NATIONAL ADVISORY BOARD
on Climate Change and Disaster Risk Reduction
GOVERNMENT OF VANUATU

PROJECT PROFILE FORM

NAB Project № *[completed by NAB]*	
GIP code/Project № *[obtain from DSPPAC]*	
Cost Centre/Activity № *[obtain from Dept.]*	
Donor/DSPPAC file № *[obtain from DSPPAC]*	

1. Project title: Enhanced Climate Resilience and Grid Connected Renewable Energy through Battery Storage

2. Project description: The project is a public private partnership in Port Vila, Vanuatu. It comprises solar photovoltaic plants (5 MWp) with a battery energy storage system (BESS) (11.5 MW/6.75 MWh), owned by the Government, and operated and maintained by UNELCO, the private sector utility under its concession agreement. The BESS will stabilize the grid integration of the PV plants and enhance the climate resilience of the power system. The project will double the renewable energy supplied to the grid, decrease diesel fuel consumption by 31%, improve the reliability of the electricity supply, and lower the price of electricity for customers on Efate Island.

3. Approval sought: ☐ Identification* ☒ Concept ☐ Funding Proposal
**For identification of project, use first page only* ☐ Continuation of existing project

4. Funding envelope: Concept note for a GCF Project

5. Total funding (Vatu and USD)
VUV 1,283,321,900 / USD 11,500,000

6. Access modality: To be determined

7. Implementing entity/organisation:
To be determined

8. Executing entity/lead government agency:
Department of Energy

9. Other government / partner agencies
Ministry of Finance & Economic Management
Utilities Regulatory Authority

10. Project contact details:
Antony Garae, Department of Energy
Frederic Petit, UNELCO

11. Location: Kawene, Undine Bay, Bouffa, and Tagabe in Port Vila, Efate

12. Duration:
Years 2 months ……
From 2023 to 2025

13. Theme(s):
☒ Mitigation ☒ Adaptation
☒ Cross cutting ☐ DRR / DRM

14. Climate/DRR relevancy (% of budget)
☒ High (≥80%) ☐ Medium (≥50%)
☐ Low (≥25%) ☐ Marginal (≥5%)

15. Sector(s) by ministry:
- ☐ Agriculture, livestock, forestry, fisheries and biosecurity
- ☐ Lands and natural resources (geology, mines, water)
- ☒ Climate change adaptation, meteorology, geo-hazards, environment, energy and disaster management
- ☐ Education and training
- ☐ Finance and economic management
- ☐ Foreign affairs, international cooperation and external trade
- ☐ Health
- ☒ Infrastructure and public utilities
- ☐ Internal affairs (custom and culture, labour and employment services)
- ☐ Justice and community services
- ☐ Trade, tourism, industry and commerce
- ☐ Youth and sports development

16. Scope:
☐ Regional ☒ National
☒ Provincial ☐ Community

17. Number of people impacted/affected:
☒ Direct 83,371 ☐ Indirect ……
☒ Women 41,425 ☐ Youth (<30 years) 51,721

18. Project Type:
- ☐ Capacity building
- ☐ Community awareness
- ☐ Disaster response
- ☐ Field implementation
- ☐ Formal education program
- ☐ Funding - small grants
- ☐ Informal training courses
- ☐ Knowledge communication
- ☐ Pilot / trial / demonstration Project
- ☐ Planning and governance
- ☐ Policy formulation and integration
- ☐ Policy support
- ☐ Research (feasibility study etc.)
- ☒ Other: Infrastructure

STOP HERE IF PROJECT ONLY AT IDENTIFICATION STAGE

CONTINUE FROM HERE ONLY IF PROJECT AT CONCEPT OR FUNDING PROPOSAL STAGE

[Information provided on this form will be made publicly available unless otherwise agreed with the NAB Secretariat]

19. Project rationale:

The provision of sustainable and reliable electricity is critical in these times of climate exacerbated impacts and for the country's governance, social wellbeing, sustainable development, and overall economic resilience. It is an essential service, and a key cross-cutting input to the economic activities of Vanuatu and plays a large role in the growth of the economy. An electricity supply that also integrates renewable energy allows Vanuatu to increase its economic and energy security and resilience by reducing the need for fuel imports and thereby the shocks from, and vulnerability to, fluctuating global petroleum prices, as well as creating local employment opportunities, and reducing greenhouse gas (GHG) emissions. It is also integral to meeting Vanuatu's national sustainable development goals and its obligations under international climate agreements.

