

# **PAPUA NEW GUINEA**

## **VIRTUAL PILOT TRAINING OF TRAINERS FEEDBACK WORKSHOP REPORT**

**Capacity Building to Strengthen Sustainable  
Implementation of Renewable Energy Technologies for  
Rural Energy Access**

### **Workshop Report**



09<sup>th</sup> -10<sup>th</sup> JULY 2020

DREAM INN HOTEL

Port Moresby – Papua New Guinea

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## Acronyms and Abbreviations

ACSE	Adapting to Climate Change and Sustainable Energy
Amp	Amperes
CCDA	Climate Change Development Authority
CPA	Central Provincial Administration
EE	Energy Efficiency
EU	European Union
GE	Green Economy
GGGI	Global Green Growth Institute
KOICA	Korean International Cooperation Agency
PIDF	Pacific Island Development Forum
RE	Renewable Energy
ToT	Training of Trainers
Volt	Voltage

## 1.0 Introduction

To strengthen informed and inclusive decision-making by resource owners and local government officials for integration of green economy (GE) and renewable energy (RE) into local level planning and to strengthen implementation of renewable energy (RE) infrastructure for rural electrification, the Global Green Growth Institute (GGGI) and the Pacific Islands Development Forum (PIDF) partnership, with funding from the Korea International Cooperation Agency (KOICA), has led to the development of a project titled ***“Capacity Building to Strengthen Sustainable Implementation of Renewable Energy Technologies for Rural Energy Access Project”***.

The project’s main objective is to strengthen informed and inclusive decision-making by resource owners and local government officials for integration of Green Economy (GE) and Renewable Energy (RE) into Local Level Planning and to Strengthen Implementation of Renewable Energy (RE) infrastructure for Rural Electrification. GGGI will work closely with local partners to develop various training modules within the project context to achieve this goal. In addition, in-country based local trainers will be engaged to deliver these capacity building trainings throughout the identified communities.

The direct beneficiaries of this capacity building project will be a total of 3000 trainees from 4 countries. The target groups for whom this capacity building training will be conducted (and customized) are:

- 1) Local government officials, Provincial government officials, District Officials and ward officials etc.
- 2) Traditional community/religious leaders and vulnerable groups (women, young leaders), etc.
- 3) Local electricians, people with technical aptitude, etc.
- 4) Small businesses

### 1.1 Workshop objectives

The four main objectives of the Pilot Feedback ToT Workshop include,

1. To introduce the project to selected national trainers and gain their support for the training phase of the project
2. To train the trainers on the draft “Solar in the Community” training module and obtain feedback on the trainer’s guide, learners’ workbook, delivery methods and its suitability to the projects targets groups on Day 1 of the workshop
3. To train the trainers on the draft “Solar Operation and Maintenance Basics” training module and obtain feedback on the trainer’s guide and learners’ workbook, delivery methods and its suitability to the projects targets groups on Day 2 of the workshop
4. To further discuss on other areas of improvement in order to ensure easier knowledge transfer and acceptance of the training modules by the communities.

The good gender mix of trainers participating in the workshop ensured a balanced feedback from all target groups for this project.

## 1.2 Participants

A total of 6 selected national (PNG) trainers were selected to attend the pilot feedback workshop on two training modules (Solar in the community and Solar O&M Basics) out of a total of eighteen national applicants. The applicants were selected based on their qualification and background or experience in community engagement projects or activities. Out of the selected three were females (one of whom joined virtually) while the other three were males. Those selected included a Doctor at the University of PNG, two solar vendors, two programs coordinators with two different NGOs, and a government official.

Invitations were also given to the Central Provincial administration of which two officers from the Disaster Emergency and Climate Change Division attended (unfortunately one did not attend the second day due to work commitments). Two technicians from the solar company (Green Future: Envisioned Ltd) who built the solar training kit also attended to help with the technical part of the workshop

The workshop was joined virtually by Dr. Achala Abeysinghe (GGGI Country Representative) who gave the welcome remarks and Mr. Mohammed Tazil (Senior Regional KOICA RE Project Officer) who did the presentation. Other attendees who joined virtually include, KOICA consultant representatives, and the other three country coordinators on the same KOICA Project. The GGGI staff in PNG based in Port Moresby also attended and were on hand to provide support when needed.

## 2.0 Workshop Opening

Welcome Address: Dr. Achala Abeysinghe, Country Representative – GGGI



The welcome opening remarks was delivered by Dr Achala Abeysinghe, the PNG Country Representative of GGGI. In her welcome speech she acknowledged and thanked KOICA for the Project funding support. She also acknowledged the support from PIDF in working to implement the Project in the Pacific Region. She further extended her words of gratitude to CCDA & CPA as the two important Project stakeholders. She emphasized on the importance of the project and the impacts that this project may have on the rural communities.

Finally, she thanked all participants for attending the workshop. She wished the Project team success for a productive meeting and for the overall project implementation.



After the welcome remarks given by Dr. Achala Abeysinghe, few minutes was given to the participants to introduce themselves and give a brief of their occupation. About Ten participants attended physically while about five joined virtually that is inclusive of the KOICA consultants, a selected participant, GGGI Country Representative, Senior Projects Officer and other country coordinators.

### 3.0 Project Overview

#### 3.1 Project Objective and Details

Project Overview: Mr. Benjamin Keni -PNG KOICA RE Project Coordinator



An overview of the Project was given by Mr. Benjamin Keni, PNG KOICA RE Project Coordinator. He gave a presentation outlining to participants the objectives of the project and Province of implementation. He went on to discuss the ten training modules and the targeted groups or beneficiaries in this Project. The overall project schedule and key dates so as the approach to take in training and the key performance indicators of the project were outlined in the presentation.

In his presentation he also shared the results of the pre-implementation survey which basically showed that many in the rural Project communities were interested in the Project and wanted to be involved once the project is implemented.

#### 3.2 Day 1 – Training of Trainers on “Solar in the Community” module

After the Welcome remarks and presentation on the project details and objectives, the actual workshop was conducted which was a mixture of power point presentations, group activities, hands on practical activities and interactive question & answers sessions to get feedbacks from all participants. The presentations were done virtually by Mr. Mohammed Tazil, GGGI Senior Regional Projects Officer. The first day of the ToT workshop concentrated on the draft **‘Solar in The Community’** Training Module while the second day of the ToT workshop concentrated on the second draft training module on **‘Solar Operations and Maintenance Basics’**.

The online presentations were conducted well with no major problems faced during the workshop and quality feedbacks were collected from the participants. The good internet quality enabled the successful online presentations and collection of feedbacks during the question and answer sessions.

On hand were two trained solar technicians from two solar companies (Green Future Envisioned Limited & Solar Solutions PNG Limited) who voluntarily attended the workshop and helped in the practical sessions of the workshop where different components of the solar kit were separated and re-connected. They also helped in showing to participants how to use a Multi meter and Clamp meter to measure currents and voltages in a solar system. They also practically explained the functions of the different solar components as presented and outlined in the Learner's workbook.

