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Report No: 92945

PROJECT PAPER

FOR A

SMALL RETF GRANT

IN THE AMOUNT OF

US$4.7 MILLION EQUIVALENT

TO THE

REPUBLIC OF VANUATU

FOR A

RURAL ELECTRIFICATION PROJECT

October 22, 2014

Energy & Extractives Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective {October 1, 2014})

Currency Unit = Vatu (VUV)
VUV98 = US$1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

COM	Council of Ministers
CPF	Country Partnership Framework
CQS	Selection Based on Consultants Qualifications
DA	Designated Account
DoE	Department of Energy
ECOP	Environment Code of Practice
ERR	Economic Rate of Return
ESDP	Energy Sector Development Project
ESMF	Environmental and Social Management Framework
FM	Financial Management
GDP	Gross Domestic Product
GoV	Government of Vanuatu
IA	Implementation Agency
ICB	International Competitive Bidding
IDA	International Development Association
IFR	Interim Financial Report
IP	Indigenous Peoples
IPP	Indigenous Peoples Plan
km	Kilometer(s)
MCCND	Ministry of Climate Change and Natural Disasters
MIPU	Ministry of Infrastructure and Public Utilities
MoFEM	Ministry of Finance and Economic Management
MW	Megawatt
NCB	National Competitive Bidding
NERM	Vanuatu National Energy Roadmap
NGO(s)	Nongovernmental Organization(s)
NPV	Net Present Value
O&M	Operation and Maintenance
ORAF	Operational Risk Assessment Framework
OVR	Output Verification Report
PAA	Priority and Action Agenda
PDO	Project Development Objective
PPP	Purchasing Power Parity
PV	Photovoltaic

QBS	Quality Based Selection
QCBS	Quality and Cost Based Selection
SSS	Single-Source Selection
TA	Technical Assistance
TOR	Terms of Reference
UNELCO	Union Electrique du Vanuatu Ltd
URA	Utilities Regulatory Authority
US	United States
USD	United States dollars
V	Volt(s)
VERD	Vanuatu Energy for Rural Development
VUI	Vanuatu Utilities and Infrastructure Ltd
VUV	Vanuatu Vatu
Wp	Watt peak power
WTP	Willingness to pay

Regional Vice President:	Axel van Trotsenburg
Country Director:	Franz. R. Drees-Gross
Sector Director	John A. Roome (through June 30, 2014)
Sector Manager:	Michel Kerf (through June 30, 2014)
Senior Global Practice Director:	Anita M. George (from July 1, 2014)
Global Practice Manager	Charles M. Feinstein (from July 1, 2014)
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Task Team Leader:	Kamleshwar Prasad Khelawan

VANUATU
Rural Electrification Project

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DATA SHEET

Vanuatu

Rural Electrification Project

Small RETF Grant Project Paper

East Asia and Pacific Region

GEEDR

Basic Information

Date:	October 22, 2014	Sectors:	Energy
Country Director:	Franz R. Drees-Gross	Themes:	Rural services and infrastructure 50%, Climate change 50%
Practice Manager:	Julia M. Fraser	EA Category:	B – Partial Assessment
Project ID:	P150908		
Instrument:	Investment Project Financing - IPF		
Team Leader(s):	Kamleshwar Prasad Khelawan		

Recipient: Republic of Vanuatu

Executing Agency: Department of Energy, Ministry of Climate Change and Natural Disaster

Contact:	Jesse Benjamin	Title:	Director
Telephone No.:	+678 25 201	Email:	jbenjamin@vanuatu.com.vu

Project Implementation Period:	Start Date: December 1, 2014	End Date:	December 31, 2019
Expected Effectiveness Date:	December 1, 2014		
Expected Closing Date:	December 31, 2019		

Project Financing Data(US$M)

[ ] Loan	[X] Grant	[ ] Other
[ ] Credit	[ ] Guarantee	

For Loans/Credits/Others

Total Project Cost :	7.8	Total Bank Financing :	4.7
Total Cofinancing :	3.1	Financing Gap :	0

Financing Source	Amount(US$M)
BORROWER/RECIPIENT	
IBRD	
IDA: New	
IDA: Recommitted	
Pacific Region Infrastructure Facility (PRIF)	4.7
Cofinancing (consumer contribution)	3.1
Financing Gap	
Total	7.8

Expected Disbursements (in USD Million)

Fiscal Year	2015	2016	2017	2018	2019	2020			
Annual	0.5	1.0	1.0	1.0	1.0	0.2			
Cumulative	0.5	1.5	2.5	3.5	4.5	4.7			

Project Development Objective(s)

The project development objective (PDO) is to scale up access to electricity services for rural households, aid posts and community halls located in dispersed off-grid areas.

Components

Component Name	Cost (USD Millions)
Electrification of off-grid households, aid posts and community halls	6.2
Technical assistance and project management	1.6

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]

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Does the project require any exceptions from Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [X]
Is approval for any policy exception sought from the Board?	Yes [ ]	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [ ]	No [X]

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Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X
Forests OP/BP 4.36		X
Pest Management OP 4.09		X
Physical Cultural Resources OP/BP 4.11		X
Indigenous Peoples OP/BP 4.10	X	
Involuntary Resettlement OP/BP 4.12		X
Safety of Dams OP/BP 4.37		X
Projects on International Waters OP/BP 7.50		X
Projects in Disputed Areas OP/BP 7.60		X

Legal Covenants

Name	Recurrent	Due Date	Frequency
Schedule 2, Section IV, Part B		Prior to Disbursement under Category (2)	

Description of Covenant

No withdrawal shall be made for payments under Category (2), unless (i) the Subsidy Implementation Manual has been prepared and adopted in accordance with Section I.C of Schedule 2 to this Agreement; (ii) for each respective Vendor, the Recipient has entered into a Subsidy Implementation Agreement with the such Vendor; and (iii) the IVA has verified the transaction and prepared an Output Verification Report in accordance with the Subsidy Implementation Manual.

Team Composition

Bank Staff

Name	Title	Specialization	Unit	UPI
Kamleshwar Khelawan	Task Team Leader	Senior Energy Specialist	GEEDR	392699
Renee Walmsley	Operations Analyst	Operations Analyst	GEEDR	
Megan Schlotjes	Team Member	E T Consultant	GTIDR	
Marjorie Mpundu	Senior Counsel	Country Lawyer	LEGES	
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Ross Butler	Senior Safeguards Specialist	Social and Environmental	GURDR	
David Whitehead	Financial Management Specialist	Financial Management	GGODR	
Robert Gilfoyle	Senior Financial Management Specialist	Financial Management	GGODR	
Jinan Shi	Senior Procurement Specialist	Procurement	GGODR	
Kim Baverstock	Team Assistant	Program Support	EACNF	

Non Bank Staff

Name	Title	Office Phone	City
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Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Vanuatu	Torba, Sanma, Penama, Malampa, Shefa, and Tafea Provinces	Rural areas	Yes		Households, aid posts and community halls.

I. STRATEGIC CONTEXT

A. Country Context

1. The Republic of Vanuatu is an archipelago of 82 volcanic islands (65 of them inhabited) covering a total area of about 12,200 square kilometers, of which approximately a third is land. Vanuatu's population of approximately 270,000 people is almost evenly distributed among the six administrative provinces: Malampa, Penama, Sanma, Shefa, Tafea and Torba.

2. Vanuatu has become one of the fastest growing economies of the Pacific region. The economy has experienced strong and sustained growth, mainly driven by tourism, construction, and aid inflows. The per capita Gross Domestic Product (GDP) is estimated at US$3,375 (US$5,297 at Purchasing Power Parity (PPP))[1], yet the cost of basic infrastructure services is high and affects the business environment in the country. For instance, although Vanuatu ranks 74th (of 183 countries) in the "ease of doing business" indicator reported by the World Bank, it ranks far worse (129th) in the "getting electricity" indicator, mainly due to the high costs associated with obtaining a new connection to the electricity grids and a lack of access and connectivity to grids in rural areas.[2]

3. The national household count stands at an estimated 50,740, of which about 12,470 households (25 percent) are located in urban areas and the remaining 38,270 (75 percent) are dispersed in rural areas.[3,4] The average household monthly income in Vanuatu is VUV83,800 (US$835), with an average household monthly income of VUV97,500 (US$972) reported in urban areas, compared with VUV79,500 (US$792) in rural areas. For female headed households, the average monthly income across Vanuatu is VUV59,300 (US$591): VUV85,200 (US$849) in urban areas and VUV 51,200 (US$510) in rural areas[5]. Generally, urban households in Vanuatu rely on wages and salaries from labor-based activities as their main source of income, while rural households rely mainly on home consumption (subsistence) and household enterprises based around the sale of agricultural products, handicrafts, and other goods produced in the home.

B. Sectoral and Institutional Context

4. An estimated 27 percent of the Vanuatu households and public institutions have access to electricity via connections to a grid network.[6] Even on the largest four islands, the share of those without access to electricity remains high: Efate (24 percent), Santo (65 percent), Tanna (86

[1] IMF World Economic Outlook Database, May 2014
http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx
[2] Ease of doing business, The World Bank group as ranked at May 2014.http://www.doingbusiness.org/rankings
[3] Vanuatu Household Income and Expenditure Survey 2010. Vanuatu National Statistics Office, Government of Vanuatu. December 2012.
[4] Vanuatu National Energy Road Map 2013-2020. Government of Vanuatu. March 2013.
[5] Vanuatu Household Income and Expenditure Survey 2010, Vanuatu National Statistics Office, Government of Vanuatu. December 2012.
[6] Vanuatu National Energy Road Map 2013-2020. Government of Vanuatu. March 2013.

percent), and Malekula (84 percent). There is a severe imbalance in access between urban and rural areas; the population without access in rural areas ranges from 83-85 percent in Tafea and Shefa, 89 percent in Sanma, 92 percent in Malampa and 97 percent in Torba.

5. The rural population usually access electricity through the use of diesel generators or solar, however, some communities are supplied by small micro-/mini-grid systems. An earlier "Lighting Vanuatu" project supported by the Australian Government focused on providing solar lanterns to rural consumers. This project is now closed. The lower population density in rural areas, large distances between customers, lower electricity loads and high connection costs have meant that the extension or building of new electricity grids for supply to peri-urban and rural consumers remain uneconomic. The Government of Vanuatu (GoV) is working with the World Bank to implement a Global Partnership on Output Based Aid Improved Electricity Access Project, which has recently been approved, to assist low income consumers predominantly in urban areas to connect to the electricity grid.

