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SELECTION CRITERIA FOR USAID ENERGY PROGRAM SUPPORT OF PROPOSED NON-HYDRO RENEWABLE ENERGY PROJECTS

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25 April 2018

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DATA

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Practice Area: Renewable Energy

Key Words: Criteria, Memorandum of Understanding, Environmental Impact Assessment, Feasibility Study, Investors

ACRONYMS

DHI	Diffuse Horizontal Irradiance
DNI	Direct Normal Irradiance
EIA	Environmental Impact Assessment
ESIA	Environmental Social Impact Assessment
GHI	Global Horizontal Irradiance
GIS	Geographic Information System
GJ/h	Giga-Joules/Hour
GSE	Georgian State Electrosystem
ha	Hectare
IBA	Important Bird Areas
IFI	International Financial Institution
km	Kilometer
KWh	Kilowatt-Hour
m ²	Square Meter
MEPA	Ministry of Environment Protection and Agriculture of Georgia
mln	Million
MoU	Memorandum of Understanding
MW	Mega-Watts
NHRE	Non-Hydro Renewable Energy
SPV	Special Purpose Vehicle
TBD	To Be Determined
USAID	United States Agency for International Development
USD	United States Dollars
VRE	Variable Renewable Energy
W/m ²	Watts/Square Meter

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INTRODUCTION

USAID Energy Program is a three-year program focused on supporting the development of Georgian electricity and natural gas markets that support further expansion of renewable energy projects thereby improving Georgia' security of supply. Task Three supports the immediate development of 50 MW of non-hydro renewable energy with the intent of developing a sustainable enabling environment for sustainable development of non-hydro renewable energy. USAID Energy Program will support up to ten proposed renewable energy projects in order to reach its goal of 50 MW financed and on line.

This is the first deliverable for Task Three of the USAID Energy Program. The first activity for USAID Energy Program was to create a set of criteria that will be used to shortlist all the projects down to the best 10 to support. This deliverable provides an overview of the selection criteria (the selection criteria are provided in Annex I) and it provides the next steps for Task Three. Annex II provides the details of process used to identify the selection criteria.

OVERVIEW OF THE SELECTION PROCESS

The deliverable shows the criteria that the USAID Energy Program will use to select the projects to be further assisted in Task Three during the rest of the Program. In total there are thirty-eight criteria, each described in some detail in Annex II. In particular, each criterion has a name, description (that defines the criterion and implicitly why it is important to be included), example (a fictitious project that shows how the data for the criteria should be reported) and the threshold.

The thresholds are either limits (upper or lower) or characteristics the project. For example, a lower limit is 5 MW for “Designed Net Capacity”; projects smaller than 5 MW capacity will not be assisted further in Task Three.

Also, for example, a characteristic is “Involvement of off-shore companies.” If the financiers and developer for a project cannot be firmly identified as being non-conflicted, whether in an offshore company or otherwise, then the project will not be assisted further in Task Three.

If a project meets the thresholds for all criteria then the project can be included in further work in Task Three.

ENVIRONMENTAL EXCEPTION

The only exception to the “must meet all thresholds” relates to certain environmental issues.

Unfortunately, the state of knowledge about the environmental impacts of specific non-hydro renewable energy projects is poor since most projects have not yet progressed to the point where such issues would be normally addressed. One criterion is “Project has gone through the Ministry of Environment Protection and Agriculture of Georgia (MEPA) screening process or Environmental Impact Assessment (EIA) has been completed”. Either the MEPA Screening Process or an EIA would provide the data needed to answer environmental impact criteria. Today, most project have neither the MEPA Screening or EIA, and hence most projects do not meet the threshold since the research has not yet been done.

A consequence of the poor state of knowledge is that few projects can meet the threshold requirement for source of environmental information and hence cannot meet related thresholds for more specific environmental criteria (e.g., Proximity to Roosting, Feeding Areas or Migrating Routes of Bats).

As a work around, so that work on Task Three can proceed, projects should be admitted to further work in Task Three on a provisional basis until better research on environmental issues is complete. We generally expect few environmental issues, so this is a matter of not having reliable information on this point at this moment for individual projects. There should be few projects where we must later stop work because of unforeseen environmental issues.

PREPARATION OF CRITERIA

The final list of thirty-eight criteria is the result of a high-reliability selection process. We began with thorough desk research and input of experts. A lengthy list of more than 150 potential criteria was developed. Each criterion was defined and described to ensure mutual understanding of their meanings. The lengthy list was filtered through reviews by Program staff and others. Several meetings to discuss the inclusion or exclusion of criteria were held. Some criteria were changed from their original form and new criteria were added during the meetings.

NEXT STEPS

The criteria have been provided to developers who are completing the first round of data collection; that is, they are filling the data collection forms. We are meeting with each developer to go through their preliminary answers and to ask for clarifications or additional information as needed. We expect two rounds will be required for each developer.

The answers to all criteria for all projects are being input into a database from which filters will be applied to determine meeting or failing to meet thresholds. We expect some adjustments of threshold values as we see the final data.

To the end, the Program will be able to explain in very concrete terms why a particular project is included or excluded from further work in Task Three.