#### **Photos of Day one ToT workshop session on 'Solar in the Community' Draft Training Module**



**Figure 1.0: Opening of the workshop with participants joining virtually and others joining in physically.**

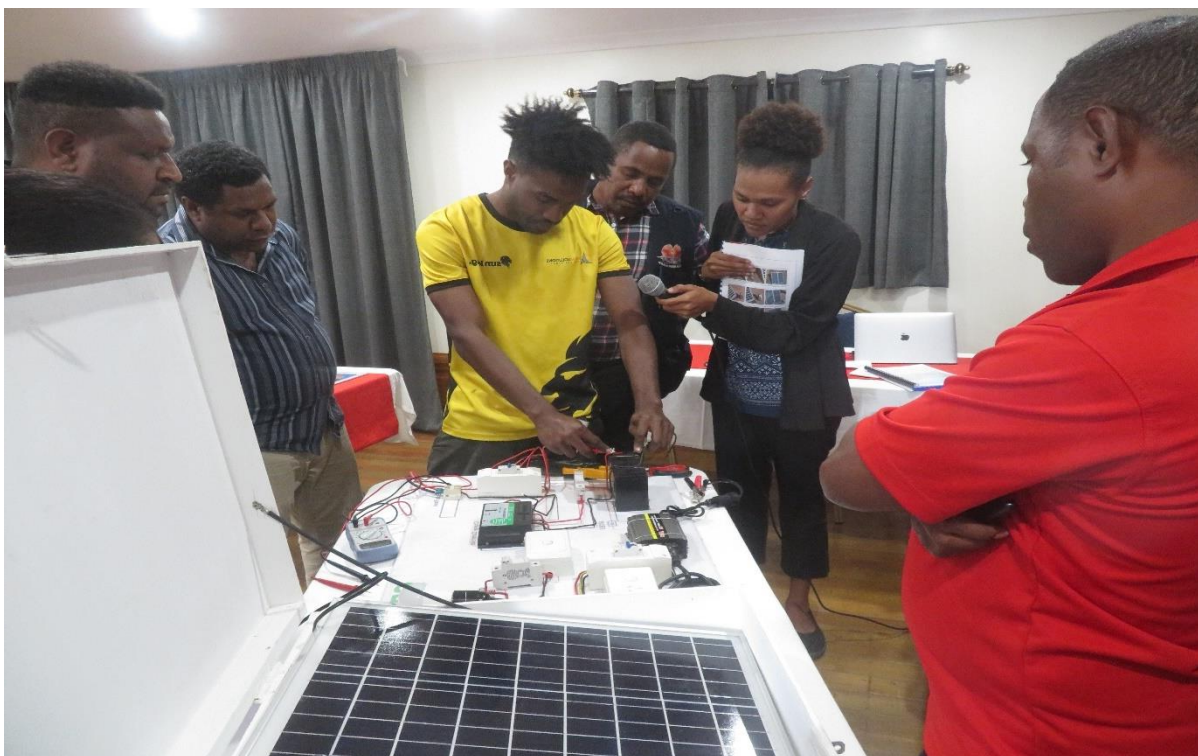




**Figure 2.0. Participants following through the Presentations done virtually.**



**Figure 3.0. Participants taking part in the Practical part of the workshop to measure current and voltage readings.**



**Figure 4.0. Participants looking on as the electrician connects the solar system to the battery.**

As part of concluding the first day of the workshop participants were asked to provide their feedback or thoughts on the workshop and training module discussed in Day 1. Workshop evaluation forms were also given to participants to fill which were collected at the start of Day 2 of the workshop.

### 3.2.1 Day 1 – Feedbacks from trainers on “Solar in the Community” module

The following are feedbacks from the six selected participants and two staffs from the Central Provincial Administration as well as the technical officer for Solar Solutions PNG limited who attended the workshop. These were verbally discussed before the start of the workshop.

1. Module 1 – illustrations need to be the same in the learner’s guide and Trainers Guide. Some technical drawings to have dotted or note form for each figure.
2. Have a one page at the end of the workbook as a section for reflection for participants to write one thing they have learnt from discussions at the beginning of the second day of workshop.
3. Trainer guide to be consistent to learner guide for diagrams etc. Page number needed for Module 2- Solar Operation & Maintenance Basics.
4. List of Acronyms to be included in the training modules and workbooks

A detail of all feedbacks for Day 1 are listed under the workshop feedback section in this report.



### 3.3 Day 2 – Training of Trainers on “Solar O&M Basics” module

The second day of the ToT workshop started off with a general recap of Day 1. A general discussion was held where participants asked questions and provided their thoughts or feedback on Day 1 and together questions asked were answered by Mr. Mohammed Tazil virtually with support from Mr. Benjamin Keni who was present.

After the general feedback discussions, Day 2 of the workshop started following the same structure as day 1. Presentations were done virtually by Mr. Mohammed Tazil while Participants followed through using the Trainers guide and the Learners Workbook. The second day concentrated on the second draft training module on ‘Solar Operation & Maintenance Basics’.

This session was more interactive, participants were taught on how to mount a solar panel to receive maximum solar energy and also were taught on ways to safely connect a Pico-solar system by themselves and also measure current and voltage flowing through the system so as conduct trouble shooting of the system to identify any faults.



**Figure 5.0. Participants on Day 2 following through presentations done virtually.**





**Figure 6.0. Participants been taught on the importance of properly mounting a solar Panel so as avoid shading of the panel.**



**Figure 7.0: Participants measuring voltage and current before and after shading of the solar panel.**

### 3.3.1 Day 2 – Feedback from trainers on “Solar O&M Basics” module

The following are feedback from the six selected participants, one staff from the Central Provincial Administration as well as the two technical officers who attended the second day of the workshop. These were verbally discussed as part of concluding the second day of the workshop.

- I. Clearly specify which solar systems should be recommended for use by communities back in the rural areas/villages.
- II. The most preferred connection (AC/DC) must be specified to locals during rural community trainings and include in the training modules on Solar.
- III. During rural community trainings there should be more than one solar training kit available for the rural communities to have more hands-on exercises.
- IV. One asked if they will be given certificates as qualified trainers unfortunately this is not possible as this project focuses on basic trainings and is not certified to give certificates to participants to qualify them as trained and qualified trainers.
- V. As part of the installation and maintenance it is important to highlight the issue of theft.

This will include the following;

- i. Secure installation of the panel dissuades individuals to steal the panel
- ii. If possible, install in a position which can be monitored relatively easily
- iii. Check the installation regularly to ensure it is secure and not easy to steal.

The detail feedbacks of Day 2 are stated in the workshop feedback section 5.0 of this report. The feedbacks were collected from the workshop evaluation form.

