

# CLIMATE INVESTMENT FUNDS

December 13, 2017

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Meeting of the SREP Sub-Committee  
Washington D.C.  
Thursday, December 14, 2017

**RESPONSES TO COMMENTS FROM SWITZERLAND ON SREP INVESTMENT PLAN FOR LESOTHO**

# SREP Investment Plan for LESOTHO

## Response Matrix

Questions and Comments from representative of the Swiss Confederation

December 08, 2017

#	Question / Comment	Response / Clarification
1a	<p>Wind seems to have by far the largest potential of any RE resource that could be connected to the main grid (2077 MW vs 118 MW for solar PV), yet it was not selected as a priority for SREP. Why? Do you expect to find other financing to support a wind power demonstration project?</p>	<p>This is a valid point, and was discussed during the joint missions.</p> <p>The justification for this choice is based on a mix of considerations. First, and as discussed below in #3a, the SREP program was put together with the understanding that SREP funds has limited resources to provide investment financing at this time. Therefore, the Government of Lesotho (GoL) and MDBs decided to keep the scope of the projects to a size where they would still be able to pursue them even if SREP funds would not be available. For this reason, the sponsor of the On-Grid component (AfDB) decided to limit the scope of their project to just one technology; solar was preferred to wind because of its scalable and demonstration effect from small on-grid pilots (wind pilot project of similar size/cost would have had less impact).</p> <p>Second, in a country with a peak load around 150MW, there was some thinking that the total resource potential was less important a factor than selecting the technology with the best project sites that could be put in place the fastest. The terrain and existing lack of road infrastructure in the locations with the best potential for wind make these projects more challenging. While wind will hopefully play a big part in the second stage of market development, it was determined that solar PV represented the best technology to focus on to establish the market.</p> <p>Other donors have showed some interest in the past in wind and SHPP projects in Lesotho, and some private sponsors are currently conducting wind assessment in most promising sites. But the challenge of having to be the first to go through an unestablished transaction process has possibly dissuaded them from pursuing these ideas further. The intention is that the presence of a FiT and example of complete transaction could pique their interest again to support wind or SHPPs.</p>

1b	<p>Rooftop solar PV seems to have been neglected as a potential source for grid connected RE electricity generation. Why?</p>	<p>The portfolio of technologies included in the resource assessment was put together based on directions from the Department of Energy (DoE). One factor that made this technology to be less attractive to the view of DoE was the availability of rooftop space for a large-scale deployment, compared to public land available for on-grid solar projects. Another factor that led the DoE to exclude the technology from the IP were perceived technical and regulatory challenges. Due to the technical challenge of adding rooftop solar generation into the grid, it was not yet possible to know the capacity that could be injected. The technical and financial regulations needed to support rooftop solar were also not as advanced as the other technologies included in the IP.</p> <p>However, it is expected that scale-up of a critical size of solar capacity in the country would naturally drive rooftop solar potential, first on commercial buildings then on residential households. SREP funds would contribute to this critical mass of solar market and to the enabling environment (technical and regulatory) for commercially viable rooftop solar to emerge.</p> <p>This decision is not meant to suggest that there is no potential for rooftop solar in Lesotho. In fact, the GoL has plans to install rooftop solar PV on public buildings.</p>
1c	<p>With regards to the prioritization of RE technologies (Chapter 6) we understand that one of the criteria that resulted in a low ranking of wind power (despite its large availability) was its higher LCOE (levelized cost of energy) than e.g. solar PV, i.e. its larger viability gap.</p> <p>i. It is unexpected that wind power should have a larger viability gap (i.e. higher LCOE) than solar PV. What peculiarities to the situation in Lesotho could explain this unexpected result?</p> <p>ii. (Q) Taking into account that solar parks are “economically and financially viable now” (table 6.3 p.68) and wind parks financially viable only with subsidies, why do you propose to use the SREP subsidies (grants and concessional financing) for solar PV instead of wind parks?</p> <p>iii. (Q) To what extent is wind power less reliable than solar PV? How would solar power be stored for use during the night? Have the storage costs been considered in the economic and financial viability appraisals?</p>	<p>As we reviewed the results our assumption is that this result is due to the resources in Lesotho. The solar PV resources are excellent. The combination of high irradiation and minimal tree cover result in capacity factors that are only eclipsed by the very best wind resources.</p> <p>i. The combination of lower capital cost and high capacity factor accounts for the difference. In other countries, the gap between the capacity factors of wind and solar is often much larger so that the additional capital costs for wind are spread out over more kWh. Here though, the difference between the resources is less. Keeping all other costs/assumptions the same, if we are to reduce the capacity factor of the solar parks by 25% (from ~34-35% to 25-26%) you see an increase in the LCOE from 10-11 cUS\$/kWh to 13-14 cUS\$/kWh.</p> <p>ii. As we mentioned in #1a the goal of the On-Grid component is to support the establishment of a market that does not yet exist. While solar PV may be both technically and financially viable, that has not yet resulted in the development of a solar park and market. There are external costs/risks not captured by a simplified measure like LCOE that could be limiting investment. The use of the subsidy is intended to ignite the market by helping the first developer overcome these hurdles.</p>

