

**PROJECT INFORMATION DOCUMENT (PID)  
CONCEPT STAGE**

September 11, 2017  
Report No.: 120526

<b>Project Name</b>	KTDA Small Hydro Programme Of Activities (P160157)
<b>Region</b>	AFR
<b>Country</b>	Kenya
<b>Sector</b>	Hydropower (100%)
<b>Lending Instrument</b>	IPF (Carbon finance)
<b>Project ID</b>	P160157
<b>Borrower(s)</b>	KTDA Power Company Limited
<b>Implementing Agency</b>	Regional Power Companies
<b>Environmental Screening Category</b>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
<b>Date PID Prepared</b>	September 11, 2017
<b>Estimated Date of Appraisal Completion</b>	October 27, 2017
<b>Estimated Date of Board Approval</b>	N/A
<b>Concept Review Decision</b>	Following the review of the concept, the decision was taken to proceed with the preparation of the operation.

**I. Introduction and Context**

*{Same as in Sections I parts A-B-C of the PCN: Country Context; Sectoral and Institutional Context; Relationship to CAS.}*

**A. Country Context**

1. Kenya, a lower middle income country (MIC) with per capita Gross National Income (GNI) of US\$ 1,340 in 2015, has a population of nearly 46 million people dispersed across 47 counties with significant regional disparities in economic growth and poverty reduction which pose significant development challenges. Kenya holds great potential from this growing and youthful population; its dynamic private sector; a platform for change laid down by the new Constitution; and its pivotal role within East Africa and beyond. In the last decade, annual growth rates averaged 5.2 percent. Real investment spending has rebounded, after a dip in 2013, driven by higher development spending on major infrastructural activities, such as the standard gauge railway, roads, and power generation projects. Kenya also improved its business environment as the country jumped from 129 in 2015 to 92 in 2016/2017 in the Doing Business Index. However, Kenya's high unemployment, poverty and inequality rates have dampened its new status as a MIC even though the data are outdated and precise levels are unknown. The poverty rate is estimated to have reduced to 39 percent in 2012 from 47 percent in 2005/6. Governance concerns persist; and growth has been constrained by low investment and low firm-level productivity and has yet to take off at the rapid, sustained rates needed to transform the lives of ordinary citizens. There are significant differences in opportunities and outcomes between women and men and for those living in the remote and most underdeveloped regions.

2. The promulgation of a new Constitution in 2010 signaled far reaching political and economic maturity. Kenya's highly ambitious devolution of political and economic power to 47 new county governments seeks to narrow long-term, deeply entrenched regional disparities; increase the responsiveness and accountability of government to citizens; and grant greater autonomy to regions and group. "Vision 2030", a national long-term development strategy, aims to create a globally competitive and prosperous nation with a high quality of life by 2030 that aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Vision 2030 calls for the rehabilitation and upgrading of the road network, upgrading the railways, improving urban public transport and expanding access to electricity and clean and safe water. The Government is currently implementing the first phase of the plan, covering the period 2013-2017 through its Medium Term Plan (MTP).

## **B. Sectoral and Institutional Context**

3. More than 75% of the Kenyan population live in the rural areas, with agriculture as their main occupation. The main farming systems feature cash crops, food crops, fruits and vegetables, forages, livestock, and tree growing. Energy plays a significant role in the lives of the smallholder farmers. Improving infrastructure and the business environment, while being responsive to environmental pressures, is the backbone of long-term growth. The proposed project addresses this by improving competitiveness of tea factories via reduced energy costs and improving related infrastructure to improve access to reliable electricity, the benefits of which trickle down to individual tea framers. The proposed project will also use a planned IFC loan to leverage private resources (such as syndicated loans from FMO<sup>1</sup> and Proparco<sup>2</sup>) to support these aims, in-line with calls for the WBG to will ramp up its already considerable support to public-private partnerships, especially in the energy, water, and transport sectors.