APPENDICES

THRESHOLD AND PRIORITIZATION CRITERIA FOR WIND PROJECTS

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
SOLAR-PROJECT SPECIFIC					
1	Energy Sector Map Number	Number assigned to project on the Energy Sector Map. Start with 201 to distinguish from existing map numbers	Informational	201	
2	Project Name	Name typically assigned by the developer. Text name	Informational	Imagination	
3	Involvement of Offshore Companies	USAID Energy Program needs to identify the ultimate developer and equity-provider (final owners and beneficiaries). This means the corporate veil must be penetrated. If local development company cannot or will not give information on the ultimate developer, equity-provider and owners (i.e., does not penetrate the corporate veil) then project cannot be considered by USAID Energy Program. Enter Yes (offshore company involved) or No. If Yes, explain. Detailed textual description	Threshold	Yes. ABC, Cyprus. Ultimate developer and equity-provider as shown below	If No (i.e., no offshore company is involved) then project passes threshold. If Yes (some offshore company is involved), then if corporate veil is penetrated and ultimate developer, equity-provider and owners are revealed, then project passes threshold. If Yes, and ultimate developer, equity-provider and owners are not revealed, then project fails threshold
5	Developer Experience	Other projects the developer has in operation or under development, in Georgia and elsewhere. Purpose is to ensure developer "knows what they are doing". Detailed textual description	Threshold	Two Hydro Projects in Georgia (zz and bb; 10 MW and 17 MW); One Wind Project in Bulgaria (aa; 23 MW). No negatives in due diligence	Has at least two similar projects operating in some other place. Due diligence reveals no negative matters
7	Equity-Provider and Owners Financial Strength	Other projects the equity-provider and owners have financed in Georgia and elsewhere. Penetrate corporate veil in any Special Purpose Vehicles (SPVs) to identify the actual equity-provider and owners that have the required financial resources. If same as developer, then nevertheless enter the value of the projects. Detailed textual description	Threshold	Two solar projects in EU 50 and 75 mln USD, named X and Y. No negatives in due diligence.	Has financed at least two projects of similar investment level. Due diligence reveals no negative matters
12	On- Or Off- Electricity-Grid	On-Grid or Off-Grid. If project is connected to the electricity grid for generation, then it is On-Grid. Otherwise, Off-Grid	Threshold	On-Grid	Must be on-grid unless project is biomass, geothermal or waste-to-energy
13	Designed Net Capacity	Also termed Nameplate Capacity of proposed power plant. The maximum output of electricity (MW) or heat (GJ/h) that a power plant can produce under ideal conditions or intended full-load sustained output of a power plant. Note that plants typically do not operate at Designed Net Capacity (e.g., downtime for maintenance). See http://www.ownergy.co.uk/library/gosple/F2RCAP1d.pdf In MW	Threshold	35 MW	5 MW or greater
14	Capacity Factor	Average utilization of plant over course of year. Ratio of its actual output over a period, to its potential output if it were possible for it to operate at full Designed Net Capacity 24/7/365. If 100 percent, then plant operates at Designed Net Capacity 24/7/365 during year. If 50 percent then plant operates at Designed Net Capacity for 12 hours a day all year (12/7/365), or at Designed Net Capacity for six months of year (24/7/182) or some other equivalent combination. In percent	Threshold	42 percent	14 percent for solar projects. 33 percent for wind projects.
16	Cost Per Designed Net Capacity	Total Project Cost divided by Designed Net Capacity. In USD/MW	Prioritization	1.36 mln USD/MW	1.5 mln USD/MW

