

KENYA
Scaling-Up Renewable Energy Program (SREP)
Joint Development Partner Scoping Mission
February 7-11, 2011

I. Introduction and Background

1. Kenya is one of six pilot countries selected to benefit from the Scaling-Up Renewable Energy Program in Low Income Countries (SREP). SREP operates under the Climate Investment Funds (CIF). It is funded through contributions from bilateral development partners, the Department for International Development (DFID) and the Government of Netherlands being the largest contributors. The African Development Bank (AfDB) and the World Bank Group (WBG), including the International Finance Corporation (IFC), will jointly manage the SREP program for Kenya. The World Bank is the lead institution for the Kenya SREP.

2. The objective of the SREP is to pilot and demonstrate the economic, social and environmental viability of low carbon development pathways in the energy sector by creating new economic opportunities and increasing energy access through the use of renewable energy. The initial allocation to Kenya is US\$50 million. Kenya is also eligible to potentially access an additional allocation (up to US\$ 60 million), which is available in reserve. However, the reserve fund can be accessed by any of the six pilot countries based on criteria to be developed by the SREP Sub-Committee.

3. Financing from SREP is guided by a number of principles. The financing will:

- address the additional costs and risks associated with renewable energy technologies, which adversely affect the viability of investments.
- meet the specific requirements of removing financial and institutional barriers and to leverage additional public and private financing.
- “crowd-in” the private sector.
- finance investments and capacity building for both public and private sector entities.
- increase the installed renewable energy capacity in a country’s energy supply in line with national energy plans.
- support proven renewable technologies.

4. A Multilateral Development Bank (MDB) Scoping Mission (“the Mission”) visited Kenya from February 7-11, 2011, to launch, with the Government of Kenya, development partners, civil society and private sector representatives, the process of preparing a Renewable Energy Investment Plan that will form the basis for the SREP financing. The Mission was led by the World Bank Group (WBG) and included representatives from the AfDB . The Mission included observers from the following institutions: the DFID, European Investment Bank (EIB), Japan Bank for International Cooperation (JBIC) and the United Nations Environmental Programme (UNEP). *Annex 1* provides the names of the Mission members and observers.

5. The Government (GoK) team was lead by Mr. Patrick Nyoike, Permanent Secretary, Ministry of Energy and included representatives from the Ministry of Finance, the Prime Minister's Office, the Geothermal Development Company (GDC), the Kenya Power and Lighting Company Ltd (KPLC), the Kenya Electricity Transmission Company Ltd (KETRACO), the Kenya Electricity Generating Company Ltd. (KenGen), the Rural Electrification Authority (REA) and the Energy Regulatory Commission (ERC). *Annex 2* provides the names of the officials.

6. The Mission had consultations with the Kenya Private Sector Alliance (KEPSA), the Kenya Association of Manufacturers (KAM), and Kenya Institute for Public Policy Research and Analysis (KIPPRA). Consultations were also carried out with the energy sector development partners based in Nairobi, including the Agence Française de Developpement (AFD), the Japan International Cooperation Agency (JICA), United Nations Development Programme (UNDP), UNEP, US Agency for International Development (USAID) and Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ). *Annex 3* shows the Mission's meeting schedule and *Annex 7* a power-point presentation of SREP.

7. The objective of the Mission was to launch the preparation of the SREP Investment Plan (IP), including discussing the programming and financing modalities, collecting information on ongoing and planned renewable energy initiatives, clarifying the institutional arrangements for the IP preparation, and agreeing on a timeline and resources required for the IP preparation. The Mission also discussed with the Government Kenya's energy sector policies and programs and possible areas for SREP support.

8. This Aide Memoire records the Mission's findings and recommendations. It was discussed at the wrap-up meeting chaired by Dr. Geoffrey Mwau, Ministry of Finance, on February 11, 2011. The Aide Memoire is subject to endorsement by the management of the AfDB and WBG.

9. The Mission expresses its appreciation for the courtesies received and for the support and cooperation accorded to it by the management and staff of the agencies with whom the Mission interacted.

II. Agreements Reached with the Government

10. The GoK and the Mission reached an agreement on the arrangements and timing for the preparation of the IP. The key agreements are recorded in the paragraphs below followed by a detailed action matrix with timing of next steps.

11. Institutional arrangements for preparing the IP:

- Responsible agency: MoE
- Focal Points: Acting Director, Renewable Energy, MoE and Deputy Manager, Corporate Planning and Strategy, GDC
- Task Force: MoF, GDC, KETRACO, KPLC, KenGen, ERC, REA

- Consultative Group: NEMA, KEPSA, National Task Force on Accelerated Development of Clean Energy, KIPPRA, and CSOs.

12. The IP preparation process includes the following steps:

- Assess electricity demand and needs.
- Assess the renewable resource potential.
- Construct and analyze the supply cost curve.
- Define the investment objectives.
- Select technologies and business models.
- Estimate investment and operating costs.
- Identify the financing instruments (co-financing, GoK counterpart financing, leveraging, partnerships, etc.)¹.
- Review the adequacy of policy, regulatory, and legal framework for renewable energy development.
- Propose institutional/organizational arrangements for implementation.
- Establish capacity-building needs.
- Assess risks and design mitigation measures.
- Develop the financing plan.

13. The Mission explained to the Government an outline of the Investment Plan suggested by the SREP (*Annex 4*) as well as the criteria that SREP investments will need to address to the extent possible (*Annex 5*).