		<p>iii. Utility-scale storage was not included in the analysis of wind or solar PV. Only solar microgrids included a storage component.</p> <p>The statement on page 68, (“Resource may be available at peak, but not reliable enough for firm power”) is meant to convey that wind is not as a reliable resource for meeting demand of Commercial &amp; Industrial activity during the day than solar. Without actual hourly resource data, this assessment is based purely on the assumption that the typical pattern for wind is that resources are highest in the evening.</p> <p>We acknowledge that the way it is phrased probably overstates the conclusion. The IP study did not go into the analytical level needed to assess definitively which resource will be more reliable or what mix of wind and solar will provide the optimum reliability. Such an analysis would have required site specific information on resources that was available. The ongoing mapping study will potentially provide this level of data and these results could be incorporated into the proposed integration study.</p>
1d	<p>The (economic and financial) viability studies (figures 5.2 p.59, 5.3 p.60 and 5.5 p.62) indicate that solar (PV) parks are economically viable and financially nearly viable. Therefore a 100% concessional financing as used in these analyses (table 5.3 p.59) seems not appropriate but rather any concessional loans should be blended with (private) equity and commercial loans. If the concessional of the proposed package is too generous for the first project, there is the risk of a crowding out of private funds, rather than the targeted catalyzing effect. We note that blending is proposed in the financial plan.</p>	<p>Agreed, it is indeed the intention to use the minimal of amount of subsidies/concessional funds to get the solar PV project to financial closure without distorting the market.</p>
2a	<p>What is the typical size (installed capacity and number of connections) of what you qualify as micro-grids? Why not consider mini-grids?</p>	<p>As mentioned p.37 (footnote 64), micro-grids are qualified – in this IP - as an isolated grid of 10 kW or below. Given the disparate groupings of homes in rural areas, these smaller “micro” configurations will be most prevalent. The analysis is not meant to suggest that other larger configurations will not be viable in some areas.</p> <p>The Lesotho Electrification Masterplan that is currently underway will provide a more precise quantitative assessment, and will allow to identify viable areas for isolated grids (masterplan is scheduled to be delivered during SREP Off-Grid project</p>

