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Environmental and Social Review Summary

Country: Kenya
Project Name: KTDA Small Hydro Programme of Activities
Project Number: P160157
Environmental Category: B

Project Description

1. The proposed project 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 with registration number "PoA 6606".

2. The International Finance Corporation (IFC), in December 2015, considering possible 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 though an Emission Reductions Purchase Agreement (ERPA) provide results-based carbon finance to KTDA tied to CER deliveries after the SHPs become operational and start generating renewable electricity.

3. 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. Regional Power Companies (RPCs) are being set up for this purpose and are owned by the small-scale tea farmers' co-operatives, themselves members of KTDA. The underlying project will ultimately increase the productivity, and hence, the bottom line of the 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 (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.

4. With IFC financing the seven SHPs, a separate ESRS is available via IFC's website (https://disclosures.ifc.org/#/projectDetail/ESRS/36402) covering Lower Nyamindi, South Mara, Iraru. Kipsonoi, Nyambunde, Kiringa and Nyamasege. This ESRS covers the three SHPs not covered by IFC financing, namely Gura, Chania and North Mathioya SHPs with total installed capacity of 12.4 MW.

Key Issues

5. Each of the project sites has an Environmental and Social Impact Assessment prepared. The projects are run-of-river types and consist of an intake, headrace water channel, forebay, penstock and surface power house connected to the tea factory and the national grid. The length of the headrace channel varies, but can be up to several kilometers in length. The infrastructure is located in private lands, which have either been bought or leased (willing buyer – willing seller) from local farmers –mostly tea farmers. Transmission lines were not explicitly considered in the majority of the ESIA; the actions necessary to fill this gap are discussed under PS 1 below.

6. The Performance Standards that apply (the same as by the IFC) are PS1 (Assessment and Management of Environmental and Social Risks and Impacts); PS2 (Labor and Working Conditions); PS3 (Resource Efficiency and Pollution Prevention); PS4 (Community Health, Safety and Security); and PS6 (Biodiversity Conservation and the Management of Living Natural Resources). PS 5 does not apply, since the land acquisition (whether by easements or purchase) is conducted on a "willing buyer – willing seller" model according to KTDA's land acquisition policy, which is expected to conform to the PS5 and GN5. The Land Acquisition and Resettlement Framework required in the ESAP was intended to provide guidance to KTDA.

7. As per the Environmental and Social Review Summary (ESRS) prepared for the seven IFC-financed SHPs, and the related Environmental and Social Action Plan (ESAP), KTDA Power has on a corporate level designed and implemented an Environmental and Social Management System; developed TORs for future Environmental and Social Impact Assessments (ESIA); developed Environmental Health and Safety Standards, prepared a Land Acquisition and Resettlement Framework and developed TORs for an aquatic biodiversity baseline and monitoring programs at the sites. These similarly apply to the three separately financed SHPs. A land acquisition and compensation report summarizing the details of the land parcels and compensation paid to all land owners for all project sites is required and is currently still a living document for North Mathioya. The final land reports will be expected to demonstrate that the willing-buyer-willing-seller model that has been applied to the project conforms with the Bank's PS5 and GN5. A total of 25.2 hectares has been acquired for the intake, canal, penstock and powerhouse as well as for the transmission lines for the three projects. The project footprint has been altered where possible to avoid acquisition and compensation paid to permanently affected land owners.

8. Broad community support exists for the project, which is seen as beneficial in improving the incomes of local tea farmers (who, by being members of KTDA, also have a direct stake in the project). Stakeholder consultations have been carried out as part of the EIA process. The scenario for community engagement is unique as a significant majority of the affected community members are KTDA farmers. PS 7 on Indigenous Peoples and PS8 on Cultural Heritage will not apply, as no Vulnerable and Marginalized Groups were identified in the project area (which are agricultural tea landscapes) and the project sites are situated in agricultural landscapes (mainly tea farmers), thus cultural heritage sites are not anticipated to be encountered.

9. In reviewing for possible cumulative impacts, it was noted that none of the three SHPs have cumulative impact. They are on separate rivers, and there are no other SHPs from outside this proposed project on those rivers according to the World Small Hydropower Development Report of 2013 (UNIDO, ICSHP). An environmental and social audit will be carried out for all three SHPs.

10. The proposed project's overall risk rating is substantial and the project's EA category is B. Vegetation clearing, modification of the natural flow of the rivers, and the presence of the weirs are identified as the main activities that could cause adverse environmental impacts, including impeding fish migration, soil erosion and air pollution from vegetation burning, changes in stream ecology, and impairment of downstream uses. Impacts on surface water quality, air quality, noise, and solid waste management will be local and of short duration, and the ESIAs for each subproject require adherence to good construction practices and include measures to minimize clearing and prompting re-vegetation of disturbed sites, equipment and materials storage areas and borrow pits, upon completion of activities.