17	Levelized Cost of Electricity	Allows comparison of different technologies (e.g., wind, solar, natural gas) of unequal life spans, project size, different capital cost, risk, return, and capacities. Present value of investment and operating costs (life-cycle cost) divided by the quantity of electricity generated. In USD/kWh	Threshold	0.015 USD/kWh	0.02 USD/kWh
20	Expected Months of Operation	The months the plant is expected to operate each year. Could be Year-Round, Jan-Jun, Oct-Feb and so forth. Textual description	Informational	Year-Round	Counter-cyclical to hydro production
27	Current Status	Current status of the project. Note status of MoUs, if any. More elaboration is better than less. If project is not moving forward and little work is being done at this moment (e.g., waiting on uncertain events or decisions by others), then show project is in Hiatus. Summary textual description	Informational	Pipedream; in hiatus waiting for clarity on offtake tariff	Feasibility at least 50 percent complete. Specifically, six-months of most data collection for wind. All-site specific work for solar
28	Apparent Level of Activity	At any project phase, work on the project may be active or on hiatus as developer waits for some event or decision by others. Possible answers are Active, 50-50, Low Level and On Hiatus. Detailed textual description of work that is being done at this moment	Threshold	Low Level	
29	Key Reasons for Level of Activity Not Being Active	Detailed textual description of reasons Apparent Level of Activity is not Active.	Threshold	Have been waiting four months for decision X from Government	Key reasons (problems) must relate to the enabling environment, including financing issues related to the enabling environment. Must be something that USAID Energy Program can help fix
35	Project Has Gone Through the MEPA Screening Process or Environmental Impact Assessment (EIA) Has Been Completed	A number of other criteria require information about environmental and social matters. The source of this information is the screening application that includes details on characteristics, location and characteristics of the potential impact of projects and/or EIA report. Screening procedure takes two weeks screen projects for environmental and social issues. Screening applies to all wind projects. Screening does not apply to solar projects unless over 10 ha in size (becomes an industrial site). Yes or No. If No, then detailed textual description of why not	Threshold	Result of MEPA screening or EIA show no particular environmental or social problems	If screening shows no need for an EIA or if an EIA has been done, then project passes threshold. If no screening or EIA has been done (always the case at this moment) then project can be accepted provisionally if all other thresholds are met. Developer will be required to provide Energy Project the same data as required by MEPA to do the screening process
44	Target Online Date	Target date in project plans. Date that developer is working against. Note date as being: Actual (in past), Firm (nearly certain date in future), Flexible (depends on other events happening in the normal course of business; largely in the control of developer) or Questionable (date depends on uncertain events; largely outside control of developer). If date is truly unknown, then enter To Be Determined (TBD) rather than a date. If Flexible, Questionable or TBD, show detailed textual description of why it is not Firm	Threshold	June 2020; Flexible depending on finalizing vendor selection.	Require a Firm or Flexible date. Scale 1 to 5. In 2019 is 5. 2020 is 4 and so forth. Best likely estimate at this moment assuming success in fixing enabling environment. Longer-term projects do not fit with USAID Energy Program mandate
48	GIS Altitude of Project	Altitude from GIS, along with any correction needed for altitude from mean sea level. In m	Prioritization	493 m	
50	Distance to Closest Settlement(s) And Their Names	Name of settlements and their distance from project. Wind farms are noisy. Solar farms can disrupt economic activity in their vicinity. In km. If several settlements, name all	Threshold	XYZ Village 3.5 km; ABC Town 7.0 km	Project must be more than one km from nearest settlement
52	Distance to Closest Protected Area(s) And Their Names	As a rule, it is better to be far from Protected Areas to minimize impact of project. Name and distance from project in km. Law generally requires a one km buffer zone around protected areas	Threshold	XYZ National Park; 25 km	10 km minimum distance
53	Description of Protected Area(s) And Likely Project Impact, If Any	Name of the closest Protected Area(s). Description of possible negative impacts from project. These, along with other things, should be included in the Terms of Reference for any ESIA. Nature of connecting roads between project site and Protected Area(s), if any	Threshold	Distance from park suggests no direct project impact; road to park is 1 km from site, so it will be visible from road.	Any likely negative impact is a problem

56	Distance to Closest Airport; Name and Likely Project Impact, If Any	Wind masts create aerial hazards, particularly since the masts tend to be on ridges. Solar cells can reflect sunlight and blind pilots. Both types can affect airport radars and create a safety hazard. Name and distance from project in km. Textual description of steps taken to date or that need to be taken to receive no objection from closest airport	Informational	Tbilisi airport; 21 km; no impact. Air traffic radar station 15 km; blades may interfere	Any likely negative impact is a problem. Minimum distance from closest airport is 10 km
65	Likely Cost of Transmission Line to Existing or Planned Transmission or Distribution System Connection Point	Apply rules-of-thumb to estimate likely cost of transmission line, substation or upgrade of existing substation divided by net declared capacity. In USD/MW	Prioritization	130 000 USD/5 MW = 26 000 USD/MW	Scale TBD
69	Weighted Average Land Use	Area needed for one MW of Designed Net Capacity. In ha/MW	Prioritization	1.5 ha/MW	Solar: fixed and one-axis tracking system 2.4 ha/MW; Solar: two-axis tracking system 3.9 ha/MW; Wind: 0,3 ha/MW
79	Presence of Rare or Endangered Flora or Fauna Species	What rare or endangered species are present? If unknown say Unknown. Source of information would be screening report, an EIA report or any other credible source (e.g. reports of research/academic institutions). Always keep requirements of IFIs in mind. Detailed textual description along with source of data	Threshold	Widget Grasshopper; EIA report	If it is known there are no rare or endangered flora or fauna species, then passes threshold. If there are rare or endangered flora or fauna species, or the situation is unknown, then fails threshold
88	Distance to Site from Closest Road That Can Handle Construction Equipment	Distance to closest paved road suitable for construction equipment. If project is large, it is likely that permission to build the road will be required. In km. Textual description of terrain from closes paved road	Prioritization	1.6 km. Steep hills.	Scale TBD
97	Informed Citizenry	The general opinion of local citizens is important when evaluating the project. This means that local citizens must be aware of project. Confirmation from developer that local government and citizens are (already) aware of project so that their opinions can be sought during site visit. Note as Yes, No or Unknown. Describe any meetings already held	Threshold	Yes; Three public meetings held in Jan, July and Nov 2017	If Yes (citizens are aware of project), then passes threshold. If No or Unknown, then fails threshold
100	General Opinions Expressed by Local Citizens	If answer to the Informed Citizenry question is Yes, then Team will visit local villages and chat with citizens about their general opinion of project. A 60 minute visit	Threshold	Worry about impact of project on sheep grazing; seems mostly based on insufficient information about project	Citizens must already be informed, and their opinions must be generally positive
104	Expected Debt: Equity Ratio	Ratio of project debt and project equity. The greater the ratio, the more important is debt in the overall project. Reflects percentage of investment cost coming from equity-provider relative to non-equity (e.g., debt) financing. Also note timing of equity (e.g., equity before debt). Detailed description of any unknowns in this regard	Threshold	25%; All Equity Before Debt; some doubt on Debt: Equity Ratio acceptable to XYZ Lender	Less than 4:1
105	Required Average Tariff	Single number reflecting seasonality of Generation and seasonality and diurnal pattern of revenue. In USD/kWh for electricity	Threshold	0,060 USD/kWh	If equal to or less than 0.060 USD/kWh, passes threshold
107	Financial Capacity of Expected Buyer	Detailed textual description of the financial capacity of the expected buyer. If expected buyer has low financial capacity, then project will not be bankable	Threshold	Georgian Railway; Purchases will represent 3 percent of annual purchases by Railway	If financial capacity is high or medium, then passes threshold
114	Geographical zones for Wind project development (According the 10 Year Development Plan)	From GSE 10-Year Development Plan. 1 Poti; 2 Chorokhi; 3 Kutaisi; 4 Mountain-Sabueti I; 5 Mountain-Sabueti II; 6 Gori-Kaspi; 7 Paravani; 8 Samgori; 9 Rustavi. The integration capability of the transmission grid sets the temporal and spatial	Threshold	Region 3; Is 50 Percent of GSE's connection limits in this Region	Net Capacity does not exceed GSE's connection limits