The project is an extension of the 4.4 MWp solar PV and 3.4 MW wind projects that have already been completed or are to be completed by the end of 2022 by the funding actions of UNELCO though the electricity tariff and actions of the GoV and the European Union though grants. These developments have been successful in the establishment of the 3 solar PV plants of Undine Bay, Kawene and Bouffa and 1 windfarm at Kawene on the island of Efate and are supplying an average of 16% of renewable energy into the Efate electricity grid. The 3 solar plants have sufficient land to accommodate additional PV infrastructure, transmission, and distribution infrastructure sufficient to carry additional capacity back to the grid, and a SCADA (supervisory control and data acquisition) system so that the project can take advantage of the already secured land and the established infrastructure from these earlier developments.

20. Project objective against the baseline:

The project will contribute to national target of close to 100% renewable energy in the electricity sub-sector by 2030, by increasing the share of renewable energy on the Efate electricity grid by 15%, taking the overall renewable energy integration to 31% and achieve close to the NDC target for solar and wind on Efate as well as increase the overall share of renewable energy in Vanuatu as a whole. Secondly the project is also within the constraint (less than or equal to the marginal cost of diesel) of the NERM to ensure an affordable electricity price in Vanuatu.

21. Policy coherence and alignment: The project aligns with the following policies, plans, strategies, and priorities:

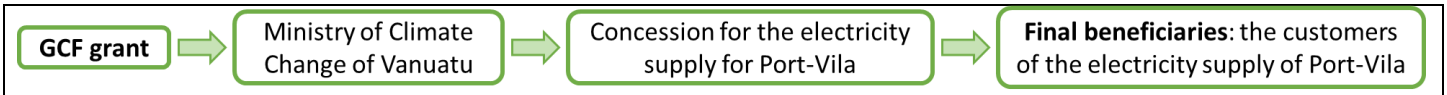
1. The National Sustainable Development Plan, "Vanuatu 2030 - People's Plan" (NSDP) with the national goals of, "A stable and prosperous economy, encouraging trade, investment and providing economic opportunities for all members of society throughout Vanuatu" and "An economy which fosters sustainable growth and development through low impact industries and modern technologies to ensure the well-being of future generations" and clearly defined policy objectives of:
   - ECO 2.1 "Increase access to safe, reliable and affordable modern energy services for all that are increasingly generated from renewable sources and reduce reliance on imported fossil fuels"
   - ECO 2.5 "Improve partnerships and the cost-effective use of resources to ensure sustainable asset management and maintenance"
   - ENV 2.3 "Promote renewable sources of energy and promote efficient energy use" and "A strong and resilient nation in the face of climate change and disaster risks posed by natural and man-made hazards" and targets of "100% of grid-based electricity generated from renewable energy sources" and "100% of households using renewable energy technology as the main source of lighting"
   - ENV 2.6 "Ensure adequate financial resources to support our sustainable development aspirations"
   - ENV 3.4 "Promote and ensure strengthened resilience and adaptive capacity to climate related, natural and man-made hazards."
   - ENV 3.5 "Access available financing for climate change adaptation and disaster risk management", and
   - SOC 6.8 "Coordinate donor resources to align with national objectives"
2. The Nationally Determined Contributions (NDC) goal of "Reduce GHG emissions in the energy sector by 78.786 Gg CO_2e by 2030" and target of "Grid connected renewable energy generation close to 100% by 2030".
3. The Climate Change and Disaster Risk Reduction Policy (CCDRRP) with strategic priority 7.4.3 is: "Enabling communities to increase their capacity to adapt to ongoing and uncertain changes by developing and delivering community-based adaptation and risk reduction programmes."
4. The updated National Energy Road Map (NERM) 2016-2030 objectives and priorities for accessible energy, affordable energy; secure and reliable energy, sustainable energy, and green growth.