4. Kenya's dynamic private sector faces serious infrastructure constraints. Electricity supply and transport need to be improved if Kenya is to realize its potential for private sector-led growth. Vision 2030 calls for: (i) addition of 5000 MW of new generation capacity between 2013 and 2017 (ii) universal access to electricity serving the average cost for electricity for industrial consumers to below US¢10/kWh from about US¢19 and US¢ 12/kWh for residential consumers from US22¢/kWh . Higher levels of electricity service reliability and quality are necessary for stronger economic growth and increased competitiveness. However, impressive achievements in electricity access have been made in the last three years. Access rate has increased sharply from 25% in 2012 to 50% in December 2015. In FY16 alone, the Kenya Power and Lighting Company Limited (KPLC) had already connected 1.2 million new consumers as at June 23, 2016, bringing the total connections to 4.8 million (about 60% access). Therefore, GoK's target of 70% is likely to be largely achieved in the coming year. The interconnected electricity system covers primarily the densely populated southern and central belt, including the Central Kenya highlands of the country and access. This is above the average of 32 percent in 2012 for Sub-Saharan Africa, but inconsistent with the socio-economic condition of the country. In the absence of electricity services, about 65 percent of the population depends on expensive and polluting energy alternatives to meet their household needs. Lack of access to electricity represents one dimension of poverty and poses a significant challenge for socioeconomic development to support the young and growing population. Blackouts have been a norm especially in the Kenya's central highlands due to inconsistent supply electricity and high demands. Due to this, solar power systems have been implemented, though in small scale basis, in areas where many rural communities may never get access to the national grid. This is because of the high costs involved, which necessitates significant amount of government subsidies. The decline of coffee and tea prices in the world market has affected the buying capacity of the small scale farmers in the central

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<sup>1</sup> Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden N.V. ("FMO") is the Dutch Development Finance Company focusing on the private-sector.

<sup>2</sup> Proparco is the private sector financing arm of AfD (Agence Française de Développement)

highlands. Accelerating the pace of electrification in line with the government's target of 70 percent electrification by 2018 can contribute to eliminating extreme poverty and achieving shared prosperity. In addition, KPLC has been making big investments annually in strengthening and expanding the distribution network in order to improve the reliability and quality of electricity supply (investments in 4 years total about US\$ 1.2 billion). This includes construction/refurbishment of about 90 substations and about 10,000 km new distribution lines.

5. Recognizing the essential role that the power sector plays in economic growth and poverty reduction, the successive governments in Kenya have undertaken key sector reforms since 1993 when the country's first Energy Sector Policy Framework was developed. This led to the procurement of the first four independent power producers (IPPs) in 1995 and 1996. Further, the generation function was unbundled from transmission and distribution functions. The generation assets owned by KPLC were transferred to the Kenya Electricity Generating Company Limited (KenGen), while the transmission assets owned by the Government and KenGen were transferred to KPLC, whose mandate was now limited to transmission, distribution, and retail functions.

6. Kenya's current installed generation capacity is 2,341MW, against a peak demand of 1,600MW and a reserve margin of about 32%. The access rate currently is about 60% and the government plans to increase connectivity to at least 65% by the year 2022. With the introduction of geothermal energy, the share of hydro power has gone down from about half of installed capacity to under 40%. Geothermal forms 27% of installed capacity and contributes to 48% of the energy mix. The rest comes from fossil fuel thermal power plants, bagasse and wind. The current per capita electricity energy consumption of about 121 kWh per year is expected to grow as the country gears up for accelerated growth.

7. The Ministry of Energy is keen on promoting development and utilization of small hydro power as SHPs in the total energy mix of the grid currently only represents 1% or some 15 MW consisting of two SHPs. The Government has already identified about 300 sites with a potential of about 600 MW. The studies are still on-going and site assessments have been done in the five drainage basins of Tana, Athi, Lake Victoria, Rift Valley and Ewaso Ngiro North.

