

1. Country/Region:	<i>Kenya/Olkaria</i>	2. CIF Project ID#:	[...]
3. Project/Program Title:	<i>Development of Olkaria VI Geothermal Power Plant of 140 MW at Olkaria Geothermal Field</i>		
4. Date of Endorsement of the Investment Plan:	<i>8th September 2011</i>		
5. Funding Request (in million USD equivalent):	<i>Grant: USD 0.5 million (project preparation grant)</i>	<i>Non-Grant (loan, equity, guarantee, etc.): USD 20 Million</i>	
6. Implementing MDB(s):	<i>AfDB</i>	<input checked="" type="checkbox"/> Private sector arm <input type="checkbox"/> Public sector arm	
7. Executing Agency:	<i>AfDB</i>		
8. MDB Focal Point and Project/Program Task Team Leader (TTL):	<i>Headquarters- Focal Point: Mafalda DUARTE Climate Investment Funds Program Manager, AfDB m.duarte@afdb.org</i>	<i>TTL: Naoshige Kinoshita n.kinoshita@afdb.org</i>	

I. General Project/Program Description

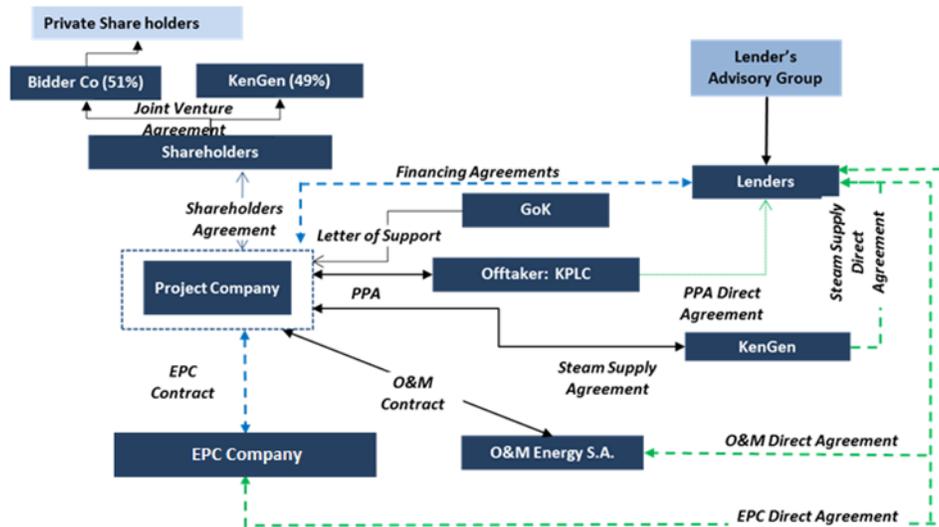
On September 2013, the Government of Kenya (GoK) has through the Kenya Electricity Generating Company Limited (KenGen) released a Request for Proposal (RFP) for the development of a 140 MW Geothermal Power Plant for Phase I of the Olkaria geothermal field under a Build, Own, Operate and Transfer (BOOT) scheme. A feasibility study commissioned by KenGen prior to the launch of the RFP indicates that the total potential of the Olkaria Geothermal field is estimated at 560 MW.

Following applications to the RFP, an Evaluation Committee to be appointed by KenGen shall evaluate the proposals on the basis of the responsiveness to the Terms of Reference set in the RFP. Each proposal will be given a technical score, which if below 80% will result in the disqualification of the bidder. Once the technical assessment is completed, an assessment of the financial proposal will follow. The Bidder achieving the highest combined technical and financial score will be selected as Preferred Bidder. Selection is expected to take place during the third quarter of 2014 and financial close during early next year.

The project will then be developed through a Joint Venture Agreement (JVA) between KenGen and the Preferred Bidder, with a 30-year concession period. The project is expected to generate and sell clean and base load power under a 25-year Power Purchase Agreement (PPA) to be entered with Kenyan Power and Lighting Company (KPLC). KenGen is expected to invest up to a maximum of 49% of the project's total equity and the selected bidder, or "Preferred Bidder", will invest a minimum of 51% and assume responsibility for securing debt financing.

