**FREAGER SECTM TVET TRAINING of TRAINERS**

**Port Moresby: March 2021**

**Concept Note**

1. **Background**

Household electricity accessibility is very low in PNG despite PNG having a significant potential indigenous energy resource reserve which includes fossil fuel and renewable energy source. At present, an estimated 85% of the population, almost exclusive to the rural area, still lacks sufficient access to electricity services. Electricity is a key ingredient for socio-economic development and thus it is priority of the government to provide clean and affordable energy to its people.

Through the EU-funded Renewable Energy in Pacific Islands Countries (EPIC) Project that ended in 2016, the University of Papua New Guinea (UPNG) established a specialized Centre of Renewable Energy (CORE) at its School of Natural and Physical Sciences to develop local skills and capacity to react to the current challenges, immediate needs to the renewable energy (RE) development in the Pacific, Including PNG. The EPIC Project also assisted to develop a Master of Science in Renewable Energy Management (MScREM) uder CORE which is currently being offered by the Physics Division. As a Higher Educational Institution, the University of Papua New Guinea, serves as an organization to educate and strengthen capacity building in RE and EE in PNG through educational activities, curriculum development, research and awareness.

The Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) is part of the Pacific Community (SPC) and its mission is to promote private sector participation in the renewable energy and energy efficiency market and transition the countries to low carbon and resilient economies.

The Second Operation Phase (SOP 2021 - 2025) of the PCREEE has four strategic priority programmes and are: i) Local RE&EE Business Start-Up and Entrepreneurship Support, ii) RE & EE For Sustainability Mobility, iii) RE Mini-grids and iv) Energy Efficiency Investments. Capacity Building and Trainings is an integral and cross-cutting components of delivering the four strategic priority programmes.

In May 2020, SPC and UPNG signed a Memorandum of Understanding to facilitate collaboration between the parties, particularly on areas of mutual interest, which include i) Innovation, Demonstration, Research and Development, ii) Databases and Knowledge sharing platforms, iii) Capacity Building and staff exchanges and iv) Resource Mobilisation.

Prior to the MOU, PCREEE supported PNG on the establishment of the Solar Energy Association of PNG.

1. **Introduction**

Since the launching of the Centre, UPNG CORE has been engaging with government, private sector, NGOs, the Solar Energy Association of PNG and development partners to advocate for increased sustainable energy uptake in PNG, while also driving its own internal educational and research programmes.

CORE has been a stakeholder in the adaptation of the Regional PacTVET SE Curriculum to the National TVET SE curriculum which is currently with the Department of Education. However, facilitators from TVET institutions need to be upgraded with skills and knowledge to be able to run the programmes competently, hence the need for the Training of Trainers Workshop.

UPNG CORE has worked in consultation with private sector to identify gaps in the field of RE for project development. Currently, PNG is implementing the GEF/UNDP-funded Facilitating Renewable Energy and Energy Efficiency Applications for Green House Gas Emission Reduction (FREAGER) project to address some of these capacity shortfalls.

The FREAGER project is aimed at increasing use of sustainable energy technologies; (i) Implementing and enforcing approved national and provincial energy policies, plans and standards, (ii) Strengthening capacity building whilst increasing RE installed capacity and implementing EE technology, (iii) Increasing availability and access through establishing a financing mechanism for RE and EE initiatives and (iv) Enhancing awareness, attitudes and information of RE and EE applications for end users. UPNG CORE is facilitating the FREAGER Sustainable Energy Curriculum and Training Material Development (FREAGER SECTM) component of the Project. The FREAGER SECTM component is aimed at increasing capacity in Sustainable Energy (SE) for PNG and the Region, which will enable increased uptake in RE systems and implementation on energy efficiency (EE) measures.

The main project objective is to enhance capacity development programs in Sustainable Energy for local communities, Higher Educational Institutes and Secondary Schools in PNG. UPNG CORE has five (3) major deliverables to produce:

1. Development of Step-by-Step Guides for Solar PV Minigrid, Hydro-power, and Energy Efficiency.
2. Curriculum and training materials for project beneficiaries
3. Curriculum and training materials for technical institutions and industry

The objectives of the FREAGER-SECTM project is therefore aligned with PCREEE’s strategic priorities in particular building the capacity of Pacific Island Countries and Territories (PICTs) to meaningfully engage on SE business start-ups and entrepreneurship, RE mini-grids, e-mobility and energy efficiency investments.