6. Electricity services in Vanuatu are delivered through three types of models: (a) independent "main grid systems" in the two main urban centers; (b) isolated "mini-grids" in lesser population concentrations, but where a grid supply system is still a technically and economically competitive option; and (c) decentralized energy service systems. Grid electricity in Vanuatu is supplied by two concessionaires, Union Electrique du Vanuatu Ltd (UNELCO) and Vanuatu Utilities and Infrastructure Ltd (VUI), and is largely restricted to Port Vila and Luganville, as well as small parts the islands of Malekula and Tanna. UNELCO, a subsidiary of GDF Suez, has been operating in Vanuatu since 1939 and supplies the Port Vila, Malekula and Tanna concession areas. In Port Vila, the concession is in force until the year 2031 and provides UNELCO exclusive rights to generate and supply electricity within a 15 km radius of the city boundaries. VUI, a subsidiary of Pernix Group, has supplied the Luganville concession area since January 1, 2011, after signing an Operations and Maintenance (O&M) agreement with GoV for the Luganville electricity concession.

7. The total installed capacity on the grids in Vanuatu is 30.7 Megawatts (MW). Of this capacity, 26.0 MW is in Port Vila (peak demand 11.3 MW), 4.1 MW in Luganville (peak demand 1.50 MW), 0.34 MW in Malekula (peak demand 0.12 MW) and 0.27 MW in Tanna (peak demand 0.12 MW). About 80 percent of electricity is generated from diesel powered plants using imported fuel. The remaining 20 percent of electricity is produced using renewable energy (10 percent from the Sarakata hydro plant, which serves Luganville, and the rest from wind and coconut oil on UNELCO's grid system). UNELCO is scaling up the use of biodiesel in its power plants, including investment in copra plantations to increase security of supply of biodiesel.

8. The Utilities Regulatory Authority (URA) regulates electricity tariffs in the concession areas. The current high fuel prices in Vanuatu, from imported diesel, are passed through to consumers, resulting in high electricity tariffs across the concession areas. Low consumption domestic consumers, considered to be low income consumers, benefit from a reduced base tariff. Prices for electricity supply outside the concession areas are not regulated.

9. Outside the concession areas, the Department of Energy (DoE), within the Ministry of Climate Change and Natural Disasters (MCCND), is responsible for electrification projects (rural

electrification). DoE also plays a central role in coordinating energy sector development and policy. Other Government Ministries involved in the electricity sector include the Ministry of Infrastructure and Public Utilities (MIPU), which is responsible for all the public infrastructure of the government, and the Ministries of Education and Health, which have in the past been beneficiaries of solar energy packages for social institutions through other donors.

10. GoV has made the development of the electricity sector a priority. The Vanuatu National Energy Roadmap (NERM)[7], which was developed with support from the World Bank, lays the foundation for future energy sector policy and investment in Vanuatu. NERM was approved by the Council of Ministers (COM) on June 27, 2013, and launched by GoV in April, 2014. NERM sets out three strategic directions for the sector: (a) *Government leadership and commitment*, to establish a comprehensive and consistent set of enabling policies, a strengthened legislative and regulatory framework, and targeted financing mechanisms; (b) *Empowering and holding accountable key energy institutions*, including effective energy sector institutions, the DoE, and the URA; and (c) *Implementing a sector-wide approach under the principle of "Many Partners, One Team, One Plan"*.

11. NERM identifies five priority areas and targets for Vanuatu's energy sector, including: (a) *Access* to secure, reliable and affordable electricity for all citizens by 2030; (b) *Petroleum Supply* – reliable, secure and affordable petroleum supply throughout Vanuatu; (c) *Affordability* – lower cost energy services in Vanuatu; (d) *Energy Security* – an energy secure Vanuatu at all times; and (e) *Climate Change* – mitigating climate change through renewable energy and energy efficiency. This Project will contribute to increased access and affordability of electricity in rural Vanuatu.

12. Of the 50,740 total households nationwide, an estimated 21,500 are in grid-concession areas or in adjacent areas feasible for grid-extension. GoV and the two incumbent concessionaires are working towards implementing the Improved Electricity Access Project, funded by the Global Partnership on Output-Based Aid/World Bank, which will provide assistance to low-income consumers who are still not connected or currently share a connection within the existing grid service areas.

13. The remaining 29,240 households are in areas termed "off-grid". Some of these households are relatively concentrated and may be more likely to benefit from a micro- or mini-grid configuration, powered by local resources, such as hydro and other renewable energy technologies where available, diesel gensets, or hybrids of the two. There have been no past studies or data that would enable an accurate estimation of the size of the group that would benefit from micro- or mini-grid configurations. Assuming that 30 percent of off-grid households are in this category (including the few estimated to have operating or forthcoming micro- or mini-grid installations), the remaining dispersed off-grid households would be estimated at 20,470. In addition to the off-grid households, some 560 schools, health centers, dispensaries, and aid stations (posts) which provide vital services to poor and isolated communities are not likely to have access to grid electricity in the near future. Under NERM, GoV's goal is to provide access to modern energy to this off-grid segment of the population in the near, or immediate, future. The GoV is currently finalizing a Scaling Up Renewable Energy Investment

[7] Vanuatu National Energy Road Map 2013-2020. Government of Vanuatu. March 2013.

Plan (SREP IP) for consideration for funding through the Strategic Climate Fund. The projects under consideration as part of the SREP IP are (i) and extension of this World Bank Vanuatu Rural Electrification Project to include micro and mini grids and (ii) investment in two small hydro projects to increase renewable energy in Vanuatu's electricity generation mix through the Asian Development Bank and also provide access to households and businesses who are currently not connected to the electricity grid.

C. Higher Level Objectives to which the Project Contributes

14. The development of a regional Country Partnership Framework (CPF), which would include consideration of Vanuatu's priorities and objectives, has been proposed. This Project directly supports the Government's Priority and Action Agenda (PAA) 2006-2015 which aims to: (a) reduce the cost of services; (b) extend the coverage of rural electrification; and (c) promote the use of renewable energy. It is consistent with GoV's current vision for a more diversified economy and more equitable social and economic development and the GoV's objectives and targets for increasing access to secure, reliable and affordable electricity of its citizens under the NERM. The Project will also contribute to global efforts to mitigate climate change by promoting the use of clean energy technologies, including the use of solar energy solutions in rural areas, to displace the current use of mainly kerosene for lighting and to the World Banks twin goals of (i) eliminating extreme poverty and (ii) boosting shared prosperity.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

15. The project development objective (PDO) is to scale up access to electricity services for rural households, aid posts and community halls located in dispersed off-grid areas.

Project Beneficiaries

16. The primary beneficiaries are the households, aid posts (village-based and operated nurses' aid centers) and community halls in rural off-grid areas that are located beyond the economic grid extension areas, and those that are too dispersed across the off-grid areas to be considered in future projects for isolated micro- or mini-grid configurations. A total of 85,750 people equating to 17,500 households (of which 13% are female-headed) will benefit directly from the project.

PDO Level Results Indicators

17. Project outcomes will be monitored through three PDO level indicators:

PDO indicator 1: People provided with access to electricity under the project by household connections (number) (core sector indicator).
PDO indicator 2: Community electricity connections under the project – Other Renewable Energy – Off-grid (number) (core sector indicator).

III. PROJECT DESCRIPTION

18. The Project consists of two components:

19. Component One: *Electrification of off-grid households, aid posts and community halls (US$ 6.2 million).* The Project will target 85 percent of the 20,470 dispersed off-grid households in Vanuatu, which equates to approximately 17,500 households, and 230 aid posts and 2,000 not-for-profit community halls.[8] The Project will subsidize the retail cost of solar photovoltaic (PV) systems by 50 percent. Aid posts serve the basic health services needs of the community and are community-operated and managed. Communities and villages will also have access to subsidies to purchase solar systems under this Project for community-operated and managed aid posts and not-for-profit community halls. Initially, the Project will focus on solar PV systems of between 5 to 30 Watts peak capacity that are of "plug and play" type, installed easily by the consumer and require little to no maintenance other than replacing batteries. These systems can provide lighting and phone charging capabilities, with some systems capable of supporting other uses such as radios and small televisions. "Plug and play" systems of higher capacity are not ruled out in the future, provided they meet the product registration criteria for this Project. The Project will not fund smaller systems such as solar lanterns; such systems were funded under the Lighting Vanuatu project, and the demand and awareness for those systems is considered self-sustainable.

20. Component Two: *Technical assistance and project management (US$ 1.6 million).* The Project requires significant work on ensuring the integrity of the vendor supply chain, and of the products that are supplied to consumers/retailers, consumer awareness and training, collection and disposal of any hazardous or toxic materials, project management and independent verification to ensure the funds allocated under this Project are effectively directed towards achieving the PDO of this Project. The expectation of the participation of a number of vendors, a number of different types of products with different capabilities, the remote locations of consumers, the limited knowledge of the consumers and access to vendors, lack of a specific residential address or telephone or other formal contact details make the above activities particularly challenging. This component addresses two key areas of the Project, the first focusing on design and the second on implementation, with the following key activities:

(i) Vendor and product registration arrangements, communications and microfinance products. The following activities will be financed to support the preparation and implementation of the investment activities under Component One: (a) establishment of vendor registration arrangements; (b) development of product registration arrangements (for a product catalogue); (c) development of program and product awareness, safety and

[8] It is assumed that 62 percent of the total number of villages (3,220) in Vanuatu are located in rural areas, and that each village has one community hall. A total number of 230 aid posts are located in rural areas of Vanuatu.

product care training material for communities, and end users; (d) establishment of a grievance mechanism for end-users and communities; (e) support with the development of microfinance products to encourage lending in rural areas; and (f) development of legislation, regulations and further refinement of the Environmental Code of Practice (ECOP) for disposal of batteries for rural electrification products under the Project.

