

## EUROPEAN UNION- PACIFIC TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING PROJECT

# FIJI TRAINING NEEDS ANALYSIS REPORT

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## **Table of Contents**

BACKGROUND .....	3
Project Objectives .....	4
Geography & Climate of Fiji .....	4
Geologic History of Fiji .....	5
SUMMARY OF CONSULTATION EVENTS .....	5
Consultation Meeting Objectives.....	5
3- Days Meeting .....	6
Participants Presentation Summary .....	6
Education Sector .....	6
Climate Change Division .....	9
Energy Sector .....	11
Group Discussion Findings .....	13
Energy Group .....	13
Climate Change 2 Groups.....	13
Education Group .....	14
CURRENT STATUS & TRENDS OF ENERGY, CLIMATE CHANGE & TVET IN FIJI.....	14
Energy Sector .....	14
Renewable Energy.....	16
Major Projects.....	19
Climate Change Sector .....	19
Pacific Centre of Environment and Sustainable Development (PACE-SD USP) .....	19
Department of Environment.....	20
Department of Forestry .....	20
Ministry of Foreign Affairs .....	21
Secretariat of the Pacific Regional Environment Program (SPREP) .....	21
Secretariat of the Pacific Commission .....	22
Education Sector .....	23
CONSULTATION METHODOLOGIES.....	24
Consultative Workshop Meeting (TNGA).....	24
Roundtable Meetings.....	24
Desktop Literature Review.....	24
Personal Communications .....	25

NATIONAL POLICIES & FRAMEWORKS.....	25
Education .....	25
Fiji Higher Education Commission (FHEC).....	26
Climate Change .....	27
Energy .....	28
TRAINING NEEDS & GAPS DATA MATRIX.....	30
Table 2: A matrix on the gaps and needs analysis for TVET programs in Fiji.....	33
TRAINING NEEDS & GAPS ANALYSIS & DISCUSSION.....	34
Training Needs & Gaps.....	34
Present & Future Demand Market .....	38
Training Supply: TVET Providers .....	41
Supply and Demand Market .....	41
CONCLUSION & RECOMMENDATION .....	45
REFERENCES .....	46
APPENDIX.....	49
Appendix 1 .....	49

## **BACKGROUND**

The European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (PacTVET) project falls under component three within the broader Adapting to Climate Change and Sustainable Energy (ACSE) programme. The Project builds on the recognition that energy security and climate change are major issues that are currently hindering the social, environmental and economic development of Pacific African Caribbean and Pacific (P-ACP) countries. Many P-ACP countries continue to remain entirely dependent on imported petroleum products despite efforts to reduce their reliance on fossil fuels and improved energy security, thus this project builds its objectives around the need to reduce reliance on the use of fossil fuels. The P-ACP region ranks amongst the highest in term of fuel prices and electricity tariffs and coupled with the inefficiencies in power generation and consumption. Despite efforts in promoting renewable energy opportunities within the region, about 70% of the populations still do not have access to electricity. About 70% of the region's imported fuel consumption is towards transportation alone.

The Pacific region is among the most vulnerable to climate change. These countries are hardest hit by the adverse effect of climate change while they have little to contribute to the cause i.e. producing less than 0.03% of the current global greenhouse gas emissions – they also have the least capacity to react and adapt to changes in climate. The lack of local and regional capacity and expertise which results in the absence of sustainable training programmes and the absence of trained staff and well-resourced and equipped training institutions to deliver on the required training programmes remains key barriers to improving P-ACP countries' energy security status and resilience to climate change impacts.

The significance of capacity building on sustainable energy and climate change to the sustainable development of the P-ACP countries can be seen by the endorsement by the Forum Leaders on the Framework for Action on Energy Security in the Pacific (FAESP) and the Pacific Islands Framework Action on Climate Change (PIFFAC). Both frameworks have themes on Capacity Building, Training and Awareness with outcomes of:

- Increased awareness and understanding of sustainable energy and climate change issues among communities and other stakeholders.
- Strengthened capacity to monitor and assess impacts of sustainable energy and climate change.
- Strengthened capacity to identify, design and implement effective sustainable energy and climate change measures.

The project is being implemented by the Secretariat of the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 53 months and is being funded by the European Union. The general objective of the project is to enhance sustainable livelihoods in PACPs which is being identified as a high priority for P-ACP communities and governments alike. The purpose of the project is to enhance and/or create P-ACP's regional and national capacity and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

The importance of setting the training needs/gaps must be upheld since it sets the baseline for the development of or tailoring of each P-ACP counties' sustainable energy training requirements. Each P-

ACP country could have unique factor(s) that need to be made known so that the objective and the purpose of the project can be realized in each of the P-ACP countries

## Project Objectives

Working with the PMU, specialist consultants and in-country coordinators would assist with the delivery, conduct, collation and analysis of a regional training needs and gap assessment i.e. assessing national training needs on issues relating to SE & CCA in all P-ACP countries. This will involve, but is not necessarily limited to:

- Conducting a Needs and Gap Analysis review covering both training supply and demand for the CCA and SE sectors in all PACP's, using existing documentation, reports, studies to gather new and up to date information;
- Consulting with TVET institutions and education providers, trade and industry bodies, as well as governments on workforce training needs and priority sectors for skill development;
- Investigating TVET qualification frameworks across the region, curricula and accreditation guidelines in each country and identification of training delivery modes (including working with other projects and practitioners to ensure that efforts are not duplicated)
- Analyze the conditions required for success of accreditation strategies (including recognition of prior learning and industry requirements).
- Devise a series of scenarios (national level) for future project activities – including an evidence-based assessment for selection of partner TVET institutions. Assessment of TVET institutions should be based on analysis of capacity and gaps and opportunities in current TVET offerings
- Consultation with TVET institutions and education providers
- The assessment of TVET institutions should also be used to deliver a strategy for developing a regional pool of assessors and trainers.
- Scenarios developed should be gender inclusive and have a specific gender and equal opportunities component (including access for disabled).
- Work with the PMU, in-country coordinators, and project partners, to facilitate and assist with the development of benchmarks, competency standards and courses on Training of Trainers (TOT)
- Develop benchmarks, competency standards and unit descriptors working with national qualification boards and IACs to incorporate into national TVET qualification frameworks and/or develop new national/regional qualifications;
- Develop accreditation strategy, including training a pool of accreditors;
- Develop pathways and links between TVET, further and tertiary education to provide opportunities for national capacity development.

## Geography & Climate of Fiji

Fiji is a tropical archipelago located between Melanesia and Polynesia. The Fiji islands are situated 3,000 km east of Australia in the Pacific Ocean at 16-20°S latitude and 178°E-178°W longitude. Fiji comprises of over 300 named islands, which take up an ocean area of some 650,000 km<sup>2</sup> and a total land area of 18,274 km<sup>2</sup> (Evenhius & Bickel, 2005). There are two large islands, Viti Levu (10,388 km<sup>2</sup>)

and Vanua Levu (5,535 km<sup>2</sup>), two mid-sized islands, Taveuni (434km<sup>2</sup>) and Kadavu (408km<sup>2</sup>), and many smaller islands, 97 of which are inhabited (Parham, 1972; Evenhius & Bickel, 2005). The highest peak in Fiji, Mt. Victoria reaches 1324m a.s.l.

Fiji has an oceanic climate with mean temperatures ranging between 22°C (July) - 26°C (January) (Ash, 1992). The high mountain ranges in Viti Levu causes a strong orographic effect where the windward (i.e. south-eastern) sides of the island are typically wetter and cloudier than the drier and sunnier leeward (north-western) sides. The seasonality in Fiji is divided into the warm and wet months (November – April) and the cooler and drier months (May- October). The warm wet season can be interrupted by tropical cyclones resulting in pronounced flooding within river valleys (Sarnat & Economo, 2012).

### Geologic History of Fiji

Viti Levu is the largest and oldest island of the Fijian archipelago and is supposed to be the source from which the inhabitants of other islands resulted (Sarnat & Moreau, 2011). Viti Levu comprises the oldest rocks of the archipelago, and is supposed to be a relic of the ancient Vitiaz Arc that formed on the Australian plate margin in the Late Eocene to Early Oligocene (Rodda, 1994; Hall, 2002). Viti Levu's appearance above sea level happened in the early Miocene, 25–20 Ma (Whelan *et al.*, 1985), and serves as the earliest age estimation for Fijian terrestrial lineages. All of the subsequent colonization events are inferred to have transpired after Viti Levu's initial emergence 20-25 Mya, but, before the islands significant uplift 5 Mya (Whelan *et al.*, 1985). Miocene island-hopping through the western Melanesian islands may possibly have been aided by the fragmenting Vitiaz Arc, which formed a nearly continuous chain of archipelagos extending from New Guinea to Fiji (Hall, 2002).