22. Current status: The project is currently at the concept note stage.

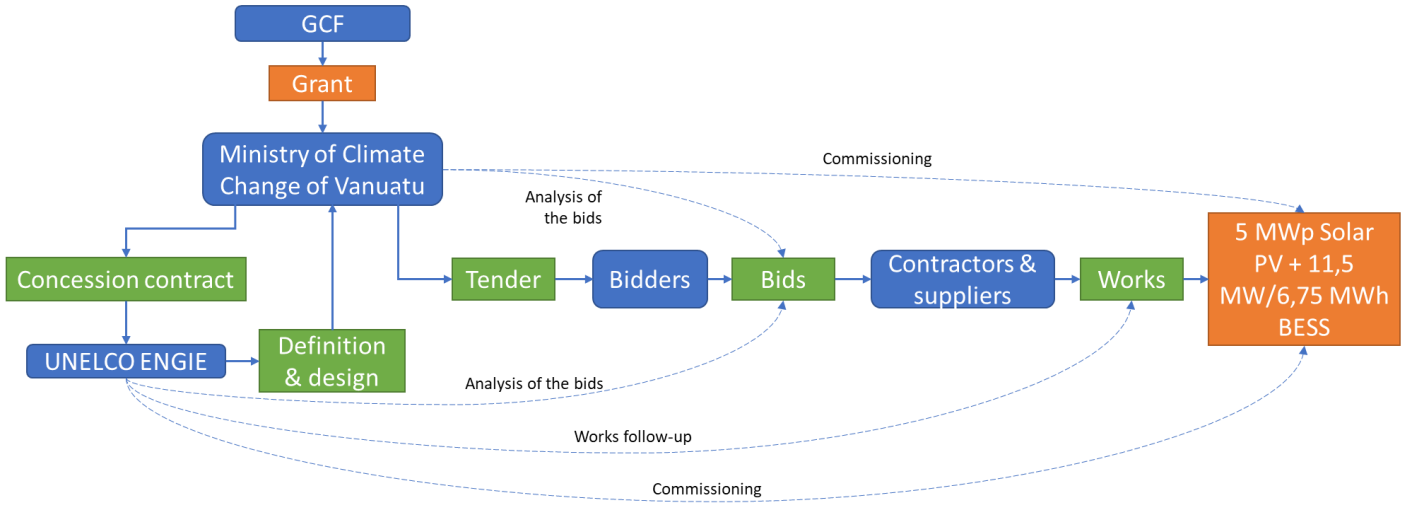
23. Market overview: UNELCO is the monopoly electricity and water supplier on Efate and operates the grid within the Port Vila concession area. The generation of the electricity supply on Efate includes a small amount of solar and wind (an average of 16% of the energy generation per year) but is largely dependent on imported diesel fuel and as such is very GHG intensive.

24. Implementing / executing entity background / justification: An accredited entity Is yet to be determined. UNELCO is a private limited company with capital of VUV 525,773,650 and has been operating in Vanuatu since 1939. ENGIE has a shareholding of 51% of UNELCO and the Vanuatu National Provident Fund (VNPF) has 49%. The Department of Energy and UNELCO have cooperated previously on numerous projects.

25. Institutional / implementation arrangements: The accredited entity will implement the project with the executing entities being the DoE and UNELCO.



The project will be organized as follow:



26. Results Areas *[GCF projects only]*

Reduced emissions from (mitigation):		Increased resilience of (adaptation):	
☒	Energy access and power generation	☐	Most vulnerable people and communities
☐	Low emission transport	☐	Health/well-being, & food/water security
☐	Buildings, cities, industries & appliances	☒	Infrastructure and built environment
☐	Forestry and land use	☐	Ecosystems and ecosystem services

27. Expected performance against investment criteria

a) Impact Potential:

Mitigation

The project consists of solar PV infrastructure and a BESS which will contribute to 5,670 tCO_2eq GHG emission reductions over its lifespan. This corresponds to an avoided cost of diesel of USD 1,600,994 per year. The project will assist in avoiding the lock-in of long-lived high-emission infrastructure.