14. The Mission emphasized that the processing of the SREP financing through the MDBs will require adherence to the Environmental and Social Safeguard procedures of the respective institution. Projects will be categorized according to their impacts, and an Environmental and Social Management Plan (ESMP) and a Resettlement Action Plan, if required, will need to be prepared and disclosed accordingly.

15. Preparation of the Joint Mission:

- Timing: tentatively end of April/early May 2011, depending on progress on IP.
- The Mission's Draft TORs will be developed jointly by MoE, WBG, and AfDB by early March.

16. Preparation Grant:

- GoK indicated its desire to apply for the advance preparation grant (up to US\$375,000) to support IP preparation activities such as seminars, stakeholder workshops, local travel, consultants, etc.

¹ The Joint Donors and Investors Conference on Geothermal Development, which is tentatively scheduled to be held in Nairobi in March/April 2011 may provide input to the IP preparation.

III. Next Steps

17. The Mission agreed on the following timeline with the Government of Kenya.

<i>Action</i>	<i>Responsible Entity</i>	<i>Timing</i>
Apply for preparation advance grant	SREP Focal Points/MoF	Early March 2011
Prepare Joint Mission ToRs	MoE, AfDB, WBG	Early March 2011
Nominate external peer reviewers	AfDB, WBG	Mid-March, 2011
Prepare Draft Investment Plan	MoE	End-March 2011
Stakeholder consultations	MoE	February-April 2011
Approve Joint Mission ToRs	SREP Sub-Committee	Early April 2011
Joint Mission	AfDB, WBG, Development Partners	April/May 2011
Web-based public consultations on the draft IP	MoE	April/May 2011
Finalize IP	MoE	April/May 2011
Feedback from external peer reviewers	External Peer Reviewers	Mid-May 2011
Endorsement of the IP	AfDB, WBG	May 2011
Approval of the IP	SREP Sub-Committee	June 2011
Prepare FS/ESIA/RAP for individual projects	Implementing Agencies	ASAP, in parallel

IV. Mission Findings

18. **Government is committed and has capacity to mitigate and adapt to climate change by broadening renewable energy.** Despite Kenya's relatively low carbon-intensive economy, the GoK is committed to implementing mitigation actions, which include broadening Kenya's renewable energy base. Kenya has a National Climate Change Response Strategy (NCCRS), which has been designed to put in place actions to address the challenges of climate change. These actions range from adaptation and mitigation measures in key sectors to necessary policy, legislative and institutional adjustments. Efforts are now underway to implement the actions identified in the NCCRS. There is also a Climate Change Coordination Unit in the Office of the Prime Minister that ensures that policy development and implementation is effective and consistent across ministries/ departments. Moreover, the GoK is planning to establish Green Energy Fund, which will address the issues of high upfront cost and human resource constraints in renewable energy development by providing concessional lending as well as capacity development support. The GoK explained that given its resource constraints, the Green Energy Fund could benefit from SREP financing.

19. **GoK has a National Energy Strategy.** Inadequate power supply and weak electricity network infrastructure is a brake on Kenya's economic performance and threatens Kenya's ambition set out in its overarching development program *Vision 2030* to be a middle-income country by 2030. Over the next several years, committed investments in additional generation capacity and in strengthening the electricity network will be barely sufficient to keep pace with anticipated electricity demand from economic activities and households.

20. Kenya is endowed with plentiful indigenous renewable energy resources and the NCCRS identifies the need to accelerate the development of renewable energy projects. This vision for green energy is further emphasized in the Government's *Vision 2030*, which identifies reliable, clean and affordable energy as a foundation for Kenya's long-term economic and social development.

21. Policy and regulatory measures are in place to boost power generation from renewable energy sources. The Energy Act of 2006 confers the responsibility for generation and transmission system planning to ERC, which has overseen the preparation of a Least Cost Power Development Plan (LCPDP). To mobilize investment for the Plan, the GoK has prepared an Electricity Access Investment Program 2009 – 2014. A Renewable Energy Feed-in Tariff (FIT) was established in 2008, and in January 2010, Kenya revised the FIT policy, which resulted in the addition of three renewable energy sources: geothermal, biogas, and solar energy resource generated electricity.

22. In addition to enabling policy and regulatory reforms, the GoK also has established key institutional mechanisms. The MoE has a dedicated Directorate focusing on renewable energy. In addition, during 2010, the GoK has set up a 'Green Energy Task-Force'. The overall mandate of the Green Energy Task Force is to ensure the expansion of the generation of green / clean energy. Given the potential of geothermal energy to supply so much of Kenya's future electricity requirements, the Geothermal Development Company (GDC), which began operations

in 2009, has the primary responsibility for geothermal resource development through exploratory drilling and technical studies.

23. **Stocktaking: What Development Partners are Doing.** Development partners' support to renewable energy development includes investment in geothermal, co-generation, mini hydro, and biogas power generation as well as associated transmission and distribution lines. *Annex 8* provides an indicative list of projects.

24. **GoK has Capacity to Prepare an IP for SREP.** Given that Kenya has a nationally designated institution with mandate to engage on renewable energy development, a recent energy strategy, and a development plan laying out goals for renewable energy scale-up in country, the Mission believes that the GoK has the requisite capacity to prepare an IP for SREP.