Following the signing of the JVA, a Special Purpose Vehicle (SPV) will be established under Kenya Law. The Preferred Bidder will then be responsible for the design, finance, supply, construct and, commission the transmission line component, the substation and the associated infrastructure, which will include an estimated USD 80 million for the development of the steam gathering system that shall be transferred to KenGen on commissioning for operation and maintenance.

Figure I: Project Envisaged Structure



The project will be named Olkaria VI and shall be located in the South East part of the existing Olkaria I Power Plant. Olkaria VI will be supplied with steam from wells already drilled and to be drilled within the Olkaria South East field. Some steam will also be imported from wells located on the western sector of Olkaria East field closer to the proposed site. Olkaria VI is expected to be the first project to be structured as a full-fledged Public-Private Partnership (PPP) with clear and well-defined roles between the Public and Private counterparts.

With only 18% of the population having access to electric power, Kenya is among the countries with the lowest energy access rates in the world. This project will not only be significant in terms of expanding energy access but also contribute to local economic development and employment as KenGen expects the successful bidder to demonstrate local participation by achieving a local hiring target (Kenyan citizens) of a minimum of 20% of total workforce and sourcing at least 20% of construction services and supplies from Kenyan companies.

Annex I provides a summary of the responsibilities of both KenGen and the Preferred Bidder under the Joint Venture Agreement.

II. Context and Market

The power sector in Kenya is facing significant challenges linked to the rapidly growing demand of electricity and the country's high dependence on thermal power which is sensitive to the volatility of international commodity prices. At the same time, hydro power is increasingly becoming unreliable due to high costs in supply and unreliable rain patterns. Against these challenges, the strategy of the Government of Kenya (GoK) is to expand the development of new power infrastructure and to promote equitable access to quality energy services at least cost possible while protecting the environment and mitigating the negative impacts of climate change.

The Kenyan total installed capacity is actually 1,841 MW, dominated by hydroelectricity (44.5%), geothermal (13.2%), thermal (42%) and wind (0.3%), although increasing demand and the volatility of hydro power generation is leading to a surge in diesel based generation. The amount of other renewables in the energy mix is currently negligible.

In order to overcome the aforementioned issues, the GoK has introduced a number of policy measures including the incorporation of renewable energy integration into a Least Cost Power Development Plan (LCPDP) process. The Kenyan LCPDP proposes the development of about 5 GW of electricity from geothermal by 2030, which is expected to be equivalent to 26% of the system peak demand.

Recognizing its limited capacity in addressing alone this supply-side constraint, the GoK is making significant efforts to put in place a proper enabling environment to enhance investment flows from the private sector into the sector. This includes allowing for the creation of Independent Power Producer (IPP) schemes following public-led tender processes with the objective of competitively select private sector counterparts to, under Build-Own-Operate and Transfer (BOOT) schemes and alike, invest in the generation system of the country.

Given the geologically active areas present in Kenya, particularly in the Rift Valley region, it is estimated that the country has the potential to install roughly 15 GW of geothermal power. Total installed capacity using this technology currently stands at only 241 MW. The GoK is of the view that geothermal power represents the least cost power source for the country and is aiming at increasing geothermal contribution to the energy mix from the current 241MW to 5,530 MW installed capacity by 2030.

Despite the strong commitment by the GoK to the development of this specific technology, there remain impediments to private sector investment and the flow of capital needed to unlock the full geothermal potential in the country. These include: (i) high first-mover costs, and (ii) lack of technology track record in Kenya. In the context of the proposed project, these barriers are exacerbated by the fact that the GoK is not looking to provide a Sovereign Guarantee to cover the obligations of the off-taker (KPLC) under the Power Purchase Agreement (PPA).

SREP resources will be instrumental in improving the risk-return profile of the transaction and unlock further investment.

III. Detailed Project Description and Innovation

- a. **Innovation.** This project is innovative because it will test geothermal generation under a PPP scheme in which all risks involved in the project will be allocated properly and fairly between the public sector and private sector counterparts. As per KenGen's Request for Proposals, no Sovereign Guarantee will be provided by the GoK to cover the obligations of KPLC under the PPA. Consequently, the project will test a financial scheme that is not usual to financiers in the context of Sub-Saharan IPPs. This could greatly affect the bankability of the project due to perceived high risk; however, if properly structured this transaction could mark the beginning of a new paradigm in the financing of similar infrastructure in the country.