8. In its effort to increase installed small hydro capacity, the Government has been assisting investors and developers, including Kenya Tea Development Agency Holdings (KTDA), with resource assessments and feasibility studies. In the 2009/2010 financial year, the Government undertook feasibility studies for development of small hydro power for KTDA in 12 sites. Furthermore, the Ministry has commenced another feasibility study for 14 additional sites with a view to invite investors to express interest in developing the power stations.

9. Development of such schemes by private investors has been facilitated by the establishment of the Feed in Tariff (FIT) policy, which was launched in April 2008. The FITs policy allows power producers to sell and obligates the distributors to buy on a priority basis all renewable energy sources generated electricity at a pre-determined fixed tariff for a given period of time.

### **C. Relationship to CPS/CPF**

10. According to the latest CPS for Kenya (FY 2014-2018), the first domain of engagement is competitiveness and sustainability, i.e. improving infrastructure and the business environment, while being responsive to environmental pressures, as the backbone of long-term growth. The proposed project addresses this by improving competitiveness of tea factories via reduced energy costs and improving

related infrastructure, the benefits of which trickle down to individual tea framers. As per the CPS, WBG policy advice will help the authorities create a well-functioning and properly regulated energy market and IFC and MIGA instruments will help leverage more private resources. Again, the CPS calls for the WBG to ramp up its already considerable support to public-private partnerships, especially in the energy, water, and transport sectors. The proposed project will use a planned IFC loan to leverage private resources (such as syndicated loans from FMO and Proparco) to support these aims. Another high priority is to target support for the poor including focus on agriculture -- a direct link with the project to helping farming families in rural areas. The poor must also be protected from the impact of disasters and climate-related changes to their environments, as climate variability and hydro-climatic shocks (droughts and floods) impact disproportionately on the poor.

## **II. Proposed Development Objective(s)**

*{Same as in Section II of the PCN: Proposed PDO and key results}*

Achieve GHG reductions from renewable energy produced by small hydropower benefiting smallholder tea farmers in rural Kenya.

The key PDO level indicators are listed below:

1. Cumulative GHG reductions achieved
2. Number of tea farmers benefiting from improved incomes
3. Share of beneficiaries (women)

## **III. Preliminary Description**

*{Same as in Section III A 1 of the PCN – description of project.}*

11. The proposed KTDA Small Hydro Programme of Activities (the “Project”) developed by KTDA Power Company Limited (KTDA Power) will generate Certified Emission Reductions (CERs) from 10 small scale run-of-river hydropower plants (“SHP” or “Sub-Project”) in Kenya to be procured by the World Bank as Trustee of the Carbon Initiative for Development (Ci-Dev) carbon fund. The Project is furthermore implemented under a Clean Development Mechanism (CDM) Program of Activities (PoA) titled “KTDA Small Hydro Programme of Activities”, which was registered with the United Nations Framework Convention on Climate Change (UNFCCC) secretariat in September, 2012.

12. The International Finance Corporation (IFC), in December 2015, considering carbon finance revenues, committed US\$ 25 million in debt to KTDA Power to finance the total cost of US\$85.6 million for the construction of seven SHPs of the 10 SHPs with total aggregate capacity of 16.2MW. IFC also syndicated US\$30 million in parallel loans from FMO and Proparco (US\$15 million from each). IFC will thus be co-financing seven of the planned 10 SHPs, with other investors providing funding for the three other SHPs. These 10 SHPs build the foundation for the proposed Project. The Bank will not invest in the SHPs themselves, but through an Emission Reductions Purchase Agreement (ERPA), provide results-based finance to KTDA tied to CER deliveries after the SHPs become operational and start generating renewable electricity.