## SUMMARY OF CONSULTATION EVENTS

### Consultation Meeting Objectives

As the PACTVET is about the Education, Climate Change and Sustainable Energy sectors, there was a need for an effective coordination at the national level to network with other relevant associations and workers in the country to empower TVET based training. In July 2015, there was an in-country consultative workshop conducted to develop the training needs and gap analysis in which the activity was intended to gather specific inputs from local stakeholders on the priority needs on both SE and CCA. SE included areas such as refrigeration, renewable energy technology installation, motor mechanic, electrical wiring, sustainable sea transport, etc. CCA also included food security (agriculture, fisheries); disaster risk reduction; vulnerability and adaptation assessment; water security; forestry and project management. It was very important that the PACTVET activities complemented past, current and future activities on TVET and including national projects related to Climate Change and Sustainable Energy (ACSE) programme. The EU-PACTVET Team invited local stakeholders and experts (individuals and organizations) to actively participate in disclosing any past or current activities and projects related closely to TVET SE and CCA being carried out at their institutions or organizations in which they were given at least ten to fifteen minutes to present and share their findings in the in-



country consultative workshop which was held on the 1<sup>st</sup> – 3<sup>rd</sup> of July 2015. The consultative meeting coordinating team recognized the participant's contributions during the three days' workshop to be very important as the nature of their work is oriented towards Sustainable Energy and Climate Change Adaptation (CCA) and would positively implicate the implementation of this regional project.

### 3- Days Meeting

The Fiji National Stakeholders Consultative Workshop was scheduled on the 1<sup>st</sup> – 3<sup>rd</sup> of July this year from Wednesday to Friday and was welcomed by Professor Elizabeth Holland, the Director for Pacific Centre of Environment for Sustainable Development (PACE-SD). The meeting was officially opened by the Honorable Minister for Education; Dr. Mahendra Reddy who apart from acknowledging the initiatives of the project also highlighted the need to revitalize legislations, relevant stakeholders roles and bridging the gaps to provide contextual CCA and SE training to meet our collective needs. Following his speech was the brief from our sponsor of the project from the EU Head of Cooperation, Renato Mele who outlined the need to significantly commit to this PACTVET \$6+ million project in to order successively achieve the outputs as planned. PacTVET Team Leader, Dr. Sarah Hemstock also provided a short brief of the project specifying the two phases of the 53 month project explaining the current phase where the project is conducting gaps and needs analysis while phase two will build on achievements of key results 2, 3 and 4 activities tailored to individual country needs. Furthermore, the team is working together with the Fiji Higher Education Commission to achieve competency based standards to support the design of training programmes and create unit standards. The consultations program schedule can be found in Appendix 1.

### Participants Presentation Summary

#### Education Sector

- *Mrs Viori Uluiratu Odro (Ministry Of Education):-*  
Mentioned the role of TVET Education in the Ministry has continued to reform their syllabus to accommodate global educational initiative such as CCA and SE, the curriculum has integrated these initiatives into subject areas of Home Economics, Agriculture, Industrial Arts, Office Technology and Vocational Education, basically, years 9, 10, 11, years 12 will be in 2016 and year 13 will be in 2017. Climate Change has also been integrated into these subjects based on the different subtopics of each level. Year 12 subjects such as economics, automotive engineering, and cookery also introduced at Vocational level as a subset of TVET mainstream education.
- *Hasmuk Patel (USP- PACTAFE):-*  
Elaborated on the significant role of up-skilling and reskilling of skill based training and qualifications offered by their PACTAFE institution for relevant industry most suitable for post-secondary and matures students already in the workforce.
- *Dr. Atu Raturi (USP - Renewable Energy Program):-*  
Dr. Raturi provided a comprehensive update on the current status of CCA and SE globally where more than 7 million people around the world are geared towards engaging in sustainable energy work, bioenergy, geothermal, hydro, solar and wind power. He also

described how the university has continued to provide opportunities in the capacity development in SE at all levels which is part of their key areas that need work under the USP Strategic Plan (2013-18). Priority Areas and Strategic themes have been developed with Post Graduate Diploma in Renewable Energy, Masters in Renewable Energy and Ph.D. in Renewable Energy whereas undergraduate courses in renewable energy are compulsory for all engineering students. The testing and characterization of LED lights, electric vehicles, wave energy, tidal power biofuel, ethanol from cassava, biofuel testing lab (cert lab) IAS. USP- KOICA Renewable Energy Project are some of the highlights of their student's initiatives.

- *Mr. Sumeet Naidu (EDULINK):-*  
LEAP Project Life Long learning in Energy Security Access and Efficiency Programme funded by European Union, divided into 6 Packages. USPs main role- work package 2 and 3 to develop application courses for energy practical. Carry out needs analysis activities in 2014, Kick off meeting in the Mauritius conducted 2 workshops. Need for training in EASE Piloting modules and course outline of courses will be developed in Mauritius next Year.
- *Mr. Paula Tuivanuayalewa (FNU- PICO Hydro Electric Power Systems for Rural Dwellers in Fiji):-*  
Mr. Paula described energy to be needed in all walks of life. Objectives are to find ways of implementing a PICO hydro power systems that can create 5Kw of energy in rural areas. New ways in implementing the technology (some places have enough height while some have low lying hills) that can be used in implementing these hydro in low lying areas. Old generators has been used to make a Pico hydro system where the engine has been replaced by a small hydro system which is able to produce 840 watts. PV Project in Vabea village in Kadavu (Feb 2015) are potentially producing 2.4 KW which is sufficient to provide enough energy to power their community school. Apart from the successful implementation of the project, there still exist the need to provide training maintenance in order to sustain the equipment's and keep the systems viable.
- *Mr. Alipate Kau (FNU – Refrigeration & Air-condition Department)*  
The solar refrigeration and air conditioning projects coordinated at FNU funded by JICA were one of the successful energy projects that interested many stakeholders such as Fisheries department, rural communities and individual entrepreneurs. According to him, FNU has established a few solar projects within the rural parts of Fiji as initiatives of the university.
- *Mr. Prasanna Waichal (FNU- Electriclal & Electronics)*  
FNU Diploma in Renewable Energy Technology is being coordinated by Mr. Waichal who also develops locally made technology, parts of his projects consists of solar powered investments for Traffic Light System based in Honiara and monitored by his students. Flettner rotar based model ship- cutting diesel usage by 20%, low cost water purifier Rural



Water supply systems, rail transportation can be used to cut down to a truck carriage ratio of 1:10. Future Plans have a dedicated workshop to produce local facilities. Developing local and Regional technology at affordable cost. To foster regional entrepreneurship and economic development through industry involvement and tech transfers.

- *Mr. Cyril Ratchman (FNU – Coastal Engineering)*

Some coastal habitats in Fiji as described by Mr. Ratchman's in his presentation have shown elements of coastal erosions which highly needs coastal engineering conceptual systems to sustain our coastal zones. Apart from the typical coastal protection structures mainly used in Fiji, other structures and systems can be introduced to serve as a breaker for sea level rise. One of these includes the FNU project at Galoa, Navua, alongside the southern coastal of Viti Levu was the study site. Research findings identified shoreline retreat and wave reflection. Parameters, celerity, wave depth and direction will allow engineers to develop more efficient methods to control sea level rise with future insights of the consequences related to it.

- *Mrs. Yunyun Gomaria (FNU Spatial Town & Country Planning)*

According to Mrs. Gomaria, Natural and Human Causes of Climate Change and also influenced by Spatial Planning through the used for building and land. Sustainable Development in Environment Equity and Central development needs are Island Specific Spatial Plan that can be solutions to sustainable problems as in Agropolian- based on Agriculture whereas Minapolitan – based on fisheries (neighborhood development by the communities) capacity building of the people. She concluded by emphasizing on sharing the same visions and missions for the planning for SD and CC. We should be able to adapt and have the different kind of activities giving people many choices for living and planning with spatial development.

- *Dr. Raul Alamban (FNU- Department of Agricultural Engineering)*

Consultations with farmers to use technology that can efficiently battle the problems of livestock related to Climate Change. Consultations with various agri-industrial sectors. Major Issues and Concerns have formulated key interventions to improve technology and include the Private Sector. All developments and decisions frameworks that are made, environment and stakeholder influence are taken into account.

- *Mr. Saimoni Matawalu (FNU- Electrical Department)*

Standards used in Electrical Wiring. Some people who do wiring in certain Projects are the middle triangle hierarchy people that do hands on work. Feasible and sustainable hands on electrical engineering on the field. All projects done by FNU are sustained and maintained. The Engineering Flaws in village projects are not recognized because of lack of knowledge by the local people and local engineers.