To promote partnership and collaboration between UPNG CORE and SPC PCREEE, UPN has requested co-financing support from the PCREEE Sustainable Energy Entrepreneurship Support Fund to support trainings on Sustainable Energy for local communities, higher educational institutes and secondary schools in PNG. The training is of greater importance and urgency to PNG’s respond and resilience to the negative impacts of the COVID 19 pandemic. Solar Mini-grids will play an integral part on the safe storage of COVID-19 vaccines in the rural and remote parts of PNG.

1. **Overview**

CORE has been working towards achieving the deliverables of the FREAGHER SECTM project since December 2019. The progressive CORE FREAGER SECTM project workplan and achievements is as summarized below;

Deliverable 1 – Three (3) step-by-step guides (solar PV minigrid, hydropower minigrid, energy efficiency) developed and have been submitted in June 2020 for approval by UNDP, and currently been used for workshops in Eastern Highlands, East Sepik and Milne Bay

Deliverable 2 – 3 community handbooks created for (solar PV minigrid, hydropower minigrid, energy efficiency) for project beneficiaries of Eastern Highlands, East Sepik and Milne Bay. Submitted to UNDP October 2020. Also been used in workshops in Eastern Highlands, East Sepik and Milne Bay.

Delivery 3: -Currently only two higher education programmes that are directly addressing capacity issues in PNG:-

* Master of Science in Renewable Energy Management (MSCREM)
* TVET Sustainable Energy

CoRE is currently developing learning guides for the 8 modules for the course-work component of the course, with 5 guide developers engaged.

Between 2014 and 2017, SPC/USP worked with the TVET Division of the PNG Department of Education to develop programmes in climate resilience and sustainable energy to address the issue of human capacity shortages in PNG. The frameworks of the following programmes were created: -

* National Certificate 1
* National Certificate 2
* National Certificate 3
* National Certificate 4
* Diploma
* Advance Diploma

However, these programmes were never progressed since 2017 due to lack of capacity within the Department of Education. Therefore through the mentioned UNDP-project, CoRE stepped-in to assist in progressing this exercise. So far we have developed the training packages for NC1-2 to be submitted for approval and now are working the following activities based on the limited funding we have: -

* Development of NC3-4 training packages (March 1-2)
* Contextualizing Student and Facilitator Guides for NC1-2 (March 3-4)
* Training of Trainers Workshop for Facilitators (NC1-4)

PCREEE has been a strong supporter of accredited trainings on sustainable energy since it improves the professionalism of the private sector, support better quality energy services and improve the durability and reliability of energy installations. It has supported Tonga Energy Office in the development of a National Certificate in Sustainable Energy (NCSE), Level 1 and Level 2, accredited by the Tonga National Qualification and Accreditation Board (TNQAB).

PCREEE is therefore pleased to partner with the FREAGER\_SECTM project in rolling out the RE accredited trainings in PNG.

1. **Aim and Objective**

The overall goal of the project is to upskill selected facilitators to be able to implement NC1-4 in their respective institutes

The objectives of the training are to:

1. Potential TVET Facilitators to familiarise with the following;

(a) generic qualifications NC 1 and NC2 that delves into workplace responsibilities, on-grid and off-grid systems, RE and Non-RE energy sources and EE

(b) NC3 that covers logistics and procurement of project activities; scheduled and preventative maintenance; EE assessments, practice, retrofitting, and evaluation; and RE applications of tools and equipment for complex tasks; Use of drawings, codes, standards and specifications; fault diagnosis and rectification; assistance in installation and O &M; and (c) NC4 that looks into WHS identification and risk assessment; Supervision and coordination of energy sector activities; Energy Management; and RE applications of tools, equipment, and materials for planning, design and installation; Installing, operation and coordination of maintenance efforts of RE systems.

1. Discuss basic theory of systems introduced by lecture, emphasize hands on work (learning by doing) in preparing system design and carrying out installation, diagnosis and rectification, and O&M related activities of RE and EE systems.
2. Support energy audits (e.g buildings and industrial facilities) and include preparation of content for a course on building and industrial energy audits for partner tertiary education institutions.
3. Promote Renewable Energy and Energy Efficiency in rural and remote communities
4. Empower rural communities through RE&EE trainings and promote business start-ups and entrepreneurship
5. **Expected Outcomes**

The expected outcomes of the ToT event are as follows;

1. The ToT will prepare facilitators to deliver the NC1-4 qualifications through applicable institutions.
2. The ToT will enable facilitators to discuss basic theory of systems introduced by lecture and enhance hands on work (learning by doing) skills in preparing design of systems and conducting installations, diagnosis and rectification, and O&M activities of RE and EE systems.
3. Enhance capacity of facilitators to support energy audits (e.g buildings and industrial facilities) and include preparation of content for a course on building and industrial energy audits for partner tertiary education institutions.
4. Number of individuals including women in PNG that are newly involved in designing, installing, operating, maintaining and repairing off-grid rural RE power systems as one of their main sources of income.
5. Increased understanding on renewable energy and energy efficient systems by future entrepreneurs
6. Increased interests on the establishment of sustainable energy business and productive utilisation of renewable energy
7. **Target Outputs**