## 4.0. Results from the Reaction Survey Form

- **Relevance to your work**

According to the six selected national trainers 4 (66.7%) out of the six stated that the workshop was of Highest relevance to their work while 2 (33.3%) of participants stated High relevance as they were working with organisations that did not really deal with solar or RE for the matter but thought the subject was of importance.

- **Comprehension (Understandable Language) of Training Manual**

For this 2 (33.3%) participants ranked highest, 2 (33.3%) ranked High, 1 (16.7%) of participant ranked to have moderate comprehension while the last one (16.7%) of participant ranked it to be low due to his/her comprehension level of the two draft training modules.

- **Sufficiency of Manual Coverage (Are enough topics covered)**

Out of the six trainers 2 (33.3%) gave a Highest rating on the sufficiency of the manual as they thought most of what is to covered under the two modules were stated and covered while 4 (66.7%) of the participants gave a High ranking as they might have thought there some topics missing especially the waste management part without knowing that this is covered in the other training modules.



- **Quality of Illustrations**

For the quality of illustrations in the two draft training modules 2 (33.3%) of the selected trainers gave a rating of Highest as they may have thought the illustrations were clear and well outlined while 4 (66.7%) gave a rating of High as there maybe some illustrations that they saw were not that clear or were not fitting to the PNG context.

- **Relevance of illustrations to Thematic Area (topic)**

For the relevance of the illustrations to thematic area or the topic as per the two draft training modules on solar 3 (50%) gave a ranking of Highest while the other 3 (50%) gave a ranking of High as they thought there were some small areas that needed improvement especially using illustrations/ pictures that are from PNG or the Pacific so locals can relate well.

- **Ease to present effectively as a trainer to the community**

On ease to present the two draft training modules effectively as a trainer to the community, 3 (50%) of the participants gave Highest Ranking as they thought the modules were quite detailed and they understood well as such can delivery well to the rural communities. One (16.7%) gave a ranking of High while two (33.3%) gave a Moderate ranking as they were not very confident in delivering the modules especially the technical part of modules which includes the actual connection of solar components.

- **Understanding (Grasp) of the Thematic Area (topic)**

With respect to participant's understanding of the thematic area or topics to be discussed as per the draft training modules, 3 (50%) gave a ranking of Highest, 2 (33.3%) gave a ranking of High and 1 (16.7%) participant gave a ranking of Moderate. A ranking of moderate was given probably because solar is not part of his/her current work.

**Usefulness in your work to use/train for the community**

In terms of how participants perceive the usefulness of the materials to their respective jobs to train communities, 4 (66.7%) participants gave a ranking of Highest, 1 (16.7%) gave a High ranking while one (16.7%) gave a moderate rating in terms of the usefulness of the training modules.

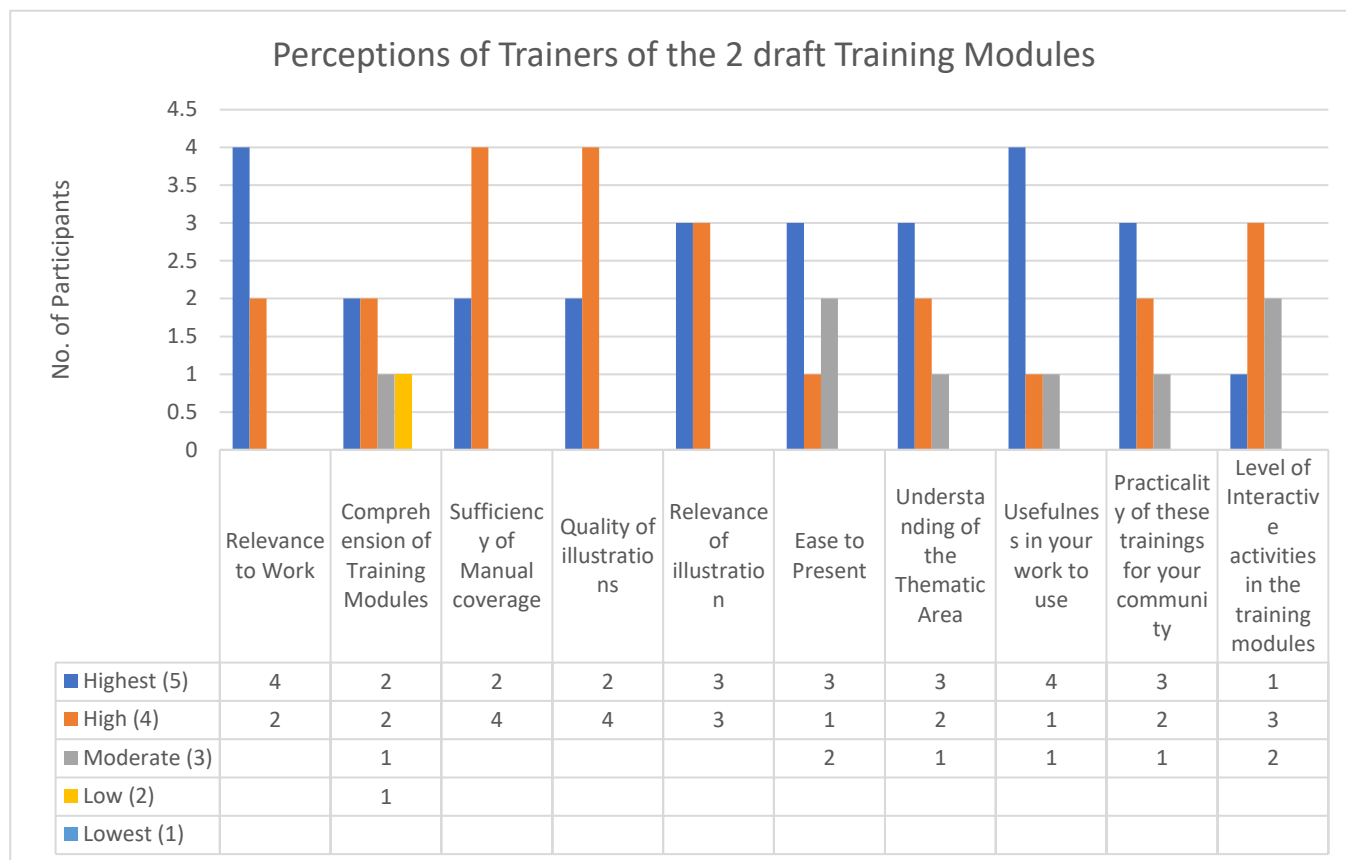
- **Practicality of these trainings for your country/community**

In terms of the practicality of the training to PNG, 3 (50%) of the participants gave a Highest ranking, 2 (33.3%) gave a ranking of 2 (33.3%) and 1 (16.7%) gave a moderate ranking.

