Upscaling Rural Renewable Energy - Solar PV

Country / Region: **Mongolia** | Project Id: **XSREMN056A** | Fund Name: **SREP** |

MDB : **International Bank for Reconstruction and Development**

Comment Type	Commenter Name	Commenter Profile	Comment	Date
Comment 1	Daniel Menebhi	Switzerland	Unfortunately the annex 1 with access instructions to the online system for comment submission is missing in the FAQ file. At this stage, we do not have any comments or objections. However, we have the following questions for which we would appreciate to have answers prior to giving our support for project approval: 1. The grant vs non-grant allocation (to the IP) and the project is unclear. a. Please confirm the grant vs non-grant allocation in the endorsed IP. b. According to the project cover page, the requested SREP contribution is 100% grant but in the CIF AU summary (in the e-mail) of available resources, the requested SREP contribution appears as non-grant. Please clarify. 2. Relation of the project to the updated results framework of the IP. a. During the IP endorsement process, we requested the results framework to be updated according to our comments but we have never seen this updated results framework. Please provide it. b. To what extent does the project respond to this updated results framework? (or our comments if it was not updated). 3. Cost vs Tariffs a. What is the present cost of electricity to the utility (the tariff being stated at 4.2 US cent/kWh)? b. What is the levelized cost of solar PV generated electricity according to the project (both with or without the SREP contribution)? 4. Economic and financial viability: It is noticed that the financial viability is impressive (FIRR14.4%, FNPV $117.9 million). What would be the financial IRR and financial NPV without the SREP contribution? 5. Cost of CO2 emission abatement. a. If the SREP contribution is 100% grant, the cost of avoided CO2 emission (to SREP) is $80 per ton eqCO2. How would the CIF AU and WB qualify that cost? b. If the SREP contribution is not grant, please calculate and state the cost of avoided CO2 emission by ton eqCO2	Jan 26, 2017
Response 1	Leslee Hong	IBRD	#1-a (CIF AU Response) The SREP Investment Plan for Mongolia was endorsed in 2015. The level of debt distress of Mongolia at that time was high based on IMF's debt sustainability analysis. In accordance with SREP guidelines agreed by the Sub-Committee in November 2011 on resource distribution, Mongolia could receive all indicative allocations in grant. #1-b (CIF AU Response) The resource tracking table should indicate the amount of funding requested as grant. The table will be fixed. #2-a The revised IP with the updated results framework was circulated to the SREP Sub-Committee on December 17, 2015. The revised IP was also posted on the CIF website: https://www-cif.climateinvestmentfunds.org/sites/default/files/meeting-documents/srep_ip_mongolia_final_14_dec_2015-latest.pdf #2-b The results framework of the Project has adopted same indicators from that of the updated IP. Target numbers are estimated in a consistent manner with the revised results framework of the IP but with updated assumptions on average household electricity consumption and average household size. #3-a Weighted average cost of supply at end-user level is 6.0 USc/kWh. It is correct the tariff is just 4.2 USc/kWh. The difference is paid as a subsidy to the utility due to the high incidence of poverty in the region. #3-b With SREP support the cost of supply from the PV plant at end-user level would be 5.4 USc/kWh. Without SREP support the cost of supply at end-user level	Feb 01, 2017

