

CLIMATE INVESTMENT FUNDS

June 7, 2017

**[APPROVAL BY MAIL]: LIBERIA: RENEWABLE ENERGY PROJECT (AfDB)(SREP)-
XSREL032A**

AFRICAN DEVELOPMENT BANK RESPONSE TO COMMENTS FROM SWITZERLAND

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1 The hydro power plant shall be connected to the cross-border transmission line between Liberia and Côte d'Ivoire. To what extent will the project thereby satisfy demand in Nimba County vs export electricity?

[AfDB]: The project will satisfy electricity needs in Liberia only and power will shall not be exported for neighboring countries. Being this an on-grid project, the power generated by the project will be transmitted through the cross-border transmission line but in Liberian territory.

2 Is the project also expected to provide electricity to Guinea?

[AfDB]: No.

3 Who will finance the implementation of the distribution grid which shall connect the rural population located along the existing cross-border line in Nimba County (the design of which is being financed by the SREP PPG) and the mini-grids that should “provide reliable and affordable electricity to the main towns of Nimba County” (p.16 PAD)? This distribution grid and these mini-grids do not seem part of the project.

[AfDB]: These villages are not yet connected to the grid and the distribution network to power them is outside the scope of the project. Nevertheless, and because the costs are relatively small, this study has been included as part of the project and shall aim at identifying options to connect these communities in the future.

4 There is some confusion about the number of beneficiaries from improved access to electricity:

- i. Cover Page states: 282'500 men + 282'500 women
- ii. SREP Results Framework (table 6, p.18 of PAD) states 64'644 men + 65'356 women
- iii. Outline of SREP investment criteria (5.1, 2nd paragraph on p.16 PAD) states “the project could meet 13% of the current total electricity demand in the country and supply electricity to around 110'784 households and benefit to a total of 564'998 people of which around 50% would be women and children”. [Note: probably more women and children than 50%]
- iv. Under “Brief Description of Expected Outcomes” (para. 2.15, p.8 PAD) states “It is expected that over 7'000 new customers ... will connect to the grid by 2021 and an additional 11'000 more by 2041” [Note: the latter figure seems very low]. Please explain the differences between these statements and clarify which one is the relevant expected outcome of the project with regards to the SREP contribution.

[AfDB]: The figure that was provided in the Cover Page is the correct one. In order to reflect those figures across the documents, the following changes were made in the PAD:

- i. The SREP Results Framework was updated to reflect the numbers already provided in the Cover Page.
- ii. The text “of which around 50% would be women and children” was deleted. Currently, the PAD refers simply to men and women.
- iii. Paragraph 2.15 in Page 8 was also redrafted.

5 The overall co-financing is stated as \$5.98 million in the Cover Page, \$6.0 million in Table 2 (p.9 PAD) Source of financing and \$4.59 million in Table 6 (p.18 PAD) of the SREP Results Framework. Please clarify which is the relevant figure.

[AfDB]: The USD 6 million provided on page 9 of the PAD is the correct amount. The figures in the Cover Page and in the SREP Results Framework in the PAD were updated accordingly.

6 The leverage factor of SREP financing of 1:0.26 (corresponding to an overall co-financing of \$6 million) is ten times lower than anticipated in the endorsed SREP IP for Liberia (1:2.6). It is appreciated that this fact is outlined and explained by the AfDB and that the Government of Liberia is adding a contribution (\$1.18 million) which was not anticipated in the IP

[AfDB]: Noted. Indeed, the leverage factor is well below the target established by the SREP. In our engagements with the Government of Liberia and Development Partners it became clear that it would be virtually impossible to meet the leverage target for all reasons outlined in the PAD.

7 How many jobs are expected to be created by the project?

[AfDB]: The project is expected to generate up to 150 jobs during construction the construction phase and 30 during operations.

8 Does the anticipated cost of USD 0.053/kWh (para. 1.10 p.3 PAD) reflect the full investment and O&M costs of the project?

[AfDB]: Yes, O&M costs are included the project's total cost.

9 It is noted that the economic viability parameters of the project are impressive (ENPV \$67-124 million; EIRR 22.9%-32.4%; EBCR 2.8-4.4) but these figures apparently include shadow prices for CO₂ emissions (Annex 2, Table 1, p.22 PAD). What is the level of these shadow prices (in \$/tCO₂eq)? What would be the economic viability parameters if these shadow prices were disregarded (or set to 0)? What would be the financial viability parameters (FNPV, FIRR and pay-back period) of the investment on the basis of expected electricity sales and O&M costs?

[AfDB]: The unit costs of CO₂ emissions are a function of the "carbon price" which we have assumed to be equal to USD 30 per ton as well as the carbon intensity of the generation source. For Heavy Fuel Oil generation, the unit cost of CO₂ emissions is assumed to be USD 0.01.7 per kWh. This figure compares to a unit cost of generation USD 0.2221 per kWh and represents at least 7.7% of the total generation cost. In this regard, with this low CO₂ emission cost, the FNPV, FIRR and pay-back period are expected to be within the project's economic viability parameters of: (i) an ENPV of USD 67-124 million, (ii) an EIRR of 22.9% - 32.4%, and (iii) an EBCR of 2.8 - 4.4.

10 Under Environmental & Social (para.4.16 p.13 PAD) some negative impacts including income loss (resulting from losses in subsistence agriculture and fisheries) are mentioned. It is also stated that a grievance redress mechanism shall be set up to address such losses. Have these potential losses been evaluated/quantified and what is their economic value?