- **Level of interactive activities in the Training Manuals**

On the level of interactive activities on the 2 (33.3%) draft training modules one gave a ranking of highest, 3 (50%) participants gave an overall ranking of High while one (16.7%) participant gave a Moderate ranking.

## Graphical Representation of Reaction Survey Results



**Graph 1.0. Perceptions of participants to the two the draft training modules Prior to the ToT workshop.**

**Table 1.0: Recommendations for addition to the Training manuals**

Topics to be added	Which Chapter	Reason for the addition
1. Include a clause on energy efficiency (Solar in the Community) for solar appliances to guide the communities to make informed decision before they decide to purchase the items from the suppliers. These items include; Incandescent Bulbs, Florescent tube and other solar appliances.	Chapter 3.0 Basics of Electricity or  Chapter 4.0 Components of Solar power System	Local communities need to be informed of the importance of energy efficiency to help them to buy high energy efficient appliances like, bulbs and florescent tubes. Etc...
2. Safe Disposal of Batteries & Solar Components	Module 2 (Solar O& M Basics) – Components of Solar PV Page 16	Outline clearly safe and environmentally friendly ways to store and dispose batteries & other solar components to avoid the risk of exposure to hazardous chemicals that will

		affect the natural environment and human population
3. Inclusion of relevant examples	Module 1 (Solar in the Community)	Include examples that are suitable to PNG to explain Heat energy (eg). i. Mumu Picture to explain Heat energy. ii. Sun drying of peanuts or coffee (PNG Context) instead of kava to explain heat energy.
4. Purchasing Solar power systems	5	There are lots of cheap solar products in the market which the community waste a lot of money on cheap products

**Table 2.0: Recommendations for Edits or Deletion to the Training Manuals**

Topics to be added	Which Chapter	Reason for the addition
Solar Dryer	Module 1 (5)	
Safe disposal	Module 1 (8)	Batteries and other solar parts contain toxic and harmful substances, which could degrade local environments and cause health issues if not properly disposed of. In addition to discussing Battery maintenance issues, it would be useful to discuss best practice disposal processes, including some common Melanesian uses (good and bad) of batteries like remolding of lead for fishing sinkers etc.
Provide charts and pictures to certain solar systems set up; for instance; DC and AC set ups etc.	Solar Operation and maintenance Basics- Chapter 2- Components of Solar PV systems  Chapter 3- Components requirements	In the rural communities most of the people are illiterate and few semi-educated so when using flip-charts and pictures of the systems and set up and going through with them one at a time would greatly help them in complying with the good practices and standards that will be communicated to them.
Learning Environment		Should include or recommend training environments (indoors/outdoors) with regards to the complexity and structure of the modules a suitable environment should be selected to conduct trainings.
Safety in PV systems	5	In PNG rural community many don't consider safety when wiring the solar products; they sometimes re-modify connections to increase power which is sometimes dangerous. As such connections must be identified and corrected for safety purposes.

## Further Clarifications

***List any points or questions, that you may need to be explained, for better understanding during the workshop.***

1. During the actual pilot training and for the actual training, the trainers(us) should be provided with the all the necessary tools that are required to enable them to effectively deliver and demonstrate what is required by the beneficiaries.
2. Some of the communities are already using some complex-inbuilt solar systems and when these types of system fail, they tend to dispose the entire inbuilt system. Therefore, it would be nice to include something about this in terms of set up and maintenance for the inbuilt solar PV systems that communities may currently use.
3. Include glossary for some terms used in the description section of the modules (though most of the components of solar systems are given) as this will enable trainers to give their feedbacks/ comments on the suitability of the terms used with specific considerations of the literacy levels of the rural communities.
4. Be more mindful of the terms used and simplify technical jargons for illiterate target audiences in the rural communities.
5. Edit to ensure that the both learner workbooks have the following;
  - I. Use lesser words/ large prints with more pictures and less words
  - II. Have clear Pictures that are more related to the local PNG communities
  - III. Ensure logical arrangements of pictures and wordings
6. More emphasis must be given to the types of solar systems to be purchased- in PNG likewise in the pacific, there are many cheap products being sold in the market so the community needs to understand and differentiate to purchase good quality products that will last long.
7. Emphasis more on the wiring of the solar systems- it is important because most of the time communities don't know how much power is used by their appliances and complained that their solar panel is faulty without understanding the wiring problems.

## 5.0 Results from the Workshop Evaluation

### 5.1 Day 1 – Workshop Evaluation

**Feedbacks of Participants extracted from the Workshop evaluation form filled by participants for Day 1 of the ToT workshop.**

❖ **Under areas/ topics about which the trainers would you like to receive further trainings. The following were listed. The feedbacks are based on the draft training module on ‘Solar in the Community’.**

- I. Use illustrations relevant to PNG context
- II. Emphasize more on sustainability Principles that includes addressing environmental, social, economic and governance issues.
- III. Preferred doing/conducting more practical exercises. On ground doing demonstrations on what has been taught.
- IV. Add more information on charge controller – function of each specific features of the charge controller.
- V. Installing solar PV systems (more practical exercises to be done to clearly and rightly connect wires
- VI. More on connecting Series and Parallel Circuits and outlining clearly how to calculate total voltages, current and power.
- VII. Explain more on pure-sine wave from non-pure sine waves.
- VIII. Mounting brackets & Pole (Clearly set the roof & pole solar systems)
- IX. Include a section to explain how solar (PV) systems are environmentally friendly. Probably give a brief description in the module would be better and will enable clear understanding of the system.
- X. More training on solar systems installation at a bigger scale similar to those at the village level given the PNG context.
- XI. Include ways to safely dispose solar and battery wastes to avoid exposure to hazardous chemicals and increased environmental threats or even degradation/contamination.
- XII. One suggested further training in;
  - i. Basics of electricity
  - ii. Components of solar power systems and its operation.

❖ **Suggestions for improving the workshop**

The following were suggested by the workshop participants as measures for improvements in future workshops;

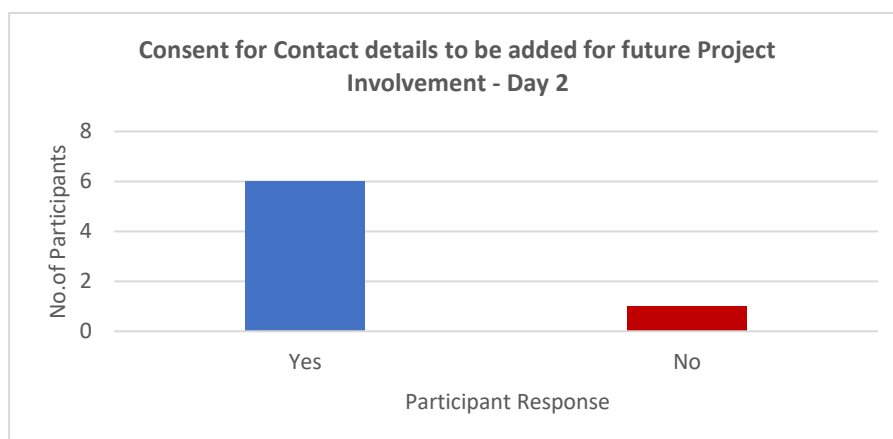
- i. Create/ suggest options that promotes more interactions in groups of participants who attended the workshop.
- ii. Allow more time for hands-on trainings than theory lessons as this are very practical.
- iii. Include more outdoor practical setup of the solar systems.
- iv. Prepare in advance contingencies and test all equipment's before the actual workshop to avoid delay and malfunction of equipment's during the workshop.