Adaptation

The adoption of this technology offers opportunities for more climate resilient energy infrastructure. Expected strengthening of adaptive capacity and reduced exposure to climate risks: the project will offer adaptation co-benefits by strengthening the resilience of Port Vila's electricity supply by providing redundancy in the source of electricity powering the system via the BESS. During catastrophic events (severe tropical cyclones) leading to fuel depletion in Vanuatu, the project offers a solution to generate electricity using less diesel. It will therefore ensure a longer capacity to supply electricity to critical infrastructure such as water pumping, hospital, and refrigeration for food storage. This will provide additional resilience so that during times of climate exacerbated impacts, where there may be no supply of electricity to the Port Vila settlement, electricity will continue to be supplied to the water supply and sanitation system to ensure that it is maintained for the entire Port Vila population of approximately 83,371 people (26% of Vanuatu population).

b) Paradigm Shift Potential:

The solar PV and associated BESS are breakthrough technologies that offer higher integration percentages of solar energy into the grid and the maximum climate mitigation potential of the project to be achieved. The project can be easily scaled in Port Vila and/or replicated in the other islands of Vanuatu, and other Pacific Islands with similar context and that are dependent on imported diesel for electricity.

The project is an important milestone achievement for UNELCO, GoV agencies, the URA, and development partners. The project allows the achievement of national goals on climate related developments whilst also overcoming constraints set by other important national goals regarding the affordability of electricity. The development challenge becomes even greater when the affordability factor set by the institutional framework of the country is the marginal cost of fuel, the very commodity that this initiative seeks to avoid. The project is being supported by all the relevant agencies with complete awareness of this economic, social, and environmental dilemma. Therefore, the lessons learned from this project, through continued monitoring and evaluation of the monthly electricity price adjustments by the URA, (this system is already in place) will enable the URA to inform the GoV on the project outcomes and results.

This will enable the GoV to update national goals and policy to foster a more enabling environment for climate related developments that are sustainable. The investment is also a Public Private Partnership (PPP) in that the GoV will own the assets, UNELCO 49% owned by the VNPF), the DoE and URA are closely involved and the project addresses climate change and promotes synergies within GCF cross-cutting areas, including climate change mitigation and adaptation in the urban sector. The BESS will also promote an enabling environment and the advancement of the regulatory framework and policy to systematically promote investment in low-emission and climate-resilient development by allowing the greater penetration of privately owned residential solar PV, smart metering and energy efficiency measure and innovative virtual

power plants to aid the energy transition and the decarbonization of the Vanuatu economy. As homeowners switch cooking and water heating from gas to electricity to maximize the benefits from residential solar PV, there may be additional GHG emission reductions from less natural gas (CH4) being used as well as allowing for the possibility of greater electrical vehicle charging (and vehicle to grid charging) which can also result in a less emissions from a switch from petrol/diesel to renewable energy.

c) Sustainable Development Potential:

Environmental Co-Benefit:

Environmental sustainability is the fundamental principle in the project's design. Renewable energy generation from solar power will reduce the reliance on imported diesel fuel by up to 31% and the associated fuel transport costs along with a corresponding reduction in GHG emissions from displacing its transport to Vanuatu and use in generation. The BESS also allows for the greater integration and management of privately owned rooftop solar PV that is expected to increase over time.

Social Co-Benefit:

The anticipated benefits are through the resilience of the water supply system, the health and hygiene of especially the most vulnerable population which is protected in extreme events, and the improved air quality and associated health benefits from using renewable energy as an alternative fuel source.

