



UNDP-GEF BRANTV Project ID 5926

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TERMS OF REFERENCE

(Advert)

Consultancy:	International Consultant with the Expertise to Conduct Training on Pico Micro Hydropower Design and Installations and Develop How-to-Guide Booklet
Unit:	BRANTV Project Management Unit (PMU)
Duration:	60 working days (Approx. 35 working days will spent in Vanuatu on three different trips)
Duty Station:	Department of Energy office (DoE), Port Vila, Vanuatu
Project Title:	Barrier Removal for Achieving the National Energy Road Map Target of Vanuatu (BRANTV)

1. Background

The Department of Energy (DoE) under the Ministry of Climate Change in Vanuatu with support from the United Nations Development Programme (UNDP) is implementing a Global Environment Facility (GEF 6) funded project referred to as the Barrier Removal for Achieving National Energy Road Map Target of Vanuatu (BRANTV) Project for the Vanuatu Government to address the National Energy Road Map (NERM) rollout. The project is managed by the Project Management Unit (PMU) which sits under the DoE.

The project's objective is to enable the achievement of the energy access, sustainable energy, and green growth targets of Vanuatu, as represented in the country's National Energy Road Map (NERM). The project has five interrelated components for implementation in the areas of capacity building, policy and planning, institutional framework, financing and technical and economic viability.

Central to the approach is BRANTV's implementation of Vanuatu's Rural Off-Grid and Energy Efficiency (EE) Promotion Program which includes demonstrations¹ on: pico-/micro hydropower mini-grid system,; pico-/micro hydro

¹ Demonstrations are actual hardware implementations. There are 4 different demonstrations of which 19 are either Pico or Micro hydroelectric systems with its mini-grid, 1 hybrid system which is made up of a Pico hydro and solar, community based standalone solar system approximately 5 to 6 kW without any grid and compound based Nano grid system usually ranging from 700W to 2 kW designed to connect up to 5 households through its mini-grid.

PV hybrid mini-grid system , community-scale solar PV systems, family compound-scale PV nano solar systems; and applications of EE cook stoves, and productive, livelihood-enhancing uses of Renewable Energy (RE) and EE.

The PMU with the support of the DoE and Government agencies and private sectors have identified 40 communities to demonstrate the RE and EE technologies. The selection takes into consideration meeting the criteria of technical and economic viability of demonstrating RE-based energy generation system. The baseline information was important for the purpose of co-financing the incremental features of each demo site. Furthermore, the household data was critical towards maintaining an economic viability and thus a sustainable energy source supply for the communities.

The PMU is seeking the services of an International RE-based Generation consultant with expertise to support the PMU with the Design and Implementation of the project components of RE Technology on pico-/small micro hydro power grid and pico-/small hydro PV solar hybrid power grid. This also includes the delivery of Technical training on Design, Installation and Development of How-to-Guide Booklets.

2. Objective

The objective of the assignment is to undertake and deliver the following:

- I. Conduct Training on Design, Installation, Operation and Maintenance of pico-/micro hydro systems;
- II. Conduct Training on Design, Installation, Operation and Maintenance of pico-/micro hydro PV solar hybrid (Both these trainings have to be either Regional and or International accredited);
- III. On Site Design and Implementation of one pico-hydro PV hybrid demo ;
- IV. Verify and provide approval of designs of pico micro hydro demo sites; and
- V. Develop How-to-Guide booklets of Installing, Operating and Maintenance of pico micro hydro PV solar hybrid and pico micro hydro systems.

3. Scope of Work:

More specifically, the consultant will:

Pico-/small micro hydro and pico-hydro PV hybrid

- I. 1st Phase training: Deliver theoretical training for up to 5 participants from DoE, PMU and selected participants from private sectors and community. Training will be hosted in Port Vila for 10 working days. During this training, additional 4 working days is allocated for the Consultant to do site-visit of hydro demo sites in Pentecost, specifically: Loltong, Melsisi, Waterfall, Rangsukuk and Pangi. Upon return, the Consultant is expected to design the hydro systems for these demo sites and report back to DoE/PMU of the preferred part and equipment to be procure for installation of pico-/micro hydro at Loltong.