13. The underlying project has two objectives. First, the underlying project aims to generate captive electricity to enhance access to reliable electricity much needed by KTDA’s tea factories, supplied by Regional Power Companies (RPCs) which are owned by the small-scale tea farmers’ co-operatives. The underlying project will ultimately increase the productivity, and hence, the bottom line of the underlying smallholder tea businesses allowing these savings to be passed on to the tea farmers themselves. Second,

surplus electricity will be sold to the state-owned utility company, Kenya Power and Lighting Company (KPLC), by supplying electricity to the national grid, which will contribute towards addressing electricity reliability issues in the country and responding to the efforts by the Ministry of Energy aiming to increase installed small hydro capacity. The underlying project will serve captive power to 39 tea factories, contributing to increase income for over 350,000 small-holder tea farmers, and will contribute to an increased share of energy from small SHPs in the total energy mix of the grid, which currently represents under one percent.

14. KTDA Power plans to develop a portfolio of SHPs with an aggregate generation capacity of 28.6 megawatts (MW) across 10 sites in and around the Central Highlands. These 10 SHPs will consist of 7-10 CDM Project Activities (CPAs) under the CDM-PoA framework. The main barrier for the expansion/replication of KTDA Power’s business model has been difficulty in obtaining external commercial debt financing. This is due to high project cost per MW derived from project site constraints<sup>3</sup> and KTDA Power’s policy to ensure high quality of electro mechanical equipment. In order to overcome this challenge, KTDA Power first developed a pilot project consisting of three SHPs with total capacity of 12.4 MW, obtaining concessional financing from Agence Française de Développement (AFD). Due to the “concessional” characteristics of the loan by AFD, the financing structure for this pilot project was with low leverage. Equity investment from tea factories represented 70% of the total project cost for the pilot project. All the three SHPs of the pilot project started construction, of which two SHPs (Chania and Gura) completed construction in August 2016 and October 2016. The third pilot, North Mathioya, is expected to become operational in September, 2017

15. Once the pilot project had demonstrated a certain level of track record, KTDA Power embarked upon commercial expansion/replication via development of an additional seven SHPs through partnership with IFC. KTDA Power aimed aims to obtain commercial debt financing for the expansion/replication of projects in order to demonstrate the commercial viability of its innovative business model. Of the seven SHPs to be financed by the IFC, five have started construction.

16. However, revenue from electricity alone does not generate sufficient cash flow for the debt servicing. That is why carbon finance is being considered as results-based financing via the World Bank as trustee of Carbon Initiative for Development (Ci-Dev), which would make the underlying project viable. The carbon finance will not pay for the construction of the SHPs, but will be made available after the SHPs are commissioned and start generating renewable electricity to help KTDA Power with the loan payments to IFC.

17. The list of the 10 SHPs is shown in Table 1 below. The KTDA factories are distributed both throughout the East and West of the Great Rift Valley. Seven SHPs have already started construction.

*Table 1: List of 10 SHPs*

Project	Capacity (MW)	River	County	Owner RPC	Construction Start	Expected Completion Date	Commercial Operation Start	Land acquisition
Gura	5.8	Gura	Nyeri	Gura RPC	09/2013	10/2016	12/2016	Complete

<sup>3</sup> Canals must avoid landslide prone slopes and geologically unstable zones. Otherwise, maintenance cost will be high and interruption in power production frequent. If possible, the right-of-way of the canal should not interfere with economic activities or other rights-of-way, such as roads, railways, pipelines, or transmission lines. Unfortunately, and especially at the West, this is unavoidable and KTDA will need to incur into negotiations with land owners to acquire right of way for canals. The softly undulated nature of the region, especially near Kisii, is a condition that forces the design of new hydropower projects to use large canals in order to achieve reliable heads. Larger canals are required since tea producers are calling for economical and reliable power. With the hydrologic characteristics of the area and the demand requested by the tea production activities, it will not be possible to provide such power without the application of larger heads and the construction of conveyance canals and/or pipelines.