(ii) Project management and support. The following activities will be financed for effective implementation, monitoring and reporting under the Project: (a) capacity building and implementation support to the DoE through technical experts and advisors; (b) workshops and training for the DoE staff (and other Governmental departments, such as the MIPU) involved with off-grid electrification; (c) execution of awareness programs to rural communities and consumers in Vanuatu; (d) independent verification of subsidy claims prior to payments; (e) monitoring, evaluation and annual reviews of the Project; and (f) operating costs associated with this project as provided for in the legal agreement.

21. Further details on the Project description and components are presented in Annex 2.

A. Project Financing

22. Table 1 below presents the project financing plan.

Table 1: Financing Plan

Project Components	Project cost	Grant Financing	% Financing
1. Electrification of off-grid households, aid posts and community halls.	6.2	3.1	50
2. Technical assistance and project management.	1.6	1.6	100
Total Baseline Costs			
Total Project Costs	7.8	4.7	60
Total Financing Required	4.7		

B. Lessons Learned and Reflected in the Project Design

23. The Project builds on the lessons from successful projects in the energy sector. These include:

- **Use of existing markets and networks in Vanuatu to distribute solar lanterns:** Lighting Vanuatu has successfully delivered solar lanterns to rural consumers in Vanuatu through the use of existing markets and networks in Vanuatu to distribute solar lanterns to the remote rural communities.[9] The observed benefits of the lanterns are most apparent for women, the elderly and children, and have impacted positively on social behavior amongst these communities by promoting collaborative work on handicrafts and sewing

[9] Lighting Vanuatu is a Government of Australia initiative funded through the Governance for Growth program.

activities in the evening. With this model of distribution, the project has delivered twice its expected sales of solar lanterns and more than 50 percent of households across Vanuatu now use solar lanterns for lighting.

- **Use of subsidy mechanism:** This Project will follow a similar subsidy approach to Lighting Vanuatu, where the vendors, who have an established network and geographic reach across Vanuatu, will supply eligible solar products and lodge a claim to the implementing agency, the DoE, for reimbursement of the subsidy component of the system. Since the Lighting Vanuatu project has achieved demand and awareness of solar lanterns, systems eligible for subsidy under this Project will be those larger than the solar lanterns.

- **Targeted public subsidies:** Other projects have used targeted public subsidies to reduce the upfront costs and increase affordability of solar energy systems to low-income consumers.[10] Accordingly, the design of this Project includes a subsidy for households, aid posts and community halls.

- **Lighting Vanuatu has increased the number of solar lanterns in rural communities in Vanuatu:** The Project will bring to the rural users access to more than just lighting, since the smallest of systems eligible for subsidies under the Project will also have mobile phone charging capabilities. However, it is expected that the supply chains established under this Project will continue to support the solar lantern market.

- **Lack of recycling and safe disposal information in Vanuatu:** Lighting Vanuatu reported a lack of information on recycling and safe disposal of solar lighting systems available for rural consumers. Accordingly, this Project will be implemented in accordance with an ECOP and will support the DoE in increasing community awareness on the disposal of redundant solar systems and associated batteries. Vendors will also be required to comply with an ECOP for battery recycling or regulations for waste disposal established for the Project.

- **Lack of maintenance resources and capacity in Vanuatu:** The lack of a nationwide and programmatic approach has seen many of the systems installed under other projects in Vanuatu fail to be maintained because of the lack of the resources and capacity in Vanuatu. Therefore, in response to Vanuatu's rapidly changing rural electrification environment, this Project seeks to provide communities with quality systems and educate communities on basic maintenance to extend the life of the systems.

- **Geographical incentives for the distribution of solar products should be considered:** The Project has not included geographical incentives at this stage, due to the complexity such an arrangement will introduce, however, it is proposed that the registration of vendors will require the vendors to set out their supply channels and business plan for the

[10] Bangladesh Rural Electrification and Renewable Energy Development Project. Implementation Completion and Results Report. World Bank. June 26, 2013; Mongolia Renewable Energy and Rural Electricity Access Project. Implementation Completion and Results Report. World Bank. December 17, 2012.

remote communities which will be monitored. Annual project reviews will consider modifications if required.

- **Avoid flooding the market with cheap, inferior systems that characteristically have inadequate light output and short battery life:** A quality assurance mechanism was put in place at the start of the Lighting Africa project to ensure reliable and appropriate solar lanterns were supplied to rural communities in Africa.[11] For Vanuatu, it is proposed under Component Two, to develop a registration program for vendors and a product catalogue, listing quality assurance/standards of each product, similar to Lighting Africa, and to distribute to communities information on systems eligible under the project. The dissemination of product information via NGOs and other community groups will be maximized, given their existing networks and geographic reach to the rural communities.

- **Private sector development:** Other rural electrification projects have assisted in developing a private sector to implement the delivery and on-going maintenance of the systems. The design of this Project encourages private sector involvement through adopting a vendor model more suited for the country context, microfinance opportunities for small businesses, and promoting ownership of the systems by the end user through a contribution.

- **Simple delivery mechanism:** Other rural electrification projects have employed simple yet effective delivery mechanisms or models commensurate with the community and country context. This Project follows similar delivery mechanisms and also carefully considers the type of systems for the households to ensure these are low maintenance, easily installed, readily available, and affordable.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

24. The recipient and executing agency for the Project will be the Ministry of Finance and Economic Management (MoFEM), who will enter into a Financing Agreement with the World Bank. The implementing agency will be the DoE, within the MCCND. DoE is currently implementing the Bank supported Energy Sector Development Project (ESDP) and is the implementing agency for the recently approved GPOBA project.

25. DoE has recently appointed additional staff, including a Finance Officer and a dedicated Off-Grid Officer, to support its rural electrification programs and financial activities for ESDP, and will also support these fiduciary activities for this Project. The Project will provide additional support to DoE to assist with implementation of the Project.

[11] Lighting Africa is a similar project implemented by the World Bank and IFC in Africa, which disseminated about 7 million solar lanterns (1-5 Watt-peak range) to off-grid African households.

26. Vendors registered to participate in the Project will enter into a Subsidy Implementation Agreement (SIA) with DoE that will set out the rights and obligations of parties to the agreement. Vendors may register (or deregister) at any time after the project becomes effective and until the project closing date in accordance with the criteria and procedures set out in the Project Operations Manual (POM). Project will finance an Independent Verification Agent to verify the sales of solar home systems and record the subsidies provided to end users. The POM will set out the roles and responsibilities, processes and monitoring and evaluation requirements for the Project.

27. Further details of the implementation arrangements are presented in Annex 3.

B. Results Monitoring and Evaluation

28. The monitoring and evaluation system, including but not limited to assessing the progress and effectiveness of the Project, will be based on the agreed specific indicators defined in the Results Framework (see Annex 1). DoE will be responsible for ensuring the timely and accurate collection of the requisite indicator data. The Project will support the establishment of a grievance mechanism.

C. Sustainability

29. GoV and DoE have demonstrated a strong commitment to off-grid electrification through the targets set in the NERM.[12] The Project provides a range of systems to meet consumer demand, taking into account affordability and capacity to pay. It is based on low maintenance systems suited to remote communities where access to maintenance service providers is limited and costs will be prohibitive, and seeks to build on and reinforce the existing private sector supply chain for rural solar home systems. The Project will build capacity in rural communities, via workshops and training material on basic maintenance of solar systems, such as cleaning the panels and changing batteries, to prolong the life of the systems. It also proposes to promote the availability of microfinance products to assist rural consumers through financial institutions and vendors.

[12] Vanuatu National Energy Road Map 2013-2020. Government of Vanuatu. March 2013.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk	Risk Rating
Stakeholder risk	Moderate
Implementing Agency Risk	
- Capacity	Substantial
Project Risk	
- Design	Moderate
- Social and Environmental	Moderate
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Substantial
Overall Implementation Risk	Substantial

B. Overall Risk Rating Explanation

30. The overall risk rating for this project is 'Substantial', primarily because of the current limited capacity within DoE, governance risk, uncertainty in the response of the off-grid household market, challenges of the geographical reach, and the large number of transactions to be managed under the operation. Risk mitigation measures include: (a) embedded technical, procurement and financial management advisors within DoE; (b) registration of vendors based on technical, financial and sales and after sales service capability; (c) development of product catalogue and marketing support to DoE and participating vendors; (d) payment of subsidies following verification that systems have been supplied; (e) independent financial auditing; (f) consumer awareness and training materials and programs; and (g) ongoing capacity building for DoE and other government agencies involved with the Project.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

31. **Economic Rate of Return (ERR).** On a conservative estimate, rural consumers spend US$16 per month on kerosene, candles and other fuels for lighting. The economic benefit has therefore been estimated at US$16 per month, and excludes benefits such as cost savings for phone charging or any non-monetary benefits, e.g., better lighting for education, health benefits, and improved household productivity. Economic costs of the project include the cost of a 20

Watt[13] solar system at US$489 (which includes the markup for supply to rural communities and the cost of disposal of batteries), replacement of batteries every three years, and the technical assistance and project management costs amortized over the estimated number of households, community halls and aid posts targeted by the Project. Based on these estimates of benefits and costs, the ERR for the project is estimated at 23 percent. Using a discount rate of 10 percent, the economic NPV of the project is around US$6.9 million.

B. Financial Analysis

32. Consumer benefits are estimated as per the economic analysis of the consumers' WTP. The financial rate of return to a household is estimated to be 64%, and the net present value is estimated to be $678. Despite the substantial net financial benefit to consumers, the initial upfront costs of solar systems are a significant barrier to rural consumers. Unless there is a significant subsidy, rural consumers will continue to be denied the potential social and economic benefits of electricity, such as access to lighting and to communications, and potential for income-generating activities. On average, only 59% of consumers' income is in the form of cash. Very few communities will be able to afford systems without subsidies.

33. Access to finance is difficult for rural households who do not have a regular income, may not own land, and cannot demonstrate a credit history. Further, consumers in Vanuatu are averse to taking out loans (which may be a cultural preference or a result of bad experience with high interest rates) and as a practice save to fund significant expenses such as school fees, uniforms, etc. In view of this, subsidies proposed under the project are essential to achieve project objectives.