11. Downstream uses were taken into account and downstream users were consulted in preparation of the ESIAs. However, the ESIAs do not include inventories of downstream uses. The aquatic biodiversity baseline studies and monitoring programs required in the ESAP will result in measures to better address the in-stream impacts, but the ESAP requirement for the aquatic ecology studies does not explicitly require water quality baselines, fish migration studies, improved calculation of environmental flows, and determination of whether fish passes are needed at SHPs in which they are not already part of sub-project design. These items will be addressed as part of the ecological survey, and their satisfactory completion will be incorporated as conditions precedent in the Emission Reductions Purchase Agreement (ERPA) with KTDA Power or in the sub-ERPAs between KTDA Power and the Regional Power Companies. Cumulative impacts are not an issue in any of the three non-IFC-financed SHPs, but there is the potential for such impacts on the Gucha River, where two SHPs will be located. The ESIA for one of the two plants, Nyamasege, has not yet been undertaken, and inclusion of cumulative impacts in that study will be an ERPA condition.

12. KTDA with IFC support has engaged competent contractors, project engineers, and consultants with track record of impact management that can be evaluated from ongoing and nearly finished projects and has been satisfactory overall and KTDA has been enthusiastic and dedicated in its uptake of performance standards requirements. Also, KTDA Group is an existing IFC client and the IFC conducted Integrity Due Diligence on KTDA Group and KTDA Power and found no major issues. KTDA Power is led by an experienced management team and has hired appropriate in-house technical experts. It has been confirmed that there are no technical constraints in connecting SHPs to the grid. The Project has also obtained all the necessary regulatory approvals.

Chania

13. The SHP has an installed capacity of 1.0 MW and is situated in Thika District, Gatanga Constituency, Kariara Division along River Chania. The SHP generates power for the benefit of Mataara tea factory, and Ngere Tea factory, some 0.5 km and 2.5 km away respectively. The surplus electricity is supplied to the national grid. The powerhouse is at the bottom of a steep

gorge, with a 700 meter canal leading to the penstock, which is at a steep 45 degree angle. The area if impact of the project is about 3.2 hectares.

Gura

14. The SHP with 5.8 MW installed capacity is located at the boundary of the Aberdares National Park high in the Gura valley, in Othaya division, Nyeri District, Central Province about 220 km from Nairobi. The SHP covers an area of about 12 ha and has a water canal about 7 km long, of which 2 km is through gazetted forest and the rest through tea farms. The power house is located close to Munyange village.

North Mathioya

15. The project site is located in Gacharageini Sub location, Njumbi Location, of Mathioya Division in Muranga North District. This site is located on the south-eastern slopes of the Aberdare range, north-west of Muranga town. The site is located between two ridges, running west to east. Two natural permanent rivers, the Gachugi/Hembe and Mathioya Rivers, converge just east of the Fly Fishers Camp to form the North Mathioya River downstream of the bridge crossing. The SHP will directly influence the section of river between its intake and the powerhouse, a section of about 5km in length downstream of the intake, as well as the area between the existing road (which runs along the southern slopes of the river valley) and the river itself which forms the corridor for the canal route. In addition, the area straddling the new transmission line from the powerhouse to its terminus at Kiru Tea Factory and the areas underlying the distribution lines from again Powerhouse to Gatunguru tea factory to the other two tea factories at Kanyenyaini and Githambo should also be considered as influenced areas.

16. The North Mathioya scheme will have an installed capacity of 5.6 MW. The scheme comprises a reinforced concrete diversion weir, some 26m in length and 2.6m in height, which will divert water into a 5.0 km long headrace canal contouring along the southern slopes of the river valley. Water from the canal will enter a forebay immediately north of Gacharageini school, from where it will be discharged via steel penstock pipes to the power station located on the North Mathioya River bank 650m to the north-east. The water will be returned to the North Mathioya River via a tailrace channel 15m in length, discharging at a river bed level of 1833m.

Key Information Sources

7. The EIAs for the three non-IFC financed projects (Gura, Chania and North Mathioya) have been prepared between 2008 to 2011.

8. The key documents reviewed by the task team included:

- "Environment and Social Impact Assessment for Gura Small Hydropower Project" dated March 2008.
- "Feasibility Study (including EIA) For Development Of A Small Hydropower Station On The North Mathioya River, Kangema, Kenya" dated August 2009.
- "Environmental Impact Assessment for Chania Mataara Small-Hydropower Station" dated February 2011.