25. **High Priority Areas Identified for Support.** The Mission had initial discussions with the GoK and other stakeholders on candidate projects that could feature from SREP financing subject to completion of the required analysis in the IP. These are discussed below.

Geothermal

26. The GoK indicated that unleashing the development of Kenya's unique geothermal resource base is its top priority as laid out in its national energy strategy. However, the high initial cost and risk of resource exploration have slowed-down the development of this energy source despite its cost-competitiveness on a life-cycle basis. All of the geothermal based electricity generation constructed in Kenya to date has been in the Olkaria geothermal field near Naivasha. Other prospective areas in the Rift Valley together may have sufficient geothermal resources for about 7,000 MW of electricity generating capacity. This capacity is yet to be unleashed.

27. Geothermal resource exploration proceeds in phases. Following the first phase of surface level geophysical reconnaissance (already carried out for all the identified prospective areas), the subsequent phases are exploration drilling, appraisal drilling, production drilling and the development of above ground steam field infrastructure. The high-risk phase is the exploration drilling because it requires large investment and has relatively high probability that an individual well may not tap into the steam resource.

28. The Mission discussed with the GoK and the GDC the following options, which are not mutually exclusive, for accelerated geothermal resource development. The Government agreed to undertake a rigorous assessment of the different business models before selecting the option to be adopted for SREP.

- a) Financing exploration wells for GDC. SREP funds could be used to finance exploration drilling to reduce the exploration risk and thus unlock public and/or private funding for production drilling and subsequent power plant development.
- b) Support geothermal drilling through a Guarantee Fund. An alternative approach to financing specific exploration wells for GDC or private investors would be to use SREP to co-finance a

Guarantee Fund to mitigate the exploration drilling risk. This fund would assist GDC in raising financing for drilling, establishing a secure revenue stream and ultimately achieving project bankability. The Guarantee Fund could be structured in various ways. *Annex 9* describes a possible scheme.

- c) Engagement of the private sector. The GoK sees private sector participation as central in realising its goal of developing up to 5,000 MW of geothermal generation because this undertaking will require enormous technical and financial investment. During the Mission, several business models were discussed including channeling SREP to support the engagement of the private sector in the development of the resources after two or three wells are drilled by GDC. The private sector can then participate in field development in parallel or complimentary to GDC efforts. This has the potential to leverage private funding for drilling in addition to power plant investment.
- d) Carbon finance-linked lending. Geothermal development has the potential to benefit from linking up with the carbon finance market. For example, the World Bank team is exploring the idea of catalyzing an IBRD loan for geothermal resource development. The loan could leverage on initial financing provided by SREP, utilize carbon revenues generated by the investments, and thereby reduce the cost of an IBRD loan to an IDA-equivalent concessional terms (*Annex 6*).

Wind

29. Kenya has an active wind-power investment program in both the public and private sectors and a few small existing projects (5 MW). There are approximately 500MW of IPPs and 300MW of KenGen wind projects in the pipeline. However, there are a number of issues that may hold back investment in wind power. The main obstacles are:

- Wind is an interruptible source requiring a reserve power back-up that can come on line at short notice. This could be provided up to a point by hydro and perhaps in time geothermal power but it is doubtful whether enough back up for over 800 MW would be feasible.
- Wind changes the dynamics of grid behavior and a system study would be required to assess the impact on the grid and need for grid reinforcement.
- Wind will change the dispatch regime and the capability of KPLC to operate it would need to be augmented.
- There is a need to secure large amount of finance for the IPPs and transmission lines.

30. SREP could potentially help address one or more of these bottlenecks. It could help co-finance system studies, capacity building to KPLC, specialized equipment for grid reinforcement or transmission lines to the wind farms.

Solar

31. The discussions the Mission held with relevant GoK entities concluded that solar power is less attractive for large-scale power generation in Kenya. In most parts of the country, solar radiation is considered insufficient for grid connected generation. Its cost is higher than other renewable options such as geothermal and hydro. Solar may be better suited for off-grid applications.

Mini Hydro and Biomass

32. Opportunities to develop mini hydro and biomass (biogas and bagasse) resources exist. The private sector has shown interest in developing these resources if current barriers are addressed and risk mitigation structures established. The possibility of using SREP to provide a first-loss guarantee as an incentive to scale-up the use of these resources was discussed.

Transmission

33. The Mission discussed with KPLC and KETRACO the need to coordinate generation capacity development at a given location with the planning and construction of transmission facilities including the associated substations. It was concluded that dynamic simulation studies related to these issues would need to be carried out. The Mission agreed that a possible use of SREP could be for such studies on technical issues in integration of variable renewable energy sources. In addition, the Mission noted that the SREP IP would need to include investment needs for transmission facilities associated with generation capacity additions.

Regulatory Option – Feed-in-Tariff

34. The Prime Minister's Climate Change Policy Advisor discussed the obstacles to cogeneration through renewable energy sources with the Mission. SREP could scale up smaller scale renewable energy by selectively subsidizing feed-in-tariffs.