* The project's expected impacts in terms of environmental, social, economic, and gender-sensitive development, i.e., estimates of the impact of the project on air quality, health, access to education, job creation, poverty alleviation, increased involvement of local industries, economic productivity, and how the activities will address the needs of women and men to correct prevailing inequalities in climate change vulnerability and risks will be addressed further in the full funding proposal.

d) Needs of the Recipient:

The proposed project was conceived intentionally to align with and contribute to Vanuatu's 2030 national goals, policy objectives and targets as set out in its NSDP, NDC, and updated NERM. By increasing the share of renewable energy in the energy mix, the project will improve Vanuatu's energy security and reduce the financial burden of importing fossil fuels for electricity generation. It also contributes to Vanuatu's climate change mitigation obligations by reducing greenhouse gas emissions and allowing it to lead by example in international climate negotiations. In addition, the project contributes to the formation of climate resilient infrastructure to adapt to climate-driven extreme disasters, especially as it is difficult for the GoV to develop this infrastructure with such a limited budget, and the inability to take on further debt.

e) Country Ownership:

The project will ensure that the NDA is kept well informed and all processes of the National Advisory Board (NAB) on Climate Change and Disaster Risk Reduction, the Government Investment Programme, and national regulations are adhered to from this concept phase right through to the implementation phase. The project demonstrates country ownership through its consistency with key national sustainable development and climate policies.

f) Efficiency and Effectiveness:

This project consists of a renewable energy system including the solar PV infrastructure and the BESS. The costs and mitigation targets for the project are summarized as follows:

a) Total program cost:	USD 11.5 million
b) Requested GCF amount:	USD 10.0 million
c) Fuel (diesel) consumption reduction	2.1 million litres/year
d) Fuel cost reduction:	USD 1.6 million/year
e) Expected annual tCO2eq reductions:	5,670.0 tCO2eq/year

As for the cost effectiveness and efficiency, a more detailed cost estimation will be calculated as part of the full funding proposal to ensure the most up to date data are used especially as the costs of the renewable energy technologies involved are reducing year by year. A competitive tender and procurement process will also be undertaken to ensure value for money and that the components used in the project are of good quality and meet international standards.

28. Consultation: Consultation took place with the Government of Vanuatu (Ministry of Climate Change / Department of Energy), Utilities Regulatory Authority, UNELCO, and the National Advisory Board on Climate Change and Disaster Risk Reduction. A consultation workshop was also held with these stakeholders and a consultation workshop report published. Consultation with these stakeholders will continue as the project is developed to a full funding proposal and implementation.

29. Potential overlaps / duplication to be resolved: Other solar PV capacity is being installed on the Efate grid, but these capacity additions are taken into account as part of this project (see above).

30. Technical feasibility/evaluation: Local staff will be procured to develop the full funding proposal and for the installation of the solar PV and battery where possible. No local staff will be funded through the project, nor will additional staff be required for the operation and maintenance of the assets as UNELCO will use existing staff.

31. Economic and financial analysis/viability: An economic and financial analysis has been undertaken that demonstrates that a 100% grant would result in greatest reduction in the tariff for customers. In the event the grant would not be 100%, a 40% grant would be sufficient for the project to not increase the tariff under project assumptions. The additional finance could be sought from the Accredited Entity or from the NGEF, for example. However, if 40% of the project cost was sought from UNELCO it would have to deplete its contractual annual investment plan which

would only be possible with the permission of the GoV (the Grantor) and by abandoning other budget lines. This would have a negative impact on the investments for extensions of the network towards area without access to the grid, and therefore contradict the ECO 2.1 goal "Increase access to safe reliable and affordable modern energy services for all…"

32. Financial management and procurement: See organisation of the project diagram above. Precise details of financial management and procurement will be elaborated at the full proposal stage.

33. Environmental and social considerations: The project will not involve transboundary impacts on air, water, or other natural resources, will not contribute to cumulative impacts, will not involve associated facilities and third-party impacts, and will not be likely to induce potential social conflicts. The accredited entity (once determined), executing entities and implementing agencies have the capacity to implement the environmental and social management plans/action plans.

34. Gender and social inclusion considerations: ***[TO BE PROVIDED AT FULL FUNDING STAGE]***

35. Monitoring, reporting and evaluation: ***[TO BE PROVIDED AT FULL FUNDING STAGE]***

36. Sustainability measures: It is intended that the project be funded by a 100% donor grant, with no government funding, the government will own the assets and that issues regarding sustainability will be re-assessed with renewal of the concession in 2032. Recurrent costs related to operation and maintenance will be recovered through a 2% fee paid through the tariff.