		preparation, hence will be very useful to define size of grids to be considered).
2b	With regards to the evaluation of RE technologies (table 6.3 p.67ff) it should be noted that “microgrids” based on intermittent RE (e.g. solar PV or wind) will only provide “reliable firm power” for productive uses if associated with some sort of storage, most likely batteries.	Agreed. The microgrid configurations in the IP do indeed include batteries. Given the fall in battery prices in recent years, this was found to be the most cost-effective solution compared to solar-diesel hybrid configurations.
3a	The total amount of SREP contribution of USD 18.5 million is well below the indicative allocation of USD 30 million. Why?	There were a couple factors that went into this decision. First, it was the understanding of the MDB partners that it would be preferable to have a less ambitious but more coordinated and implementable IP, to increase leverage of proposal and compose with potential lack of funds available from SREP. With that in mind, the scope of the two IP components were kept at levels that WB and AfDB will be comfortable pursuing independently from the SREP allocation amount. Second, given the relative nascent stage of the RE market in Lesotho there was also discussion that it may be better to phase the amount of concessional funds/grants into the market, while developing the enabling market conditions.
3b	Are the technical assistance components “RE Integration Study” (USD 0.6 million) and “Small Hydropower plants pre-feasibility studies” (USD 0.9 million) equivalent to the preparation grants requested in the decision or are the latter coming on top to finance feasibility studies for the projects?	These two studies are what the preparation grants are being requested for.
3c	In the summary of the financing plan (table 1.2 and 8.1) the SREP contributions are not detailed in grants and non-grants. This distinction is needed and should be added.	On pages 5 and 81, the text introducing these tables and describing the program identifies the splits between grants and concessional SREP funds which can be summarized as follows: <ul style="list-style-type: none"> <li>▪ For the Distributed RE solutions component: \$4 million grant and \$8 million non-grant for investment funding and \$0.9 million of grant for PPG</li> <li>▪ For the on-Grid RE component: \$5 million non-grant of investment funding and \$0.6 million of grant for PPG.</li> </ul> We can however also make it clear in the table, if opportunity is provided to deliver an improved version of the IP.

3d	With regards to the financing plan, to what extent are funds qualified as “from other donor/DFI or private lender” to be considered as funding gaps? How confident are the MDBs (AfDB and WB) that these gaps can be filled?	<p>For the On-Grid RE component the source of these funds will most likely depend on whether AfDB decides to use its private window or a PRG through its public window. One of the factors it will use to determine whether the private or public window is used will be which approach has the best opportunity to attract these additional funds.</p> <p>The contributions from other MDBs for the Distributed RE Solutions component are already committed as part of the EU and UNDP/GEF pilot projects. Any grants or financing offered through this component are expected to at least partially be matched by private operators (in the case of microgrids) sector equity debt or consumers (other distributed RE).</p>
3e	What is the nature of private sector funds expected to be raised for micro-grids (USD 15 million) and other distributed RE technologies (USD 5 million)?	For microgrids, the thought is that this would include either equity contributions from private operators or other private financing. For other distributed RE, financial instruments offered for these technologies through a green financing facility would most likely be a blended loan made up of grant and funds from a local bank. This amount would include the private portion of funding as well as any down payments required from consumers.
4a	The outcome of 125’000 tCO <sub>2</sub> /year seems high in relation to the expected increase of annual electricity output from RE (91.5 GWh). What are the underlying assumptions that lead to this result? Please detail the calculation.	<p>Agreed, this figure, is slightly too high. In fact, the intended goal should be 100,000 tCO<sub>2</sub>/year. This 125,000 tCO<sub>2</sub>/year figure was inadvertently left in from an earlier version of the IP. The assumptions to arrive at the 100,000 tCO<sub>2</sub> target is as follows:</p> <ul style="list-style-type: none"> <li>▪ The 20 MW solar PV plant would produce 61,510 MWh per year. This would displace 61,510 MWh in imports from South Africa, where the average CO<sub>2</sub> emission per kWh are 0.98 tCO<sub>2</sub>/MWh. That results are thus 60,288 tCO<sub>2</sub> avoided.</li> <li>▪ For distributed RE, the assumption was that each rural household emits 1.25 t/CO<sub>2</sub>/year. Most or all of this could be avoided with electrification and/or switch to a minimal emission cookstove like this <a href="#">one</a> – Ace1 stove - being manufactured in Lesotho. Based on the projected funding the estimate was that 9,678 would be served by new microgrids; 14,436 by SHS; and 14,800 by cookstoves. (see #4b below for how these estimates were made). That’s a total of 38,914 households and 48,643 tCO<sub>2</sub> avoided.</li> </ul> <p>To be conservative the 108,931 tCO<sub>2</sub> total was rounded down to 100,00 tCO<sub>2</sub>.</p>
4b	The expected increases of households with electricity access between 2016 and 2022 (i.e. within six years of which two already passed)	GoL rural access target seems indeed too ambitious. The 75% national goal is a GoL plan so should be kept, and, in retrospect, the rural access goal needs to be adjusted to better align with the