- *Mr. Joji Marau (FNU – School of Mechanical Engineering)*  
Outrigger Fijian canoe in Suva harbor. The project aims to reduce the use of fossil fuels and promote a more sustainable method of sea transport which requires returning to traditional canoes to safely and with low cost take us from point A to point B. Partnerships with NGOs and the Uto ni Yalo will help create hybrid canoes to improve the design for more efficient transportation as well as revitalizing the traditional canoe building. The newly built Drua is the second model of its kind to the first Drua invented in 1913. The next Drua in plan aims to cater for about 200 people.
- *Dr. Dellena Alagcan (FNU – Department of Agricultural Science)*  
CBP- uses kitchen waste high in starch content to make up enough energy that can be used to cook 2 meals for 5-6 persons. Removal of CO<sub>2</sub> and CH<sub>4</sub> from slurry. CBP is much smaller and effective than Conventional Biogas Systems.  
Setup is at Samabula Campus. Blue Flame generated from the Gas. Training Needs Analysis Enable to identify gaps in training Areas In order to meet requirements – could be an Administrative Problems and non-wastage of Resources in training. Evaluate and implement training effectively to close off the training gaps. Conduct Field Evaluation. 75% Current Knowledge and skills training when there is a need for 90%. The gap is filled by tailoring the skills in training. Indicators for the need of safety- accidents, waste in industries, high frequencies of equipment repair due to wear and tear, high rate of evaluation report. Low rating of evaluation Reports.

#### Climate Change Division

- *Mr. Mansa Katonivualiku (Ministry of Foreign Affairs)*  
Mr. Manasa deliberated on emphasizing Fiji's responses to Climate Change- UNFCCC Kyoto Protocol CC Policy Framework, pivoting on the National Climate Change Policy established in 2012 revitalizing it to be a holistically developed guide. In the framework, 8 objectives addressing Climate Change issues through Education, Adaptation, Mitigation, Finance, Awareness raising, Data Analysis, Mainstreaming and International Pacific Region Participation to ensure that the policies (2012-2016) are followed accordingly. However, there still exist gaps in the policy which relates to adaptation and response but clear articulation of relocation as adaptation as a response is absent. Fiji still needs to work on the coordination of responses. (Who is doing what in response to CC?), Climate Finance is another essential aspect which is geared towards Green Climate funding describing how it can be accessed, the process needed to undertake is very tedious hence not undertaken because finance institutions cannot give direct funding but through UNIE's National Implementing Entity that can directly access Climate Change Funding. Monitoring procedures are not fully established based on Information and data that needs to be shared, there is less accessibility to these. Adaptation- Vulnerability and Adaptation Assessments should be a thorough consultation process which is needed in place. Mitigation- iNDC and **CDM** (market driven mechanism) Emission reduction from developing countries can be **sold** to developed countries to meet their GHG reduction mark as per the Kyoto Protocol.

- Daniel Gareck CCCPIR (SPC/GIZ)*

Mr. Gareck presented a Glossary of I-Taukei terms related to Climate Change which in Fijian can be interpreted as Vosaqali Ni Vei Draki Veisau. These visual guides consist of key devices to raise awareness on Climate Change to the community including flip charts and teacher guides and training of trainers manual. The guides which included possible student learning outcomes, was done in 2014, as a Facilitator Guide, Learner Guide and Learner Workbook (Certificate level 1 Programme developed on Climate Change- 7 Units). The guides were ready to be used for the Vanuatu Project.
- Dr. Kirstie Meheux (Disaster Risk Management SPC)*

Dr. Kirstie emphasized on capacity building at the National Level focusing on National Trainer Capacity for Disaster Risk Management through SPC. Such courses in Emergency Operations Center involving decisions during emergency situation. Exercise Management- what to do in an actual course of a disaster. Raining for instructors. GIS for DRM. For beginners and Advanced. Post Disaster Needs Assessments. Calculating the cost of disasters. Emergency responses Team Training of Trainers- Agencies have the same standard of understanding on how to react to different management. Risk informed decision making for Urban planners. Take the tech work Rm, Economics and dev training to meet the needs of practitioners in the field. Projects – develop a competency Framework for Emergency Management in Pacific Island Countries for territories. (Good feedback but needs accreditation) 13 different key functions that SPC offers.

USP- EV424 FNU\_ PG Certificate in DRM SINU- Solomon Islands National University.
- Ms Vika Rogers (Department of Environment)*

Ozone Depleting Substances Regulations (2010) ODS are banned in Fiji- (2003-2009) Valid Licensing needed to Import and Export. CCl<sub>4</sub>, Halon, CH<sub>3</sub>CCl<sub>3</sub> phased out in the period between 2003 and 2010. ODS Phase out Programme is linked to other sectors of the country (tourism, education) Because of the ODS phase out has caused an extensive change in GHG's. (CO<sub>2</sub>) Because of ODS phase out, industries have formed better resources that are more environmentally friendly) Capacity Building in Training Curriculums in FNU and DOE. Enforcement Officers Training.
- Ms Sainimere Veitata Waqalevu (USP- PACE-SD)*

15 countries are involved with USP. Community engagement work with 44 communities in the 15 countries. Enhancing water food security. Trainings carried out (7 steps taken to implement these projects). From NPAC Formation to M&E Plan. The 4 year plan has ended and is now being monitored. Community representatives are trained to carry out the projects that have been carried out. 1813 Climate Ambassadors

Locally Managed Climate Change Network Across the Region. Have all the stakeholders and Community have a platform in which they can share experiences, Communities can have a development plan which can then be mainstreamed into the government's policies.

## Energy Sector

- *Mr. Inia Saula (Fiji Department of Energy)*

Mineral fuel accounts for 1/3 of our imports. Fiji's energy situation is characterized by a higher demand in imported fuel. 2007 census-89% of Fiji's population has access to modern form of energy access. Transport sector is the main use of imported fuel in Fiji and the Pacific Island. Fuel consumption data is getting difficult to attain. Transport power and household sector needs an improvement in terms of household sector. The objectives revolve around forming ways to use and distribute sustainable energy. Grid based power supply, fuel and biofuel, green energy (key areas identified) Fiji SE4 for all Report. SE4 target- baseline target from now till 2040. 90% -2015 target (access to modern energy services) Renewable energy share in electrical generation -81% target Renewable energy share in total energy consumption- 18% Target. The Green growth framework have short term and long term targets and the policies have been aligned in the Energy sector to meet this target. The Demand Supply Curve till is very directly related to an increase in demand as the ears increase. Priority policy statements have comprise of comprehensive audits, data collection and investigations, cost control on renewable energy capacities and capabilities.

- *Mr. Anare Matakiviti (IUCN – Fiji)*

Institutional response to climate change and sustainable energy, Main focus of work- value and constructive nature Effective and equitable governance of nature's use. Deploying nature based solutions to global challenges in climate food development. Regional members of IUCN are comprised of 8 members. Activities of IUCN in Fiji. Valuing and conserving Nature- MACBIO (implementing 36 MPA's in Fiji) developing a thorough understanding of water and wetland). Also some work in participation of *National Policy making*- part in development in NBSAP review. Also participated in the Green Growth Framework. Energy Ecosystem and Sustainable Livelihoods Initiative. Co fund international conference in USP. Establishment in developing a sustainable transport hub Wind hydro and solar works have been done as an initiative to work with RE. *Tavua Solar PV Streetlights Demonstration*. Lifecycle Fiji Demonstration. NTF Grid connected Solar Power Demonstration. Household Biogas Demonstration Naboro Biogas Plant and Bolting Facility. Are of work for IUCN- Society, Economy, and Environment. *Consequences*- Risk and uncertainties in the future- What do we need to do? Need to look at the model of development where the focus is mainly of Economy. Where the growth is measured by GDP and less focus on Society and The Environment. *Green Growth Economy*- Environment is considered in the Economic Growth Calculation. Naboro Biogas Plant- Problem (700 pigs and increasing) 300 KG of waste from the Kitchen hence killing the river ecosystem (all the freshwater pig has gone) In order to feed the pigs they are cutting mangroves and buying LPG for cooking for the prisoners. Unhealthy work environment. Solution- Build a biogas plant. Can generate 40 to 50 cubic meters of biogas. That is similar to 16-20Kg of LPG. Bottling this would ensure a reduction in cutting buying LPG. The waste water that goes into the creek is clean and hence restores the freshwater creek. Skills needed to ensure management of the Project: Designing and constructing, operate and maintain, manage the project, Commercial aspects (training) Linkages to the Biogas

plant on the economy. Potential Climate Change Impacts on the Biogas project the economic value of the ecosystems, Knowledge products and communication. Upskilling is needed in the correction services, Naboro Prison Personnel, Facilitators. The consequence are very positive on the whole 3 aspects of the sustainable development Framework which focuses on the Environment, Economy and the Society.