C. Technical

34. The Project's technical design is based on proven technology that meets minimum standards and reflects lessons from similar programs in Vanuatu and other rural electrification programs. Vendors will be registered under the program based on technical, financial and necessary operational competencies. Products eligible to be subsidized under the Project will be registered on a product catalogue based on technical specifications, availability (product and parts), ease of maintenance, vendor after sales service support and disposal arrangements. There are currently 11 vendors in Vanuatu[14] supplying rural solar home systems of the "plug and play" type. Details of vendor registration and product qualification will be developed as part of Component Two. The POM will set out the roles and responsibilities of various parties for project implementation and monitoring and evaluation.

[13] Note for analytical purposes a 20 Watt system has been used as being a typical system. The Project will support "plug and play" systems from 5 to 30 Watt and beyond subject to those systems meeting the Project's product qualification criteria.

[14] Vanuatu Energy for Rural Development (VERD) Program: Final Design Document. DFAT Australian Aid, Government of Australia. November 2012. This was confirmed while the task team was on mission in October and November, 2013.

D. Financial Management

35. A financial management (FM) assessment was carried out in accordance with the "Principles Based Financial Management Practice Manual" issued by the Board on March 1, 2010. The main FM risks relate to the limited capacity of DOE and that the subsidies paid may not be in accordance with the project's intended purposes. The Project and MoFEM will provide supplementary FM capacity building and support. FM instructions detailing adequate internal controls over subsidies and other payments will be a part of the Project Operations Manual. In addition, the project includes a process for independent verification of outputs. The proposed financial management arrangements satisfy the financial management requirements stipulated in OP/BP 10.00.

E. Procurement

36. A procurement capacity and risk assessment of DoE, which will be responsible for project procurement, was conducted in November 2013. The procurement capacity and risk assessment of DoE rated the overall procurement-related risk of the project as substantial. Procurement support will be hired under the Project to assist the DoE with the procurement. A summary of the procurement capacity assessment and procurement arrangements is provided in the table below.

Risk Identified	Mitigating Plan
1. Lack of capacity	• Additional qualified procurement staff will be hired to supplement the current capacity of the PMU and DoE.
2. Lack of procurement planning	• DoE shall prepare/update its procurement plans and submit the procurement plans/updates to the Bank for review and no objection. • The Bank will monitor implementation of approved procurement plans. • DoE will submit procurement progress reports to the Bank for review every six months.
3. Lack of transparency in vendor registration	• Invitation to vendors for registration will be announced to all vendors through a public advertisement, and criteria for vendor registration will be open and transparent. • List of registered vendors will be available to all beneficiary households, aid post and community halls.
4. Non-compliance with the agreed procedures	• A flow chart will be developed for each procurement/selection method and will be included in the POM. • Detailed procedures will be defined in the POM for registration of vendors, development of standard solar PV system product catalogue, and terms and conditions for payment of subsidies. • The Bank will provide intensive implementation support.

5. Poor record-keeping	• Standard procurement filing checklist will be used for project record-keeping.

F. Social (including Safeguards)

37. The increased access to electricity services that the proposed project will provide to rural households, aid posts and community facilities located in dispersed off-grid areas will build on the achievements of the recently completed Lighting Vanuatu project by providing improved functionality and enhanced benefits.

38. There will be no land acquisition for this Project since the installation of PVs will take place within existing households and public facilities. Indigenous Peoples OP/BP 4.10 has been triggered due to the presence of indigenous people (IPs) in the rural areas of the outer islands. However, since the overwhelming majority of the beneficiaries are IPs, the Project has integrated the elements of an Indigenous People's Plan (IPP) in the design of the Project, including consultations for broader community support of the Project, provision of culturally appropriate project benefits in the installation of PV panels in households, and gender-related considerations (e.g., specific consultations with women's groups and uptake of project services by female-headed households). Consultations undertaken during the design of VERD, on which this project is based, indicated strong community support. Further, consultations during the preparation of NERM established affordable electrification of rural households as a key priority.

G. Environment (including Safeguards)

39. There are no significant and/or irreversible adverse environmental and social issues associated with the Project. The use of renewable solar PV technology would result in net positive environmental impacts through replacement of kerosene and diesel currently used for lighting in rural areas of the country. Environmental Assessment OP/BP 4.01 is triggered because the risk of improper management (disposal/recycling) of lithium, lead-acid or lead-gel batteries (or other batteries types).

40. An Environmental Code of Practice (ECOP) has been prepared and will be adopted, until such time the government develops the necessary legislative and compliance framework for disposal of solid wastes, in particular lead-acid and other batteries. The ECOP will provide guidance for the safe management of batteries used in the systems. Where these batteries are toxic and not suitable for land-fill (such as lead-acid batteries) clear performance criteria will be established for the management of the batteries. Vendors participating in the Project will be required to comply with the ECOP. Arrangements for the collection/storage/transport/disposal of used batteries are envisaged as criteria for vendor registration, in compliance with the ECOP, until alternative national systems are developed and are in place. The ECOP was disclosed in the Infoshop August 8, 2014.

H. Gender

41. **Access and affordability of services will result in greater benefits for the female population, in particular to the 13% of households headed by women.** Improved access to electricity and modern fuels reduces the physical burden associated with organizing alternative energy sources. Access to electricity also frees valuable time, especially for women, widening their employment opportunities. In addition, street lighting will improve the safety of women and girls at night. Access to modern energy can go a long way in improving health and reducing premature mortality, especially among women and children.

42. Access to solar lanterns in rural Vanuatu under the Lighting Vanuatu project has contributed to energy autonomy for women, the elderly and children. Women are now playing a greater role in the management of a household's energy and lighting than they generally have in the past. Previously, they were often forced to wait for their husbands to return from the store with fuel in order to start the generator or light the kerosene lamp. Furthermore, the worry associated with children, the elderly, or other vulnerable people handling kerosene lamps has now been eliminated.

43. Changes in financial dynamics through the transition to solar have also shifted the gender dynamics of household energy use. Although gender roles have not radically altered since the introduction of portable solar lanterns, the majority of respondents did note that men were no longer in sole charge of one of the main household expenditures: energy. With kerosene fuel no longer needing daily monitoring, most respondents reported an associated decline in marital confrontations related to money issues.

44. During the review of Lighting Vanuatu, most women talked about the additional work they now undertake in a positive, social sense – small groups of relatives or friends coming together to work on weaving, sewing or handicrafts in the evenings. This project will also provide economic opportunities for women and girls. More generally, most villagers found that there is now more opportunity to socialize. People regularly mentioned the use of solar lanterns for village and inter-village functions. While lighting also brings with it the potential for some anti-social outcomes, it is surprising that none were mentioned during the extensive survey and interview processes – although it may take time for communities to fully appreciate both the upside and downside of improved and mobile lighting.

45. **National Women's groups.** Women's groups are active across the country and will be engaged throughout the project in consultation and information dissemination, and if willing, monitoring and evaluation.

Annex 1: Results Framework and Monitoring

REPUBLIC OF VANUATU: Rural Electrification Project

Project Development Objective (PDO):
The project development objective is to scale up access to electricity services for rural households, aid posts and community halls located in dispersed off-grid areas.

PDO Level Results Indicators*	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				YR 1	YR 2	YR3	YR 4	YR5				
Indicator One: People provided with access to electricity under the project by household connections.	☒	Number	0	1,225	8,820	31,850	58,800	85,750	Quarterly	Claims from registered vendors for subsidies on the systems sold.	Vendors/DoE	
Indicator Two: Community electricity connections under the project – Other Renewable Energy – Off-grid	☒	Number	0	50	550	1,200	2,000	2,230	Quarterly	Claims from registered vendors for the subsidies on the systems sold.	Vendors/DoE	By type (aid post, community hall), as defined in the POM
INTERMEDIATE RESULTS												
Intermediate Result (Component One):												
Intermediate Result indicator One: Number of households provided access to electricity under the Project by household systems.	☐	Number	0	250	1,800	6500	12,000	17,500	Quarterly	Claims from registered vendors for subsidies on the systems sold.	Vendors/DoE	By location, as defined in the POM.
Intermediate Result indicator Two: Number of female-headed households provided access to electricity under the Project by household systems.	☐	Number	0	50	720	1,300	1,800	2,275 (13% of households are female headed)	Quarterly	Claims from registered vendors for subsidies on the systems sold.	Vendors/DoE	By location, as defined in the POM.
Intermediate Result indicator Three: Number of kilowatts installed through the installation of household systems.	☐	Number	0	4	27	98	180	263	Quarterly	Claims from registered vendors for subsidies on the systems	Vendors/DoE	

										sold.		
Intermediate Result indicator Four: Number of kilowatts installed through community facility connections.	☐	Number	0	2	17	36	60	67	Quarterly	Claims from registered vendors for subsidies on the systems sold.	Vendors/DoE	
Intermediate Result (Component Two):												
Intermediate Result indicator One: Number of private vendors in Vanuatu registered under the Project's vendor registration program.	☐	Number	0	2	5	10	10	10	Annually	DoE's record on the vendor registration program.	DoE	
Intermediate Result indicator Two: Number of registered products available in the product catalogue.	☐	Number	0	5	20	25	25	25	Quarterly	Product catalogue.	DoE	By type of system and location, as defined in the POM.
Intermediate Result indicator Three: Communication campaigns; number of rural village awareness programs undertaken by province, island and village	☐	Number	0	50	100	150	200	200	Annually	DoE	DoE	By province, island and village, as defined in the POM; by type and channel (media, brochures, direct marketing (vendors) and others), as defined in the POM.
Intermediate Result indicator Four: Consultations with women's groups, including on project design and reviews.	☐	Number	0	6	8	8	8	8	Annually	DoE, in conjunction with National Council of Women.	DoE/VNCW	
Intermediate Result indicator Five: Institutions providing microfinance products to	☐	Number	0	1	2	3	4	4	Annually	DoE, in conjunction with the microfinance	DoE	

households in rural areas for the purchase of solar systems under the Project.										institutions.		

***Please indicate whether the indicator is a Core Sector Indicator (see further http://coreindicators)**
****Target values should be entered for the years data will be available, not necessarily annually**

Annex 2: Detailed Project Description

REPUBLIC OF VANUATU: Rural Electrification Project

1. The proposed project aims to scale up access to electricity services for rural households, and aid posts and community halls located in dispersed off-grid areas. With an estimated total cost of US$7.8 million, the Project will include the two components described below.