	<p>seem highly ambitious if not unrealistic, in particular with regards to rural households (from 18% to 75%).</p>	<p>national goal. For the 75% national goal to be met electrification would need to be universally achieved in urban and peri-urban areas (approx. 50% of households), then remaining portion of the goal (25%) would need to come from the other half of the population in rural areas (i.e. to get access for 50% of the 50% of the population in rural areas). The incoming National Electrification Masterplan will provide an accurate estimate of energy access rate that can be achieved by 2035; we would propose to adjust project targets accordingly to masterplan outcomes, when preparing the off-grid project.</p>
5a	<p>With regards to the proposed investment into the first commercial utility-scale RE project (i.e. 20 MW solar PV park as described p.73-74), it is not quite clear how the introduction of concessional SREP co-financing will respect the principles of transparency and equal treatment of all contenders, at a stage where a “preferred bidder” has already been identified after a competitive bidding process. Please elaborate.</p>	<p>This was a point discussed during the joint mission. AfDB has been monitoring this tender since it began and has been actively considering supporting the winning bidder. In their opinion, because all bidders had the same information when they submitted bids (i.e. they were not aware that concessional financing may be offered) then it could be considered as equivalent as a competitive process. This thinking may need to be reconsidered if several additional firms would express interest in submitting an offer during the preparation phase.</p> <p>The DoE will make all tender documentation available to AfDB to review the process and ensure it done according to their procurement guidelines.</p>
5b	<p>The proposed RE integration study will identify needed investments into the LEC grid to allow the introduction of multiple sources of electricity generation from RE. Who will implement these necessary investments and how will they be financed?</p>	<p>No MDB has yet committed to these investments. AfDB, because it is both managing the study and has ongoing projects with LEC on a network expansion and rehabilitation, is a candidate to support LEC on these projects and provide financing. Also, the strong regulatory environment provided by LEWA and LEC’s recent financial performance leave the possibility that some private financing could be sought for part of these projects.</p>
5c	<p>With regards to the investments in other distributed RE, a self-sustained financing facility that will support investments well beyond the time frame for SREP investments is foreseen. From what sources is such a self-sustaining facility expected to be funded? Does that include reflows from the concessional lending?</p>	<p>The exact details on the financing facility have not been determined yet. It is possible the World Bank would provide reflows over time, should the first round of funds be successful. World Bank has also recently approved projects with a duration long enough to allow the off-grid financing facility to be self-sustained (e.g., the CTF-funded 10-year duration project financing such a facility in Haiti). Should the fund be established within the Government owned Lesotho Post Bank, Government funds could also be used.</p>
5d	<p>With regards to the technical assistance for SHPP, does this also include transaction advisory services to define FiT and concession agreements? If not, who will provide and finance such advice?</p>	<p>The FiT rules, methodology for determining the tariff, and concession agreement templates are part of the draft RE Regulatory Framework that was funded by AfDB. As part of the ongoing EU capacity building program, there will be technical</p>

		assistance provided to LEWA and DoE to support implementation of the FiT through the first set of transactions.
6	<p>In relation to the still incomplete electricity access of Lesotho we are concerned by the consideration of the proposed SREP co-financed solar park as a potential source for energy exports. This would constitute a sacrifice of the national development potential intended by the project in favor of short term pecuniary benefits to the government or private interests and is not adequate in our eyes. The concession agreement to be concluded with private developers should make clear provisions as to the precedence of national consumers (households and enterprises) on exports.</p>	<p>Agreed. The Standard Power Purchase Agreement (SPPA) that has been published by LEWA (<a href="#">link</a>) does specify at 2(b), "The Seller agrees to sell all Delivered Electricity to the Buyer (LEC)." There is also a separate Exporter license that has been proposed in the draft RE Regulatory Framework, in which there is a clause that exports can be temporarily suspended should power be required for domestic purposes.</p>