37. Supporting documents *[where applicable]*

☒	Budget template *[mandatory]*	☒	Risk assessment *[mandatory]*	☒	Logical framework
☒	Concept note	☐	Funding proposal	☐	Financial analysis
☐	Environmental analysis	☐	Project timetable	☐	Letter of support
☐	Consultation evidence	☒	Location map *[detailed plans where construction is involved]*		

38. Provincial consultation certification by implementing/executing entity

I certify that the Province has been consulted with and the project is consistent with the Provincial Governments Provincial Plan. I also confirm that I am not aware of any ongoing disputes or disagreements that may adversely impact on the implementation of the project. A letter of support is attached.

[TO BE PROVIDED AT FULL FUNDING STAGE]

Name **Signature** **Date**

39. Director of Lead Government Agency

I certify I have checked the project profile, and any other supporting information for screening this project. I am satisfied that this project proposal is ready for presentation for approval.

[TO BE PROVIDED AT FULL FUNDING STAGE]

Name **Signature** **Date**

40. DSPPAC Sectoral Specialist sign off

I certify I have checked the project profile, and any other supporting information for screening this project. I am satisfied that this project proposal is ready for presentation for approval.

[TO BE PROVIDED AT FULL FUNDING STAGE]

Name **Signature** **Date**

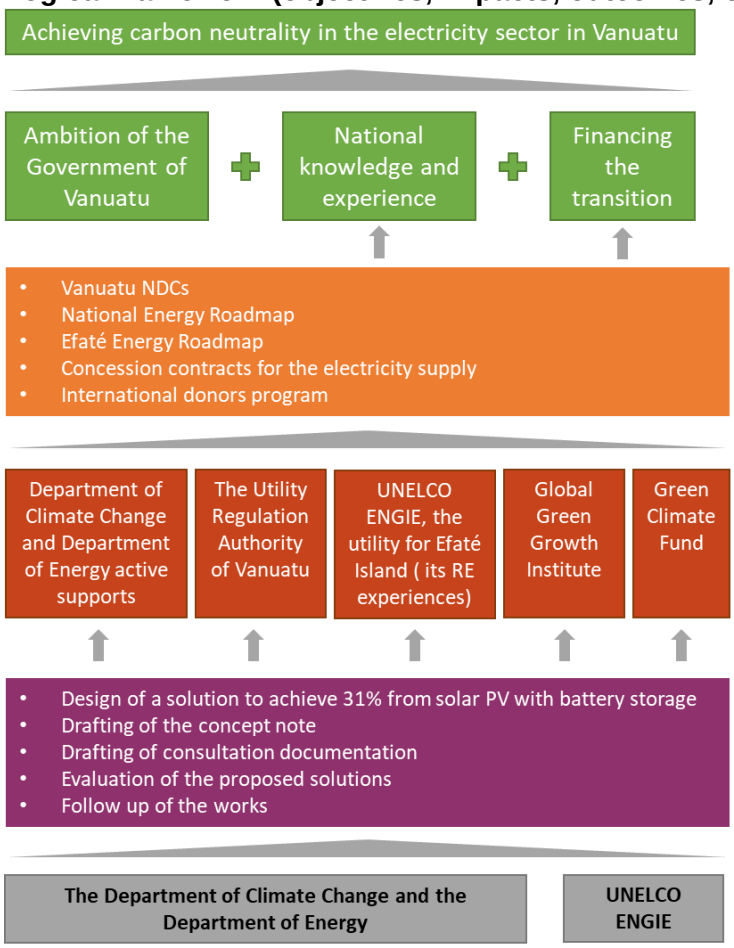
41. Director General's Certification

I certify that I have checked the project profile, and any other supporting information for screening this project. I am satisfied that this project proposal is ready for presentation for approval. I understand that no Government funding will be released for the project until the project has been approved by the appropriate government authorities, any additional government contribution has been appropriated, the approved donor funding has been released and a detailed project income and expenditure form has been submitted.