As the first ToT to be conducted, the target outputs include;

* 15 programme facilitators to participate in the ToT to enhance knowledge and skills in Sustainable Energy
* 4 pilot institutions to participate in upskill in Sustainable Energy to deliver programme
* 300 students to be educated for a ratio of 20 students per programme facilitator
* Training Workshop report

1. **Training Strategy & Content**

The ToT Training will be conducted by CoRE and partners over 6 days and it shall cover the following key areas;

|  |  |  |
| --- | --- | --- |
| **Skill-set** | **Topic** | **Day** |
| 1 | NC 1 | 1 |
| 2 | NC 2 | 1 |
| 3 | NC 3 | 2 |
| 4 | NC 4 | 2 |

The training programme will include a session on the Solar Energy Association of PNG (SEAP) and business start-up support from the PCREEE

1. **Possible Partners**

The workshop will be conducted as a partnership between UNDP/GEF, CCDA, PCREEE, SPC/PacTVET, SEAP and UPNG CORE.

1. **Complementarity and Replicability**

The Training is open to be integrated with other related events of partners.

The ToT on Sustainable Energy is a positive approach to build local capacity for sustainable benefits in RE. The possibility for replication is high as the certification of locals in Tertiary Institutions and will consequently encourage ToT’s in Sustainable Energy in other PNG Technical Colleges. There is the possibility of replication of similar trainings in other PICs too.

1. **Budget** (based on 15 people, including 3 resource personnel)

|  |  |  |
| --- | --- | --- |
| **Cost Item** | **Estimate [USD]** | **Comments** |
| Venue | **1,250** (250\*5 days) | PCREEE |
| Catering (20heads) | **4,500** (45/person\*20pax\*5 days) | PCREEE |
| Flights/Transport | NA | FREAGER-SECTM Project |
| Perdiems | NA | FREAGER-SECTM Project |
| Facilitator Fees | In-kind | Lecturers from UPNG Core |

**PCREEE Contribution: USD 5,750**

**Annex 1: Training Schedule**

**Day 1**

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Topic | Activities | Facilitator |
| 8:00-8:30 | Registration |  | Darlen |
| 8: 30am-10:15 |  | Welcome  NC1   * - demonstrate basic general knowledge * - apply basic skills required to carry out simple tasks * - apply basic solutions to simple problems | Wilson/Darlen |
| 10:15-10:30 | Tea Break |  |  |
| 10:30-12:15 |  | * - apply literacy and numeracy skills for participation in everyday life * - work in a highly structured context * - demonstrate some responsibility for own learning * - interacting with others within workplace. | Damian/Darlen |
| 12:15-13:00 | Lunch |  |  |
| 13.00-14.45 |  |  | TVET |
| 14.45-15:00 | Tea Break |  |  |
| 15:00-16:30 |  |  | TVET |
| 16:30 | End |  |  |

**Day 2**

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Topic | Activities | Facilitator |
| 8:00-8:30 | Registration |  | Darlen |
| 8: 30am-10:15 |  | Welcome  NC2  - demonstrate basic factual and/or operational knowledge of a field of work or study related to energy/sustainable energy  -apply known solutions to familiar problems   * - apply standard processes relevant to the field of work or study | Wilson/Darlen |
| 10:15-10:30 | Tea Break |  |  |
| 10:30-12:15 |  | * - apply literacy and numeracy skills relevant to the role in the field of work or study * - work under general supervision * - demonstrate some responsibility for own learning and performance * - collaborate with stakeholders and community leaders and members | Damian/Darlen |
| 12:15-13:00 | Lunch |  |  |
| 13.00-14.45 |  |  | TVET |
| 14.45-15:00 | Tea Break |  |  |
| 15:00-16:30 |  |  | TVET |
| 16:30 | End |  |  |

**Day 3**

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Topic | Activities | Facilitator |
| 8:00-8:30 | Registration |  | Darlen |
| 8: 30am-10:15 |  | Welcome  NC3  -Providing of quotations for installations and service jobs  -Carry out simple SE project activities  -Compliance of scheduled and preventative maintenance | Wilson/Darlen |
| 10:15-10:30 | Tea Break |  |  |
| 10:30-12:15 |  | **3.1 EE**  -Evaluation, recommendation and selection of EE products  - Evaluation of energy saving measures  -Promote/Contribute to EE  -Conduct Assessment for energy consumption system | Damian/Darlen |
| 12:15-13:00 | Lunch |  |  |
| 13.00-14.45 |  |  | TVET |
| 14.45-15:00 | Tea Break |  |  |
| 15:00-16:30 |  |  | TVET |
| 16:30 | End |  |  |