This 1st phase training should cover:

- a. Design of overall hydro generation system, including dam, weir, penstock etc.;
 - b. Installation methods of these hydro generation systems; and
 - c. Trainings will be certified to permit trainees undertaking design and installation of pico micro hydro sites.
- II. 2nd Phase Training: Deliver practical training on Installations, Operations and Maintenance of the pico-/ micro hydro generation plant. This is an on-site training to be conducted during the on-site installation of point iii) below. Training covers:
 - a. Daily system monitoring;
 - b. Trouble-shooting techniques and addressing faults;

- c. Routine maintenance, provide checklist for daily, monthly, quarterly, semester and annual checks.
- III. 3rd Phase Practical training: Site installation of pico-/small micro-hydro PV solar hybrid at Loltong. Design the system (AC or DC Hydro and Solar) based on the data collected by the PMU and data collected during first trip field visit. Data is inclusive of required height of dam and size, size of headrace, size of forebay, size of penstock, layout of turbine, solar system and how it will merged to form the Hybrid system. The objective of this training is to transfer knowledge and skills to trainers to be able to install additional 9 demo sites of pico-/micro hydro systems. It is envisaged that installation at Loltong will take 15 working days.
- IV. Support DoE/PMU on finalisation of designs for additional 9 pico-/micro hydro demo sites. Designs will be prepared by PMU and DoE team and sent to Consultant for verification and approval. This assignment will be done from home-base using data provided by the DoE. A total of 12 working days assigned for this assignment.
- V. All infrastructure system designs should be able to scale up to meet growing demand and be sustainable in the long run. Work will also determine the best risk mitigation measures needed to maintain the systems in the face of the various key natural disaster types typically occurring in Vanuatu (cyclone, earthquake, storm/tsunami)

How-to-Guide Booklets

- VI. Develop and Publish, How-to Guide booklets for pico-/small micro-hydro and pico-/micro small hydro PV hybrid system. This will involve the setting up and implementation of a mechanism by which those working locally on such applications can remotely ask questions of experts. The foregoing will be carried out for installation, operation, and repair of pico-small micro-hydro mini-grids and pico-/micro hydro PV hybrid mini-grids. Content will also cover assessing suitability of potential water sources, basin design, and issues such as distance from village, concentration of households, and need for willingness to pay for power. Pico-hydro/PV hybrid mini-grids will also be addressed.

4. Qualification Requirements

The International consultant is expected to meet the following qualifications:

- a) A minimum Bachelor's Degree in Electrical, Mechanical, Civil Engineering or relevant engineering field
- b) Additional qualifications on the Design, Engineering and Operation of Pico/Micro hydro and micro hydro PV solar hybrid power systems,
- c) Over 10 years' experience in the Design, Engineering and Installation of pico-/ micro-hydro systems including micro hydro PV solar hybrid power systems and various types of PV solar micro systems,
- d) At least 5 years of experience in Pacific Island Countries or in small island settings.
- e) Track record of successfully installed and long-lasting pico-hydro/ small micro-hydro systems and mini-grids; as well as various types of solar PV systems.
- f) Consultant must have good experience in conducting and delivering technical training
- g) Good written and oral communication skills in the English language.
- h) Expertise and experience in developing how to guide booklets for various types of pico/micro-hydro systems, various types of solar PV systems, and mini-grid network systems.

