギー第二課

１．案件名

国　名：ケニア共和国
案件名：地熱開発のための能力向上プロジェクト
The Project for Capacity Strengthening for Geothermal Development in Kenya

２．事業の背景と必要性

（1）当該国における電力セクターの現状と課題

ケニア国の電力開発計画「最少費用電源開発計画（Least Cost Power Development Plan。以下、「LCPDP」という）によると、中所得国入りを目指す観点での経済成長、並びに年 2.64%の人口増加により、ケニア国のピーク電力需要は 2010 年の 1,227MW から、20 年後には 12,738～22,985MW へと大幅に増加すると予測されている。これに対し発電設備容量は、2011 年の段階で 1,593MW であり、今後大規模な電源開発が必要な状況にある。また、発電設備容量のうち、水力発電が 763MW（48%）、火力発電が 586MW（37%）、地熱発電が 213MW（13%）である。水力発電に発電設備容量の約半分を依存しているため、電力供給は干ばつなどの天候の影響を受けやすい不安定な状況にある。安価かつ低炭素でベースロードとなる電源の増強が必要な状況のもと、ケニア政府はポテンシャル 7,000MW と言われる豊富な地熱資源に着目し、地熱エネルギーの発電量を 2030 年までに 5,530MW まで引き上げる計画を進めている。

このような状況のもと、より迅速かつ効果的な地熱資源開発を進めるため、ケニア政府は 2009 年にケニア電力開発公社（Kenya Electricity Generating Company Ltd.。以下、「KenGen」という）から地熱部門を独立させ、地熱開発公社（Geothermal Development Company Ltd.。以下、「GDC」という）を設立した。現在 GDC は、ナイロビから北西約 150km のメネンガイ地区を中心に、AFD、世銀、アフリカ開発銀行等から 400 百万米ドルを超える融資を受け、試掘等の地熱開発を実施している。資金面でのリスクは概ね充足している一方で、GDC の探査、掘削、貯留層評価の一連の技術レベルは低く、①適切な掘削地点が選定できない、②狙ったターゲットを掘り当てられない、③持続可能な蒸気生産量を見極められない等、技術面での事業リスクを抱えており、技術向上を通じた地熱開発のリスクそのものの軽減が喫緊の課題となっている。

加えて、GDC が地熱開発を促進するためには、蒸気の性状に応じた適正な発電プラントを建設するため、蒸気供給者として電力事業者が必要とする正確な蒸気データを提供する必要がある。また、周辺住民の地熱開発への理解促進等

を進めるため、住民向けの地熱の多目的利用を説明するための知識の習得が必要な状況にある。

（2）当該国における電力セクターの開発政策と本事業の位置づけ

ケニア政府は国家開発計画「Vision 2030」の中で、2030 年までに中所得国入りすることを目標に掲げ、電力料金（2010 年：家庭用 0.18USD/kWh、産業用 0.16USD/kWh）の低減による産業競争力強化に向けた電源開発の必要性を強調している。この中の優先事業の一つとして地熱開発を挙げており、メネンガイにおける 1000MW の開発をフラッグシッププロジェクトとして取り組んでいる。また LCPDP においては、5,530MW の地熱開発を担う主たる実施機関を GDC としている。本事業は、地熱開発を促進するために実施機関である GDC の能力向上を図るものであり、これらの開発政策に合致したものである。

（3）電力セクターに対する我が国及び JICA の援助方針と実績

我が国のケニア国別援助方針における 5 つの重点分野の内、「経済インフラ整備」において、開発課題として「電力アクセス改善」が挙げられており、本事業は、協力プログラム「発電・送電能力向上プログラム」に位置づけられる。