Component 1: Electrification of off-grid households, aid posts and community halls (US$ 6.2 million)

2. Of about 50,700 total households in Vanuatu, about 38,240 remain unelectrified. Of this number, about 29,240 are considered "off-grid", meaning beyond economic grid extension distance. About a third of these off-grid households are sufficiently concentrated for future independent micro- or mini-grid power supply solutions, leaving about 20,470 households for which individual solar PV systems are likely to be the least cost, practical and nearest-term electricity access solution. The Project targets 85 percent of these 'true off-grid' households (about 17,500 households) nationwide.

3. In addition, for further promotion of community and social development, the Project will target electrification of a further 2,230 not-for-profit community halls and aid posts in off-grid rural areas.

4. Due to the low income level, geographic dispersion and basic electricity needs of these households, it is considered that small solar PV devices that can provide lighting and mobile phone charging services that are "plug and play", self-installed and require little or no maintenance, would be the most suitable (see Box 1). At a minimum, systems eligible under this Project must meet the following technical and warranty requirements:

- The light output must be greater than 25 lumens or greater than 50 lux over an area of 0.1 square meters under test conditions described in IEC TS 62257-9-5;
- Run time must be greater than 4 hours per-day for solar-charged products;
- The warranty period for the entire product, including the battery, must be at least one year from the time of purchase by the end-user; and
- The warranty must cover manufacturing defects that impede operation under normal use and protection from early component failure.

Box 1. A new generation of small "plug and play" PV products: "solar pico systems" (SPS)

Until recently, PV projects by the World Bank and other agencies only utilized "solar home systems" (SHS) in the approximately 30 to 100 Wp range in off-grid rural electrification projects. The basic SHS consists of one or more solar panels, a charge regulator, one or more lead-acid batteries and lights— usually tubular mini-fluorescent lights of at least 10 watts each. The system requires installation by a trained technician. In the past few years, small "plug and play" solar PV systems that are portable or self-installed have surged in the market and have been increasingly featured in large projects, such as the IFC-World Bank Lighting Africa initiative. Small systems ranging from less than 1 Wp to 10 Wp are called "solar lanterns" or "pico-solar" systems. However, higher output "plug and play" systems from 15 to 30 Wp have also emerged in the market in this category. This broader range of systems, from 2 Wp to about 30 Wp is sometimes referred to as "solar pico systems" (SPS). The components of SPS are still the same as SHS, only in more compact and much more efficient forms. Almost all have adapters for charging mobile phones. The new batteries range from cell-phone sized lithium-ion batteries to small sealed lead acid batteries, much smaller than a car battery. The lights used are highly efficient light emitting diodes (LED) and is the main reason why SPS can provide almost equivalent service as much larger SHS. For the same lighting output (lumens), LEDs need 1/10 of the wattage of an incandescent bulb and ½ of the wattage of a CFL bulb. About 300 lumens of lighting is generally considered as the minimum required for a small rural household, equivalent to one 30 W incandescent bulb. This can be provided by just 3 watts of LEDs. SPS offers the advantage of modularity. Rather than having to find a way to finance the full cost of an SHS, customers can start with a small affordable SPS, then progressively buy additional lights or appliances, and add panels and battery in series, to a service level approaching that of a larger SHS.

Source of data: IEA 2012.

5. These systems will be available for purchase to all rural consumers. The Lighting Vanuatu project provided households with portable solar lanterns of generally less than 2 Watts over the project duration and has contributed significantly to the use, awareness and demand for solar home systems in Vanuatu and has increased consumers' appreciation of benefits, both economic and social, of solar lighting. Vanuatu currently has a self-sustainable market for solar lanterns of generally less than 2 Wp capacity and does not require on-going donor support with solar systems of this size.[15] The Independent Completion Report of the Lighting Vanuatu project recommended that future donor-funded projects should consider alternative electrification systems and not include solar lanterns. There is now consumer demand for higher capacity and semi-permanent systems that go beyond lighting and provide services for phone charging, radios, small fridges, etc. Affordability is the biggest barrier for consumers to move up to solar home systems with higher power outputs and enhanced user benefits. The Project will "buy down" the upfront costs to consumers of these higher output systems through a capital cost subsidy.

6. This Project is focused on "plug and play" systems in the 5 to 30 Wp range for the project scoping purposes; however, larger systems that meet the product criteria (technical specifications, etc.,) may also be considered eligible for a subsidy under the Project. Whilst there is demand for larger purpose designed household systems from vendors, consumers and Government, Vanuatu does not have the capacity and technical expertise in the rural areas to install and maintain such systems that require qualified personnel. The remoteness and the costs associated with servicing a sparsely distributed rural population means that such technology will be a high risk at this stage; the systems often fall into disrepair shortly after installation because of lack of after sales support. Further, advancements in technology also mean that larger "plug and play" solar home systems are now becoming available. This Project may contribute to the development of "technical" supply chains to support more advanced and special purpose solar home systems that require qualified technicians for installation and maintenance in future; a review of the Project after Years 1 and 2 will determine the suitability and relevance of this to

[15] Independent Completion Report Lighting Vanuatu. DFAT Australian Aid, Government of Australia. January 2014.

the market. Extension of rural electrification programs to include public institutions (schools and health facilities) can assist in justifying the significant investment required for technical capacity-building and thus support specially designed systems for rural households in future.

7. The current retail prices of "plug and play" systems in Port Vila range from VUV10,000 to 20,000 for a 10 Wp system and between VUV20,000 and 40,000 for a 20 Wp system. The range of prices reflects potential variability in system output, life expectancy and warranty periods. These systems are currently not "certified" to any standard. These prices do not include costs of supply to rural areas, consumer awareness and training, local agency mark-up or safe disposal of batteries and equipment. The prices of systems used for economic and financial analysis and assessment of capacity to pay have been adjusted to include these costs and are estimated at VUV25,500 (US$254) for a 10 Wp system and VUV45,500 (US$453) for a 20 Wp system. The Project will be based on actual costs.

8. Affordability of solar home systems. Surveys by the Lighting Vanuatu project noted that kerosene costs on average are around $16 per month[16] per household, however, some households reported costs of twice this amount. The GPOBA project estimated that households within or near existing electricity grids, but not connected to the grid, spend between US$19 to US$23 per month on kerosene and candles, etc., for home lighting and a small amount for batteries for radios.[17,18] The analysis in this Project assumes a rural household electricity expenditure of US$16 per month. This can be taken as an indication of the average willingness to pay (WTP) for a solar device that can provide similar services.

9. The average total rural household income is US$841 per month, of which an average of US$733 is spent on total expenditures per household per month. According to HIES 2010, 59 percent of the average rural household income is from cash sources.[19] Table 1 below shows average monthly income, average monthly cash income and net cash incomes in US$ for the various provinces in Vanuatu. The higher incomes in the Shefa and Sanma provinces are a reflection of these rural communities benefiting from the two main economic centers, Port Vila and Luganville, respectively. Table 1 clearly shows that the capacity to pay significant upfront costs of solar home systems by typical rural households is very limited. With micro-financing and stretched payments, affordability is improved. The National Bank of Vanuatu is working on microfinance products for rural consumers, however its availability and use remains limited. VANWOODS also assists with microfinance. However, Ni-Vanuatu have generally been averse to taking on debt and normally save for specific expenditures, e.g., school fees, school uniforms, and household equipment, including solar home systems. Based on the average cash income, it would take several months for a rural householder to fund the purchase of a solar home system (refer Tables 1 and 2). The upfront capital cost of the system remains a significant barrier for rural electrification in Vanuatu.

[16] Independent Completion Report Lighting Vanuatu. DFAT Australian Aid, Government of Australia. January 2014.
[17] Vanuatu GPOBA Improved Electricity Access Project. GPOBA Commitment Paper. World Bank. March 12, 2014.
[18] Vanuatu Energy for Rural Development (VERD) Program: Final Design Document. DFAT Australian Aid, Government of Australia. November 2012.
[19] Vanuatu Household Income and Expenditure Survey 2010 (HIES 2010). Vanuatu National Statistics Office, Government of Vanuatu. December 2012.

Table 1: Average Monthly Household Income by Province[20]

	Torba	Sanma	Penama	Malampa	Shefa	Tafea	RURAL
Average income (US$)	696	995	716	637	1,395	566	841
Average cash income (US$)	369	577	337	357	1,30	170	496
Net cash income (US$)	138	382	122	152	783	11	276

Table 2: System Costs as Percentage of Net Cash Income

Size	Cost (VUV)[a]	Torba	Sanma	Penama	Malampa	Shefa	Tafea	RURAL
5 Watt	16,200	127	46	144	115	22	1536	63
10 Watt	25,500	198	72	225	181	35	2406	99
15 Watt	34,500	268	97	304	245	48	3255	134
20 Watt	45,500	354	128	401	323	63	4293	177
30 Watt	67,900	528	191	599	481	93	6406	264

[a] *– the cost includes an adjustment for distribution to rural areas, product information and awareness, and disposal of redundant batteries and systems.*

10. Total subsidy requirements for household systems. The Project will provide a subsidy for eligible products to buy down the retail price of solar home systems for consumers. An analysis, similar to that presented in the design of the Vanuatu Energy for Rural Development (VERD) Project[21], was undertaken. VERD proposed a variable subsidy for each product (2.5 to 30 Wp systems), based on a straight line relationship with the individual system Wattage, ranging from 51 percent up to 61 percent and an average of 55 percent, which is in line with levels used in other World Bank projects of a similar nature. This Project will subsidize solar home systems by 50 percent of the retail price of eligible solar systems.

11. With an assumed fixed subsidy of 50 percent, the costs of systems as a percentage of the households' incomes are reduced (by half) and are thus more affordable. Project design assumes that a fixed subsidy will be provided to all eligible products of 50 percent for two reasons: (a) a large subsidy reduces the consumers' ownership commitment and therefore there is less inclination by the owner to take care of and maintain the system; and (b) a fixed subsidy will be easier to manage for the stakeholders involved and reduce any confusion for consumers across products.

12. Despite the 50 percent subsidy, system costs will remain high for households in the lowest two income quintiles. These households are likely to acquire smaller 5 to 10 Watt systems.