[TO BE PROVIDED AT FULL FUNDING STAGE]

Name **Signature** **Date**

42. Logical framework (objectives, impacts, outcomes, outputs, activities, and inputs) *



43. Project budget summary (estimated in Vatu '000)

Items/component	Year 1	Year 2	Year 3	Year 4	Year 5	Total	% of Total
Grants *[GCF]*						USD 10M	87%
Aid in kind* [UNELCO]						USD 1.5M	13%
Total						USD 11.5M	100%

** contributions made directly towards projects realisation such as equipment, materials, labour, T/A, building works, vehicles, time etc. and other quantifiable resources that count towards the achievement of the project results*

44. Project component costs (estimated in Vatu '000)

Items/component	Year 1	Year 2	Year 3	Year 4	Year 5	Total	% of Total
Solar PV (5MWp)						USD 7M	61%
Centralized BESS (11.5 MW/6.75 MWh						USD 3M	26%
Land, transmission and distribution line infrastructure, and SCADA system for establishment of the project						USD 1.5M	13%
Total							100%

45. Project risk factors, mitigation measures, and assessment tool*

[Use tool to describe the financial, technical/operational, social/environmental, and other risks that may prevent the project objectives from being achieved, and proposed risk mitigation measures.]

Selected Risk Factor 1				
Description	Risk category	Level of impact	Probability	Score
The proposed technology (BESS) may underperform.	Technical and operational	High (>20% of project value)	Low	3
Mitigation Measure(s)				

The project will ensure (by charging a 2% on the cost of investment imposed on the electricity tariff) that proper operation and maintenance is carried out by UNELCO through the lifetime of the investment. To contribute to the sustainability of the project there is renewal provision in the concession agreement which is calculated at 1.5% across all concession assets.				
Selected Risk Factor 2				
Description	Risk category	Level of impact	Probability	Score
More frequent and or intense tropical cyclones and/or other natural hazards in the future may damage project infrastructure	Other	Low (<5% of project value)	Medium	2
Mitigation Measure(s)				
The project will ensure that infrastructure investments meet standards for cyclones.				
Selected Risk Factor 3				
Description	Risk category	Level of impact	Probability	Score
Land acquisition causing delays on project implementation	Technical and operational	High (>20% of project value)	Low	3
Mitigation Measure(s)				
The project will be on land already owned or leased to UNELCO during the establishment of the 3 solar farms and or on already acquired land where the Tagabe Power Plant is located.				
Selected Risk Factor 4				
Description	Risk category	Level of impact	Probability	Score
Future drop in diesel prices: If the price of diesel falls significantly, it lowers the affordability constraints on the renewable energy technologies, and the renewable energy produced by the project may be curtailed and as it can no longer be afforded by the electricity tariff	Financial	Medium (5.1-20% of project value)	Low	2
Mitigation Measure(s)				
This risk is mitigated up to complete elimination by the level of grant funding participation on the project, and where 100% grant participation totally eliminates the risk.				
Selected Risk Factor 5				
Description	Risk category	Level of impact	Probability	Score
Capacity constraints of all executing entities and the agencies with oversight roles may inhibit effective implementation	Technical and operational	Low (<5% of project value)	Low	1
Mitigation Measure(s)				
A detailed Project Administration Manual will be prepared by the accredited entity setting out the reporting, monitoring and evaluation activities, responsibilities, and budget to be complied with by all executing entities. It will assist the executing entities to implement the project in accordance with the set guidelines. The accredited entity will regularly follow its project implementation processes and guidelines including reporting obligations under the Accreditation Master Agreement, and any additional terms that may be agreed in the Funding Activity Agreement.				
Total score (add all the scores and divide by the total number of risk factors)				2.2

**These are project related risks, not broader, general, global climatic and environment risks*

	Probability	Low	Medium	High
Impact	Score	(1)	(2)	(3)
Low	(1)	1	2	3
Medium	(2)	2	4	6
High	(3)	3	6	9

Multiply the impact of each risk factor by the probability of each risk factor to give an individual risk factor score. Then add all the individual risk factor scores and divide by the number of risk factors to give an overall project risk score.

Key 1 Negligible 2 Minor 3 Moderate 4 Major 6 Severe 9 Extreme

History of the document

Version	**Date**	**Nature of revision**
1.0	NAB Meeting 9 February 2018	Initial endorsement