5. Key Deliverables and Schedule of Payments:

Payment for services rendered will be made upon acceptance/approval of the key deliverables as shown in the below schedule:

	Deliverables	Timeline	Percentage payment linked to the outcome
1	Inception report – provide an assignment approach and work plan of achieving the deliverables	7 days after signing contract	10% of the contract amount
2	Deliver training on design, installation, operations and maintenance of pico/ micro hydropower and pico micro hydro PV solar hybrid including learning materials and provide training report. Design of pico-/micro hydro demo sites of Loltong, Melsisi, Waterfall, Pangi and Rangsuksuk and recommendations of parts and equipment for installation.	14 working days: 10 days training and 4 days site inspection	30% of contract amount
3	Completion report of site installation of pico-/micro hydro PV solar hybrid at Loltong. This is part of the practical training delivered to DoE and selected participants from demo sites village communities.	15 working days for site installation	20% of contract amount
4	Delivery of final designs for the remaining 9 demo sites of pico-/micro hydro systems.	12 working days to verify and approve designs of 9 pico micro hydro demo sites	10% of contract value
5	Delivery of published ‘how-to guidebooks’ on installations, operations and maintenance of pico-/small micro-hydro, pico micro hydro PV hybrid systems’ in PDF and MS Word format.	12 working days assign to deliver “How-to-guide booklets”	30% of contract amount

6. Duration of the Work

The duration of this contract will be 60 working days spread over three to four months. The contract is expected to begin mid of December 2019.

7. Location

This work will require three international trips to Vanuatu. The first trip is to conduct training on design, installation, operations and maintenance for 10 days and 4 days allocated for site visit to Loltong, Melsisi, Waterfall, Pangi and Rangsuksuk on Pentecost, .

The second trip is expected to last for 14 days for site installation of pico-/micro hydro PV solar hybrid in Loltong. This trip will occur only when DoE/PMU had procured part and equipment of installing pico-/micro hydro PV solar hybrid at Loltong and is available for installation. The Consultant will advise on the part and equipment to be procured base on the design.

The third trip is to present how-to guide booklets to PMU/DoE and present final report.

All international and local traveling costs and accommodation will be met by the PMU based on reimbursement of receipts.

8. Administrative and logistical requirements

- Selected Consultant will be responsible for arranging for the most economic route for her/his international travels to and from Port Vila with the assistance of the PMU. Costs will be reimbursed by the PMU based upon submission of paid receipts and invoices.
- PMU will give support to arrange for her/his accommodation in Port Vila. All paid receipts and invoices will be reimbursed when submitted to PMU.
- PMU will assist to arrange for local travels to outer-islands. PMU is responsible to meet costs of local travel.

9. Institutional Arrangements

The consultant will work closely with the Project Management Unit team and the Electrification team and report to the Director of DoE, Ministry of Climate Change. The PMU and DOE will provide support to ensure deliverables are achieved.

10. Recommended Presentation of Offer

- Letter of confirmation of interest and availability.
- Updated personal CV indicating all past experience of similar assignments, including details of three references.
- (if necessary) Certificates and accreditation, business license, information about business
- Financial proposal:
 - ✓ Financial proposal must be expressed on the basis of “a daily fee” in USD;
 - ✓ Travel and living expenses in Vanuatu will be paid by PMU, as indicated under section 8: ‘Administrative and logistical requirements’ and should not be included in the price proposal.

Any interested candidate can obtain a full detail of the Terms of Reference from the receptionist at the Department of Energy, Ministry of Climate Change, Number 2 Area or email: dleona@vanuatu.gov.vu and requests for a soft copy.

Application close before COB Monday 2nd December, 2019 address to:

Anthony Garae

Director

Department of Energy

Ministry of Climate Change

PMB 9067

Send e-copy of your application to Email:

- gantony@vanuatu.gov.vu or dleona@vanuatu.gov.vu

11. Approval

This ToR is prepared by: Doreen Leona

Signature

: 

Name and Designation

: BRANTV Project Manager

Date of Signing

: 19/11/2019



This ToR is approved by

: Antony Garae

Signature

: 

Name and Designation

: Director, Department of Energy

Date of Signing

: 19/11/2019