同援助方針に係る援助実績は以下の通り。

・有償資金協力「オルカリアⅠ 4・5 号機地熱発電事業」（2010-2014 年）

・有償資金協力「ソンドゥ・ミリウ／サンゴロ水力発電所建設計画」（2006-2013 年）

・有償資金協力「オルカリア-レソス-キスム送電線建設計画」（2010-2015 年）

・技術協力「再生可能エネルギーによる地方電化モデル構築プロジェクト」（2012-2015 年）

・技術協力「再生可能エネルギーによる地方電化推進のための人材育成プロジェクト」（2011-2015 年）

地熱発電プラントでは我が国メーカーが世界シェアの 70%（設備発電量ベース）を占めており、ケニアの地熱開発を促進する本事業は、我が国の成長戦略の「インフラシステム輸出」に資する。加えて、本事業により、GDC から提供される蒸気データの精度が向上するため、我が国電力事業者の海外展開にも貢献する。

（4）他の援助機関の対応

GDC に対しては、アフリカ開発銀行、世界銀行、米国輸出入銀行、フランス開発庁、ドイツ復興金融公庫、インド輸出入銀行等が試掘のための融資等の資金供与を実施・計画中である。

３．事業概要

（1）事業目的（協力プログラムにおける位置づけを含む）

本事業は、GDC が地熱開発に必要な技術面での一連の能力向上を行うことで、地熱開発に伴うリスクの低減を図り、GDC が電力事業者に対して適切に蒸気供

給を行うことにより、ケニアにおける地熱開発の促進に資する。

（2）プロジェクトサイト／対象地域名
　GDC 本部：ナイロビ
　地熱開発サイト：メネンガイⅠ、メネンガイⅡ、シラリ、パカ、アルス、コロシ、チェプチャク、ススワ

（3）本事業の受益者（ターゲットグループ）
・GDC 職員　約 500 人（掘削サイトの増加に伴い、プロジェクト期間中に新たに職員が雇用され、受益者は拡大するものと考えられる）

（4）事業スケジュール（協力期間）
　2013 年 9 月～2017 年 8 月（計 48 ヶ月）

（5）総事業費（日本側）
　約 18.5 億円

（6）相手国側実施機関
　地熱開発公社（Geothermal Development Company）

（7) 投入（インプット）
　1）日本側
【専門家】
チーフアドバイザー/地熱開発計画、＜探査・貯留槽評価＞掘削地点選定、地質、地化学、物理探査、データ統合、貯留層シミュレーション、＜掘削＞掘削作業管理、掘削スーパーバイザー、貯留層評価、坑井調査、噴気試験、経済性評価、＜経営他＞経営・財務、電力事業者連携、環境社会配慮、発電所エンジニアリング、地熱多目的利用等（400M/M 程度を想定）
【供与機材】
地熱開発に必要な機材・スペアパーツ（傾斜掘削用、坑内配管等回収ツール、大容量高圧コンプレッサー等）
【研修】
本邦研修（掘削技術：毎年 24 名程度（1 ヶ月間）、及び貯留層評価：毎年 24 名程度（1 ヶ月間））
2）ケニア側
・カウンターパートの配置
　プロジェクトダイレクター：GDC 最高経営責任者（CEO）

プロジェクトマネジャー：GDC ビジネス開発部チーフマネジャー
資源評価部
資源管理部
掘削オペレーション部
インフラ部
サプライチェーン部
人事部
環境部
地熱直接利用部
・プロジェクトの専門家及びスタッフに必要なオフィススペース、機器
・カウンターパートの給与・手当

（8）環境社会配慮・貧困削減・社会開発
1）環境社会配慮
① カテゴリ分類　C
② カテゴリ分類の根拠　本事業は、「国際協力機構環境社会配慮ガイドライン」（2010 年公布）に掲げる影響を及ぼしやすいセクター・特性及び影響を受けやすい地域に該当せず、環境への望ましくない影響は最小限であると判断されるため。
2）ジェンダー・平等推進／平和構築・貧困削減
・ 本事業では、地熱有望地点の周辺コミュニティが地熱開発から裨益を受けられるよう、地熱の直接利用等の事業により周辺コミュニティに雇用を創出することを盛り込んでいる。