The Project will be financed under a non-recourse project finance structure with an envisaged leverage of 30/70 (equity/debt). Since no Sovereign Guarantee will be provided, the relevant parties involved in the project finance will look to obtain other forms of commercial risk insurance, including by deployment of SREP resources to that effect.

- b. **Technology, Product, and/or Business Model.** The project will have a total installed capacity of 140MW consisting of two units of 70MW each. The proposed technology is standard and technology risk is expected to be acceptable. Furthermore, AfDB will undertake a careful review of the RFP process, currently underway, and the EPC selection to ensure that value-for-money is proven for the transaction.

There are similar power plants being currently procured in Olkaria, all to be fully-owned by the GoK. These include: (i) 2x70MW Olkaria I Unit 4&5 being financed by the Japan International Cooperation Agency (JICA), and (ii) 2x70MW Olkaria IV Unit 1&2 geothermal power station being financed by the European Investment Bank (EIB) and Agence Française de Développement (AFD).

Globally, there are more than 200 commercial geothermal projects operating in 24 countries with a cumulative installed capacity of approximately 10.5 GW worldwide. This implies that geothermal power is a technically proven technology and a commercially feasible business.

- c. **Increased Supply of Renewable Energy or Increased Access to Modern Energy Services.** The proposed Project will add 140 MW to the current installed geothermal capacity of 241 MW thereby increasing the geothermal capacity in the country by 58% up to 381 MW. This shall account to 7.6% of the total installed capacity in the country, currently at roughly 1,841 MW. Given the base load nature of geothermal generation, the GoK anticipates that its development will lead to a situation where backup or emergency generation units will be less and less needed which shall contribute to stabilize the generation system profile and contribute to lower energy costs in the country.

Assuming an average capacity factor of 85%, the project is expected to generate 1,042,440 MWh per year.

- d. **Commercial Sustainability.** The GoK does not envisage the provision of a Sovereign Guarantee under this RFP to cover the financial obligations of KPLC (off-taker) under the Power Purchase Agreement (PPA). While this can be a considerable barrier to the deployment of capital and lead to high first-mover costs, if successful even if only with recourse to commercial-based risk coverage, this model has the potential to be replicated in the future with even more limited public participation.

Historically, the financiers of IPPs in Sub-Saharan Countries (with the exception of South Africa), including AfDB, have required project companies to negotiate such an arrangement to mitigate credit risk associated with off-takers. This coverage significantly credit enhances the project company and helps to avoid situations of distress by covering repayment risk of long-term debt provided by project financiers. If deployed as a guarantee to cover KenGen's payment default risk, the involvement of SREP can greatly help in improving the perceived risk-profile of the transaction and unlock the needed financing from investors. If deployed as a concessional loan, the financing terms with regards to tenor, grace period and interest rate of SREP resources will be defined during the appraisal process and in a way that maximizes the catalytic role of SREP without crowding-out other potential investors.

A number of legal and regulatory issues still affect geothermal development in the country. For example, a lack of clarity or insufficient compensation schemes when steam suppliers fail to provide the contractually agreed supply to a given project or in cases where take-or-pay PPAs do not properly capture events beyond the control of the Project Company with regards to the delivery of power to the grid. A Project Preparation Grant of USD 0.5 million is proposed to be deployed as part of this project to support the GoK in addressing constraints in the enabling environment such as the ones mentioned herein.

As the project is structured and the proposed financing structure implemented, significant positive demonstration effects are expected which will likely reduce the risk-return profile of geothermal development in Kenya and potentially lead to a discontinuation of concessional support over time.

IV. Rationale for SREP Funding

The rationale for SREP funding to this project is as follows:

- 1) Kenya's Climate Action Plan sets out a low carbon development strategy that considers the renewable energy generation sector as one base option for the country. Although geothermal is the most promising renewable energy source, Kenya also has excellent solar potential (about 2.160 kWh/m²/year of solar horizontal irradiation).
- 2) To mitigate first-mover costs. SREP resources will help mitigate this risk which will result in a relevant precedent for future investors as investment in the sector continues and as concessional support is scaled-down.
- 3) The GoK has launched a LCPDP towards the performance of Vision 2030 for which geothermal technology emerges as one of the best options for the country given its cost competitiveness and the commitment and public investment made so far in assuming drilling risk. It is essential that a competitive tariff underlying this specific project is achieved. To the extent needed, SREP resources could be used to buy-down total project costs to an appropriate level. This would ultimately offer a positive benefit to the end-users and stimulate sustainable, economic growth.
- 4) Geothermal technology is environmental friendly and a proven technology. The lower impact of competitive electricity tariffs to end-users of power generated through geothermal technology is required to promote this technology not only in Kenya but beyond.