[AfDB]: The potential losses will be fully determined during the appraisal phase of the project. The coverage of these expenses will be the responsibility of the Government of Liberia after the final number of Project Affected Persons is determined. A preliminary assessment

made on and around the site suggest that these losses are residual when compared to the total cost of the project.

11 Who will finance the redress measures (compensations)?

[AfDB]: Any compensations resulting from loss in income or physical displacement will be financed by the Government of Liberia as AfDB's rules do not allow the Bank to fund such compensations.

12 With regards to the transboundary nature of the project (para. 4.17 p.13 PAD). Will the existing regional agreements cover the project or is it necessary to negotiate a new agreement? How much time will this take? Is it likely to delay the project implementation?

[AfDB]: The existing regional agreements do not cover the project and there is no need to renegotiate them under the present project. The agreements simply guarantee the availability of 8MW at an agreed tariff from Côte d'Ivoire to Liberia without minimum quotas.

13 It is noted that the project is "likely to cause significant environmental and social impact" and that it may be vulnerable to climate change risks. Does the budget foresee DRR measures to protect the infrastructure and mitigate the environmental and social impact risks? Who will finance such measures?

[AfDB]: The project budget includes costs associated with the Environmental Social Management Plan which will be covered by the Government of Liberia. This is part of the estimated contribution from the Government of Liberia of USD 1.18 million.

The implementation of the Environment and Social Management Plan in accordance with AfDB's Environmental and Social Rules and Procedures is a condition precedent for disbursement.

14 Does the weir included in the project constitute an adaptation measure to climate change? What is its main function?

[AfDB]: The weir simply creates a small water storage that allows flow diversion into the forebay and the power plant intakes in order to provide sufficient head over the penstocks to generate power. It does not constitute an adaptation measure to climate change.

15 What would be the impact of the Macroeconomic Stability Risk rated "substantial" on the project implementation and O&M?

[AfDB]: The impact is expected to be low considering 90% of the project funding shall be deployed by the SREP and AfDB in the form of Grants. This is in line with the recommendations made by the International Monetary Fund under the extended credit facility arrangement, in which it calls on the Government of Liberia and its Development Partners that grants should be sought for the construction of infrastructure projects in the country.

16 It is noted that the Sector Strategies and Policies Risk also rated "substantial" is (partially) mitigated by the SREP funded WB Liberia Renewable Energy Access Project. What is the progress of this project in terms of developing regulations for decentralized electrification?

[AfDB]: The implementation status and results reports of the WB's referred project are fully disclosed on the WB's webpage and can be found here and here.

17 It is understood that the Rural Renewable Energy Agency (RREA) is implementing the project, but who will be responsible for O&M?

[AfDB]: At this state, it is expected that RREA will hand over the operations and maintenance of the project to a private operator.

18 What capacity building measures are planned regarding O&M?

[AfDB]: At a national level, the Millennium Challenge Corporation and other Development Partners are supporting capacity building and technical assistance by implementing a training center in Monrovia that aims at developing local skills associated with operations and maintenance of power generation assets as well as other power operators. RREA will directly benefit from center.

19 What are the anticipated annual O&M costs?

[AfDB]: The estimated operations and maintenance cost per year include:

- 0.5% of capital costs for civil engineering works (fixed for the design life) = USD 38.000 per year
- 2% of capital costs for equipment (fixed for the design life) = USD 273.000 per year

20 It is likely that a revision of the hydro-mechanical and electrical equipment will be necessary within the 30 years lifetime of the project. Have such costs been considered in the economic analysis? Who will finance them?

[AfDB]: The revision of the hydro-mechanical and electrical equipment is included in the operations and maintenance costs.

21 The plant will have a significantly different output during the dry and wet seasons with expected generation being respectively 14.7 GWh and 41.8 GWh (para. 2.10 p.6 PAD). How much is the demand that needs to be satisfied? How will the shortfall (if any) of the supply be complemented during the dry season? What will happen with the excess electricity generated during the wet season?

[AfDB]: During dry season, the shortfall of supply will be complemented by power being channeled through the cross-border grid from Côte d'Ivoire. During the wet season, the intention of the Government of Liberia to deal with the excess of supply is to consider the development and construction of distribution lines to connect to Ganta and Gbarnga, connecting these isolated populations as well as a number of energy-intensive businesses. This is an objective that falls outside the scope of the project and for which the Government of Liberia will have to mobilize resources from other sources. The technical feasibility studies of the project suggest that the daily peak demand is expected to exceed the capacity of the hydro power plant by 2021 even during the wet season.

22 It is noted that the Gbedin Falls hydro power plant presents the least cost option for electricity generation in the country (Affordability and competitiveness of renewable sources, p.16 PAD). It would therefore be a good case for private sector involvement or loan financing (vs less attractive projects having a stronger need for grants). Have such options been considered? Why not? Is the GoL considering to involve private companies in the electricity

generation sector in the foreseeable future? Could this project then be the object of a PPP involving a private company (for O&M and/or investment)?

[AfDB]: As stated in paragraph 4.6 of the PAD, “RREA is currently concluding the development of a Business Plan that will incorporate a methodology aimed at guiding engagements with private sector companies to operate power plants in the country.” This project could be the object of a Public-Private Partnership with a private operator being brought on board to operate and maintain the power plant during its life. Given the envisaged installed capacity of the power plant (<10MW) that is insufficient to provide gains in terms of economies of scale and the high transaction costs to structure this project as an IPP, the Government of Liberia objective is to minimize development risk and implement the project under a public scheme and engage a private company to operate and manage the asset.