（9）関連する援助活動
1）我が国の援助活動
特になし。
2）他ドナー等の援助活動
GDC は他ドナーから受けた試掘のための融資の中で、リグ等の資機材を調達しており、本事業では同リグを利用して掘削の OJT を行う。

4．協力の枠組み

（1）協力概要
1）上位目標：
GDC が電力事業者に対して適切に蒸気供給を行うことができる。
指標：
・ 蒸気供給契約の数

2）プロジェクト目標：
地熱開発上の技術面でのリスクが低減されるべく、GDC の人材が育成される。
指標：
・ 蒸気開発の成功率
・ 蒸気開発工程に関する工期の短縮

3）成果及び活動
成果１：GDC 職員の能力開発に必要な研修プログラムが構築される。
指標：
１－１：GDC 職員の能力チェックリストと評価表の開発
１－２：トレーニング用の教材とプログラムの開発
活動：
１－１：GDC の人材育成計画と職員の能力評価
１－２：GDC が抱える課題の抽出と改善策のとりまとめ
１－３：GDC 経営層への提言とトレーニングの方向性の決定
１－４：トレーニングプログラムの計画
１－５：トレーニング用の教材の作成
１－６：地熱開発に必要な技術能力チェックリストと評価表の作成
１－７：ベースラインの特定と目標水準の設定

成果２：貯留層の概念モデルの開発や適切な掘削地点を選定する能力が改善される。
指標：
２－１：概念モデルの構築に必要な技術能力に関するチェックリストで目標水準に達した GDC 職員数
２－２：掘削地点及びターゲットの選定に必要な技術能力に関するチェックリストで目標水準に達した GDC 職員数
活動：
２－１：概念モデル構築に関するトレーニング
２－２：掘削地点選定に関するトレーニング

成果３：掘削ターゲットを掘り当てる能力が改善される。
指標：
３－１：掘削ターゲットを掘り抜くために必要な掘削関連技術に関するチェックリストで目標水準に達した GDC 職員数
活動：
３－１：掘削作業に関するトレーニング

３－２：掘削関連機材の調達・ロジスティクス管理に関するトレーニング
３－３：健康・安全・環境（HSE）に関するトレーニング
３－４：掘削技術の理論に関するトレーニング

成果４：坑井データの解析、貯留層モデルの較正及び貯留層評価に関する能力が改善される。
指標：
４－１：坑井データ解析に必要な技術に関するチェックリストで目標水準に達した GDC 職員数
４－２：貯留層評価に必要な技術に関するチェックリストで目標水準に達した GDC 職員数
活動：
４－１：坑井データの解析に関するトレーニング
４－２：貯留層評価に関するトレーニング
４－３：データベースの構築・管理に関するトレーニング

成果５：蒸気供給者として経済面や環境面から適切な事業計画を策定する能力が向上すること。
指標：
５－１：環境社会配慮に関して必要な知識・技術についてのチェックリストで、目標水準に達した GDC 職員数
５－２：蒸気供給者として必要なプラントエンジニアリングに関する知識・技術のチェックリストで、目標水準に達した GDC 職員数
５－３：蒸気供給者として必要な官民連携スキームに関する知識についてのチェックリストで、目標水準に達した GDC 職員数
活動：
５－１：環境モニタリングと環境計画に関するトレーニング
５－２：プラントエンジニアリングに関するトレーニング
５－３：官民連携スキームの構築に関するトレーニング
５－４：IPP との合意形成・交渉に関するトレーニング
５－５：電力事業者との意見交換会

成果６：地熱エネルギーの多目的利用事業実施に関する能力が向上すること。
指標：
６－１：地熱エネルギーの多目的利用事業計画・実施に必要な知識についてのチェックリストで、目標水準に達した GDC 職員数
活動：