V. Consultations with Private Sector, Civil Society Organizations, and Development Partners

35. **Private Sector.** Representatives of KEPSA, which represents 75% of Kenya's private sector enterprises, emphasized that Kenya's renewable energy development plan should be more ambitious and, in addition to geothermal, it should include other sources of power, such as wind, solar, biomass, biogas, cogeneration, small hydro and waste. Several representatives considered that if external benefits from developing a renewable energy were considered in the preparation of the Least-Cost Power Development Plan, more renewable energy sources could become competitive. The representatives also stressed that the existing feed-in-tariff levels are still too low to scale-up investment in renewable energy development. Given the significant uncertainty in the capital expenditures required for renewable energy development, some representatives felt the formulae for determining the levels of feed-in-tariffs should be established in the regulation, with incentives to minimize costs of renewable energy development. KEPSA expressed its

strong wish to be engaged upfront in the IP preparation process and be part of an IP consultation group.

36. Representatives from KAM explained to the Mission that it is currently focusing on energy efficiency of private companies. As for renewable energy deployment, KAM representatives pointed out the issues of low feed-in-tariffs and guaranteed off-take. They suggested to the Mission to contact Mumias Sugar Company and learn from their experience.

37. **Civil Society.** Representatives from KIPPRA highlighted that their research on energy consumption pattern shows that household consumers are generally more satisfied with renewable energy, such as solar, wind, and biogas, than fossil fuels and biomass. The representatives mentioned that some of the barriers to scaling up renewable energy deployment in Kenya are regulatory constraints and incentive regimes, high initial cost, limited pool of trained technicians to undertake operations and maintenance of equipment, as well as insufficient public awareness.

38. **Development Partners.** The development partners saw SREP as an opportunity for Kenya to accelerate renewable energy development. Among many opportunities, they considered geothermal development to be of primary interest. The development partners noted that an optimal use of the SREP funds would be absorbing part of the exploration risk to facilitate private sector involvement in geothermal power. In addition, partners suggested the use of SREP funds in a clearly defined guarantee fund could encourage the development of small hydropower plants. Co-generation plants were also mentioned as a potential target area along with bio-energy (biogas, etc) production. With regard to wind projects (such as Lake Turkana Wind Farm) the partners considered that GoK was better placed to support them. The partners emphasized the importance of building adequate energy transmission networks to expand the population's access to electricity.

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Mission Schedule

<u>Date</u>	<u>Time</u>	<u>Activity</u>	<u>Place</u>
Monday 7 February	10.00 am	Mission Team Internal Meeting	World Bank Nairobi Office, Upper Hill
	2.00 pm	Mission Team Meeting with Development Partners in energy	World Bank Nairobi, Upper Hill
Tuesday 8 February	8.30 am	Meeting with MoE	MoE Conference Room, Nyayo House
	10.00 am	Kick-off meeting with Ministry of Finance	MoF, Treasury Building, 14 th Floor Conference room
	4.00 pm	Meeting with SREP focal points, Ministry of Energy, and Energy Regulatory Commission (ERC)	MoE Conference Room, Nyayo House
Wednesday 9 February	8.30 am	Meeting with Geothermal Development Company (GDC)	MoE Conference Room, Nyayo House
	9.00 am	Meeting with Kenya Private Sector Alliance (KEPSA)	KEPSA, 2 nd Floor, Shelter Afrique Bldg., Mamlaka Road
	2.00 pm	Meeting with Kenya Electricity generation Company (KenGen), Rural Electrification Authority (REA), Kenya Power and Lighting Company (KPLC) and Kenya Electricity Transmission Company (KETRACO)	MoE Conference Room, Nyayo House
	2.30 pm	Prime Minister's Climate Change Coordination Unit	PM's Office, Harambee Avenue
	2.30 pm	Kenya Association of Manufacturers (KAM)	KAM, Mwanzi Road, Westlands
Thursday 10 February	9.00 am	Joint Mission team discussion and drafting Aide Memoire	World Bank Nairobi Office, Upper Hill
Friday 11 February	8.30 am	Kenya Institute for Public Policy Research and Analysis (KIPPRA)	2 nd Floor Bishops Garden Towers, Bishop Road
	2.30 pm	Wrap-up meeting	MoF, Treasury Building, 14 th Floor Conference Room

Suggested Structure for the Investment Plan²

I. Proposal Summary (2 pages)

- Objectives
- Expected outcomes
- Program criteria, priorities and budget

II. Country Context (3-4 pages)

- Energy sector description (market structure, demand supply, and dispatch composition, electricity cost and pricing) incl. renewable energy status
- Gap/barrier analysis; needs assessment

III. Renewable Energy Sector Context (3-4 pages)

- Analysis of RE options (technology, cost, mitigation potential, barriers)
- Government plans or strategy for the sector (willingness to move towards renewable energy investments, existing or envisioned policy, regulation, plans, and resource allocation)
- Institutional structure and capacity (technical, operational, financial, equipment supply, information)
- Role of private sector and leverage of resources
- Ongoing/planned investment by other development partners

IV. Contribution to National Energy Roadmap (2 pages)

- Likely development impacts and co-benefits of SREP investment
- How SREP investment will initiate a process leading towards transformational low carbon growth

V. Program Description (6-8 pages)

- Capacity building and advisory services
- Investment preparation activities
- Technology deployment investments
- Parallel activities to be funded by other development partners
- Environmental, social and gender co-benefits

VI. Financing Plan and Instruments (3-4 pages)

- Budget envelop for investments
- Costs and sources of funding
- SREP assistance (grant, concessional debt, etc.)
- Recipients of funding

VII. Additional Development Activities (2-3 pages)

² From the STEP Programming Modalities and Operational Guidelines

- Leverage complementary co-financing with other development partners such as bilaterals, private sector, and financial institutions

VIII. Implementation Potential with Risk Assessment (2 pages)

- Country/regional risks - institutional, technology, environmental, social, financial
- Absorptive capacity for SREP and leveraged resources

IX. Monitoring and Evaluation (1/2 page)

- Results framework table

Annexes

Information should be included in annexes on the following areas:

- assessment of country's absorptive capacity
- stakeholder consultations
- co benefits
- existing activities in the field of renewable energy, particularly activities of other development partners

For each project to be implemented under the Investment Plan, an investment concept brief (maximum two pages) will be prepared as part of the Annex to the Investment Plan.