- *SPC Energy Program ( Pacific Regional Data Repository)*

Data captured which is available to the public which involves registering. The data sent in is fine-tuned and published however the raw material is also found. Added feature portals will be set in place in phase 2. Email feature. Sharing of interfaces.

Sharing of information need to be open. In this sense MOU's and agreements are been taken into consideration for capacity building activities- Grid connected, grid PV, Petroleum, SST, Cost Benefit Analysis (Training and input ) cost Benefit as part of Projects eg. Tuvalu TVET-biogas Solar PV in Solomon, FSM- Energy efficiency in schools eg. Institutional development in the form of capacity building. *Non sector specific*- there are general areas such as concept note and full proposal development. Policy development process, Cost Benefit Analysis, Excel for data Analysis (data analyses that might be needed for Policy Development)

- *Ministry of Youth & Sports*

Youths-15-35 year's 308411-youth (36%) Most programmes are non- formal in nature and are done in communities. Challenges- monitoring the programmes that the youth are involved in.Funding for Climate Change Initiatives within the Ministry. Sustaining traditional ways of building vakas, DRM training, Strengthening Partnerships with relevant partners involved in Climate Change Initiatives.

- *Dr. Richard Wah ( FHEC)*

Register all higher Education Institutions Problem :( certificate attained are not registered). Certificate(s) can be at the same academic level as PG's and Doctorates Level (10) Any new courses above level 7 will need to be approved by FHEC. National Qualifications-made up of institutions, industry Competencies required? 2 or 3 day training can be bound and compiled into units that can form generic and core units. Unit Standards- statements of competencies that the students must achieve to qualify. Competency based Using Independent Assessors- Teacher teachers- commission trains independent Officers-measure the students to see if they meet competency level Research in what is done Internationally ( Our standards are set one step higher above Australian and NZ Standards) Scoping, need to preset profiles, ideas before setting up a framework. ISAC formation in the urban, rural, coastal areas to bring in people. Certification- what institutions gives accreditation- FHEC gives Licensing Bodies- give license What kind of training the technicians need What certificate level are required to fill basic competency level What are the kind of upskilling needed prior skilled people How good is the knowledge, competencies, values and attributes and entrepreneurial skills? Need to know the Higher Education Qualification Framework for each individual countries in order to develop the new TVET programme PRQS- Traditional and Indigenous Skills is not developed in the country. Qualification Recognition- Accrediting Agency- Qualification Standards must be

met for any new programme. *Regional TVET Forum*- Research needs to be focused to ensure that resources are put in the right places to get fruitful outputs. PacTVET- courses or programme? Who else delivers? Will they be competency based? Will they carry credits? New programme needs to build from the FQF, will there be jobs available? Trade Agreements and Labor migration <http://progs.spbea.org.fj>

## Group Discussion Findings

The participants of the first two days meeting were grouped into the three main categories, the Energy, Climate Change and Education. Each group was tasked to:

- Identify existing projects or activities carried out relevant to their area of expertise
- Derive possible competency skills relating to each project

### Energy Group

This group identified both renewable and efficiency energy projects such as:

1. Renewable
  - Solar (on/off grid) PV lights
  - Solar refrigeration
  - Hydro power
  - Wind power
  - Biomass/biogas
  - Geothermal
2. Energy Efficiency
  - Sea transportation
  - Traditional construction
  - Land transportation
  - Refrigeration & Air Con Auditing
  - Licensing and regulations

### Climate Change 2 Groups

1. Food security, Disaster Risk Management and Environment
  - **Food security:** occupation includes land use management or soil specialist.
  - **DRM:** occupation provided is emergency response volunteer which requires team work, good communication skills, good risk identification (certificate level)
  - **Environment:** environment impact assessment technical officer. Requires good communication skills
2. Integrated Farming
  - Agriculture (ecological farming)
  - Begin with certificate one to introduce the basics in communities.
  - Planning and management
  - Forestry, Silviculture

Comments: Include Carbon foot print as knowledge required, Eco-farming includes reforestation. Discussion took into consideration interior vs coastal areas during thus need generic standards. Include competency to solve problems as part of attributes.

### Education Group

Approach to consider is gap analysis is not appropriate for Fiji at the moment therefore we need to start with latest. FHEC will endorse standards and national qualifications. 3 major players in developing of the national qualifications:

- Industry
- Providers
- FHEC/ISACS.

The industry needs to identify what is required from graduates so that the other two players can start working to avoid the mismatch. Provides 60% of ISACS core membership. Development of unit standards. Driving at competency that the industry needs to elaborate on. Start from the end product and that is identifying what is needed from graduates to revise in educational terms.

Comments: certificate 4 levels, a minimum of 40 to 120 credit points is the normal but 196 credit points were mentioned and needed justification. FQF: 196, 1960 notion hours (assessment) of learning to demonstrate the competency required. There has to be a paradigm shift. Outcome based. Shift from content to competent because some students take time to become competent.

## CURRENT STATUS & TRENDS OF ENERGY, CLIMATE CHANGE & TVET IN FIJI

### Energy Sector

The government's vision for Fiji's energy sector, as set out in the *Roadmap for Democracy and Sustainable Socio-Economic Development 2009-2014*, is for a resource efficient, cost effective, and environmentally sustainable energy sector. This should ensure that communities have secure access to affordable and reliable energy supplies.

The primary objective of this National Energy Policy is to achieve:

- **Affordable energy for all:** Ensure that all Fijians have access to affordable and reliable modern energy services.

The secondary objectives of this National Energy Policy are to achieve:

- **Sustainable energy supplies:** Establish environmentally sound and sustainable systems for energy production, procurement, transportation, distribution and end-use.
- **Reduced import costs:** Encourage the efficient use of energy and the use of indigenous energy sources to reduce the financial burden of energy imports on Fiji.

Although this is unlikely to change in the foreseeable future, there is still a need to reduce Fiji's reliance on imported fuels as much as possible. This will improve Fiji's macro-economic stability by making it



less vulnerable to volatile international fuel prices and high import payments. Fiji's two other main sources of energy are biomass/wood for cooking in rural areas and hydropower generated electricity. Fiji's energy demand is driven by household consumption of electricity and transport fuels and by the need of its major industries, in particular agriculture and forestry, tourism, and mining. Demand has increased over the past decade and is likely to continue increasing, although the rate will depend significantly on the effect of future political developments on Fiji's economic growth.

With the majority of Fiji's population living on the two main islands of Viti Levu and Vanua Levu and Fiji being endowed with significant renewable resources (the extent of which is not fully known), grid-based power supply has arguably the most potential to make Fiji's energy sector more efficient, cost effective, and environmentally sustainable. Over 50% of Fiji's electricity is already generated from hydropower, but there are still likely a number of medium size undeveloped hydro sites and significant unexplored geothermal, solar, and wind resources. There has not been any private investment in Fiji's power sector, but this will need to change if future investment needs are to be met.

The majority of the population has access to modern forms of energy in the last two decades through rural electrification initiatives. However approximately 10% of the population is still without access to electricity and Fiji is still struggling to provide remote areas with access to electricity in a sustainable manner.

The transport sector is the main user of imported fuel in Fiji which has obligated the government to elevate attempts to reduce petroleum imports through the use of bio-fuels, but research and development both locally and abroad has shown that its economic viability is uncertain at best, and is therefore unlikely to make the sort of impact once hoped. The transport sector needs to increase its emphasis on reducing the cost of energy consumption, but gains will take time and are unlikely to be dramatic unless there is a technological breakthrough. The Energy Department had already established substantial initiatives around Fiji with energy projects:

- Masi Village Micro-Hydro Project in Serua and at Korolevu Village in Navosa.
- Monitoring station will be installed in Naruwai Village in Bua.
- Wave energy potential sites in Muani village, Kadavu and Vuna village in Taveuni.
- The Wind Programme at Dakuilomaloma Village, Vanuabalavu, Lau and Nabouwalu Government Station, Bua. Wind Data table, (refer to Appendix 3)
- The hydro program was setup at Navakasali, Bua Korolevu, Navosa, Delaivione, Taveuni, Vunisea, Macuata and Nukuloa, Gau
- Biogas Technology is another contributing to energy and food security, waste management, reduction in deforestation, the total numbers of biogas plants currently working are Waidalice, Tailevu Waila, Naitasiri and Benau, Savusavu
- The solar water pumps installed at Tavea Island in Bua and Mali District School, in Mali Island, Macuata. Currently, they are enjoying the supply of fresh water for drinking and cooking from these boreholes. Before implementation the communities had contributed 10% of the total cost while DOE contributed the remaining 90%.
- Koro Island solar lightings installed at the Jetty in Lomaiviti which is approximately 18km from the jetty, it is only fitted with stand-alone systems to provide adequate lighting to the general public.
- Modular Biofuel Plants: dried Copra purchased from locals, copra crusher, oil Expeller, filtration, protein Meal, diesel Storage Tank 1000L, coconut oil tank 1000L, reactor tank 1000L – the coconut

oil and diesel is mixed to produce renewable diesel.