[20] Vanuatu Household Income and Expenditure Survey 2010. Vanuatu National Statistics Office, Government of Vanuatu. December 2012.
[21] Vanuatu Energy for Rural Development (VERD) Program: Final Design Document. DFAT Australian Aid, Government of Australia. November 2012.

13. The dealer model for PV dissemination. Given market characteristics in Vanuatu, the type of solar home systems that will be promoted, and the existence of several local private PV providers, the mechanism chosen for supply under this Project is the "dealer model", also known as "vendor model" or "open market" model. Lighting Vanuatu project was successful in utilizing existing markets and existing vendors' networks for distribution of solar lanterns. As there is an existing network of vendors (11 known renewable energy providers are currently operating in Vanuatu[22], and five of these have been established for a minimum of five years), this Project will use their networks for sales and distribution to reach rural communities across the country. Although a number of these providers have only been operating for less than 2 years, the Project will ensure that the vendor is financially and technically sound as part of the vendor registration process. Vendors will have an obligation to provide easy to understand product information (capability, service requirements, safety, etc.), and put in place arrangements for the return of equipment and parts, especially those that are made from toxic material, such as lead-acid or lead-gel batteries.

14. Under this market-based mechanism, consumers will purchase solar home systems from competing private vendors at subsidized prices. Information on products will be disseminated through vendors and communities via a product catalogue, which will list products that vendors are selling and that are eligible under the subsidy mechanism. In turn, the consumer will inform the vendor of his/her intended purchase, either by visiting the shop or through post/phone/email communication, and arrange payment. The vendor will then provide the system to the consumer. The consumer will arrange his/her portion of the funds for the purchase, either by means of cash or microfinance credit (either via a microfinance provider or through the vendor).

15. The purchaser will pay the subsidized amount agreed with the vendor for the eligible system. The vendor will provide the necessary data and information to DoE in order to claim the subsidy amount. DoE will pay eligible subsidies following verification of the sales from the designated account (DA). The DA will be replenished for the subsidy payments made based on DoE submitting an Output Verification Report (OVR) with its Withdrawal Application.

16. To ensure that high quality products are being provided under the Project, that the vendors ensure that adequate after sales service and/or information is available to consumers, and that used lead-based batteries are disposed of safely, the Project will establish a registration program for vendors and develop a product catalogue for solar home systems.

> Vendor Registration Program. In order for vendors to participate in the program and be eligible for claiming reimbursements of subsidies, the Project will establish a registration program for vendors. The program, at a minimum, will assess vendors on: (a) financial capacity of the business to ensure cash flows are sufficient; (b) technical ability in providing after sales services to the consumer, such as maintenance and information on systems and batteries; (c) range of products stocked and supply channels and chains; (d) number of staff and agents and communication links between them; (e) arrangements for

[22] Vanuatu Energy for Rural Development (VERD) Program: Final Design Document. DFAT Australian Aid, Government of Australia. November 2012. This was confirmed while the task team was on mission in October and November, 2013.

collecting/storing/transporting/recycling batteries and redundant solar PV systems, with particular focus on compliance with the ECOP or regulations; (f) training programs in place for staff development and capacity building; and (g) geographic reach and existing networks in rural communities and outer islands to ensure that all target beneficiaries can access products. The Project will encourage collaboration between the main center-based vendors and local communities for the distribution of products. The vendor registration program will be developed as part of Project implementation.

Product Catalogue. To promote competition between vendors across all regions and island groups, all eligible products supplied by the vendors will be listed in a product catalogue. The purpose of the catalogue is to present, transparently, to consumers the range of products available in their area and in the main centers. A vendor must be registered under the vendor registration program (see above) before a product can be listed in the catalogue. Participating vendors will be allowed to market any solar system products in the catalogue and procure them from any source in accordance with standard business practice. However, for the product to be eligible under this Project, it must be a "plug and play" system, initially in the capacity range of 5 to 30 Wp. Setting the lowest capacity to 5 Wp avoids distorting the existing commercial market for small, affordable solar lanterns.[23] The 30 Wp ceiling excludes larger systems that are preferred by higher income households. Once consumer awareness and compliance with safeguards has increased, the capacity range will be reviewed and adjusted, if needed. Product "qualification" criteria will be established, covering technical specifications[24], system performance, product and battery life, warranty, serviceability, product information and recycling needs and arrangements, etc., to enable vendors to register their products. Under Component Two, the Project will finance the drafting, type-setting, editing, printing and distribution of the product catalogue. It is anticipated that the Provincial Councils will be used to disseminate information about the scheme and the product catalogue. The postal service and women's groups, which also reach rural communities, may also be utilized in the dissemination of information.

17. An Independent Verification Agent will be funded under Component Two. The role of this agent will be to verify claims from vendors, as set out in the POM. Given the high cost of travelling to the outer islands, the verification process will predominantly be a desk review, with sample-based site visits and telephone interviews for each claim. Vendors making claims that cannot be substantiated will not be paid the subsidies and may be de-registered and therefore become ineligible to submit future claims for reimbursement of subsidies.

[23] Given the success of Lighting Vanuatu, the Project will build on the existing market of small household solar systems and will focus on plug and play systems up to 30 Wp in size, but will also offer smaller 5 Wp systems to cater to all users.

[24] All products must meet minimum technical and performance requirements to be included in the product catalogue. This can be done by: (a) showing that the specific SPS is in the list of approved products of the IFC Lighting Global initiative in the website http://www.lightingglobal.org/resources/specs; or (b) obtaining a certification that the SPS has been used in other World Bank projects; or (iii) obtaining certification from the manufacturer that the SPS has passed tests by an internationally accepted organization, such as PV-GAP, IEC, etc.

18. There would be no eligibility test for consumers to be able to purchase systems at subsidized prices. As with previous World Bank projects using the dealer model, this stance is taken because imposing any restriction would be difficult to monitor and enforce. Unelectrified consumers living within grid extension areas or in communities planned for mini-grid projects who make a financial decision to buy less-desired PV systems do so because they may feel it is their only way to get electricity access in the immediate term. They will not be excluded from this Project.

19. It is likely that vendors will compete in an effort to capture more of the expanded market. In efforts to prevent monopoly pricing in the market, the Project will monitor product prices and promote competition between products and vendors by raising consumer awareness. The Project will also establish a flexible baseline price monitoring system, which has been successfully used in previous World Bank projects. At project inception, the Independent Verification Agent will establish, and publically disclose/publish, the approximate baseline price for each product listed in the product catalogue for the year, based on prevailing international market prices, shipping and other import costs, local distribution costs and reasonable profit margins. Baseline prices will be reviewed annually by the Independent Verification Agent and adjusted, if needed.

20. Subsidies payment procedure. A unit subsidy will be paid to the vendor for each verified sale. Subsidy claims supported by sales receipts and other necessary information will be submitted to the Independent Verification Agent for verification as soon as the total sales of different products reach a threshold established in the POM or quarterly, whichever comes first. The threshold will be reviewed and adjusted periodically, as needed. Unless there are verification problems, DoE will be required to process subsidy payments no later than 30 business days after submission of claims.

21. The subsidy claim form will be developed by the Independent Verification Agent during implementation and will include, at a minimum: (a) a sales receipt that will identify the purchaser (by male/female headed household), the place and manner of purchase, the sales amount, and the address where the solar system will be used; and (b) a signed statement by the purchaser that the seller has explained the company's return policy and the product's warranty terms, and has provided information on how to dispose of the used battery and purchase a replacement.

22. The Subsidy Implementation Agreement signed between DoE and the vendor will permit DoE to audit a vendor's financial and sales records in relation to the Project.

23. Existing distribution mechanisms for solar products.

(a) Cash purchase

According to VERD, customers currently purchase pico-solar products in cash from PV vendors in the following ways: (i) The user walks into a vendor's shop in Port Vila or in the Islands. This is the most common method, with purchases often made in cash. The user may walk away with the equipment or it may be delivered later, depending on availability of stock; (ii) Family members, friends or associates walk into a shop and make a purchase on the user's behalf. This is common for returning seamen and overseas

workers to buy supplies in a main center, such as Port Vila, and then transport the goods back to the outer islands with them; (iii) Postal service. The user sends the vendor a detailed letter describing his power needs and location. The provider replies with a quote. The user sends payment via Western Union transfer. Equipment is delivered via post; (iv) Telephone. The user obtains the vendor's phone number from the national phone book or through contacts, and calls the vendor to convey his/her needs. An order is placed on the phone. The user sends payment via Western Union transfer. Equipment is delivered via post; or (v) Travelling representative. The vendor sends a representative to travel around the islands and take orders and payment for equipment. Equipment is then delivered, up to six months later.

(b) Credit purchase

Only the NGO Vanuatu Women's Development Scheme (VANWOODS) has so far provided any significant micro-financing assistance for the purchase of pico-solar lamps. It has done so through Grameen-type micro-loans to its members. VANWOODS has an extensive established network with currently 8,000 members nationwide.

It is the responsibility of the vendor to arrange delivery to the customer. The Post Office may play a role in the delivery and distribution of systems to rural consumers. However, the vendor will be required to demonstrate geographical reach, including delivery mechanisms, before becoming registered under the program.

All existing vendors sell directly to customers from offices based in Port Vila. Some vendors also operate small retail networks, which are located in the most populated islands in shops selling not only PV but a wide range of other products.

24. VERD's observations indicate that Vanuatu consumers generally prefer cash purchase and outright ownership of desired products, rather than credit purchases. The practice of "income targeting", where households save for a desired but expensive product and only purchase it once there is enough cash for outright purchase, appears to be a common cultural trait in Vanuatu. However, both options will be available to the consumer, although the consumer will bear the responsibility of arranging finance independently of the vendor. The Project will promote micro-financing products during implementation.

25. Sustainability.

(a) Maintenance

There is little or no maintenance required for solar system products promoted in this Project. Components of the system are expected to have a lifespan of around 10 years. Depending on the type, batteries will have a lifespan of 3-5 years or more. They are easily replaceable by the user. The "plug and play" design ensures a simple user connection of components. User education will be provided and information will be disseminated to consumers during project implementation via the vendor upon purchase. In addition, the vendor (or a local agent of the vendor) will provide after sales service to explain, teach, and cover basic maintenance needs associated with the systems.