A suggested outline of an Investment Concept Brief includes:

- Problem statement (1-2 paragraphs)
- Proposed contribution to initiating transformation (1-2 paragraphs)
- Implementation readiness (1-2 paragraphs)
- Rationale for SREP financing (1-2 paragraphs)
- Results indicators
- Financing plan
- Project preparation timetable
- Requests, if any, for investment preparation funding

Criteria for SREP Investments

As stipulated in the “SREP Programming Modalities and Operational Guidelines,” briefs for investment should address the following criteria, as appropriate. It is recognized that a particular investment may not address all the criteria.

- a) **Increased installed capacity from renewable energy sources:** A high priority for most low income countries is expanding their generation capacity in order to ramp up modern energy use and energy access. Therefore, SREP-funded investments should result in increased MW from renewable energy, as well as increased energy (GWh) per capita in the country.
- b) **Increased access to energy through renewable energy sources:** SREP may support grid extensions and decentralized energy systems with a view to expanding the percentage of the population with access to non-fossil-fueled electricity. Investment proposals should demonstrate how the investments are part of the Government’s long term commitment to increasing energy access.
- c) **Low Emission Development:** SREP may support the use of renewable energy technologies for electricity generation and services to replace fossil fuel technologies that would be deployed in a business-as-usual scenario aimed at substantially increasing commercial energy use in low income countries. In particular, benefits from SREP investments will often arise from “leap-frogging” technologies, in which low income countries will be assisted to mainstream renewable energy technologies into the overall energy system.
- d) **Affordability and competitiveness of renewable sources:** Affordability is essential for increasing access and for ensuring the long term renewable energy market development. SREP funding should address clearly-defined cost barriers to adoption of renewable energy technologies, such as connection costs for rural consumers, higher capital costs of new technologies, transmission costs related to grid-connected renewables, and risk adjusted rates of return sought by investors.
- e) **Productive use of energy:** SREP programs should promote the generation and productive use of energy.
- f) **Economic, social and environmental development impact:** Investment proposals for SREP financing should demonstrate the generation of economic, social and environmental benefits.
- g) **Economic and financial viability:** Investment proposals should demonstrate the economic viability of investments and the financial viability with the inclusion of time bound SREP resources.
- h) **Leveraging of additional resources:** Activities should maximize the leverage of funds from other partners.
- i) **Gender:** SREP investments should seek to strengthen the capacity of women to be active participants in the economic sector and avoid negative impacts on women.
- j) **Co-benefits of renewable energy scale-up:** SREP investments should include decreased air pollutants from energy production and consumption as well as the potential to reduce stress on forest resources. Investments and activities should elaborate on the potential positive effects on air quality and natural resource management through the adoption of renewable energy technologies.

IBRD Carbon-linked Loan for Geothermal Development

The World Bank team discussed with the Government the idea of a US\$ 100 million IBRD loan to GoK linked to carbon credits to finance geothermal development. This would allow Government to borrow additional funds from the World Bank over and above Kenya's IDA allocation. The loan could have a tenor of up to 20 years and a 7 year principal repayment grace period. GoK would onlend these funds to GDC for steam production. GoK and GDC would transfer the carbon emission reduction rights that will be generated by this investment to a proposed donor-funded Climate Financing Facility (CLIFF). CLIFF would then sell these carbon emission reduction rights to carbon buyers and pay part of the interest to IBRD on the GoK loan above a concessional interest rate. CLIFF would be backstopped by donor funds that would pay for the interest in case the carbon revenues are not sufficient. Thus, GoK would only pay a concessional interest rate to IBRD, close to the level of IDA credit service charge. (See a lending scenario in the chart below).