- 5) The Olkaria 140MW project will be the first sizeable PPP project in the energy sector in Kenya. Properly implemented, the replication potential of this model in the country and beyond is expected to be considerable.

V. Consistency with Investment Criteria

Increased Access to Energy through Renewable Energy Sources: The proposed Project will add 140 MW to the current installed geothermal capacity of 241MW thereby increasing the geothermal capacity in the country by 58% up to 381 MW. This shall account to 7.6% of the total installed capacity in the country, currently at roughly 1.841 MW. Given the base load nature of geothermal generation, the GoK anticipates that its development will lead to a situation where backup or emergency generation units will be less and less needed which shall contribute to stabilize the generation system profile and contribute to lower energy costs in the country.

The Vision 2030, the National Energy Policy issued by the Kenyan Ministry of Energy in May 2012, sets an outlook for the energy demand in Kenya where the peak load is projected to grow to 2,511MW by 2015 and 15,026MW by 2030.

This project will be the first PPP with a clear and well defined role by the Public and Private Sector and will open doors for future replication. This is especially relevant given the base load nature of geothermal technology and its competitiveness in terms of levelised cost of energy vis-à-vis other renewable technologies. These factors can over time considerably contribute to the sustainability of the Kenyan electricity market and lead to higher access to electricity.

Low Emission Development: When operating, the proposed project will lead to annual Green House Gas (GHG) emissions reductions in the order of approximately 600,000 tons/year. During the life of the project, this savings will amount to 15,000,000 tons/25years.

Affordability and Competitiveness of Renewable Sources: Excluding “down-river” hydro power plants and others which reservoirs do not suffer from unpredictable rain patterns, geothermal is the renewable energy technology that provides the best capacity factor among renewables. Furthermore, geothermal technology can be used for both electricity and/or heat generation.

The most expensive activity linked to geothermal power generation is during the exploration phase where drilling a well may cost up to USD 5 million and in some cases, the well may be lost due to the inexistence of a heat source. One of the positive aspects of Olkaria VI is that the exploration phase has been completed and the steam potential is enough to accommodate the 100 MW envisaged capacity of the proposed plant.

Productive Use of Energy: Geothermal technology provides a way to generate base-load power. In the context of the Kenyan energy mix, which still highly depends on diesel-based generation, costs associated with geothermal development will likely be below the levelized cost of energy contributing to the long-term sustainability of electricity supply in the country. A quantification of how much these costs may be will be made during appraisal, at a time the project’s total cost is clearer. Furthermore, geothermal power plants will over time significantly reduce polluting diesel-based power generation.

Economic, Social and Environmental Development Impact: In addition to directly contributing to increased private sector participation in power generation, the project is expected to lead to an improvement in the livelihoods of the communities around the project site by supplying water and process heat for farming, industrial use and social amenities. As previously mentioned, there are stated goals for

local hiring and sourcing of goods and services, and over time, the project is expected to have a significant impact on the local economies and on direct and indirect job creation. A thorough assessment on the exact impacts will be performed during appraisal.

Furthermore, as part of the assessment to be made as financier to the project and as an implementing agency of SREP resources, AfDB will in line with its new Integrated Safeguards System, implemented the needed measure to ensure that the project will contribute to sustainable and inclusive growth. More precisely, AfDB will ensure that all risks are well identified and proper mitigation measures related to the following events are in place: (i) environmental and social negative impacts, (ii) involuntary resettlement land acquisition, population displacement and compensation, (iii) biodiversity and ecosystem services, (iv) population prevention and control, hazardous materials and resource efficiency, and (v) labour conditions, health and safety.

Dividends that shall result of KenGen's participation as a shareholder will positively contribute to the company's financial sustainability. Furthermore, all tax payments made by the project company as well as other forms of payments to the GoK will likely create positive spill-over effects in other sectors of the Kenyan economy.