６－１：ケニアの地熱有望地点で適用可能な地熱エネルギー多目的利用事業の特定
６－２：パイロット・プロジェクトの計画に関するトレーニング
６－３：パイロット・プロジェクトの実施に関するトレーニング

成果７：GDC 内部に継続的に研修を実施・改善する体制が整う
指標：
７－１：GDC 職員により改訂された教材の数
７－２：GDC 職員により実施された研修の数
活動：
７－１：トレーニング用教材とプログラムの課題の抽出
７－２：トレーニング用教材の改定とトレーニングプログラムの改善
７－３：GDC トップマネージメントへの改訂版トレーニングプログラムの提言及び GDC の人材育成方針の再確認
７－４：トレーニングプログラムの人材開発プログラムへの統合
※プロジェクト開始後半年を目途に数値目標を設定する。

4）プロジェクト実施上の留意事項
・ 本プロジェクトを適切にモニタリングする観点、ならびに GDC が本プロジェクト終了後も持続的に人的リソースの管理を行うことができるようにするという観点から、人的リソースの状況をモニタリングする「チェックリストと評価表」をプロジェクト内で作成する。また、当該チェックリストを基に、本プロジェクトをモニタリングするための指標を具体化し、以降の評価を行う。
・ 本プロジェクトの実施にあたっては、JICA 側、GDC 側が双方ともに、それぞれが雇用・登用した人員に係る事故や災害等の責任を負う。

（2）その他インパクト
・ ケニアを含む、東アフリカ地域においては、地熱エネルギーのポテンシャルが確認されている。中長期的には、本プロジェクトを通じて育成された技術者等が、東アフリカ諸国において技術移転等を実施することにより、同地域における地熱開発の促進に寄与する。
・ 地熱の多目的利用の促進により、地熱開発地域周辺における産業（観光や農業等）の創出・促進も期待できる。

５．前提条件・外部条件

（1）成果達成のための外部条件

・ 掘削に必要な水が確保されること。

（2）プロジェクト目標達成のための外部条件

・ 開発予定地に発電に利用可能な地熱資源が賦存すること。

その他、以下の課題が存在するが、合同調整委員会等の場で定期的に確認し、課題解決に向けた必要な調整を行うこととする。

・ GDC が所有している機材の一部が世界基準の規格に準じていないため、他のメーカーの機器・スペアパーツとの互換性がない。

・ 適正技術の移転に必要な機材を GDC が所有していない。

加えて、本事業実施上、地熱分野における政策や開発計画への反映が必要な場合は、別途実施予定の地熱開発マスタープラン調査（仮称）と連携しつつ、調整を行う。

６．評価結果

本事業は、 ケニアの開発政策、開発ニーズ、日本の援助方針と十分に合致しており、また計画の適切性が認められることから、実施意義は高い。

７．過去の類似案件の教訓と本事業への活用

（１）類似案件の評価結果

モロッコ国「鉱物資源探査技術向上プロジェクト」では、政府方針として民間セクターの参入を重視している分野の開発においては、参入しやすい環境の整備が重要であることが指摘されている。

（２）本事業への教訓

本事業では GDC が開発した蒸気で発電・売電しようとする電力事業者の事業リスクを低減させるため、蒸気データの品質管理の仕組みを作る。また、電力事業者のニーズを把握できるよう意見交換の場を設ける。