The population in Fiji recorded since mid-last year amounted to a little more than 900,000 people; out of this population about 92% have access to electricity, which drives the government of the day to continue to strengthen the initiatives laid out in its policies. Fiji's national energy policy has four strategic areas covering energy planning, energy security, power sector reform and renewable energy. The power sector reform includes establishment of Renewable Energy Service Companies (RESCOs) and increased funding for the Rural Electrification Programme (REP).

### Renewable Energy

Fiji has progressively developed a thriving market for grid connected PV systems aimed at large commercial energy users spearheaded by prominent companies such as CBS Power Solutions and Sunergize Group. The feed-in tariff offered by the FEA is less than the amount that customers are charged at retail, and less than the amount that would be required to 'finance' a solar farm via a PPA. Hence, it is important that the PV system's generation profile matches the load profiles for the sites they are installed on. This is a limiting factor for the growth of grid-connected PV among residential customers and small businesses: 54 kilowatt-peak (kWp) installation at the University of the South Pacific in Suva that was part of a renewable energy project funded by the Korea International Cooperation Agency (KOICA), 110 kW at Denarau, 6 kW at Lautoka, FEA- 10 kWp currently out of service, 1,500 grid-connected household-scale solar installations by December 2015, 30,000 grid-connected household-scale solar installations by December 2018 (20% of household and institutional customers).

The Fiji Department of Energy (DOE) have been aggressively expanding the installation of mini grids powered by solar and diesel generators; as well as installing PV solar home system through establishing RESCO companies to increase electrification rates amongst Fiji's rural communities.

The Sustainable Energy for All report provided the following table on rural electrification in Fiji (Table 1).

Number		Capacity KW	Total KW
Solar Svstems 100	2400	0.1	240
Solar Svstems 270	700	0.27	189
Mini Hvdro	1	100	100
Mini Hvdro	1	30	30
Biofuel 20/80	4	30	120
Diesel Units	500	22.3	14071
FEA Grid Extensions	1500	n.a.	n.a

**Table 1:** Number and capacity of various rural generation technologies

**Source:** DoE master list of rural projects, 2013

As the diesel systems frequently experience break downs and fuel supply shortages, DoE aims to shift more towards solar electrification

### *Solar water heating*

Solar water heaters are widely used throughout Fiji by private residences and hotels, resorts and businesses.

### *Wind power*

Fiji has one major windfarm site, a 10MW windfarm consisting of 37x 275kW turbines near Sigatoka on Viti Levu. The Fiji Electricity Authority has been carrying out wind resource measurements at 8 different sites around the country. As such, there is potential for expansion of this industry, though FEA does not anticipate commissioning any new windfarms between 2013 and 2017 (Sustainable Energy Solutions, 2015).

### *Hydropower*

Hydropower currently accounts for over 60% of all electricity generation in Fiji, with 85MW of installed capacity, with a further 57MW planned between 2013 and 2017 on Viti Levu (Sustainable Energy Solutions, 2015).

### *Micro-Hydro Power*

The installed capacity of micro/mini hydro is around 1000 kW, 80% of which is accounted for by the FEA's Wainikeu system in Vanua Levu.

Micro-hydro (under 100 kW) and mini-hydro (100– 1 500 kW) potential has been studied by the FDOE at sites near communities not served by the FEA. Surveys have been conducted at 38 of these smaller sites on six islands showing a total of 3.2 MW of likely capacity that may be technically and economically feasible, while 20 more sites totalling about 0.4 MW still require extra monitoring ((Sustainable Energy Solutions, 2015).

### *Bioenergy (biomass/biogas)*

Fuelwood was used as the primary cooking fuel by 20% of the Fijian population in 2007. Larger biogas and biomass projects are planned for Fiji. This includes an additional 100MW of biomass combustion plant on Viti Levu and 10MW of Biogasification generation on Vanua Levu. Sugar and Cassava crops are also new in the market to be used for the production of transport and manufacturing fuels. Fiji Sugar Corporation in Lautoka is currently working on Sugar cane by-products as biofuel.

New inclusion in Agro-forestry bio-mass fuel projects involves production of key species like *Glyricidia* and *Acacia*. – Both are short rotation fuel wood species that contains very high calorific content of oil at a very young age which is best suited for bio-mass products. It has high rate of leaf decomposition, ability to tolerate frequent harvesting with less mortality, easy establishment with vegetative propagation and easy handling due to uniform size of branching and multiple use (multiple fodder, green fertilizer). Care must be taken during its yielding stage as it is an invasive plant which could disturb habitats. Therefore, harvesting should be done before flowers and reproductive structures are formed to prevent further invasions into our native forests. In addition, bimba bamboos are the latest product in the agro-forest market confirmed to also contain substantial amount of oil best used for fuel wood.

In 2010, the FDOE contracted Niu Industries, a producer of small modular coconut oil mills, to install three such mills on the islands of Koro, Rotuma and Cicia. Also in 2012, an additional six plants in the Lau and Lomaiviti islands of Fiji were installed by the FDOE.

Current installed capacity at the Fiji Sugar Company is 4 MW at Ba, 3 MW at Rakiraki, 5 MW at Lautoka and 4 MW at Labasa. DoE bio-fuel programme was designed to produce CNO locally, DoE has plans to introduce dual fuel kits for the generators supplied with CNO. If successful this retrofit has the potential to increase CNO use to 90% of total fuel use.

#### *Geothermal*

There are 8MW of geothermal plant being planned for commissioning by FEA between 2013 and 2017.

#### *Energy Efficiency*

The Fiji government has promoted efficient use and generation of energy as part of its energy policy. This is rolled out through awareness raising and education on energy efficiency; through energy auditing and energy labelling. The department of energy carries out energy audits and the service has also grown amongst the private sector.

#### *Sustainable Sea Transportation*

The goal of our fossil fuel free energy production initiative is to help reduce the overall dependency on fossil fuel, gas or coal. This can be accomplished by providing solutions for renewable energy production and storage that can be integrated into the current electricity and fuel infrastructure. Due to the geographical locations in Fiji, many remote dwellers suffers from high fuel and consequently high electricity prices driving stakeholders aggressively to tap into alternative renewable energy productions within the next 5 – 10 years. Through government's and stakeholders investments, initiatives have developed strategically to develop platforms that can assist in their transition from fossil fuels to renewable energy resources.

Fiji has been blessed with the revival of this long lost indigenous knowledge system by locals who have recently advocated the revitalisation of traditional canoes for sporting activities and tourism industry, however, it has been identified lately as one of the cheapest solutions in finding alternative means of sustaining sea transportation. Similar to other Pacific Island countries, Fiji comprises of more than 300 islands, having a land mass area of more than 18,000 km<sup>2</sup>, finding itself the ideal context of investing in traditional canoes as means of transportation to neighbouring islands.

Currently, locals use boats for inter-island transportation, for their daily chores including farming, fishing and for their business activities, in doing this, they use fiberglass, wooden and aluminum boats of different sizes powered with outboard motors ranging from 15 to 60 horse power which averagely costs about \$90 of gasoline per week. Considering community's livelihood for living sustainably, and the high fluctuation of fuel prices many communities especially in rural and remote areas would be experiencing financial constraints to meet up with their daily needs. The introduction and revitalizing of traditional canoes would be a fair justification and ideal solutions to the growing problems.

## Major Projects

### A. Pacific Power Solution

The focus of this project is to use petroleum fuel more efficiently and reduce the utilization of petroleum consumption and increasing in the use of renewable energy.

### B. WASH Program - Program Area 1: Water, Sanitation and Hygiene (WASH)

Activities focused on produce WASH educational resources, deliver sustained WASH training in communities and schools, support communities in construction and maintenance of simple water supply and sanitation options, improve means of testing water quality and link results to action.