			would be 8.6 USc/kWh. As a result of SREP support the subsidy to the utility can be reduced. #4 There were two errors in the original financial and economic model. After fixing them, FIRR is 10% and FNPV is US$11.68 million, in a scenario with SREP support. Without SREP contribution, FIRR would be 4.3% and FNPV US$4.28 million. The updated PAD is circulated with this response. #5-a This is still far below the threshold of cost-effectiveness under CTF, which is $200 per ton of CO2 equivalent. With this level of GHG emission reduction, the Project is assessed economically feasible. Please be mindful that GHG emission reduction is one of the co-benefits, and this Project contributes to scaling up solar PV development outside the Central Energy System, where there has been no private sector investment. #5-b All SREP contribution under the Mongolia IP is grant.	
Response 2	Daniel Menebhi	Switzerland	#1, #2 and #3 understood/OK. #4: How is it possible that NPV is still positive if IRR is 4.3% at a discount rate of 6%? #5a: not taken! According to the CTF website the expected CO2 savings of endorsed CTF activities (i.e. investment plans) is 1.5 billion tons. With the total funding of CTF being $ 5.8 billion, that is $ 3.86 per ton of CO2, far from the the $200 you state in your answer. And CTF funding is not even all grant! In fact the proposed project fails with regards to effectiveness in respect to all objectives: 1. $500 (grant part only) per person to benefit from improved access to electricity 2. $80 (grant part only) per ton of CO2 avoided or saved 3. With a leverage ration of 1:1, far from the SREP average of 1:6.4 On that background, a good description of the way the project is supposed to lead to the scaling-up described in the results framework is necessary. Please provide such a description and enact the corresponding activities in the frame of the project. SECO/WEIN/mnd 2 February 2017	Feb 02, 2017
Response 3	Monyl Nefer Toga Makang	IBRD	#4. The financial NPV is calculated using a WACC of 2.5% as the discount rate rather than the economic discount rate of 6%. #5a. The project is part of the SREP IP that was agreed in November 2015 without any changes in costs, financing or leverage. It is not meant to be an access project but rather a fuel project so it is to be expected that the number of new connections as a direct result of the investment would be less significant than from a dedicated access project. The quoted project-specific CO2 reduction unit costs and leverage should not be seen in isolation from the rest of the Program. In terms of leverage, ADB is separately preparing a $100 million loan that will accompany other RE investments from the IP and the combined effect of these two operations will provide the leverage foreseen in the IP. As to the CO2 emission reduction effect consideration should be given to the combined effect of the IP which includes the TA grant on regulatory issues. The projects in the western aimags will be the first undertaken by MoE and the local utilities. They will gain understanding of price structures and practicalities around solar PV installations that will serve to (i) inform decisions on changing from unsustainable FiTs to an auctioned approach (ii) demonstrate practical solutions to the high penetration rates - which will be the case in WES due to the small size of the demand, and (iii) to be a training ground for the RE Directorate, who is going to spearhead the following scale-up of RE.	Feb 02, 2017
Comment 2	Simon Ratcliffe	United Kingdom	With respect to Component B (10 MW Solar Power) of the proposal, we note that the document states that *"a substantial number of licenses with power purchase agreements (PPAs) have been granted to developers of solar power (with a total capacity of 200 MW)"* and that *"these arrangements were made without proper consideration of the ability of the power grid to absorb this much variable power".* Our question is: -By taking actions set out in Component A (Rehabilitation of Distribution Networks), is the project team convinced that the outputs of Component B are additional? -Is there a risk that the project will displace other investments? We think the document could be clearer about the market failures which show that Component B is necessary after Component A is completed.	Feb 01, 2017
Response 1	Monyl Nefer	IBRD	#1. With respect to Component B (10 MW Solar Power) of the proposal, and the	Feb 02, 2017