Chania	1.0	Chania	Kiambu	Mataara RPC	06/2013	08/2016	12/2016	Complete
North Mathioya	5.6	N. Mathioya	Muranga	Metumi RPC	12/2014	06/2017	09/2017	In process
Lower Nyamindi	1.8	Nyamindi	Kirinyaga	Kirinyaga RPC	12/2014	06/2017	09/2017	In process
South Mara	2.0	S. Mara	Tharaka Nithi	Greater Menu RPC	12/2014	06/2017	09/2017	In process
Iraru	1.5	Iraru	Meru	Greater Menu RPC	12/2014	06/2017	09/2017	In process
Kipsonoi I	3.6	Kipsonoi	Bomet	Settet RPC	12/2016	06/2019	09/2019	Not yet due
Nyambunde	2.0	Gucha	Kisii	Nyakuwana RPC	01/2016	06/2018	09/2018	In process
Kiringa	1.1	Kiringa	Kirinyaga	Kirinyaga RPC	12/2017	06/2020	09/2020	Not yet due
Nyamasege	4.0	Gucha	Kisii	Nyakuwana RPC	12/2018	06/2021	09/2021	Not yet due

18. The underlying project would target a number of development challenges, including providing access to clean, renewable energy; providing climate change mitigation benefits and improving livelihoods for the tea growers. These are all supporting the World Bank Group's twin goals of eradicating extreme poverty and boosting shared prosperity.

#### IV. Performance Standards that might apply

*{Same as in last approved ISDS}*

Performance Standards <i>(please explain why)</i>	Yes	No	TBD
<b>PS 1: Assessment and Management of Environmental and Social Risks and Impacts</b>	<b>X</b>		
The Environmental and Social Impact Assessments (ESIAs) conducted for the IFC financed sites as well as externally financed sites identified potential direct and indirect environmental and social impacts from construction and operations of the subprojects as well as impacts of associated or ancillary facilities such as transmission lines and access roads. The ESIAs did not sufficiently address impacts related to PS6: impacts on aquatic ecology and determination of ecological flows. These ESIAs also did not cover IFC PSs, therefore the gaps were addressed in the project ESAP, and will be fulfilled during implementation. The ESIA for Nyamasege (IFC financed) will be conducted in accordance with the Bank and IFC PSs and Kenyan EA regulations. All ESIAs have undergone public consultations during preparation. Most of the SHPs (with the exception of Nyamasege SHP planned for the Gucha river where Nyambunde SHP is located) are all on separate rivers. Other SHPs in Kenya have been listed in the World Small Hydropower Development Report of 2013 (UNIDO, ICSHP) and none are on the same rivers as the proposed 10. Nyamasege SHP environmental and social assessment will take into account possible cumulative impacts.			
<b>PS 2: Labor and Working Conditions</b>	<b>X</b>		
IFC's review considered KTDA Power's operations with regards to fair, safe and healthy			