		scale limitation for very capacity integration, Respectively the presence or non-presence of project on those zones sets limits for their development			
115	Source and Dates of Following Five Criteria	Textual description of the source, to permit assessing of wind-data reliability. Include an overall comment about reliability	Threshold	Six months of on-site collection. Minute-by-minute electronic logging	Project data must be from on-site measurements, not from the wind atlas. Ensures project is already in Feasibility Study phase, or later
118	Average Wind Power Density at Hub or Meteo Mast Height	Current average from test mast. In W/m ² . Wind Power Density is used to describe wind resource as it is independent of the wind turbine characteristics. It indicates how much wind energy can be harvested at allocation by a wind turbine and has the units W/m ² . Higher is the Wind Power Density, depending on the capacity factor of Wind turbine and rotor swept area more electricity can be generated. In W/m ²	Prioritization	300 W/m ²	1 to 5 scale for X to Y. TBD
122	Anemometer Height (Highest)	The anemometer height is the height above ground at which the wind speed data are measured. In m	Informational	60 m	Anemometer installed at lesser of 60 m or 2/3 of proposed hub height
123	Height of Turbine Hub	For comparison with anemometer height. In m	Informational	60 m	
126	Self-Consumption and Losses	Losses are estimates of a decrease in energy output that is known. As an example, 6% is the estimate of energy loss due to wake. This is one component of the estimated loss. Other sources of losses are electrical, plant availability, turbine performance, environmental, and curtailment. In percent of Designed Net Capacity	Threshold	0	No more than 15 percent
130	Proximity to Bird Migratory Routes or Important Bird Areas	Injuries and mortalities tend to be related mostly to collisions with rotors or with other associated infrastructures such as overhead cables. Significant collision mortality risks are primarily related to topographical bottlenecks where migrating or local birds fly through a relatively confined area, for example mountain passes or land-bridges between water-bodies. Other susceptible locations are slopes with rising winds where the birds gain lift and near wetlands or shallow seas that attract large numbers of feeding or resting birds. Flight corridors between feeding areas, roosting sites or breeding sites are also particularly susceptible. Detailed textual description of proximity. Note source of information	Threshold	None noted; IBA and Migratory Bird route maps for Georgia	Minimum distance of wind turbine from IBA/MR 10 times the turbine height, but at least 1,200 m as recommended by the Working Group of German State Bird Conservancies
131	Proximity to Roosting, Feeding Areas or Migrating Routes of Bats	Bats are most commonly killed by the moving rotor blades. Another cause of death is internal haemorrhaging caused by the pressure drop behind the rotor blades. To prevent/minimize bat death constructing of wind farms in areas where bats are likely to roost or routes where they migrate should be avoided. The areas where bats are most likely to roost are generally coastlines, top of distinct hills and mountains in forested areas. In comparison, flat terrain, farmed lowlands and treeless areas are considered to be safe, as bats are not likely to be there. Wind farms sited at humid areas with mild temperatures, closer than 5 km to forested areas and within 600 m of steep slopes showed higher probabilities of mortality. Detailed textual description of proximity. Note source of information	Threshold	None noted; site study as part of EIA	Expert assessment of likelihood of bat strikes
143	Global Horizontal Irradiance (GHI)	The total solar energy received in one year on a unit area of a horizontal surface. It includes energy from the sun that is received in a direct beam (the horizontal component of the DNI) and the DHI. Affected by altitude, latitude (length of sunlight), atmospheric turbidity (e.g., dust) and weather (cloud cover). In kWh/m ²	Prioritization	1350 kWh/m ²	1 300 kWh/m ² . GHI in Georgia varies from 1 250 to 1 800 kWh/m ²
147	Cell Conversion Efficiency	Percentage of solar irradiation that is converted into electricity. If forecast efficiencies are available (as efficiency decreases with age), then show several cell conversion efficiencies along with age. If only one (average) efficiency is available, then show Average plus the value	Threshold	20% first five years; 13 percent next five years; 10 percent next 15 years	Conversion efficiency over 15 percent passes threshold