	Toga Makang		statement that "a substantial number of licenses with power purchase agreements (PPAs) have been granted to developers of solar power (with a total capacity of 200 MW)" The solar investment in the Western Energy System (WES) supports the scaling up of renewable energy (RE) in a remote area of the Mongolian grid in order to achieve: (i) reducing Russian electricity imports, which currently stand at 70 percent of the WES supply; (ii) enhancing energy independence while addressing urgent needs for generation expansion; (iii) reducing transmission losses; (iv) increasing CO2 emission savings; and (iv) creating opportunities for job and skills development in building sustainable energy systems. The WES was chosen as the testbed for Mongolia's first public solar investment after public workshops held in Ulaanbaatar during the preparation of the SREP investment plan revealed low private sector interest due to the WES' remoteness and low overall load. During the same stakeholder consultations, private sector players expressed concerns relating to perceived financial risks in having the local state-owned electric utility company WRES be the off-taker given its negative operating margins and reliance on government subsidies. Due to the relative poverty and isolation of the region WRES has social (i.e. lower than cost-recovery) pricing of electricity with the financial gap filled by government subsidies. The SREP contribution will allow WRES to supply solar generated power at a cost of USc5.4/kWh compared to the present average generating cost of USc6.0/kWh thereby reducing its subsidy requirement going forward. It is true that Power Purchase Agreements (PPAs) have been granted to develop 200MW of solar generation capacity. However, with the feed-in-tariff (FIT) regime for solar in the US$15–18 cents/kWh range, the actual implementation of PPA-backed projects would pose a huge fiscal challenge for Mongolia. It is therefore not realistic that more than a few of these projects will go ahead and none of those would be in the WES. #2. On the clarity about the market failures which show that Component B is necessary after Component A is completed. Component A addresses the need to upgrade Soviet-era power distribution infrastructure; it will not address market failures for RE generation technologies. The SREP funds deployed under Component B are critical to address a market failure that is specific to the isolated grids of Mongolia. In the absence of the SREP funds that will enable WRES to operate a solar plant no private sector investment could be expected given the significant levels of perceived risks. The SREP IP also includes a US$1.2 million technical assistance support to strengthen the regulatory framework to remove barriers for private participation in power infrastructure and ultimately move towards a more sustainable energy sector development path. Through this work, which is about to start, key areas of engagement with the Ministry of Energy (MOE), the National Dispatching Center (NDC) and the Energy Regulatory Commission (ERC) are system analysis and operations, energy policy support, assistance with PPAs and renewable energy pricing and market evolution. The expectation is that this work will lead to improvements in the enabling environment for RE investments by private developers and in turn scale-up of RE generation by IPPs in the CES (the main electricity network in Mongolia).	
Response 2	Simon Ratcliffe	United Kingdom	**We think the document and the response provided demonstrate a good case for need of funding in RE in Mongolia. The response doesn't address the question of whether investing in generation capacity <u>in the WES region</u> is the most cost effective use of funds (compared to some alternatives like generation capacity in other regions with improved transmission between regions – perhaps this reflects the geography). The response received states that without this investment, it is unlikely that generation capacity will emerge in WES as a result of private investment – it seems to me that this could be the case *with or without* the proposed investment in <u>generation capacity</u>. Is this the case?** **We would also appreciate a response on willingness to pay methodology chosen.**	Feb 06, 2017
Response 3	Leslee Hong	IBRD	[SREP Support in the WES region] WES is an isolated grid (interconnected to Russia but not the main Mongolian grid) which cannot easily or affordably be connected to Mongolia's Central Energy System	Feb 09, 2017

			(CES). Such an interconnection would necessitate construction of a high-voltage line over a distance of more than 400 km. The project will enable WES to reduce imports from Russia (this is the without-project situation). The main focus is therefore on energy (kWh) rather than capacity – for more detail see response to second question below. [WTP] We have not used WTP in the economic calculation. The power generated by the solar PV investment is assumed to serve as a one-to-one substitution of power imports from Russia. Its economic value to the country is thus equivalent to the cost of substituted imports. The PV plant is not foreseen to have a battery storage due to the higher cost per unit of power from such a configuration. In order to use sound and conservative assumptions in the economic analysis the calculations therefore does not credit the PV plant with capacity addition to the grid and WTP does not become relevant.	
Comment 3	Ben Green	United Kingdom	Just to confirm that the UK is happy to approve this project based on the replies provided. However, we would be grateful if you could clarify: 1. Why the growth rate in the value of substituted power import has been increased from 1.5% to 3.0% in the document circulated on 03/02? 2. Why there has been an increase in the value of emissions avoided from $3.67m to $4.22m? 3. Why has the annual O&M cost fallen from 3% to 2%? 4. It will also be useful to see subsequently more formal analysis on whether there is merit to explore battery storage alongside the proposed PV plant. Many thanks,	Feb 14, 2017
Response 1	Joonkyung Seong	IBRD	#1. Over the decade of 2007-16, the import tariff from Russia had grown from 3.5 US cent/ kWh to 5.1 US cent/kWh, or an average annual rate of 4.3%. Since 2010, the import tariff has been quoted in RUB, and has been growing at an average annual rate of 15.1% in RUB terms. In the previous analysis, the assumption on the tariff trajectory did not reflect this recent trend line and was therefore forecasting a fairly slow adjustment of the import price. The adjusted annual growth rate of 3.0% per year is still slower than the average growth rate of the last decade, so still on the conservative side. #2. The updated analysis assumes that transmission losses are reduced by 1 percentage point due to the much shorter distance that the power will travel due to the close proximity of the solar plant to the network load centers – compared with the longer transmission distance of Russian imports. This effect was not calculated correctly in the first set of calculations. #3. Solar power plants are not O&M heavy and a review of international experience showed that O&M of 2% of capital costs would more accurately reflect real costs. #4. The team agrees that this is a good suggestion. Such analysis will be carried out during project implementation.	Mar 02, 2017