Economic and Financial Viability: The Financial Viability will be assessed in more detail during the due diligence phase which will start soon after signature of the Joint Venture Agreement between KenGen and the Preferred Bidder.

The Kenyan FiT Policy issued in 2008 and revised firstly in 2010 and then in 2012, establishes the following main factors driving the tariff:

- a. The investment costs for the plant (including the costs of feasibility studies, site development, construction costs, and the costs of connecting to the transmission system including transmission lines, substations and associated equipment)
- b. The Operations and Maintenance (O&M) Costs
- c. Fuel costs where applicable
- d. Financing costs (including interest during construction) and a fair return on the invested capital. The availability of concessionary finance will be taken into account when estimating such costs
- e. Estimated lifetime of the power plant
- f. Amount of electricity to be generated

The maximum proposed tariff under the policy for geothermal generation equals USD 0.088. The objective of the policy is to facilitate resource mobilization by providing investment security and market stability for investors in electricity generation from renewable energy sources, reduce transaction and administrative costs and delays associated with the conventional procurement processes and to encourage private investors to operate their power plants prudently and efficiently so as to maximize returns. In the case of the Olkaria VI project, bidders are asked to provide a financial proposal which includes a price per kWh based on a given formula.

Given the total estimated costs for this project and bearing in mind the significant amounts involved in the construction of the required auxiliary infrastructure that shall be borne by the SPV (e.g. Steam Gathering System), the tariff that makes the project commercially viable will more likely be set at a higher level than the proposed tariff under the FiT Policy. In such a case, SREP resources would be instrumental in buying-down project costs to a level which improves the bankability of the project.

Leveraging of Additional Resources: SREP concessional resources will be blended with AfDB’s own resources. At this stage, it is expected that the total leverage effect of SREP resources will be 1/20 meaning that per each USD 1 of SREP resources being deployed, USD 20 will be leveraged from other sources. At the moment, this is a rough estimate as many of the inputs are still unclear but final concept shall be clear about this indicator.

Gender Considerations: Kenya envisions transforming itself into a newly-industrializing, middle-income country by 2030, with a globally competitive and prosperous economy and high quality of life in a clean and secure environment. This is envisioned in a long-term development strategy of the country, Vision 2030. To achieve this vision, energy is identified as one of the foundations and enablers of the socio-economic transformation envisaged in the country.

Inadequate access to affordable energy is limiting social opportunities for the poor, women and children in particular. Gender disparities in access to energy are drawing back social development of families and communities. Furthermore, women and girls tend to have increased opportunities for good health and education when communities have access to modern forms of energy.

The GoK believes that exploiting renewable energy has a great potential to promote gender equity and access to energy services in Kenya.

Co-benefits of renewable energy scale-up: The project will help overcome a number of remaining barriers affecting the exploitation of renewable energy resources in Kenya which include: (i) technical and human capacity, (ii) economic and financial, and (iii) legal and regulatory.

Removing these barriers will not only help the country meet its growing demand for electricity, enhance energy security, improve people access to affordable and reliable electricity supply, and reduce the cost of power supply, but will also bring substantial economic, social, and environmental co-benefits particularly to local communities.

Other co-benefits: Other co-benefits will include: (i) knowledge and technological transfer, (ii) improved local economy, (iii) job creation, and (iv) positive replication effect without concessionality over time. Furthermore, KenGen intends to utilize geothermal resources to promote socio-economic initiatives in surrounding communities, such as fish farming, improvements to pasture land, milk processing and grain storage.

VI. Financial Plan (Indicative):

Source of Funding	Amount (in USD million)	Type of Instrument	Percentage
Project Developer and KenGen	150.0	Equity	30%
MDBs	255.0	Commercial Senior Loans	51%
SREP	20.0	Concessional Loan	4%
Local banks	25.0	Senior Loans	5%
Others (Foreign Banks)	50.0	Senior Loans	10%
TOTAL	500.0		100%

The Financial Plan at this stage is only indicative given the fact that the RFP process is not yet finalized. The financial proposal of the winning bidder shall be used to prepare the final Financial Plan.

VII. Implementation Feasibility

The Project is expected to reach financial close by early next year and is expected to reach commercial operations under the best-case scenario by October 2016.

Expected SREP Sub-Committee Project Approval Date: November 2014

Expected MDB Approval Date: February 2015

The RFP will have a positive impact on implementation of the project with regards to time since it sets up a number of guiding principles in establishing negotiating mechanisms between all involved parties, including the bidder/project sponsor, KenGen and KPLC, among others.