VARIABLE RENEWABLE ENERGY (VRE) PROJECTS RANKING THRESHOLD CRITERIA



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TASK THREE

26 March, 2018



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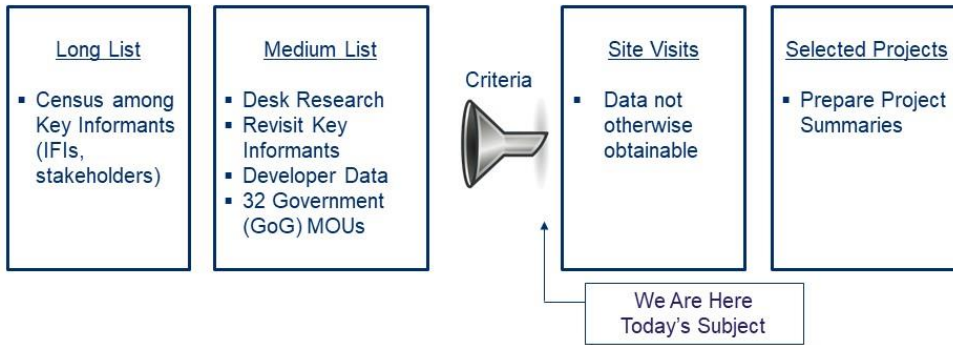
Discussion Objectives

- Communicate concepts behind selection of selection criteria for non-hydro renewable energy (NHRE) projects
 - *i.e.*, which criteria to use, and how
- Productively discuss (all) the criteria, changing, adding or removing as needed
- Note: the contents of this discussion document is the essence of the first Task Three deliverable

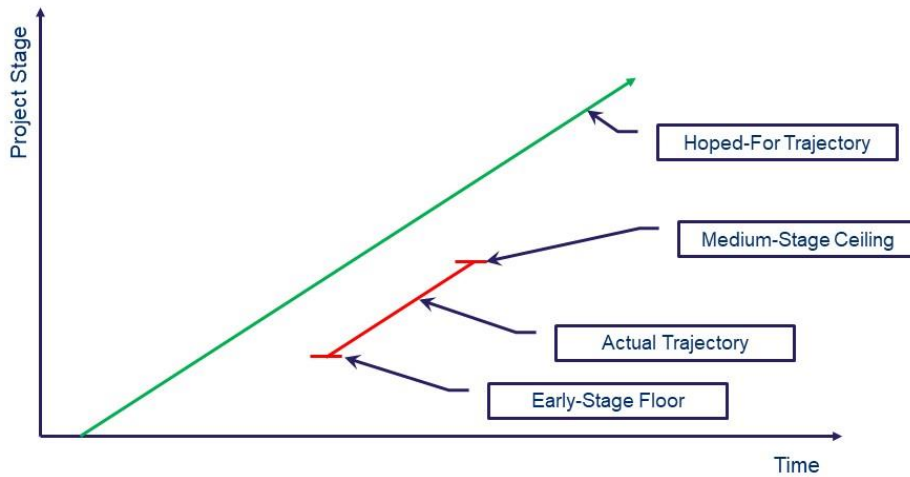
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Where we are in the initial part of Task Three



As noted previously, there are few early-stage projects to consider; the medium-stage ceiling



4



The short trajectory means the project pipeline for NHRE is smaller than for hydro projects

- Hydro (Energy Sector In Georgia map) (over 150 in total)
 - Under MOUs (over 20)
 - Licensing and construction (over 35)
 - Potential sites (over 95)
- Non-hydro renewable energy (47 in total; likely to rise)
 - Under Feasibility MOUs (34)
 - Licensing and construction (0); one operating
 - Sites which did not submitted MOUs' yet (12) – the list is continuously updated, since new project identification is live process)
- This means there is limited need to prioritize projects that make it past the thresholds
 - Some loosening of thresholds may be needed

5



Used a high-reliability filtering approach to selecting selection criteria



6



40 criteria fall into seven groups (10 slides)

- General Information (11, over two pages)
- Project Status (5)
- Project Location (6)
- Project Site, Access And Internal Roads (3)
- Local Social And Economic Issues (2)
- Financing (3)
- Wind-Project Specific (8, over two pages)
- Solar-Project Specific (2)