(b) Battery disposal strategy

Most of the solar systems eligible under the subsidy mechanism (and therefore offered to the consumer) are likely to be equipped with lithium-ion batteries with a typical lifespan of 4-5 years. Larger solar systems covered in this Project may come with small, sealed lead-acid batteries, with a battery life of about 3-4 years. Presently only two vendors have collection arrangements for pico-solar batteries. There are no local recycling operations for the more numerous and larger car batteries; they are shipped to Fiji or Dubai for recycling or end up in municipal landfills. Disposal of large numbers of used batteries will not be an immediate problem for the Project. However, after three years or so, many used batteries will need to be collected and properly disposed of every year. An ECOP for battery collection and disposal developed for the Project, which all vendors will be required to comply with, will be used and improved during early project implementation and will be fully operational before being needed in 3-4 years time. In addition, during the vendor registration program, the safeguards documents and other regulations will be explained to all vendors and mitigation measures (such as awareness raising so that users understand associated risks, responsible disposal, battery collection, transport and storage) will be developed. Regulations on disposal of solid wastes, including disposal of lead-acid/gel batteries is also proposed for adoption by GoV in the medium-term. However, at the commencement of the Project, companies/vendors applying for registration will be required to present a plan for collecting used batteries of the products they sell, transporting and storing them in centralized locations, and end disposal in accordance with the GoV regulations.

Component 2: Technical Assistance and Project Management (US$ 1.6 million):

26. This component will finance supporting activities crucial to the implementation of investment activities in Component One:

(i) Vendor and product registration arrangements, communications and microfinance products. The following activities will be financed: (i) establishment of vendor registration arrangements; (ii) development of product registration arrangements (for a product catalogue); (iii) development of program and product awareness, safety and product care training material for communities, and end users; (iv) establishment of a grievance mechanism for end-user and communities; (v) support with the development of microfinance products to encourage lending in rural areas; and (vi) development of legislation, regulations and refinement of the Environmental Code of Practice (ECOP) for management (safe disposal/recycling) of batteries.

(ii) Project management and support. The following activities will be financed: (i) capacity building and implementation support to DoE through technical experts and advisors; (ii) workshops and training for DoE staff (and other Governmental departments, such as MIPU) involved with off-grid electrification; (iii) execution of awareness programs for rural communities and consumers in Vanuatu; (iv) independent verification

of subsidy claims prior to payments; and (v) monitoring, evaluation and annual reviews of the Project.

27. Vendor registration program and product catalogue. The Project will fund the preparation and development of a vendor registration program and the drafting, type-setting, editing, printing and distribution of the product catalogue. Included in this activity will be the establishment of technical standards and product "qualification" criteria for eligible products and assessment criteria for eligible vendors.

28. Capacity building for domestic vendors and consumers. The Project will support training on solar technology, installation, maintenance and safety. Several levels of training courses tailored for vendors, local technicians and communities that will be involved in installation and maintenance of systems will be available to domestic vendors and consumers. Promotional material will be disseminated to consumers on technical requirements, safety around solar PV systems, and on-going maintenance of systems, via the vendor. Financial management training will be given to vendors enlisted in the vendor registration program.

29. Public awareness raising program. These will include continuing promotional campaigns, demonstrations and other activities nationwide in target communities, schools and general public about solar technology, the Project and its objectives, type of systems to be promoted, their proper use, supply sources and choices for consumers, and costs. A focus will also be on promoting the modality of the postal service and other distribution networks to purchase products, by ensuring that full information on product choices via catalogues and other means is provided to all potential remote off-grid markets ("beneficiary outreach program"). Microfinance Institutions, NGOs and other organizations will be engaged.

30. Grievance mechanism. The Project will support a mechanism for grievances to receive and address issues between vendors and users in relation to products that can be reached by all parties. Communication brochures will provide information of contacts and dispute resolution processes. Different forms of media and mechanisms may be required to ensure that all rural communities can communicate their grievances.

31. Leveraging microfinance products and development. The Project will assist in promoting microfinance products available in rural communities. Microfinance institutions and NGOs will be engaged.

32. Legislation and ECOP. The Project will assist GoV in establishing an appropriate battery collection and disposal program and in the preparation of draft regulations and legislation, as needed, including further refinement to the ECOP for collection, transport, storage and disposal of batteries associated with the products eligible under the Project.

33. Project management and support. The following activities will be financed for effective implementation, monitoring and reporting under the Project: (a) capacity building and implementation support to DoE through technical experts and advisors; (b) workshops and training for DoE staff (and other Governmental departments, such as the Department of Environment) involved with off-grid electrification; (c) execution of awareness programs to rural

communities and consumers in Vanuatu; (d) independent verification of subsidy claims prior to payment; and (e) monitoring, evaluation and annual reviews of the Project.

34. Project reviews. The Project will support annual reviews of the Project during implementation. The reviews will consider the performance of the project against the Results Framework, identify and address issues and including the impact of the level of subsidies to the results and future sustainability of the supply model without subsidies.

35. Component Two will support any other activities necessary for the achievement of the Project's development objectives. The Project will also benefit from the two other World Bank Projects being implemented by DoE, i.e., ESDP and the GPOBA/WB Project.

Annex 3: Implementation Arrangements

REPUBLIC OF VANUATU: Rural Electrification Project

Project Institutional and Implementation Arrangements

1. The recipient and executing agency for the Project will be the Ministry of Finance and Economic Management (MoFEM), who will enter into a Financing Agreement with the World Bank. The implementing agency will be DoE, within MCCND.

2. DoE is currently implementing the Bank funded ESDP, and is nominated as the implementing agency for the GPOBA project which is financing service connections to those households in concession areas who are not already connected (outside of the scope of this Project). DoE has recently appointed additional staff, including a Finance Officer and a dedicated Off-Grid Officer, to support rural electrification programs. DoE is currently supporting procurement and financial activities for ESDP. DoE will also support these fiduciary activities for this Project.

3. The Project design is based on independent verification of subsidy payments and procurement activities are limited mainly to hiring of consultants and purchase of some goods for DoE. DoE will be responsible for managing all project activities within their jurisdictions, including but not limited to monitoring implementation progress, providing authorization for subsidy payments, ensuring environmental and social safeguards compliance in accordance with Bank policies and providing training, progress and project reports. The Project will provide additional support for DoE to assist with the technical components of the Project.

4. DoE will be advised on financial management by MoFEM, which will also be responsible for the oversight of financial activities under the Project. The Project will offer on-going training and capacity-building activities, as required, for the staff of DoE who will be involved in implementation of this Project.

5. Vendors registered to participate in the Project will enter into a Subsidy Implementation Agreement with DoE that will set out the rights and obligations of the parties to the agreement.

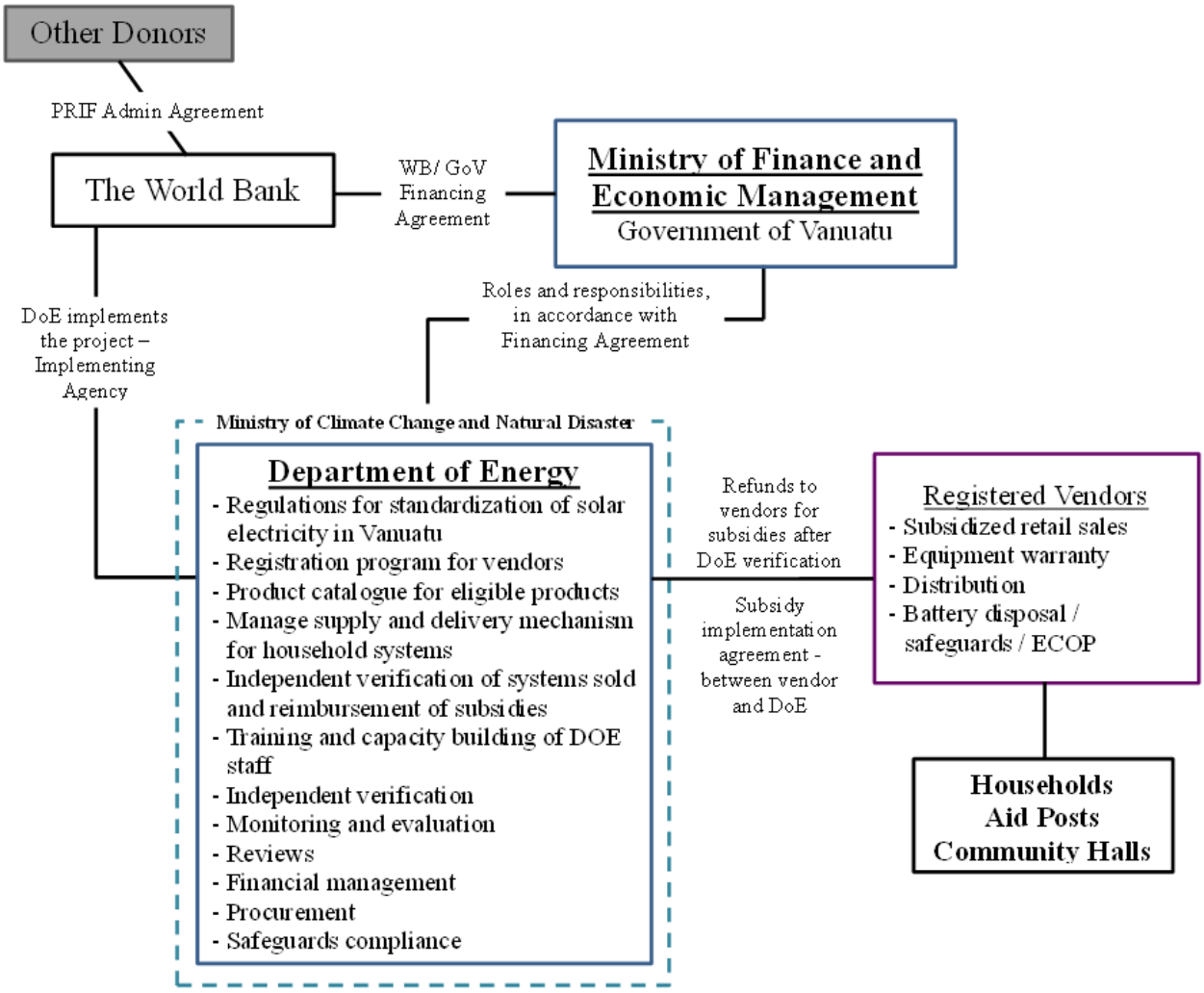

Figure A3.1. Arrangements for implementing the Project

6. A number of full-time and part-time consultants will be utilized by DoE, primarily for technical support, in the following roles:

a) Technical specialist, with sufficient background in PV systems;
b) Environmental/safeguards specialist, to assist with the development of a battery disposal program and other safeguard tasks;
c) Procurement specialist;
d) Project accountant;
e) Contracts administrator; and
f) Independent Verification Agent.