８．今後の評価計画

（1）今後の評価に用いる主な指標

４．（１）のとおり。

（2）今後の評価計画

事業開始６ヶ月以内	ベースライン調査（キャパシティアセスメント）
事業中間時点	中間レビュー
事業終了６ヶ月前	終了時評価
事業終了３年後	事後評価

以　上

Mr. Benjamin M. Kubo,	Manager, Environment & Central Rift, GDC
Mr. Gabriel N. Wetang'ula,	Deputy Manager, Environment & Central Rift, GDC
Mr. Ahmed S. Fankey,	Environment & Safety officer, GDC
Ms. Hoekly Simboyi,	Associate EIA expert, GDC
Mr. Paul Pakka, Officer,	Community Liaison, GDC
Michael M. Mbevi,	Manager, drilling operations, GDC
Mr. Johnstone Maleche,	Deputy manager drilling operations, GDC
Mr. Stephen C. Kangogo,	Senior engineer, drilling, GDC
Mr. Abraham Khaemba,	Drilling engineer, GDC
Mr. Ernest Malel,	Drilling supervisor, GDC
Mr. Peter Mburu,	Drilling supervisor, GDC
Mr. Reuben Ngosi,	Chief Engineer, Planning & Logistics, GDC
Mr. Joseph Wambua,	Chief reservoir superintendent, GDC
Mr. Jecton Tocho Achieng,	Deputy manager, corporate palnning & projects department, GDC
Mr. Francis K. Wanjohi,	Engineer, cementing, GDC
Mr. Patrick Ngunzu,	Rig maintenance engineer, GDC

1) Menengai Geothermal Drilling Project, Nakuru, Environmental Impact Assessment Study Report, Final report, April 2008, Kengen
2) Menengai Geothermal Drilling Project, Nakuru, Environmental and Social Impact Assessment Study Report, Updated ESIA report, March 2012, GDC
3) Proposed installation of 5-10 MWe modular geothermal power plants at Menengai geothermal drilling project, Nakuru County, Environmental and Social Impact Assessment, Final report, February 2012, GDC
4) Arus-Korossi-Chepchuk geothermal drilling project, Baringo County, Environmental and Social Impact Assessment Study Report, February 2012, Egerton University & GDC
5) Proposed Paka-Silali Block geothermal exploration drilling works Environmental and Social Impact Assessment, Final report, February 2012, Moi University & GDC
6) Proposed Suswa geothermal drilling project, Narok County, Environmental and Social Impact Assessment Project report, GDC
7) Menengai geothermal drilling project, Environmental monitoring report, 4th quarter (April to June 2012), GDC
8) Constitution of Kenya, 2010
9) Land Act, 2012
10) Geothermal Resources Act, 1982
11) Electric Power Act, 1997
12) Environmental Management and Co-ordination Act, 1999
13) Environmental (Impact Assessment and audit) Regulations, 2003
14) Environmental Management and Co-ordination (Water Quality) Regulations, 2006
15) Environmental Management and Co-ordination (Waste Management) Regulations, 2006
16) Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
17) Water Act, 2002
18) The Wildlife (Conservation and Management) Act, 2009
19) Forest Act, 2005
20) The National Museums and Heritage Act, 2009
21) バリンゴ湖周辺地熱地帯マップ、GDC

22) 3,000m級地熱井の掘削消耗品リスト及び費用、GDC
23) Well completion reports for Menengai wells 1 to 8
24) GDC Menengai geothermal project drilling program, well MW-16
25) Drilling staff requirements for 9 rigs operation
26) Structure for drilling operations 1 rig operation
27) Drilling operations department structures – 9 rigs operation
28) GDC proposal to JICA for capacity building and drilling support
29) Drilling operations supervisory training JICA, January 2013
30) Breakdown of contract price in USD, GDC drilling contractor personnel
31) JICA ケニア地熱プロジェクト現地調査表
32) 第一実業見積書(パワートング、メカニカルトング、スピンナー、ダウンホールモータ、フィッシング機材、ジャールス)
33) GDC 10 year business plan, Corporate planning & strategy department, April 2010
34) Nuclear Energy for industrialization, A case study of Kenya's vision 2030, Colins Juma, NEPC
35) Silali Report 21st June 2011
36) Paka Compiled Exploration Report-18th of Oct
37) Suswa Prospect - Draft 09 03 2013
38) Lake Baringo Draft report 18 10 2011
39) Suswa Prospect - Report　09 03 2013
40) Menengai geothermal prospect version 2


ジャイカ
JICA