7



General Information

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
1	Energy Sector Map Number	Number assigned to project on the Energy Sector Map. Start with 201 to distinguish from existing map numbers.	Informational	201	
2	Project Name	Name typically assigned by the developer. Text name.	Informational	Imagination	
3	Involvement Of Offshore Companies	LEP needs to identify the ultimate developer and equity provider (final owners and beneficiaries). This means the corporate veil must be penetrated. If local development company cannot or will not give information on the ultimate developer, equity provider and owners (i.e., does not penetrate the corporate veil) then project cannot be considered by UEP. Enter Yes (offshore company involved) or No. If Yes, explain. Detailed textual description.	Threshold	Yes, ABC, Cyprus. Ultimate developer and equity provider as shown below.	If No (i.e., no offshore company is involved) then project passes threshold. If Yes (some offshore company is involved), then if corporate veil is penetrated and ultimate developer, equity provider and owners are revealed, then project passes threshold. If Yes, and ultimate developer, equity provider and owners are not revealed, then project fails threshold.
5	Developer Experience	Other projects the developer has in operation or under development, in Georgia and elsewhere. Purpose is to assure developer "knows what they are doing". Detailed textual description.	Threshold	Two Hydro Projects in Georgia (22 and 16; 10 MW and 17 MW). One Wind Project in Bulgaria (23 MW). No negatives in due diligence.	Has at least two similar projects operating in some other place. Due diligence reveals no negative matters.
7	Equity-Provider And Owners Financial Strength	Other projects the equity provider and owners have financed in Georgia and elsewhere. Penetrate corporate veil in any Special Purpose Vehicles (SPVs) to identify the actual equity provider and owners that have the required financial resources. If same as developer, then nevertheless enter the value of the projects. Detailed textual description.	Threshold	Two solar projects in EU 50 and 75 mln USD, named X and Y. No negatives in due diligence.	Has financed at least two projects of similar investment level. Due diligence reveals no negative matters.

8



General Information (cont'd)

LN	NLME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
12	On- Or Off- Electricity-Grid	On-Grid or Off-Grid. If project is connected to the electricity grid for generation, then it is On-Grid. Otherwise, Off-Grid.	Threshold	On-Grid	Must be on grid unless project is biomass, geothermal or waste-to-energy.
13	Designed Net Capacity	Also termed Nameplate Capacity of proposed power plant. The maximum output of electricity (MW) or heat (GJ/h) that a power plant can produce under ideal conditions or intended full-load sustained output of a power plant. Note that plants typically do not operate at Designed Net Capacity (e.g., downtime for maintenance). See http://www.energy.gov/eere/energy-glossary/glossary/F2RCA14.pdf . In MW.	Threshold	35 MW	5MW or greater.
14	Capacity Factor	Average utilization of plant over course of year. Ratio of its actual output over a period, to its potential output, if it were possible for it to operate at full Designed Net Capacity 24/7/365. If 100 percent, then plant operates at Designed Net Capacity 24/7/365 during year. If 50 percent, then plant operates at Designed Net Capacity for 12 hours a day all year (12/7/365) or at Designed Net Capacity for six months of year (24/7/182) or some other equivalent combination, in percent.	Threshold	42 percent	14 percent for solar projects, 33 percent for wind projects.
16	Cost Per Designed Net Capacity	Total Project Cost divided by Designed Net Capacity. In USD/MW.	Prioritization	1.36 mln USD/MW	1.5 mln USD/MW
17	Levelized Cost Of Electricity	Allows comparison of different technologies (e.g., wind, solar, natural gas) of unequal life spans, project size, different capital cost, risk, return, and capacities. Present value of investment and operating costs (life-cycle cost) divided by the quantity of electricity generated. In USD/kWh.	Threshold	0.015 USD/kWh	0.02 USD/kWh
20	Expected Months Of Operation	The months the plant is expected to operate each year. Could be Year-Round, Jan-Jun, Oct-Feb, and so forth.	Informational	Year-Round	Counter-cyclical to hydro production.

PR

9



Project Status

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
27	Current Status	Current status of the project. Note status of MOUs, if any. More elaboration is better than less. If project is not moving forward and little work is being done at this moment (e.g., waiting on uncertain events or decisions by others), then show project is in <i>Hiatus</i> . Summary textual description.	Informational	Pipedream; in hiatus waiting for clarity on offtake tariff	Feasibility at least 50 percent complete. Specifically, six-months of mast data collection for wind. All-site specific work for solar.
28	Apparent Level Of Activity	At any project phase, work on the project may be active or in hiatus as developer waits for some event or decision by others. Possible answers are Active, 50-50, Low Level and On Hiatus. Detailed textual description of work that is being done at this moment.	Threshold	Low Level	
29	Key Reasons For Level Of Activity Not Being Active	Detailed textual description of reasons Apparent Level Of Activity is not Active.	Threshold	Have been waiting four months for decision X from Government	Key reasons (problems) must relate to the enabling environment, including financing issues related to the enabling environment. Must be something that UEP can help.
35	Project Has Gone Through The MEPA Screening Process Or Environmental Impact Assessment (EIA) Has Been Completed	A number of other criteria require information about environmental and social matters. The source of this information is the screening application that includes details on characteristics, location and characteristics of the potential impact of projects and/or EIA report. Screening procedure takes two weeks screen projects for environmental and social issues. Screening applies to all wind projects. Screening does not apply to solar projects unless over 10 ha in size (becomes an industrial site). Yes or No. If No, then detailed textual description of why not.	Threshold	Result of MEPA screening or EA show no particular environmental or social problems	If screening shows no need for an EA or if an EA has been done, then project passes threshold. If no screening or EIA has been done (always the case at this moment) then project can be accepted provisionally if all other thresholds are met. Developer will be required to provide Energy Project the same data as required by MEPA to do the screening process.
44	Target Offline Date	Target date in project plans. Date that developer is working against. Note date as being Actual (in past), Firm (nearly certain date in future), Flexible (depends on other events happening in the normal course of business, largely in the control of developer) or Questionable (date depends on uncertain events, largely outside control of developer). If date is truly unknown, then enter To Be Determined (TBD) rather than a date. If Flexible, Questionable or TBD, show detailed textual description of why it is not Firm.	Threshold	June 2020; Flexible depending on finalizing vendor selection.	Requires a Firm or Flexible date. Scale 1 to 5. In 2019 is 5, 2020 is 4 and so forth. Best likely estimate at this moment assuming success in fixing enabling environment. Longer-term projects do not fit with UEP mandate.