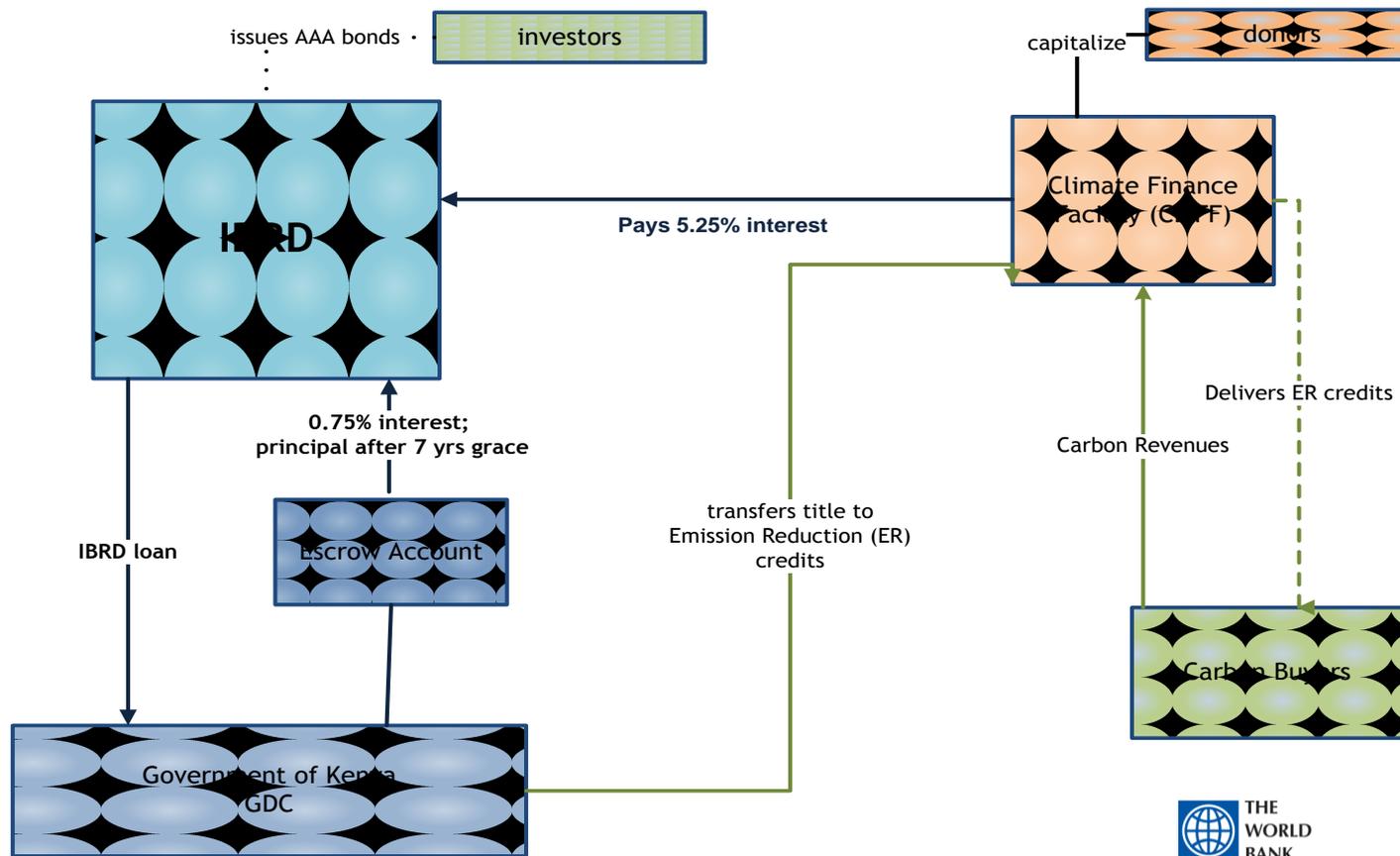
IBRD only lends to highly rated low income countries if the financed projects have "clear economic benefits". In these rare cases IBRD requires credit enhancements, in particular a debt service payment account with foreign exchange. Here, debt service payments of GoK to IBRD would be swapped into USD and flow into the debt service payment escrow account. IBRD might require additional comfort such as the posting of collateral in the escrow account of a certain percentage of outstanding principal.

This operation may fit well under SREP's objectives, because it would pilot and demonstrate the "economic viability" of a "low carbon development pathway" (geothermal) as well as related carbon finance. It would create "new economic opportunities" because IBRD's engagement in these investments would attract other commercial funders to geothermal development in Kenya. It would also help to remove barriers to large scale financing of the vast geothermal potential in Kenya as well as carbon finance development and increase installed geothermal capacity. The scheme could contribute to lower the average cost of power production, and enhanced access to electricity.

The Mission team has discussed the IBRD carbon lending idea internally and with different GoK officials. The GoK is interested in exploring this scheme further, and requested a formal write-up for the Permanent Secretary of the Treasury.

Scenario: IBRD lending backstopped by CLIFF

CLIMATE CHANGE MITIGATION LENDING FOR LOW-INCOME COUNTRIES



Mission's Presentation on SREP

Matrix of Donor Initiatives on Renewable Energy
(Including initiatives under consideration)

Donor	Title	Description
AFD	Energy Sector Recovery Project – Component D	Co-financing of ESRP – Financing of rehabilitation of KPLC’s sub-stations in Nairobi and Coast provinces. Review of KPLC’s connection policy and implementation of pilot projects to enhance connectivity in Kenya, including the set-up and funding of a connection revolving fund
AFD	Off-grid rural electrification	Conversion of diesel generators into hybrid generators (wind, solar, biomass) and construction of new generators and associated mini-grids in rural areas
AFD	Scaling –up Access	Scaling up of pilot revolving fund to enhance connectivity in Kenya, complemented by a CFL distribution component
AFD/PROPARCO	Mumias Sugar co-generation	Financing of 25W through co-generation (IPP Project) (20 MUSD Proparco +15 MUSD AFD).
AFD/PROPARCO	Lake Turkana Wind Farm	Partial financing of the 300 MW wind farm (IPP project (15 MEUR Proparco + 20 MEUR AFD)
Proparco	Olkaria III	Partial financing of 35 MW generation capacity at Olkaria III (IPP Project)
AFD	Olkaria II-3 rd Unit	co-Financing of the Olkaria II Geothermal Plant Extension (3 rd Unit) – 35 MW
AFD	Olkaria I and IV Project	Extension of the 280 MW geothermal plant
AFD	Support to the development of renewable energy and geothermal energy	Support to the Geothermal development company + funding of a national master plan
AFD	Renewable Energy and Energy Efficiency credit line	Credit line to commercial banks to promote renewable energy and energy efficiency in the agri-business and hostelry sectors
AFD	Wind feasibility study	Preparation of feasibility studies for 12 additional wind sites
AfDB	Menengai Geothermal Power Project	Partial financing of drilling activities for the development of the Menengai geothermal field for power generation
AfDB	Lake Turkana Wind Power	Partial financing of a 300 MW wind park near lake Turkana in Northern Kenya
EIB	Olkaria II Extension	Part-financing of a third steam turbine at the Olkaria II geothermal power plant
European Commission	Promoting use of Sustainable Energy in Wajir District	Installation of energy systems in at least 80% of the 20 target institutions by the end of the project, installation of 2 wells using solar technology to pump water, installation of 1 community well using wind energy to pump out water, planting of 20,000