## Climate Change Sector

### Pacific Centre of Environment and Sustainable Development (PACE-SD USP)

PaCE-SD's areas of expertise lie in environment, climate change and sustainable development. Within these broad areas, focus is mainly towards:

- Environmental impact assessment and sustainable environmental assessment
  - Disaster risk management
  - Climate change modeling and analysis
  - Climate change vulnerability and adaptation
  - Waste management and minimization
  - Watershed and natural resource management
- (source: PaCE-SD, USP website, 2015)

Currently projects being administered through PACE-SD include:

- PacTVET project jointly with SPC
- Global Climate Change Alliance capacity building, community engagement and applied research (EU-GCCA)
- Future Climate Leaders and Pacific Emerging Environment Leaders Collaboration (AusAID)
- Coastal Community Adaptation Project (USAID)
- Coordination and Support Action Project (EU-ECOPAS)
- Climate Change Game (GIZ)
- Climate Services (US Embassy)

The centre is renowned to be the hub of facilitating higher education courses ranging from levels 8-10 which starts of at Postgraduate Certificate. Climate change related courses are most suitable to be offered from this centre especially the ones planned to be facilitated at regional level.

### Department of Environment

The Department of the Environment (DoE) is the main governing body dealing with environment and biodiversity issues in Fiji. It is the national focal point for the United Nations Convention on Biological Diversity (CBD). The DoE is responsible for implementing the National Biodiversity Strategy Action Plan and the Environmental Management Act. It is one of the main partners of the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and the Secretariat for the Pacific Community's (SPC) regional REDD+ project.

### Department of Forestry

The Department of Forest is the second to Fisheries in its Ministry which has eight (8) functional divisions, the Silvi-Culture Research Department is one of the eight that coordinates works associated with forest protection as a strategy to mitigate and adapt to Climate change and disaster risks, Ecosystem-based management and Entrepreneurship. The Carbon sinks that absorbs and stores carbons in trees to reduce concentrations in the atmosphere, Reforestation & afforestation programs within degraded systems and mangroves are also part of their essential scopes promoted within communities as mitigation actions, EIAs, developing national policies for protection of reserves for the conservation of rare and endangered species, protection of watersheds, ridge-to-reefs, Seawater desalination plants, protection of watersheds, access benefit sharing regulations and identifying new fuel wood species through research practises have become their revitalised targets. The roles include:

- Implementation of forest policy 2007
  - Administer forest legislation
  - Ensure conservation, sustainable utilization and management of forest resources
  - Approve and issue forest related license
  - Provide training, extension services and research
  - Coordination with key stakeholders including forest resource owners
- (source: Ministry of Fisheries & Forests website, 2015)

The Department of Forest provides specialized trainings to their staff at their training division close to their Silviculture research station based at Colo-i-Suva on advocating the protection of pristine forests to provide essential ecosystem services, carbon storage and emissions offsetting. Protecting tropical forests therefore not only has a double-cooling effect, by reducing carbon emissions and maintaining high levels of evaporation from the canopy, but also is vital for the continued provision of essential life-sustaining services. These services are essential for the well-being of people and the planet, however they remain undervalued and therefore cannot compete with the more immediate gains delivered from converting forests into commodities. Ecosystem services operate from local to global scales and are not confined within national borders; all people are therefore reliant on them and it is in our collective interest to ensure their sustained provisioning into the future. The inclusion of REDD+ Initiative to Fiji allows for:

- Reducing emissions from deforestations
- Reducing emissions from forest degradation
- Conservation of carbon stocks
- Sustainable management of forests

- Enhancement of forest carbon stocks

(source: Fiji REDD+ Policy, 2013)

### Ministry of Foreign Affairs

The major objective of the Ministry of Foreign Affairs is the provision of policy advice to the Government regarding the formulation and implementation of its foreign policies. The ministry plays an important role in areas such as the negotiation and administration of foreign development assistance and climate change. Out of their 6 policy goals, 4 goals are targeted towards addressing issues related to climate change which are:

- To promote the integration of climate change issues in national planning budgeting and implementation process
- To provide guidance to government responses to climate change issues
- To guide sectors to develop climate change adaptation and mitigation strategies
- To support request to regional and international agencies to provide resource and assistance in addressing national climate change issues.

(Source: Fiji Climate Change Policy, 2012)

The main objectives that governs their policies outline above are to mainstream, collect, store and share data, raise awareness, provide education and training, adaptation and mitigation stages, financing and regional/international participation.

In combating climate change issues regionally and linking international relations, the Ministry is faced with drawbacks that need collective participation from related stakeholders such as:

- Awareness of climate change science background to communities
- Coordination of responses and reporting - climate proofing of all essential services and infrastructure
- Climate finance – access and hurdles to access by traditional implementing entities and rapidly institute local partners.
- Monitoring and evaluation
- Information and data storage
- Adaptation for vulnerable assessment
- Mitigation phases
- Technology upgrading to provide accurate data.

(Source: Ministry of Foreign Affairs website, 2015)

### Secretariat of the Pacific Regional Environment Program (SPREP)

The SPREP is another organization established in Fiji which addresses issues of the environment for the Pacific island people who depend on their natural environment for their sustenance and livelihoods. These vital resources and ecosystems are under ever-increasing pressure as our islands strive to address their economic aspirations and meet the needs of their growing populations. The Secretariat of



the Pacific Regional Environment Programme (SPREP) has been charged by the governments and administrations of the Pacific region with the protection and sustainable development of the region's environment. SPREP's members are American Samoa, Australia, Commonwealth of the Northern Mariana Islands, Cook Islands, Federated States of Micronesia, Fiji, France, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United Kingdom, United States of America, Vanuatu and Wallis and Futuna.

SPREP's activities are guided by its Strategic Action Plan 2011-2015. Develop through extensive consultations with members, secretariat programme staff and partner organizations, the plan establishes four strategic priorities:

- Climate Change;
- Biodiversity and Ecosystem Management;
- Waste Management and Pollution Control
- Environmental Monitoring and Governance

(Source: SPREP website, 2015)

#### Secretariat of the Pacific Commission

The Secretariat of the Pacific Community (SPC) is one of the leading comprehensive organization formerly called the South Pacific Commission, founded in Australia in 1947 under the Canberra Agreement by the six 'participating governments' that then administered territories in the Pacific: Australia, France, New Zealand, the Netherlands, the United Kingdom and the United States of America. They established the organization to restore stability to a region that had experienced the turbulence of the Second World War, to assist in administering their dependent territories and to benefit the people of the Pacific. Today 22 pacific island countries are members and territories are members of the SPC organization.

One of SPC's main visions is to conceptualize climate change issues by providing a secure resilience prosperous Pacific community whose people are educated and healthy and manage their resources in an economically and environmentally and socially sustainable. SPC is committed in helping pacific island countries and territories (PICTS) address the risk posed by climate variability and climate change. The Pacific region has for centuries been vulnerable to natural climate hazards such as floods, droughts and cyclones, consequently, climate change resulting from greenhouse gases continue to pose additional risks to the region increasing air and sea surface temperatures. SPC is working to help PICTS to respond to the risks and impacts of climate variability and climate change through its sectorial work and its whole of organizational approach. Strategies are in place to:

- Strengthen Pacific island communities to respond effectively to climate change
- Climate change integrated into SPC programmes and operations
- Strengthen partnerships at regional and international levels.

SPC are also coordinating several climate change projects through to 2015 that are funded by external partners; these include:

- Coping with Climate Change in the Pacific Island Region (CCCPIR) Implemented in partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)
- Global Climate Change Alliance: Pacific Small Island States (GCCA: PSIS) Implemented by SPC and funded by the European Union (EU)
- International Climate Change Adaptation Initiative: Building resilience in fisheries, agriculture and health Implemented by SPC and funded by the Australian Agency for International Development (AusAID)
- Vegetation and Land Cover Mapping and Improving Food Security for Building Resilience to a Changing Climate in Pacific Island Communities Implemented by SPC and funded by the United States Agency for International Development (USAID).

(Source: SPC website, 2015)

## Education Sector

### *USP – Faculty of Science Technology & Environment*

The University of the South Pacific - FSTE is an intellectual centre for excellence in Science, Technology and Environment for Pacific based research, consultancy and educational provision. It is made up of 5 schools; Geography-Earth Science and Environment, Marine, Biological & Chemical Science, Mathematics & Computing, Engineering & Physics with two prestigious institutes; Marine Resources and Applied Science. Courses ranging from Certificate levels to Doctorate which start from Level 4 to 10 according to FQF. The courses offered at the FSTE ties well in line with the EU PACTVET objectives of setting up to offer courses in Biodiversity at Diploma and Degree levels based on the existing programs currently offered with the facilities and qualified staff to teach available.

The link below gives the breakdown of the courses: <http://www.usp.ac.fj/index.php?id=10948> .