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Project Location

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
PR 48	GIS Altitude Of Project	Altitude from GIS, along with any correction needed for altitude from mean sea level, in m.	Prioritization	493 m	
50	Distance To Closest Settlement(s) And Their Names	Name of settlements and their distance from project. Wind farms and solar farms can disrupt economic activity in their vicinity, in km. If several settlements, name all. As a rule, it is better to be far from Protected Areas to minimize impact of project. Name and distance from project in km. Law generally requires a one km buffer zone around protected areas.	Threshold	XYZ Village 3.5 km; ABC Town 7.0 km	Project must be more than one km from nearest settlement.
52	Distance To Closest Protected Area(s) And Their Names	Name of the closest Protected Area(s). Description of possible negative impacts from project. These, along with other things, should be included in the Terms of Reference for any EISA. Nature of connecting roads between project site and Protected Area(s), if any.	Threshold	XYZ National Park, 25 km	10 km minimum distance.
53	Description Of Protected Area(s) And Likely Project Impact, If Any	Name of the closest Protected Area(s). Description of possible negative impacts from project. These, along with other things, should be included in the Terms of Reference for any EISA. Nature of connecting roads between project site and Protected Area(s), if any.	Threshold	Distance from park suggests no direct project impact; road to park is 1 km from site, so it will be visible from road.	Any likely negative impact is a problem.
56	Distance To Closest Airport; Name And Likely Project Impact, If Any	Wind farms create aerial hazards, particularly since the masts tend to be on ridges. Solar cells can reflect sunlight and blind pilots. Both types can affect airport radars and create a safety hazard. Name and distance from project in km. Textual description of steps taken to date or that need to be taken to receive no objection from closest airport.	Informational	Thales airport, 21 km; no impact. Air traffic radar station 15 km; blades may interfere.	Any likely negative impact is a problem. Minimum distance from closest airport is 10 km.
PR 65	Likely Cost Of Transmission Line To Existing Or Planned Transmission Or Distribution System Connection Point	Apply rules of thumb to estimate likely cost of transmission line, substation or upgrade of existing substation divided by net declared capacity, in USD/MW.	Prioritization	130 000 USD/6 MW = 26 000 USD/MW	Scale TBD.



Project Site, Access And Internal Roads

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
PR 69	Weighted Average Land Use	Area needed for one MW of Designed Net Capacity, in ha/MW.	Prioritization	1.5 ha/MW	Solar: fixed and one-axis tracking system 2.8 ha/MW Solar: two-axis tracking system 3.9 ha/MW Wind: 0.3 ha/MW
79	Presence Of Rare Or Endangered Flora Or Fauna Species	What rare or endangered species are present, if unknown say Unknown. Source of information would be screening report, an EIA report or any other credible source (e.g. reports of research/academic institutions). Always keep requirements of IFIs in mind. Detailed textual description along with source of data.	Threshold	Widgee Grasshopper; EIA report	If it is known there are no rare or endangered flora or fauna species, then pass the threshold. If there are rare or endangered flora or fauna species, or the situation is unknown, then fail the threshold.
PR 86	Distance To Site From Closest Road That Can Handle Construction Equipment	Distance to closest paved road suitable for construction equipment, if project is large, it is likely that permission to build the road will be required, in km. Textual description of terrain from closest paved road.	Prioritization	1.6 km, Steep hills.	Scale TBD.



Local Social And Economic Issues

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
97	Informed Citizenry	The general opinion of local citizens is important when evaluating the project. This means that local citizens must be aware of project. Confirmation from developer that local government and citizens are (already) aware of project so that their opinions can be sought during site visit. Note as Yes, No or Unknown. Describe any meetings already held.	Threshold	Yes: Three public meetings held in Jan, July and Nov 2017	If Yes (citizens are aware of project), then passes threshold. If No or Unknown, then fails threshold.
100	General Opinions Expressed By Local Citizens	If answer to the Informed Citizenry question is Yes, then Team will visit local villages and chat with citizens about their general opinion of project. A 60 minute visit.	Threshold	Worry about impact of project on sheep grazing seems mostly based on insufficient information about project.	Citizens must already be informed and their opinions must be generally positive.

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Financing

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
104	Expected Debt/Equity Ratio	Ratio of project debt and project equity. The greater the ratio, the more important is debt in the overall project. Reflects percentage of investment cost coming from equity provider relative to non-equity (e.g., debt) financing. Also note timing of equity (e.g., equity before debt). Detailed description of any unknowns in this regard.	Threshold	25%: All Equity Before Debt; some doubt on Debt/Equity Ratio acceptable to XYZ Lender	Less than 4:1
105	Required Average Tariff	Single number reflecting seasonality of production and seasonality and diurnal pattern of revenue. In USD/kWh for electricity and USD/M for heat.	Threshold	0.060 USD/kWh	If equal to or less than 0.060 USD/kWh, passes threshold.
107	Financial Capacity Of Expected Buyer	Detailed textual description of the financial capacity of the expected buyer. If expected buyer has low financial capacity, then project will not be bankable.	Threshold	Georgan Railway: Purchases will represent 3 percent of annual purchases by Railway	If financial capacity is high or medium, then passes threshold.