- v. Each trainer to be trained individually on ways to safely connect a solar system so they gain the practicality of successfully and safely connecting a solar system.
- vi. One suggested that the learner's workbook should have lesser writings with clear and more pictures for easy understandings.

❖ **Do you consent for your contact details to be added to our project database for further training and engagements in the thematic area?**

The graph below depicts the responses of workshop participants on both days in relation to this question been asked.



**Graph 2.0. Consent of Participants to be involved in the Project future activities.**

❖ **General Comment by Participants for Day 1;**

**After the first day of the workshop at the beginning of the second day time was given for participants to provide their general feedbacks or thoughts on the first day the following feedbacks were given and verbally discussed by the participants and presenters;**

- I. Asked for more interactions between participants and presenters and not only one presenting.
- II. Participants should be allowed to express on the ways they do maintenance on their solar systems as this will allow them to differentiate between the right and wrong ways of connecting and maintaining their solar systems.
- III. To receive maximum solar energy how will we teach locals on how to calculate angle of incline/ angel at which to place the solar panel. Keep it optional for those who want to do calculations to find the correct angel to tilt their solar panel.
- IV. Explain clearly the importance of maintaining a solar system. Provide diagrams with real pictures so locals can relate well to maintaining their solar systems.
- V. Provide/use more pictures to explain energy efficiency to guide locals to purchase & use energy efficiency appliances. (use more pictures)
- VI. Emphasis and simplify more on safety Pico solar systems as many locals in the rural villages modify their solar systems which could be very dangerous and may cause harm.

- VII. In order to enable locals to purchase quality and safe solar systems and components include a contrast table with pictures so locals can easily compare and contrast to purchase good quality solar systems.
- VIII. To trial modules can these trainers go to the selected project communities together with the in-country project coordinator to trail out the training modules to train the locals in the rural communities.
- IX. One agreed and stated that his willingness to be re-called to participate in this Project.

## 5.2 Day 2 – Workshop Evaluation

**Feedbacks of Participants extracted from the Workshop evaluation form filled by participants for Day 2 of the ToT workshop.**

### ❖ **Areas/ topics about which the trainers would like to receive further trainings include;**

- I. Energy efficiency and the methodologies in going about assisting the rural communities to quickly identify and distinguish between high energy efficiency items from low energy efficiency items.
- II. More training is required on the following;
  - a). Installing solar systems (DC/AC) in community trainings especially the wiring part.
  - b). Working on the default systems, identifying faults in connections and solving. Include more on the basics of trouble shooting.
- III. Taught/ trained to differentiate the different types solar systems like the standard off-grid system from the on-grid system.
- IV. Measuring voltage using multi-meter and be able to read accurately & explain to rural communities.
- V. Further explanations and demonstrations on the different components of a solar powered system.
- VI. More trainings on connecting a solar home system (connecting panel to charge controller then to battery, etc.).
- VII. Include more information to enable clear understanding on the purchase of solar systems.

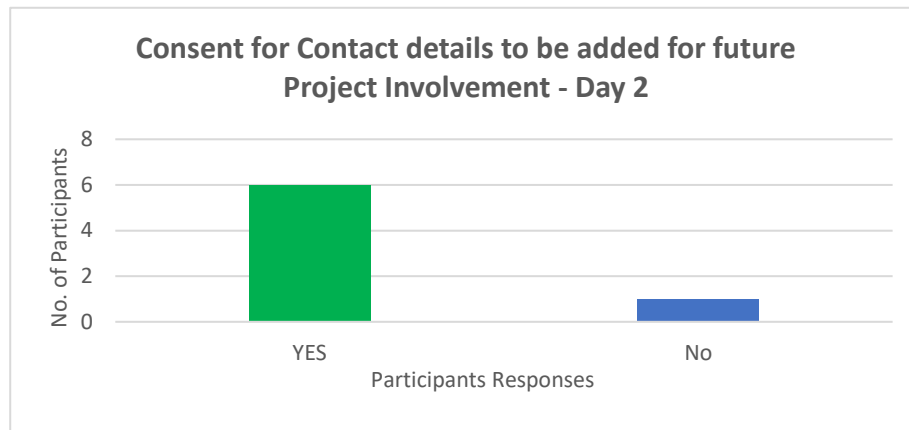
### ❖ **Suggestions for improving the workshop**

The following were suggested by the workshop participants as measures for improvements in future workshops

- I. Include more Practical activities on solar systems to enable participants to understand all the lessons covered on Solar O & M Basics. (eg. Do an actual set-up of a solar on a roof or pole would be great.)
- II. Allow questions to be asked by participants and explain to the audiences at every module taught to allow effective interactions and knowledge sharing.
- III. Provide more than one solar training kit setup in such trainings so participants (trainers) will do more hands on thus will understand especially the connections.
- IV. Give ample time for activities so participants can do the activities in order to see if the participants understand what was taught. Suggested to do more pairing exercises during trainings so those with experience can teach others as well.
- V. Encourage more group interactions and sharing of ideas amongst participants.

- ❖ **Do you consent for your contact details to be added to our project database for further training and engagements in the thematic area?**

The graph below depicts the responses of workshop participants on the second day in relation to this question been asked.



**Graph 3.0. Consent of Participants to be involved in the Project future activities.**

- ❖ **General Comment by Participants for Day 2;**

**After the first day of the workshop at the beginning of the second day time was given for participants to provide their general feedbacks or thoughts on the first day the following feedbacks were given and verbally discussed by the participants and presenters;**

- VI. State ways how locals in rural communities will dispose of damaged batteries and other solar components (Waste management) in ways that are very environmentally friendly and cause less to no harm. Include section on this in the training modules.
- VII. One commented that at first, he was connecting his solar system the wrong way with the knowledge he has gained he can be able to do connections correctly so as to explain successfully to local communities.
- VIII. A general suggestion to identify the solar systems supplied by the districts & Provincial Leaders to communities & include a section specific to such kits so instead of throwing away when damaged rather maintain & reuse the systems. (These systems are common to coastal villages of Central Province of which three are the selected project sites)
- IX. Have a section in the module on which batteries are safe to use in the communities include lifespan, type, Price, chemical content and ways to safely dispose in the environment.