VIII. Potential Risks and Mitigation Measures

Risks	Mitigation Measures
Political Risks	The Government of Kenya will provide a comfort letter to the benefit of the project and may consider provide a Partial Risk Guarantee. These should act as a significant credit enhancement and lead to interest at reasonable financing costs from different financiers. Furthermore, the fact that KenGen is aiming at putting up to 49% of the project's total equity will help to contribute to a better alignment of interests between both the Public and Private Sector counterparts.
Policy-Related Risks	Under the RFP, KenGen reserves to itself the right to terminate the RFP at any stage. While this is a risk that can delay the deployment of the proposed installed capacity and lead to delays in the deployment of capital, this is extremely important to protect the Public Sector should none of the bidders provide an acceptable proposal. Ultimately, this could lead to delays in the selection of the winning bidder but the process should be concluded by the time the project is expected to be reviewed by the SREP Sub-Committee.
Environmental, Social and Gender Risks	AfDB's participation will ensure that the project adheres to high environmental and social standards through the review of the project against its Integrated Safeguards System
Macro-Economic Risks	No Macroeconomic Risks are expected to arise as a result of this operation.
Financial Risks	The financial risks will be assessed during the due diligence phase by AfDB which will follow finalization of the RFP process.
Foreign Exchange Risk	All financial inputs to the project as well as outputs shall be denominated in US dollars.
Construction, Operation Risk	<p>The evaluation criteria in the RFP process that will lead to the selection of the winning bidder shall focus closely on these sources of risk. These include a detailed assessment on: (i) bidders Technical Capability in Geothermal Power Plant (Development, design and construction), (ii) technical expertise of the proposed management team, (iii) capital structure and financial capability of the bidder, (iv) bidders technical capability, (v) bidders technical capability in transmission lines and substations., and (vi) methodology for the project development.</p> <p>Apart from being a shareholder under the JVA, KenGen will enter into a Steam Supply agreement with the SPV. This agreement will be reviewed by lenders during appraisal to ensure that no supply risk arises during operations. This is important due to the penalties for non-delivery of power to KPLC (off-taker) that are standard in the PPA. It is therefore vital to ensure that these two agreements are back-to-back and penalties apply to KenGen should they fail to provide steam to the project.</p>

Annex I: Responsibilities of Parties under the Joint Venture Agreement

Preferred Bidder	KenGen
<ul style="list-style-type: none"> - Pay KenGen a free carry of 5% of the total project cost; - Design, finance, supply, construct, commission, operate and maintain the Power Plants; - Allow for and finance a provisional sum of USD 80 million as part of the total project cost for the steam gathering system Component, and further cause the SPV to competitively procure an EPC contract for this component. The steam gathering system cost must be included in the Base Capacity Charge Rate. The Preferred Bidder shall have the required expertise in steam field design and construction. The SPV shall transfer the steam gathering system to KenGen upon commissioning for operation and maintenance - Design, finance, supply, construct, commission the transmission line component Olkaria VI to Olkaria I and the substation and switch gears and the associated facilities and transfer this component of the project upon commissioning to KETRACO for operation and maintenance - Enter into a Steam Supply Agreement with KenGen - Enter into a Power Purchase Agreement with the Offtaker - Lease the Site from KenGen under lease agreement with KenGen - Carry out the Environmental and social Impact Assessment and implement environment management program. - Execute financial arrangements up to Financial Closure - Avail administration offices, access roads and any other infrastructure required on Site - Purchase steam from KenGen via a Steam Sale Agreement. The Steam will be metered at the site boundary at the Pressure Control Station - Make the Contracted Capacity Available to Kenya Power and to sell the Net Electrical Output to Kenya Power - Transfer the Plant to KenGen at expiry of the PPA at peppercom or at such other time as may be agreed in writing between the SPV Parties. Establish the SPV, under Kenyan Law - Obtain all the necessary licences, authorisations and permits required 	<ul style="list-style-type: none"> - Guarantee steam supply under the SSA - Take responsibility for the steam reservoir/field operation and maintenance - Raise its equity contribution as per the Joint Venture Agreement - Avail land to the SPV - Facilitate local community stakeholders management.