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Wind-Project Specific

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
114	Geographical Zones for Wind project development (According to the 10 Year Development Plan)	From GSE 10-Year Development Plan: 1 Poti; 2 Chushki; 3 Kutaisi; 4 Mountain Sabutsi; 5 Mtskheta-Mtianeti; 6 Gori-Krasno; 7 Poti; 8 Samgori; 9 Rustavi. The integration capability of the transmission grid sets the temporal and spatial scale limitation for very capacity integration. Respectively the presence or non-presence of project on these zones sets limits for their development.	Threshold	Region 3, 6, 50 Percent Of GSE's connection limits in this Region	Net Capacity does not exceed GSE's connection limits.
115	Source And Dates Of Following Five Criteria	Taxual description of the source, to permit assessing of wind data reliability. Include an overall comment about reliability.	Threshold	Six months of on-site collection. Minute by minute electronic logging.	Project data must be from on-site measurements, not from the wind atlas. Ensures project is already in Feasibility Study phase, or later.
118	Average Wind Power Density At Hub or Mean Maximum Height	Current average from last mast. In Win2, Wind Power Density is used to describe wind resource as it is independent of the wind turbine characteristics. It indicates how much wind energy can be harnessed at allocation by a wind turbine and has the units W m ² . Higher is the Wind Power Density, depending on the capacity factor of Wind turbine and rotor swept area more electricity can be generated. In Win2,	Prioritization	300 W/m ²	1 to 5 scale for X to Y. TBD.
122	Anemometer Height (Highest)	The anemometer height is the height above ground at which the wind speed data are measured. In m.	Informational	60 m	Anemometer installed at lesser of 60 m or 2/3 of proposed hub height.
123	Height Of Turbine Hub	For comparison with anemometer height. In m.	Informational	60 m	
126	Self Consumption And Losses	Losses are estimates of a decrease in energy output that is known. As an example, 6% is the estimate of energy loss due to wake. This is one component of the estimated loss. Other sources of losses are electrical, plant availability, turbine performance, environmental, and curtailment. In percent of Desired Net Capacity.	Threshold	0	No more than 15 percent.

PR

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Wind-Project Specific (cont'd)

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
130	Proximity To Bird Migratory Routes Or Important Bird Areas	Injuries and mortalities tend to be related mostly to collisions with rotors or with other associated infrastructures such as overhead cables. Significant collision mortality risks are primarily related to topographical bottlenecks where migrating or local birds fly through a relatively confined area, for example mountain passes or land bridges between water bodies. Other susceptible locations are slopes with rising winds where the birds gain lift and near wetlands or shallow seas that attract large numbers of feeding or resting birds. Flight corridors between feeding areas, roosting sites or breeding sites are also particularly susceptible. Detailed textual description of proximity. Note source of information.	Threshold	None noted. IBA and Migratory Bird migratory route maps for Georgia	Minimum distance of wind turbine from IBA/MR 10 times the turbine height, but at least 1,200m as recommended by the Working Group of German State Bird Conservationists
131	Proximity To Roosting, Feeding Areas Or Migrating Routes Of Bats	Bats are most commonly killed by the moving rotor blades. Another cause of death is internal hemorrhaging caused by the pressure drop behind the rotor blades. To prevent/minimize bat death consisting of wind farms in areas where bats are likely to roost or routes where they migrate should be avoided. The areas where bats are most likely to roost are generally coastlines, top of distinct hills and mountains in forested areas. In comparison, flat terrain, farmed lowlands and treeless areas are considered to be safe, as bats are not likely to be there. Wind farms sited at humid areas with mild temperatures, closer than 5 km to forested areas and within 600 m of steep slopes showed higher probabilities of mortality. Detailed textual description of proximity. Note source of information.	Threshold	None noted, site study as part of EIA	Expert assessment of likelihood of bat strikes.

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Solar-Project Specific

LN	NAME	DESCRIPTION	TYPE OF CRITERIA	EXAMPLE	VALUE
PR 143	Global Horizontal Irradiance (GHI)	The total solar energy received in one year on a unit area of a horizontal surface. It includes energy from the sun that is received in a direct beam (the horizontal component of the DNI) and the DNI. Affected by altitude, latitude (length of sunlight), atmospheric turbidity (e.g., dust) and weather (clouds), in kWh/m ² .	Prioritization	1300 kWh/m ²	1,300 kWh/m ² . GHI in Georgia varies from 1,250 to 1,800 kWh/m ² .
147	Cell Conversion Efficiency	Percentage of solar irradiation that is converted into electricity. If various efficiencies are available (as efficiency decreases with age), then show several cell conversion efficiencies along with age. If only one (average) efficiency is available then show <i>Average plus the value</i> .	Threshold	20% first five years; 13 percent next five years; 10 percent next 15 years	Conversion efficiency over 15 percent passes threshold.

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THANK YOU!

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