## 6.0 Conclusion

The pilot virtual ToT workshop for PNG was conducted successfully over two days from 09<sup>th</sup> -10<sup>th</sup> of July 2020 in Port Moresby. The workshop was well attended by the selected six national trainers who gave very valuable and practical feedbacks based on their experiences in community engagements or trainings based on two draft training modules of 'Solar in the Community' and 'Solar Operation and Maintenance Basics'.

The feedbacks gathered from the participants will help in the review and finalisation of the two draft training modules to suit the PNG context before these modules are taught to the selected rural project communities in the main community trainings scheduled for next year.

In all, the participants showed great interest in the project and provided very valuable feedbacks in the two days' workshop. The project gained support from the trainers as a result 5 out of the 6 participants agreed to be involved in the actual project implementation and assured that the project will definitely fill the knowledge gaps of locals especially on solar and other renewable energy sources including Green Economy through the ten training modules that will be taught to the five selected rural communities.

## 7.0 Appendices

### Appendix A: Workshop Agenda

**Capacity building to strengthen sustainable implementation of Renewable Energy Technologies for Rural Energy Access.**

Pilot Training of Trainers Workshop - PNG

Date: 09<sup>th</sup> -10<sup>th</sup> July 2020

Workshop Agenda- Day 1 (09<sup>th</sup> July 2020)

Module 1 – Solar and the Community

Time	Chapter	Lesson Type
8:15 - 8: 20 am	1. Welcome Remarks	Dr Achala C. Abeysinghe (Country Representative   PNGG-GGGI)
8:20 – 8:30 am	2. Project Introduction	Mr. Benjamin Keni (Associate Country Programs Coordinator)
8:30 – 8:45 am	3. Ice breaker – Participant Introductions	Theory and activity 1
8:45 - 9:30 am	4. What is Solar Energy	Theory
		Activity 2
		Activity 3
9:30 - 10:00 am	5. Basics of Electricity	Theory
		Activity 4
10:00 - 10:15 am	Tea Break	
10:15 - 11:30 am	6. Components of Solar Power systems	Theory
		Activity 5
11:30 - 1:00 pm	7. Types of Solar Systems	Theory
		Activity 6
1:00 - 1:30 pm	Lunch Break	
1:45 - 3:00 pm	8. Measurements and Test Equipment	Theory
		Activity 7A (optional)
		Activity 7B
		Activity 8
		Activity 9 (Optional)
3:00 - 3:15 pm	Tea Break	Theory on Safety
3:15 - 4:15 pm	9. Purchasing Solar Power Systems	Theory
		Activity 10
4:15 - 5:00 pm	10. Maintenance of Home Solar Systems	Theory
		Activity 11
		Activity 12 (Optional)



## Workshop Agenda- Day 2 (10<sup>th</sup> July 2020)

### Module 2: Solar Operations and Maintenance

Time	Chapter	Lesson Type
8:15 - 8:45 am	1. Ice Breaker - Introductions	Theory and Activity 1
8:45 - 10:00 am	2. Components of Solar Power systems	Theory
		Activity 2
		Activity 3
		Activity 4
10:00 - 10:15 am	Tea Break	
10:15 - 11:30 am	3. Component Requirements	Theory
		Activity 5
		Activity 6
		Activity 7
11:30 - 12:30 pm	4. Types of Solar PV Systems	Activity 8
		Theory
		Activity 9
		Activity 10
12:30 - 1:00 pm	5. Tools used in Solar PV System	Theory
		Activity 11
1:00 - 1:30 pm	Lunch Break	
1:30 - 2:00 pm	6. Installing Solar PV systems	Theory
2:00 - 3:15 pm	7. Safety Requirements of Solar PV Systems	Theory
		Activity 12
3:15 - 3:30 pm	Tea Break	
3:30 - 4:30 pm	8. Identifying and Resolving common faults in solar home PV systems	Theory
		Activity 13
4:30 - 5:00 pm	9. Solar PV Maintenance checklist	Theory
		Activity 14

## Appendix B: Participants List


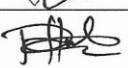
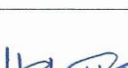

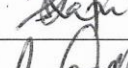
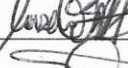







**Project Title:** Capacity building to strengthen sustainable implementation of Renewable Energy Technologies for Rural Energy Access.

**Workshop:** Pilot Training of Trainers -PNG (09<sup>th</sup> -10<sup>th</sup> July 2020)

**Workshop Venue:** Dream Inn Hotel – Port Moresby

### Workshop Participants

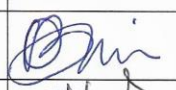
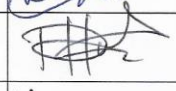

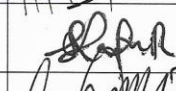



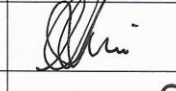
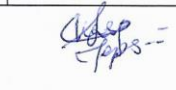
No.	Name	Gender (M/FM)	Organisation/ Title	Signature	Date
1	Jennifer Ramamurthy	FM	Selected Trainer	Attended online.	
2	Dr. Olive Baloioloi	FM	Selected Trainer		09/08/20
3	Rozabelle Hota	FM	Selected Trainer		09/07/20
4	Hobert Asari	M	Selected Trainer		09/07/20
5	Kafu Simon <del>Simon</del> Senior	M	Selected Trainer		
6	Larsen Daboyan	M	Selected Trainer		09/07/20
7	Murray Konido	M	Central Province Admin		09/07/20
8	Tony Avaut	M	Central Province Admin		09/07/20
9	Bernard George JOHN KAPAG	M	Green Limited		09/07/20
10	Dr. Achala Abeysinghe	FM	GGGI Staff	Attended Online	
11	Benjamin Keni	M	GGGI Staff		09/07/20
12	Jennifer Shirley Nila	FM	GGGI Staff		09/07/20
13	NARCEAN SEN	M	Source SOLUTIONS		09/07/20

**Project Title:** Capacity building to strengthen sustainable implementation of Renewable Energy Technologies for Rural Energy Access.