European Commission	Community based mini hydropower development in upper tana river basin for poverty alleviation	Construction of 7 mini-hydro power plants with total capacity of 3185kW, Installation of distribution power lines to 23538 households, 28 markets centres, 59 Schools, 3 Tertiary Institutions, 12 Health centres, 8 factories and 33 churches, 7 tree nurserie
European Commission	Up scaling the smaller biogas Plants for agricultural producers and processors	At least 330 additional rural households in 5 provinces will get access to clean energy, indoor air pollution in 330 rural households will be reduced by 30%, 330 rural households will have reduced fuel wood consumption by 60%, at least 30 agricultural ent
European Commission	Community Based Green Energy Project (CB-GEP)	To increase access to modern, affordable and sustainable energy services for 268,000 households, 48 institutions and 48 rural community based groups in rural and peri-urban areas in Kenya
European Commission	The Improved Cook Stoves for Households and Institutions Project	Contribute to improving livelihoods of rural and peri-urban poor households in Kenya by improving their access and use of efficient, renewable and clean energy options by both men and women
European Commission	Solar Energy for rural Kenya	Improving the access of poor people to sustainable and affordable energy services in a perspective of combating climate change and achieving the MDGs and WSSD objectives on energy. Providing safe, environmentally friendly and affordable light, independent
European Commission	Support to and expansion of Malindi Bio – Fuel Cluster – Jatropha farming	To promote the oil tree Jatropha as a renewable, sustainable and decentralized source of biofuel for cooking and lighting for small-scale farming communities in Malindi and Magarini Districts at the Kenyan North Coast.
GIZ	Renewables Made in Germany – Project Development Program	Technical assistance; advisory and facilitation of matchmaking and business-to-business partnerships between German and East African renewable energy companies for technology partnerships and investment promotion
Government of PRC/CHINA EXIMBANK	Olkaria I and IV Geothermal Project	Provide Concessional Loan to fund drilling services for 26 production wells
GoFinland	“Decentralized Re-system for electrification and Empowerment”	Village lighting, and electrification for productive purposes
Go Belgium	Electrification project	Enhance the reliability of the electricity network in the Thika region by installing a 132 kV transmission line, strengthening the existing 66 kV grid, and expanding the 33 kV rural electrification network (Phase II)
IDA /WB	Energy Sector Recovery Project	Sector reform; KPLC corporate recovery; strengthening of ERC, MoE, and KEBS; upgrading of KPLC distribution lines and sub-stations; electricity meters to connect 400,000 customers; Olkaria II 3 rd unit.
IDA/WB	Energy Sector Recovery Project Additional financing	Financing of financing shortfalls of ESRP; scaling up distribution component to connect additional customers in peri-urban areas.
IDA/WB	Electricity Expansion Project	Generation, transmission.distribution, off-grid, renewable energy.
IDA/WB	Agricultural productivity and Agribusiness project	Small hydro, solar, wind, or bio-gas
IDA/IFC/GEF	Lighting Africa	Support to innovative renewable energy lighting products