<b>Performance Standards</b> <i>(please explain why)</i>	<b>Yes</b>	<b>No</b>	<b>TBD</b>
working conditions and is based on an assessment of the practices in place, and a review of the documents, and information made available during due diligence process. When fully operational, each SHP will employ approximately 10 staff. During construction, the number of employees is expected to peak at 300 for each project. It is expected that a substantial number of employees will be recruited from the local community for each project. No workers' accommodation is planned for the projects in construction phase. For future projects, where applicable, the EPC contractors for the other projects shall develop workers' accommodation which meet internationally recognized standards such as those specified in the IFC/EBRD guidance document on workers' accommodation.			
<b>PS 3: Resource Efficiency and Pollution Prevention</b>	<b>X</b>		
This is a renewable energy project which is expected to have a net positive impact by replacing fossil fuel in power generation. These SHPs have been developed as part of KTDA's strategy to move away from fossil fuel consumption and also reduce consumption of biomass for generating electricity at the tea factories, thereby reducing carbon emissions and reducing production costs.			
<b>PS 4: Community Health, Safety, and Security</b>	<b>X</b>		
The projects sites are typically located within 100m of farm plots and/or households. The projects have been designed to meet recognized industry standards so as to minimize potential impacts on the community. The socio-economic assessment for the projects revealed no significant trend in diseases and the projects are not expected to lead to an increase in any disease; influx of migrant workers will be limited as most of the employees are expected to be recruited from the local communities and foreign workers will be limited to a handful per site. Medical facilities will be available on each construction site and HIV/AIDS awareness campaigns will be included in the training sessions for all employees. Drowning risk posed by headrace canals was a concern raised by community members during ESIA consultations, and all canals will be fenced as a mitigation measure.			
<b>PS 5: Land Acquisition and Involuntary Resettlement</b>		<b>X</b>	
This PS does not apply due to land transactions being conducted following a "willing buyer-willing seller" approach. The designs of the projects considered options to minimize the need for extensive land acquisition; where applicable, the project footprint has been altered to avoid land that was not available for acquisition, and, for the major part, resettlement agreements are based on easement with only limited purchase where this was necessary. Where applicable, compensation was paid to land owners that would be temporarily affected by the project. In addition, beyond the value of the land, compensation was also paid to permanently affected land owners for the crops on their plots of land. The land acquisition and compensation process involved extensive consultations with the land owners (mostly KTDA farmers), the local administrative authorities and requisite national agencies. Compensation and land rates have been agreed and paid for the parcels of land and crops, and resettlement agreements have been reached for the cases where cash payments were not appropriate and the parcel owners preferred land-for-land settlements instead. There are a few parcels of land which have not been acquired and are pending the resolution of land titles issues within the affected families. These include one parcel in Lower Nyamindi sub-project, 11 parcels in South Mara sub-project and one parcel in Iraru sub-project. As indicated in the ESAP for this project, KTDA Power shall provide a final land acquisition and compensation report summarizing the details of the land parcels and compensation paid to all land owners for all project sites. In addition, the final land report will demonstrate that the "willing-buyer-willing-seller principle has been adhered to as required by			

<b>Performance Standards</b> <i>(please explain why)</i>	<b>Yes</b>	<b>No</b>	<b>TBD</b>
PS5 and GN5. This report is currently still a living document for those sites with construction ongoing in final draft stage. A total of 38 hectares has been acquired for the first six sites for the intake, canal, penstock and powerhouse as well as for the transmission lines. The project footprint has been altered where possible to avoid acquisition and compensation paid to permanently affected land owners.			
<b>PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</b>	<b>X</b>		
<p>Biodiversity issues relate to impacts of the SHPs on existing flora and fauna in the different locations. Hydropower projects can have significant impacts on the river flow, thereby leading to reduced biodiversity; hydro projects can also impact aquatic system connectivity and migration of species. The EIAs for the 9 projects considered the potential impacts on terrestrial flora and fauna; a diverse amount of plant and animal species were identified in the project areas with the dominant plant being tea as the projects are located in the tea-producing areas. In general, the project sites are considered modified habitats which have been modified through agricultural use and other human activities. There were no endangered terrestrial species identified during the EIA and no area was identified as a critical habitat.</p> <p>The EIAs did not include biodiversity assessments for the rivers and ecological flow assessments. As indicated in the ESAP for this project, biodiversity monitoring will be required for the first six projects during the construction phase as well as during operations. The same requirements will be for the three non-IFC funded sites. For the Nyamasge project, the EIA shall include a detailed biodiversity assessment for the river as well as ecological flow assessment. The EIA shall also cover the potential cumulative impacts of the Nyabunde and Nyamasege SHPs on the River Gucha.</p> <p>An ecologist is being hired by KTDA to carry out a biodiversity baseline and monitoring plan.</p>			
<b>PS 7: Indigenous Peoples</b>		<b>X</b>	
The SHP sites are not known to be in sites with indigenous peoples. The sites are in agricultural tea/coffee growing areas.			
<b>PS 8: Cultural Heritage</b>		<b>X</b>	
The project sites are situated in agricultural landscapes (mainly tea farmers, but coffee farmers also), thus cultural heritage sites are not anticipated to be encountered.			

## V. Tentative financing

Source: Carbon Finance		(\$m.)
Borrower/Recipient		
IBRD		
IDA		
Others (Carbon Initiative for Development)		8.00
	Total	8.00

## VI. Contact point

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