**Workshop:** Pilot Training of Trainers -PNG (09<sup>th</sup> -10<sup>th</sup> July 2020)

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**Workshop Participants**

No.	Name	Gender (M/FM)	Organisation/ Title	Signature	Date
1	Jennifer Ramamurthy	FM	Selected Trainer	Attended online	10/07/20
2	Dr. Olive Baloiloi	FM	Selected Trainer		10/07/20
3	Rozabella Hota	FM	Selected Trainer		10/6/20
4	Robert Asari	M	Selected Trainer		10/07/20
5	Kafu Simon Simon	M	Selected Trainer		10/07/20
6	Larsen Daboyan	M	Selected Trainer		10/07/20
7	Murray Konido	M	Central Province Admin		10/07/20
8	Tony Avaut	M	Central Province Admin		
9	Bernard George George	M	Green Limited (Send a 7/rep).		10/07/20
10	Dr. Achala Abeysinghe	FM	GGGI Staff	Attended online	10/07/20
11	Benjamin Keni	M	GGGI Staff		10/07/20
12	Jennifer Shirley Nila	FM	GGGI Staff	Attended	10/07/20
13	Charity Sap	FM	Selected Trainer Technical Person (Solar solutions).		10/06/20

## Appendix C: Reaction Survey Form Sent to Participants

### Project: Capacity Building to Strengthen Sustainable Implementation of Renewable Energy Technologies for Rural Energy Access

Workshop for review of two training modules on “Solar in the Community” and “Solar O&M Basics”

#### Reaction Survey Form of Training Manuals

Dear Trainer,

Congratulations on being selected to attend the *Workshop on the Review of draft Training Modules for "Solar in the Community" and "Solar O&M basics"*!

**As a preliminary requirement before the workshop**, you are requested to have a read through the draft training manuals and capture your first thoughts on the relevance of the training materials provided through this reaction survey and **bring this filled form with you on the 1<sup>st</sup> day of the workshop.**

The objective of this evaluation of the training manuals by you, as the participant, assesses how they “feel” regarding the manuals.

Also called “smile sheets”, reaction surveys measure your immediate perceptions as a participant and trainer, of the quality and usefulness of the training material and also enables you to come prepared to actively participate during the duration of the workshop.

Name: \_\_\_\_\_ Country: \_\_\_\_\_

Email: \_\_\_\_\_ Phone: \_\_\_\_\_

Please give 1 to 5 ranking ( ✓ ), 1 being the lowest and 5 being the highest						
Your perceptions of the following after going through the Drafts:						
	1	2	3	4	5	
1						Relevance to your work
2						Comprehension (Understandable Language) of Training Manual
3						Sufficiency of Manual Coverage (Are enough topics covered)
4						Quality of Illustrations
5						Relevance of illustrations to Thematic Area (topic)
6						Ease to present effectively as a trainer to the community
7						Understanding (Grasp) of the Thematic Area (topic)
8						Usefulness in your work to use/train for the community
9						Practicality of these trainings for your country/community
10						Level of interactive activities in the Training Manuals

Topics to be added	Which Chapter	Reason for the addition

Topics to be added	Which Chapter	Reason for the edits or deletion

[illegible]

*Vina'ka, Tank iu tumas, tenk yu tru, Tangkyu Tangkyu tumas*



## Appendix D: Workshop Evaluation Filled by Participants

### Project: Capacity Building to Strengthen Sustainable Implementation of Renewable Energy Technologies for Rural Energy Access

Workshop for review of two training modules on “Solar in the Community” and “Solar O&M Basics”

#### Workshop Evaluation Form

Dear Participant,

We convey our appreciation at your attendance and valuable contributions in the *Workshop on the Review of Training Manuals for Solar in the Community and Solar O&M Basics*.

**As a concluding requirement of the workshop**, you are now requested to share your experience of this workshop by filling in this evaluation form.

The purpose of this evaluation of the workshop will enable us to assess if we have successfully attained the objectives of this workshop and also assist in evaluating if any further improvements are required.

Name: \_\_\_\_\_

Country: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

**1. Please respond to the following statements by using the 4-point rating scale to indicate the extent to which you agree or disagree with each statement. Please circle the number that applies.**

**4= Strongly Agree**  
**Disagree**

**3= Agree**

**2= Disagree**

**1= Strongly**

1. Workshop objectives were stated clearly and met.	4	3	2	1
2. The workshop was well organized.	4	3	2	1
3. The workshop helped me to learn how to work effectively with my peers in a workshop setting.	4	3	2	1
4. The information and/or skills presented were relevant and useful	4	3	2	1
5. The presenter(s) provided adequate time for questions and answered them satisfactorily.	4	3	2	1
6. The presenter(s) modeled student-centered learning strategies and techniques both for community and technical level.	4	3	2	1

7. This workshop increased my knowledge and skills in Earth science.	4 3 2 1
8. The information and/or skills presented were relevant and useful.	4 3 2 1
9. The workshop as presented was congruent with the workshop description.	4 3 2 1
10. The presenter(s) allowed me to work with and learn from others.	4 3 2 1
11. The presenter(s) suggested ways to follow up the training.	4 3 2 1
12. The materials provided were useful for training in Solar O&M Basics.	4 3 2 1
13. The manuals were appropriate for the training at community level.	4 3 2 1
14. The physical arrangements were adequate.	4 3 2 1
15. The activities suggested in the manuals will assist in the training	4 3 2 1

16. How would you rate this workshop? (please check one)	<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> Very Good <input type="checkbox"/> Not Good
17. How comfortable are you with using the manuals presented in this workshop for training?	<input type="checkbox"/> Very <input type="checkbox"/> Not at all <input type="checkbox"/> Somewhat
2. 18. Areas/topics about which you would like to receive further training:	
19. Suggestions for improving this workshop:	
20. Do you consent for your contact details to be added to our project data base for further training and engagements in the Thematic Area?	

## Appendix E: Workshop Presentation Slides

### Papua New Guinea -Pilot Training of Trainers & Feedback Workshop

Capacity Building to Strengthen Sustainable Implementation of Renewable Energy Technologies for Rural Energy Access



### Project Overview

**Benjamin Keni**  
Papua New Guinea - Project Coordinator



### Project Objective and Method



**Objective:** To strengthen informed and inclusive decision-making by resource owners and local government officials for integration of Green Economy (GE) and Renewable Energy (RE) into Local Level Planning and to Strengthen Implementation of Renewable energy (RE) Technologies for Rural Energy Access.

This will be achieved through the development and delivery of 10 training modules, consisting of 4 modules on Green Economy and 6 modules on Renewable Energy.