17. The environmental and social risks have been identified and will be proposed to be managed using Bank Performance Standards per OP/BP 4.03. This is made possible by the client being a private sector entity and facilitated by the fact that the IFC has already conducted their environmental and social due diligence as per IFC Performance Standards for the seven SHPs in their investment pipeline. As the proposed project for the Bank is actually 10 SHPs, the Bank and IFC will apply the same level of environmental and social due diligence to the three non-IFC financed SHPs.

18. KTDA Power, having prepared an environmental and social management system acceptable to IFC, will roll out the same to the individual sites, including for the three SHPs covered here. The Bank Task Team will work together with IFC E&S specialists to ensure that project also meets Bank Performance Standards requirements, and document the working arrangements in a memorandum.

19. A joint IFC-Bank mission focusing on environmental and social risks and mitigation measures took place in August-September 2016 and a follow-up mission occurred in April 2017. The Bank will supervise the three non-IFC funded SHPs.

PS1: Assessment and Management of Environmental and Social Risks and Impacts

20. The Environmental and Social Impact Assessments (ESIAs) 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 access roads. However, in the majority of the ESIAs, impacts of transmission lines were not explicitly addressed. For this reason, an ERPA condition will require KTDA Power to have a qualified ecologist or botanist survey the line, either at the same time as the land surveyors are laying out the alignment, or before. The objective would be to identify and sensitive features, rare/endangered plant species, and important habitat, and to decide on adjustments to the alignment to avoid adverse impacts or on measures to mitigate those that are unavoidable. Any physical cultural heritage present will be identified at the same time. The ESIAs also did not sufficiently address impacts related to PS6: impacts on aquatic ecology and determination of ecological flows. These ESIAs also did not cover PSs, therefore the gaps are being addressed in the project ESAP and in actions that will be specified as conditions precedent in the ERPA, to l be fulfilled during implementation. Details are provided under PS6 below. The ESIAs will be updated based on the results of the above-mentioned additional studies. All ESIAs have undergone public consultations during preparation. None of the three non-IFC SHPs has cumulative impacts, as they are all on separate rivers. Two IFC SHPs, Nyamunde and Nyamasege, are both on the Gucha River and could have cumulative impacts. The terms of reference for the Nyamsege ESIA that has not been started will include cumulative impact assessment, to be completed prior to ERPA signing for either of those SHPs.

21. Ecosystem Services: The rivers where the SHPs are located provide domestic water and irrigation water for local communities; the projects are not expected to have any impacts on any provisioning or regulating services provided by the rivers. The other users were taken into consideration in the design of the projects as well as in the permitting process conducted by WMRA. An inventory of downstream uses will be conducted in conjunction with the ecological

survey required in the ESAP and ERPA to confirm that there will be no disruption of downstream uses. The designs of the projects were based on low water demand and adequate ecological flows shall be allowed in order not to significantly alter the natural flows of the river to minimize impacts on downstream users.

PS2: Labor and Working Conditions

22. IFC's review considered KTDA Power's operations with regards to fair, safe and healthy 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.

PS3: Resource Efficiency and Pollution Prevention

23. All three SHPs are renewable energy projects which are 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.

PS4: Community Health, Safety, and Security

24. 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.

PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

25. 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 three 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.

26. The EIAs did not include biodiversity assessments for the rivers and ecological flow assessments. As indicated in the ESAP for the IFC financed SHPS, biodiversity monitoring will be required during the construction phase as well as during operations. The same requirements will be for the three non-IFC funded sites. An ecologist is being hired by KTDA Power to carry out a biodiversity baseline and monitoring plan as well as review the ecological flow. To ensure that all biodiversity issues are properly addressed in the ecological survey, completion of the below-listed studies to the Bank's satisfaction will be a condition precedent in the ERPA that will have to be fulfilled for each SHP before KTDA Power will be authorized to enter into a sub-ERPA thereby allowing the SHP to join the program. ESIAs will be updated based on the results of the studies.

- Conduct of aquatic biodiversity baseline studies, including migratory fish species;
- Conduct of baseline water quality studies;
- Calculation/determination of minimum environmental flow;
- Depending on the results of fish migration study, inclusion of fish passes in the project design and implementation

Access to Client Documentation

27. The Environmental and Social Action Plan has been disclosed via the IFC website (https://disclosures.ifc.org/#/projectDetail/ESRS/36402). The ESIAs for the IFC financed projects have also been disclosed via the IFC website. The ESIAs for the three non-IFC financed projects (Gura, Chania and North Mathioya) will also be available from the KTDA website (www.ktdateas.com) as well as via the World Bank Infoshop (www.worldbank.org).