**Day 4**

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| --- | --- | --- | --- |
| Time | Topic | Activities | Facilitator |
| 8:00-8:30 | Registration |  | Darlen |
| 8: 30am-10:15 |  | Welcome  NC3  **RE (Solar and HW)**  -Application tools, equipment & materials in complex tasks in RE and EE for O&M  -Application of RE concepts for energy generation and consumption  -Use drawings, schedules, standards, codes and specification  -Diagnose and rectify faults in RE and control systems  -Maintain and repair facilities in remote areas  -Assist in installation and O&M of RET and EE system | Wilson/Darlen |
| 10:15-10:30 | Tea Break |  |  |
| 10:30-12:15 |  | **RE (Biogas and MHP)**  -Application tools, equipment & materials in complex tasks in RE and EE for O&M  -Application of RE concepts for energy generation and consumption  -Use drawings, schedules, standards, codes and specification  -Diagnose and rectify faults in RE and control systems  -Maintain and repair facilities in remote areas  -Assist in installation and O&M of RET and EE system | Damien/Darlen |
| 12:15-13:00 | Lunch |  |  |
| 13.00-14.45 |  |  | TVET |
| 14.45-15:00 | Tea Break |  |  |
| 15:00-16:30 |  |  | TVET |
| 16:30 | End |  |  |

**Day 5**

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Topic | Activities | Facilitator |
| 8:00-8:30 | Registration |  | Darlen |
| 8: 30am-10:15 |  | Welcome  **NC4**   * -Contribute to WHS Hazard Identification and Risk Assessment * -Supervise and coordinate energy sector work and activities * -Coordinate effective workplace communications | Wilson/Darlen |
| 10:15-10:30 | Tea Break |  |  |
| 10:30-12:15 |  | * **4.1 EM** * -Administer and support SE projects   -Planning and managing in the Energy Sector  -Use Logical framework analysis and Cost Benefit Analysis to appraise projects  -Conduct sustainable energy audit | Damian/Darlen |
| 12:15-13:00 | Lunch |  |  |
| 13.00-14.45 |  | **4.2 RE (Biogas, HW, MHP, Solar)**  -Source and purchase materials/parts for installation/service jobs  -Contribute to WHS Hazard Identification and Risk Assessment  -Assist tradespersons to determine EE and practices to conserve energy  - Coordinate maintenance efforts of RE apparatus and system | TVET Wilson/Damien/Darlen |
| 14.45-15:00 | Tea Break |  |  |
| 15:00-16:30 |  | **RE (Solar and Hybrid Wind)**  -Apply tools, equipment & materials in complex tasks in RE and EE for planning, design and installation  -Install operate and maintain systems in RE and EE  **RE (Biogas and MHP)**  -Apply tools, equipment & materials in complex tasks in RE and EE for planning, design and installation  -Install operate and maintain systems in RE and EE | TVET Wilson/Damien/Darlen |
| 16:30 | End |  |  |

**Annex 2: List of Participants**

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| **#** | **Name** | **Institution** | **Province** |
| 1 | Maria Tetu | Limana Vocational Centre | NCD |
| 2 | Participant TBA | Limana Vocational Centre, NCD | NCD |
| 3 | Participant TBA |  | Mt Hagen |
| 4 | Veronica Duke | Umi Vocational Centre | Morobe |
| 5 | Richmond Kababa | Umi Vocational Centre | Morobe |
| 6 | Gimana Rigo | Keakalo Vocational Centre | Central |
| 7 | Pelega Leka | Keakalo Vocational Centre | Central |
| 8 | Raymond Grangin | PNG VET Head Office | NCD |
| 9 | Violet Gerega | PNG VET Head Office | NCD |
| 10 | Participant TBA |  | East New Britian |
| 11 | Participant TBA |  | East New Britian |
| 12 | Joseph Kisokau | POMTECH | NCD |
| 13 | Bernard Daniel | POMTECH | NCD |
| 14 | Job Kum | POMTECH | NCD |
| 15 | Participant TBA |  | Milne Bay |
| 16 | Participant TBA |  | Milne Bay |
| 17 | Participant TBA |  | Goroka |
| 18 | Damien Sonny | UPNG CORE | NCD |
| 19 | Darlen Lovi | UPNG CORE | NCD |
| 20 | Johnson Kilis | CCDA | NCD |

**END**