#### Methodology

- Four countries (PNG, Fiji, Solomon Islands, & Vanuatu)
- Train-the-trainer approach (~4 trainers in each country)
- Goal of 3000 people trained (750/ country with 40% inclusive of women)
- Target audiences: community leaders, vulnerable groups (women's groups leaders, youth leaders), local government leaders, local technicians and small businesses

### Training Modules



Green Economy Module	
-	General Principles
-	Energy Efficiency Basics
-	Green Business Basics
-	Inclusive Development
Renewable Energy Module	
-	RE General Principles
-	Solar in the community
-	Pico hydro in the community
-	Solar O&M basics
-	Pico hydro O&M basics
-	RE Financial management

## Target Audiences



- Sub-national officials
- Provincial officers
- District officers
- Town councilors



- Existing small businesses
- Private sector leaders
- Potential entrepreneurs



Traditional/  
community  
leaders

- Village/community leaders
- Women's group leaders
- Youth leaders
- Other vulnerable group leaders



Local  
technicians

- Existing technicians
- Those with electrical/mechanical aptitude
- Those interested to learn technical

## Training Modules



Local  
government  
officials



Traditional/  
community  
leaders



Small  
businesses



Local  
technicians

GE Module	Local government officials	Traditional/community leaders	Small businesses	Local technicians
- General Principles	X	X	X	X
- Energy Efficiency Basics	X	X	X	X
- Green Business Basics			X	
- Inclusive Development		X	X	
RE Module	Local government officials	Traditional/community leaders	Small businesses	Local technicians
- RE General Principles	X	X	X	X
- Solar in the community	X	X	X	
- Pico hydro in the community	X	X	X	
- Solar O&M basics				X
- Pico hydro O&M basics				X
- RE Financial management	X		X	

## Target locations – PNG



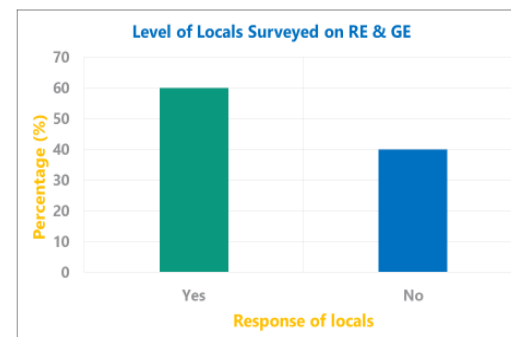
A total of five (5) project sites were selected during the national stakeholder workshop in November 2019. A pre-implementation survey as part of the initial phase of project implementation was conducted in all five selected project sites including two additional villages from November –December 2019

- I. **Kalo Village** – Rigo District – Central Province
  - i. Alukuni Village
  - ii. Karawa Village
- II. **Keapara Village** – Rigo District – Central Province
- III. **Imuagoro Village** – Rigo District – Central Province
- IV. **Edevu** – Kairuku-Hiri District – Central Province
- IV. **Brown River Community** – Kairuku-Hiri District – Central Province

## Pre-Implementation Survey Results



### 1. Measuring Knowledge Level of locals on RE & GE



**Survey Result 1** – Response of locals in all 5 sites in relation to their knowledge on RE & GE.

Total People interviewed in all 5 sites = 80 People

- **Yes** – People who think they have fair knowledge on RE & GE - **(48 People)**
- **No** – Have very little to no knowledge on RE & GE - **(32 people)**

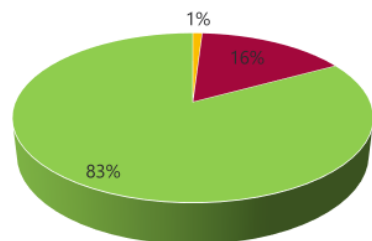
## Pre-Implementation Survey Results



### 2. Interests of Locals in learning about RE & GE

Percentage Interest Levels of Locals in Learning RE & GE

Not Interested Interested Very Interested



**Survey Result 2** – Response of locals in all 5 sites in relation to their interests in learning about RE & GE.

Total People interviewed in all 5 sites = 80 People

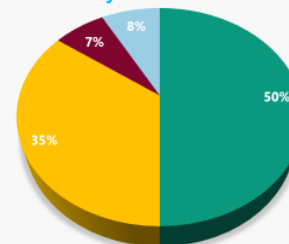
- **Not Interested** – those that were not interested (mainly women and the elderly) - (1 person)
- **Interested** – those that were quite keen to learn - (13 people)
- **Very Interested** – Those that showed great interest in Learning RE & GE - (66 people)

## Pre-Implementation Survey Results



### 3. Training Level of Locals on O & M of RE Systems

Training levels of locals on O&M of RE Systems



■ No Training ■ Self taught ■ Trained & Certified ■ Trained but uncertified

**Survey Result 3** – Response of locals in all 5 sites in relation to any previous trainings they have received on RE & GE.  
Total People interviewed in all 5 sites = 80 People

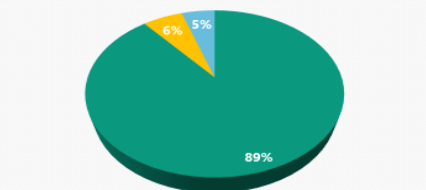
- **No training** – those that did not receive any form of training - (40 people)
- **Self Taught** – those who learnt from others or by themselves - (28 people)
- **Trained on RE** – Those who learnt & have qualifications in RE O&M - (6 people)
- **Trained but not certified** – those that received some sort of training but are uncertified with experience - (6 people)

## Pre-Implementation Survey Results



### 4. RE Systems locals were interested in been trained.

The RE systems locals were Interested on been trained



■ Solar Home Systems ■ Pico Solar PV ■ Pico Hydro

**Survey Result 4** – Response of locals in all 5 sites in relation to their interests to be trained on 3 RE Systems.

- **Solar Home Systems** – refers to bigger systems usually with more than 5 lights & power points - (71 people)
- **Pico Solar PV** – Smaller solar systems with only few lights & may charge phones - (5 people)
- **Pico –Hydro Systems** – small rural hydro systems, mainly for an individual household - (4 people)

## Overall Schedule and Key Dates



Activity	2019	2020	2021
Review existing materials and develop new modules			
Selection of target locations			
Needs assessment			
Pilot Train the trainer Workshop + Feedback			
Pilot Training (100-150/country)			
Regional Workshops			
Final review of modules + Translations			
Main Training of trainer Workshops			
Main Community trainings			



## Training Materials - Approach



- Objectives for training materials
  - **Interactive:** at least 2/3 of the training time should be interactive vs. lecture format (interactive activities include games, exercises, storytelling, groupwork, facilitated discussions, roleplaying, etc.)
  - **Actionable:** provide information/actions that people can use in their daily lives right away
  - **Tailored and tailorable:** specific to the current knowledge level, needs, culture, community structure, etc., of participants, can be modified by trainers as needed
- Next steps
  - Development of training modules underway (will be completed by early July)
  - Pilot training of remote communities (July-Aug). Trainers for pilot trainings to be hired by July.
  - Regional Workshop, final review of modules and translations (Sep-Oct)
  - Main training of trainers (Nov-Dec). Trainers for main training to be hired in December
  - Main training of remote communities 2021 onwards

## Key Performance Indicators



- No. of women(40%) & persons from vulnerable groups providing inputs(20%) / participating in decision-making meetings, committees, etc.
- No. of suitable training materials and processes prepared and translated targeting women and vulnerable groups. (10 training modules)
- Proportion of participants in training who agree that their knowledge of GE and RE has increased after attending the training.(70%)
- No. of trained trainers based in each country (4-5)
- Proportion of community committee members and local technicians trained in financial management and O&M for RE who agree that the training will assist in better O&M of their local RE installations.(70%)

Thank You