### *Fiji National University (FNU)*

FNU was formally established in 2010, but has a long history of relevant education dating back to the origins of its component Colleges, through institutions that were established according to national needs and aspirations as these developed.

The former Fiji Institute of Technology (FIT) is now part of the FNU College of Engineering, Science and Technology and is the University's Samabula Campus offering TVET courses ranging from Levels 3 – 7 (according to the Fiji Qualification Framework - FHEC) in Architectural & Civil Construction, Automotive, Mechanical, Electrical, Agricultural Engineering and Maritime including a few sustainable energy related course such as Renewable Energy, Refrigeration and Air conditioning. Apart from courses offered, most of the respective trades have carried out projects related to Solar PV (On & Off Grid), Solar Refrigeration, Hydro Power, Hydrogen Powered Automobiles, Biogas and Biomass from waste products, traditional construction of buildings and canoes, electrical rewiring, Spatial Town Planning and Coastal Engineering for Disaster Risk Management.

The National Training and Productivity Centre, established in 1973 by the Fiji National Training Act to benchmark training and qualifications in technical and trade areas based on the needs of local industries and is comparable with overseas qualifications offering up-skilling and reskilling training programs in Solar PV, refrigeration and electrical courses targeting a highly skilled workforce.

The merger of FNU has progressively proven its competent participation in striving to become the premier university in providing quality TVET education locally and widening its scope to the Pacific region establishing relations in Tonga, Tuvalu, the Solomon's and Vanuatu. Ideally, based on the university's facilitation programs, the EU PACTVET project could aim to setup baseline courses at Levels 3-5 especially for SE.

## **CONSULTATION METHODOLOGIES**

An integrated and inclusive consultative approach was undertaken in the light of Fiji's current development performance and the increasingly demands in search of solutions to Climate Change adaptations and Sustainable Energy alternatives. This Fiji In-country report compilation resulted from the consultations and outcomes of four processes, namely:

- Consultative Workshop Meeting (Training Needs & Gap Analysis)
- A series of EU PACTVET roundtable meetings
- Desktop literature survey
- Personal communications through email, telephone and office visitation

### **Consultative Workshop Meeting (TNGA)**

A one off consultative workshop with stakeholders was held at the USP-ICT Lecture Theatre to extract, process and consolidate professional ideas which convened on the 1<sup>st</sup> - 3<sup>rd</sup> July 2015 which invited representatives from all local national stakeholder groups. The purpose of the workshop meeting was to seek and refine stakeholder's professional contributions towards capturing training needs and gaps that exists in Fiji obligated to combat Climate Change and Sustainable Energy aggravating challenges and cost effective solutions.

### **Roundtable Meetings**

The series of roundtable consultations involved discussion on the needs and gaps facilitated by the EU PACTVET team. As part of the multi-stakeholder approach, the roundtable meetings involved appointment meetings with relevant stakeholders in the three main sectors; the Education (Ministry of Education, TVET providers and Fiji Higher Education), Climate Change and Energy (private and government).

### **Desktop Literature Review**

This forms the basis for evaluative report of information found in the literature related to technical, vocational education and training with the subject of sustainable energy and climate change as the content. Various literatures were consulted, within the education, energy and climate change sectors, on policy frameworks and national action plans or development strategic plans. Most Policy frameworks

(regional and national) were reviewed and those were used as the basis for consolidating future SE and CCA demands or needs in Fiji.

### **Personal Communications**

In a situation where stakeholders cannot make it to the consultative gatherings, due to other commitments, a one-to-one or face-to-face meeting or interviews were conducted. In situations that confined stakeholders against time and distance, phone interview and emails were the alternative methods of communications.

## **NATIONAL POLICIES & FRAMEWORKS**

### **Education**

The education sector in Fiji falls under the Ministry of Education that governs all educational training and facilitation, they are one of our key stakeholders in administering and monitoring of mainstream and TVET education in Fiji. The Ministry of Education is responsible for the design, implementation, monitoring and evaluation of educational legislations, policies and programmes in Fiji by providing the structures, human resources, budget and administrative and management support to ensure that the quality of service delivery is maintained at a high level. The Ministry is specifically tasked to conduct and deliver education services to the following:

- Pre-schools
- Primary and Secondary
- Special Schools for children with special needs and Vocational Schools
- Students in the years of compulsory schooling Year 1-13
- Students in vocational education and training programs
- Teaching personnel
- School management committees and controlling authorities

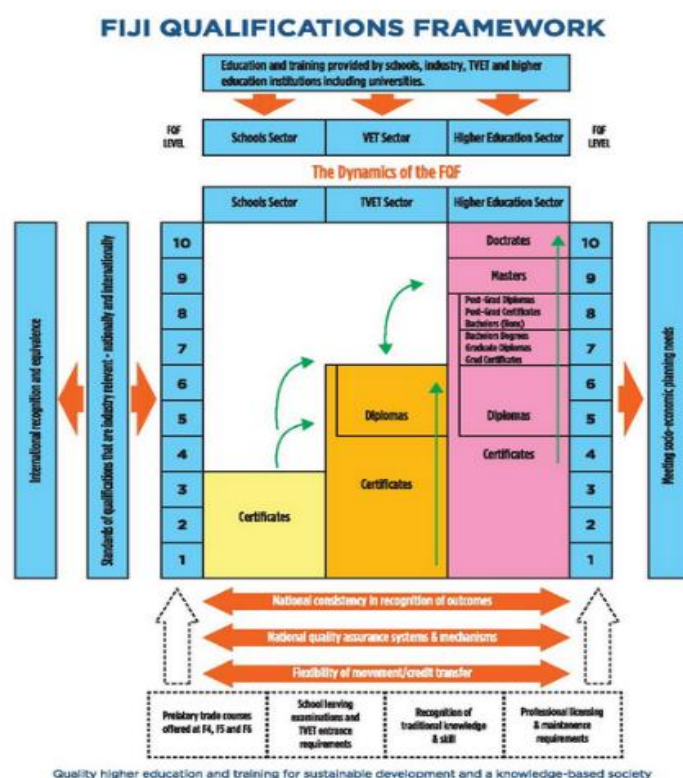
The Ministry of Education's National Curriculum Framework developed in 2007 and amendments recently highlighted the need to address Environmental Education for Sustainability at school curricula level integrating Climate Change concepts into teaching materials, classroom based activities and projects. The United Nations General Assembly adopted a resolution to establish the Decade of Education for Sustainable Development (2005-2014). This resolution highlights the importance of concerted action to ensure that development processes that we allow to occur today do not impede the livelihoods and quality of life of future generations. One of the pillars of sustainable development that gives shape and content to sustainable learning is environment. Environmental education for sustainability promotes awareness of the fragility of the physical environment affected by human activity. Environmental education for sustainability will be a core cultural feature of early childhood and school programs. All groups that make up a school community will be involved in supporting this important facet of contemporary education.

(Source: Ministry of Education website, 2015)

## Fiji Higher Education Commission (FHEC)

The Higher Education Commission is a governing body that was appointed by the Minister for Education in 2010 of its governing legislation known as the Higher Education Regulations 2009 and Higher Education (Qualifications) Regulations 2010 are subsidiary legislations. The role of the Commission are to advise the Minister for Education, on the steps to be undertaken in developing and promoting the higher education sector. The latter includes regulating the operation of higher education institutions to enhance governance and productivity which leads to quality education and training for individuals and the labor market. This, in turn, will improve the sector's contribution to the social, economic and cultural progress of the nation. All higher education institutions are required to get recognition and be registered with the Commission through the Fiji Qualifications Framework, a 10-level framework on which all higher education programs in Fiji should be registered.

Shown below is the Fiji Qualification Framework endorsed by the Fiji Higher Education Commission to be benchmarked throughout the country for any formal training needs.



Source: <http://www.fhec.org.fj/images/advportfolio/Docs/procedures/fijiqualificationframework.pdf>

The Fiji Qualification Framework layout provides an educational pathway in bridging three main mainstream educations; the mainstream school sector, the TVET stream and the higher education pathway from levels 1 – 10. It also recognizes non formal and short course trainings to enter from Cert 1 level as this might fit well with those in the workforce without qualifications but have vast loads of experiences. The framework is suitable for this EU PACTVET project simply due to the diverse targeted

learning groups which can be as low as those with experiences background only or specific prior knowledge from non-formal training.

Currently, the University of the South Pacific, Fiji National University and University of Fiji are working with the FHEC to process their respective institutional registration, recognition and Accreditation which simply means that all course offered by the three universities are currently reviewed and reformed to meet the standards and guidelines established by the FHEC as they have been mandated to coordinate and act as an advisory body to the government of Fiji to monitor all education and TVET training providers.