Project administration mechanisms

7. A POM, covering project activities and costs, financial management, and procurement, will guide all participants with implementation of the Project, particularly DoE. The POM, prepared by DoE, will provide details on institutional roles and responsibilities for safeguard

procedures, monitoring and evaluation for reporting, contract management, and scheduling. Guidance on fiduciary oversight will be included, as a minimum.

Financial Management, Disbursements and Procurement

Financial Management

8. ***Risks and Mitigating Strategies.*** The FM risk associated with the grant is assessed as Substantial primarily due to the limited capacity of DOE and the risk that subsidies may not be for the purposes intended. A recent PEFA assessment of the GoV PFM system was generally favorable with regards to cash management and accounting records but raised some concerns over internal controls across government. Project-specific FM instructions will be established, detailing adequate internal controls over subsidies and other payments (as part of the Project Operations Manual) together with a process for independent verification of output. Given the size and nature of the project, DoE will be required to maintain a financial accountant/finance officer for the duration of the project. MoFEM will undertake the normal financial functions it performs for government departments, and provide assistance and oversight to the project's financial management functions.

8. ***Budgeting.*** DoE will develop a project budget and break it down into annual budgets. DoE will review this document at a minimum six monthly, with analysis of budget against expenditure.

9. ***Funds flow.*** MoFEM will co-ordinate the funds flow of the project. The Grant will be signed with the GoV in US dollars and a designated account will be established for the project under the GoV Development Fund in the Central Treasury Account, and will be maintained in the local currency (VUV) and managed by MoFEM. Grant proceeds will flow from the Bank into the Designated Account (DA). DoE will be directly responsible for the management, maintenance and reconciliation of DA activities for project components, including preparation of withdrawal applications and supporting documents for Bank disbursements.

10. ***Accounting and internal controls.*** The GoV financial management systems and processes will be used for processing of payments and recording of transactions. The accounting software package used within the agency and all other government agencies (Smart stream financials) will be supplemented by the implementing agency with spreadsheet-based systems to keep track of payments against contracts, budgets and expenditures by activity – this supplemental information will be used in the preparation of withdrawal applications.

11. ***Accounting and financial reporting.*** DoE will be responsible for managing, monitoring and maintaining project accounting records. Original supporting documents will be retained by the DoE. Unaudited interim financial reports (IFRs) will be prepared by DoE for the project on a quarterly basis. The financial reports will include an analysis of expenditures for the quarter, year to date and project to date, compared to total project budget, and commitments. The format will be developed by DoE and agreed with the World Bank, prior to submission of the first IFR. IFRs will be forwarded to the Bank within 45 days of the end of each calendar quarter.

12. ***Audit.*** Annual audits of the Project Financial Statements will be required. The audit reports will be approved by the Auditor General.

Disbursements

13. ***Disbursement Methods.*** Three disbursement methods will be available for the project: advance, reimbursement, and direct payment. Supporting documents required for Bank disbursement under different disbursement methods will be documented in the Disbursement Letter issued by the Bank. Withdrawal Applications for the replenishment of the Designated Account for payment of subsidies under the Project will require an Output Verification Report (OVR) from the Independent Verification Agent procured by DoE. The OVR will be in accordance with the POM.

14. ***Designated Account***. One DA for the implementing agency in local currency will be set up in MoFEM as a sub-ledger for the project to manage the funds advanced to the Central Treasury Account, and will be managed by DoE. The ceiling of the DA will be determined and documented in the Disbursement Letter. Project funds will be disbursed against eligible expenditures, as set out in the legal agreements.

15. ***Disbursement Categories.*** At least two disbursement Categories will be required, one for Subsidies (under Component 1), and one for Consultants, Goods, Workshops and Training and Operating Costs (Component 2). All categories can be funded inclusive of taxes.

Procurement

16. ***Procurement Arrangements***. Procurement for the proposed Project will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits," dated January 2011 and revised July 2014 (Procurement Guidelines); "Guidelines: Selection and Employment of Consultants by World Bank Borrowers," dated January 2011 and revised July 2014 (Consultant Guidelines); and the provisions stipulated in the Financing Agreement. For each contract to be financed by the Grant, the different procurement methods or consultant selection methods, estimated costs, prior review requirements, and time frame will be agreed between the Recipient and the Bank in the Procurement Plan.

17. ***Procurement of Goods and Non-consultant Services.*** Goods and non-consultant services will be procured under International Competitive Bidding (ICB) procedures, National Competitive Bidding (NCB) procedures, Framework Agreement, Shopping, or Direct Contracting, subject to the thresholds indicated in the table below. DOE will sign a Subsidy Implementation Agreement (incorporating a Framework Agreement to be used for supply of solar photovoltaic (PV) systems) with each registered vendor from which beneficiary households, aid posts and community halls will buy solar PV products. Detailed procedures and criterion for registration/selection of vendors, and procedures and criterion for the registration of standard solar PV system products in the product catalogue will be defined in the Project Operational Manual (POM) agreed with the Bank. The Subsidy Implementation Agreement will

also set out the rights and obligations of the parties and other terms and conditions for participation in the program.

18. ***Selection of Consultants.*** Consulting contracts may be awarded to firms under the Quality and Cost Based Selection (QCBS), Quality Based Selection (QBS), Selection Based on Consultants Qualifications (CQS), or Single-Source Selection (SSS), subject to the thresholds indicated below.

19. Individual consultants would be selected and contracts awarded in accordance with the Consultants Guidelines.

Table A3.1. Prior Review and Procurement Method Thresholds

Procurement Methods	**Procurement Thresholds**	**Prior Review Thresholds**
I. Goods:		
International Competitive Bidding	≥US$1,000,000	All contracts subject to prior review
National Competitive Bidding	<US$1,000,000	All contracts subject to prior review
Shopping	<US$500,000	First two contracts
Direct Contracting	Meet the criteria set out in para. 3.7 of Procurement Guidelines	All contracts subject to prior review
II. Works:		
Shopping	<US$1,000,000	First two contracts
III. Selection of Consultants:		
Selection Methods	**Procurement Thresholds**	**Prior Review Thresholds**
Firms (QCBS, QBS, LCS, CQS and SSS)	In accordance with the World Bank's Consultants Guidelines	≥US$100,000, and all SSS contracts
Individual Consultants		≥US$50,000(exception made to SSS contracts, legal and procurement related assignments, where all contracts are subject to prior review)

20. ***Procurement Risks and Mitigation Measures.*** DoE will be responsible for implementing the Project. The procurement capacity risk assessment of DoE rated the overall procurement-related risk of the project as substantial. Procurement risks and mitigating plans are summarized as below:

Table A3.2. Procurement Risks and Mitigation Measures

Risk Identified	Mitigating Plan
1. Lack of capacity	• Additional qualified procurement staff will be hired to supplement the current capacity of the PMU and DoE.
2. Lack of procurement planning	• DoE shall prepare/update its procurement plans and submit the procurement plans/updates to the Bank for review and no objection. • The Bank will monitor implementation of approved procurement plans. • DoE will submit procurement progress reports to the Bank for review every six months.
3. Lack of transparency in vendor registration	• Invitation to vendors for registration will be announced to all vendors through a public advertisement, and criteria for vendor registration will be open and transparent. • List of registered vendors will be available to all beneficiary households, aid post and community halls.
4. Non-compliance with the agreed procedures	• A flow chart will be developed for each procurement/selection method and will be included in the POM. • Detailed procedures will be defined in the POM for registration of vendors, development of standard solar PV system product catalogue, and terms and conditions for payment of subsidies. • The Bank will provide intensive implementation support.
5. Poor record-keeping	• Standard procurement filing checklist will be used for project record-keeping.

21. ***Frequency of Procurement Supervision***. In addition to the prior reviews, procurement supervision missions will visit the project once a year to carry out post reviews with a sampling ratio of one out of 10 contracts.

22. ***Procurement Plan***. DoE will develop a procurement plan for the project and will submit it for Bank for review. The Procurement Plan will be updated in agreement with the Bank annually or as required to reflect project implementation needs and improvements in institutional capacity.

Environmental and Social Safeguards

23. The only potential environmental safeguard concern under the Project is improper disposal/recycling of lead-acid or lead-gel batteries by the community. If not handled correctly or not properly disposed of or recycled, inappropriate battery disposal could lead to pollution of surrounding soils and water resources by lead, nickel, cadmium, etc. As a result, OP 4.01 is triggered.

24. Currently, lead-acid car batteries and some solar PV batteries in the Port Vila area are collected and shipped to Fiji, Dubai or India for further processing. Solar panels on the other hand have a longer life-span (about 25+ years) and the technology for recycling the panels is available and in use in developed countries. This Project will comply with an ECOP that has been prepared and will be adopted, until such time the government develops the necessary legislative and compliance framework for disposal of solid wastes, in particular lead-acid and other batteries. The ECOP will provide guidance for the safe management of batteries used in the systems. Where these batteries are toxic and not suitable for land-fill (such as lead-acid batteries) clear performance criteria will be established for the management of the batteries. Vendors participating in the Project will be required to comply with the ECOP. Arrangement for the collection/storage/transport/disposal of used batteries are envisaged as criteria for vendor registration, in compliance with the ECOP, until alternative national systems are developed and are in place.

25. OP 4.10 has been triggered due to the presence of Indigenous people in the project area. However, since the overwhelming majority of the beneficiaries are IPs, elements of an IPP/IPF have been integrated into the design of the Project, including free, prior and informed consultations for broader community support of the Project, and gender-related considerations (e.g., uptake of project services and maintenance of solar systems by women).

26. There is no land acquisition for this project since the solar systems will be located within the existing confines of households and beneficiary public agencies.