IDA/Carbon finance	Community Development Carbon Fund – Emission reductions purchase agreement	
IFC	Advisory Service on Geothermal Power Development	Private Sector Barrier analysis and development of appropriate solutions
IFC	Advisory Service on Small/ Mini-Hydro development (<10 MW)	Technical assistance to private sector clients to help them raise commercial financing from local banks for small/mini- hydro projects
IFC	Investment Support to the Private Sector for Geothermal Power Development	Early stage financial support in the form of concessional loans for the feasibility stage (resource development stage) for at least 2 geothermal projects (22enya22ng 100 MW) so as to mobilize more private sector investment. Discussion ongoing with key large geothermal power developers e.g. Magma, Enel etc who are interested in developing Geothermal Power in 22enya. Expected leverage 1:10
IFC	Investment Support to the Development of Small/Mini-Hydro and biomass/ biogas based power projects	First loss deficiency guarantee or other form of risk mitigation (portfolio level or individual project level) for supplementing a credit line from IFC to commercial banks in Kenya providing senior / mezzanine loans to small power developers. Expected to help develop 50 MW i.e. indicative leverage of at least 1:10.
MIGA/WB	OrPower4 (Olkaria III)	MIGA guarantee
JBIC	400 MW Menengai Phase I Geothermal Power Project	Partial financing for steam assessment and field development
JICA	Olkaria-Lessos-Kisumu Transimission Line Upgrading Project	Construction of about 213 km double circuit Olkaria-Lessos 220kV line and about 77km single circuit Lessos-Kisumu 220kV Line
JICA	Olkaria I Unit 4 and 5 Geothermal Power Project	Construction of Geothermal Power Plant unit 4 and 5 at 70MW each at Olkaria
JICA	Renewable Energy Promotion Program	Project for Empowering Rural Communities through Renewable Energy Technologies in Kenya (TRICECRET-K) 1. Project for Capacity Development for Promoting Rural Electrification Using Renewable Energies in Kenya 2. Project for Establishment of Rural Electrification Model Using Renewable Energy
KfW	Olkaria IV appraisal drilling (geothermal)	Co-finance for appraisal drilling (6 wells) up to establishment of feasibility study for subseqent production drilling
KfW	Olkaria IV Transaction Advice	Transaction Advice to support the tender process for private investment (BOT/BOO) regarding the power plant Olkaria IV (64MW)
KfW	Olkaria I and IV Project	Extension of the plants
KfW/DEG	Olkaria III (geothermal)	Construction of 48 MW Geothermal Power Plant, IPP
NDF	Energy Sector Recovery Project - Component D contract V	
UNEP/GEF	Removal of barriers to energy conservation and energy efficiency in small and medium scale enterprises.	Reduction in CO2 emissions resulting from increased energy efficiency within Kenya's small and medium enterprises
UNEP/GEF	Market transformations for efficient biomass stoves for institutions and small and medium enterprises	Project to remove market barriers to the adoption of sustainable biomass energy practices and technologies by institutions and small businesses in rural and urban Kenya.
UNEP/GEF	Cogen for Africa	This regional project aim to help transform the cogeneration industry in Eastern and Southern Africa into a profitable cogeneration market and promote widespread implementation of highly efficient cogeneration

		systems by removing barriers to their application.
UNEP/GEF	Greening the Tea Industry in East Africa (GTIEA)	Regional project installing hydro with tea factories in Kenya, Tanzania, Uganda, Rwanda and Malawi. Excess power to the grid or rural electrification
UNEP/GEF	Sustainable Transport Solutions for East Africa (SUSTRAN)	Regional project increasing awareness of and support for the implementation of sustainable transport solutions amongst policy makers, stakeholders and the general public in East Africa and beyond.
UNEP/GEF	African Rift Geothermal Development Facility (ARGEO)	Regional project targeting promotion of geothermal energy development in several countries in the Rift Valley . The project will provide technical assistance for exploration and utilization of geothermal energy for power generation through a regional network, and financial incentives and risk mitigation for exploratory drilling.
UNDP	Access to Clean and sustainable energy services	Promotion, development and distribution of sustainable energy services to serve basic household needs, income generating opportunities and service economy while reducing poverty as well as reversing environmental degradation. This will address areas of Capacity building, Solar thermal, bio-fuels, pico and micro hydros, wind energy, feed in tariffs for wind, solar and biomass, Biogas development, Biomass gasification and East African Energy scaling up strategy.
UNDP (GEF)	Market transformations for efficient biomass stoves for institutions and small and medium enterprises	Project to remove market barriers to the adoption of sustainable biomass energy practices and technologies by institutions and small businesses in rural and urban Kenya. Reduction in CO2 emissions resulting from increased energy efficiency within Kenya's small and medium enterprises
UNDP	Standards and Labling in kenya	To remove barriers to market transformation to energy efficient products and services in Kenya with a replication effect to four other east African Countries (EAC) of Burundi, Rwanda, Tanzania, and Uganda. All these countries have adequate energy to meet their development goals. The introduction and implementation of the initiative will therefore improve energy efficiency, increase availability of a "new" power and reduce GHG emissions thus mitigating climate change
UNDP	Promoting Public Private partnerships: Sustainable land management thorough Sustainable charcoal production	Promoting sustainable charcoal production through private public partnerships. The project provides new technologies for charcoal production, promotes formation of Charcoal producer associations and use / enforcemetn of charcoal rules. Charcoal producers are encouraged / expected to plant trees after cutting for charcoal production for sustainability.

First Loss Portfolio Guarantee - Example

One model for geothermal development would be to use the principle of a “First Loss Portfolio Guarantee”. Under this scheme, a portfolio of an agreed number of the first exploration wells drilled by GDC would be insured against underperformance. GDC would pay an insurance premium for this cover. The criterion for triggering the insurance cover would be the performance of the whole portfolio against a benchmark. The benchmark would be set at a level that would enable GDC to earn enough revenues to service its debt. If the portfolio performs below that level, the Guarantee Fund would be called upon to top up revenues to the minimum level required for debt service. However, under this model the fund would only cover the “First Loss” up to a fixed percentage. Beyond that, GDC would have to cover any additional losses. The portfolio approach has the advantage that the guarantee does not need to be called upon if dry wells are compensated for by highly productive wells. Once GDC achieves bankability, it could cancel the cover, stop paying the insurance premium, and the remaining SREP funding would be released and available to cover future geothermal projects. The Guarantee Fund could be co-financed by SREP and other sources, consistent with the leverage principle of SREP. It would be structured taking into account other existing and planned initiatives such as the KfW risk mitigation fund. The Guarantee Fund could be exclusively used for GDC’s first wells for a selected group of fields including Menengai, or it could also be utilized by other sponsors willing to pay the insurance premium.