## Climate Change

The National Climate Change Policy document has provided a pathway for necessary stakeholders to work collectively with guided efforts in following an effective and integrated approach to addressing climate change issues in Fiji, and will support the achievement of relevant key performance indicators identified in Fiji's *Roadmap for democracy and sustainable socio-economic development 2009–2014*.

As a signatory to various international agreements and conventions such as UNFCCC, UNCCD, CBD, and the Kyoto Protocol, Fiji is obligated to develop appropriate national responses. It is also fitting that Fiji establishes national mechanisms that contribute to addressing issues identified in regional policies.

The goals of this climate change policy are:

- To support the implementation of Fiji's *Roadmap for democracy and sustainable socio-economic development 2009–2014* under the *People's charter for change, peace and progress*;
- To promote integration of climate change issues in national planning, budgeting and implementation processes;
- To provide guidance on government's responses to climate change issues;
- to guide sectors to develop appropriate climate change adaptation and mitigation strategies;
- To support requests to regional and international agencies to provide resources and assistance in addressing national climate change issues;
- To contribute to Pacific regional actions and to meeting international commitments.

Within its eight objectives, Education and Training is ranked fourth out of the eight Climate Change Objectives which states to:

**Integrate climate change in school curricula, tertiary courses, and vocational, non-formal education and training programs.**

Strategies involve:

- Review and update the current primary and secondary curricula, and the tertiary and vocational education courses to ensure inclusion of local, accurate and current climate change information, and to encourage student research around the issue of climate change.

*The Curriculum Development Unit to assess and review teaching materials on climate change regularly, given the dynamic nature of climate change science, research and international progress.*



- Develop appropriate educational materials and learning tools on climate change for students with special needs in early intervention programs, in special and mainstream primary and secondary schools, and in tertiary institutions.
  - Review and update non-formal education programs and training materials to incorporate climate change information where appropriate.
  - Build capacity of provincial administrators, Roko Tui, advisory councilors, community leaders, village headmen, youth leaders, faith-based organizations and NGOs to deliver accurate information, integrate local content, and promote critical thinking about climate change.
  - Ensure that education and training programs are designed to allow and encourage individuals to understand climate change, and to take action on mitigation and adaptation.
  - Develop appropriate training tools on climate change for government officers involved in awareness and training programs in all government departments.
- (Source: National Climate Change Policy, 2012).

## Energy

Fiji's energy situation is characterised primarily by a high reliance on imported fuels and thus a need to reduce this reliance is obligatory. Grid-based power supply has arguably the most potential to make Fiji's energy sector more efficient, cost effective, and environmentally sustainable. Over 50% of Fiji's electricity is already generated from hydropower, but there are still likely a number of medium size undeveloped hydro sites and significant unexplored geothermal, solar, and wind resources.

The first National Energy Policy and associated strategic action plan were developed in 2006 with support from the Pacific Island Energy Policy and Strategic Action Planning (PIEPSAP) project. This energy policy was endorsed by the Government in November 2006.

Summaries of the priority policies for each key area of Fiji's energy sector are provided below and were selected on the basis that they are readily achievable and have the most potential to achieve the objectives and targets for the energy sector.

### *Grid-based power supply:*

- Promote private sector investment in electricity generation, including encouraging establishing a transparent process for IPP procurement, Power Purchase Agreement principles, and avoided cost benchmarks.
- Strengthen transparency and effectiveness of the regulation, including establishing a formal regulatory contract with Fiji Electricity Authority (FEA) and ensuring the technical and economic regulatory functions are carried out by institutions external to FEA.
- Develop a national electrification master plan, showing how each un-electrified area will be served with least cost solutions.
- Establish an electrification fund and an associated framework that will be used to provide capital subsidies for electrification projects that increase access for unserved communities

### *Renewable energy:*

- Maintain a comprehensive assessment of Fiji's renewable energy resources, including hydro, wind, solar, and geothermal resources.



- Make all data on renewable energy resources available to the public and prospective investors through a single national repository.

#### *Transport:*

- Promote the fuel efficiency of imported motor vehicles, including continuing to enforce age limits for second hand vehicles and providing, as well as introducing labelling for fuel economy and tyre pressure.
- Support the development and implementation of a transport policy that encourages a shift towards more energy efficient forms of land transport, including enhancing public transport provision, the promotion of walking and cycling, and improving the layout of urban areas.

#### *Petroleum and substitute fuels:*

- Reduce the cost of imported petroleum products by negotiating directly with fuel suppliers and reviewing the pricing templates for petroleum products.
- Improve the transparency of petroleum supply, including collecting data on fuel quantity imports, re-exports, consumption, and pricing and making this data publicly available.

#### *Energy efficiency:*

- Increase public education and awareness of energy efficiency by providing information to households and businesses on the range of energy saving technologies and options available, including encouraging energy audits.
- Extend the current system of energy labelling and minimum energy efficiency standards to all widely imported electrical appliances and industrial equipment that contribute substantially to energy demand.
- Develop and implement an energy information database, so that demand side data is collected and analysed and a verifiable data trail is created upon which energy savings can be verified.

(Source: A Green Growth Framework for Fiji, 2014).

## TRAINING NEEDS & GAPS DATA MATRIX

The matrix below outlines the gaps and needs analysis for TVET programs for Fiji (Table 2).

Groups	Programs	In-Country Needs	Levels	Courses	Competency Skills	Providers to offer	MER	Career Level
1	CLIMATE CHANGE							
CC1	Disaster Risk Management	Data compilation with regards to risk assessments & its vulnerability to natural hazards. Designing a national evacuation plan for each natural hazard/ scenario.	levels 5 2 year program	Dip. in Disaster Risk Management	DRM scope (concepts, structures, DRR- community based), DRM processes (IMS, Risk analysis, Hazard mapping, vulnerability analysis, SOPs), DRM planning (contingency, disaster, recovery & business continuity, warning systems, activation review), Disaster Response Systems & Practices ( IRS, National Response structures, Assessment planning & implementation, Resource mobilization), Disaster & Development (DRM, project planning, livelihood, resilience, Issues like gender, HIV etc.	University of Fiji	Year 12 and 13 completion, Cert 4 completion, 5 years work experience	tradesman & technician
CC2	Integrated Farming Practices (Agriculture/ Aquaculture/ Mariculture/ Agroforestry, Food Security)	Alternative sources of livelihood within communities explored to reduce pressure on the marine resources, More research needs in crop/animal breed that are more tolerant to salt & drought.	levels 3 1 year Program	Cert 3 in Integrated Farming	Feed Formulation and Production using local raw materials (can address feed formulation for pigs, chicken, fish)/Ratio and Proportion, Intercropping (Identify and Establish the types of crop mix), Urban Farming, Understanding of the Climate, Understanding the land Characteristics, Land Use Planning (Composting, biogas, bio-composting), Agro forestry, Aquaculture (Food Security) development, WASH.	Fiji National University, School of Agricultural Engineering	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	tradesman & technician
CC3	Biodiversity (terrestrial & marine)REDD+ (RDF and Mangrove Areas)	Forest protection as a strategy to mitigate and adapt to Climate change and disaster risks was also suggested. This is mainly on forestry biodiversity conservation including afforestation and reforestation, Ecosystem-based management, Entrepreneurship, Which area of the forest is for water source?, How to “manage” forests, “Identification” of Endangered Species, Sustainable Harvesting- Sustainable consumption and	levels 4 2 year Program	Diploma in Biodiversity Conservation	Carbon sinks - absorbs and stores carbons in trees to reduce concentrations in the atmosphere. Reforestation & afforestation programs within degraded systems and mangroves should be promoted within communities as a mitigation action, EIAs, develop national policies, protection of reserves for the conservation of rare and endangered species, protection of watersheds, ridge-to-reefs, Seawater desalination plants, protection of watersheds	University of The South Pacific, Faculty of Science, School of Biology & Chemistry	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	technician & technologist

		production						
CC4	Traditional Knowledge	Socio-cultural and environmental adaptation	level 3 1 year Program	Cert 3 in Socio-Cultural & Environmental Practises	Indigenous knowledge systems, environmental protection, policies and regulations, indigenous protocols and approval, heritage sites cultural arts and design epistemologies, ABS policy.	University of The South Pacific, Oceania Centre	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	tradesman & technician
Groups	Programs	In-Country Needs	Levels	Courses	Competency Skills	Providers to offer	MER	Career Level
2	SUSTAINABLE ENERGY PROGRAMS							
	<i>Renewable Energy</i>							
SE1	Solar PV System (On-Off Grid)	alternative power source for FEA, and heavy Electricity consumption companies, supply to cooperate offices, shops and public infrastructures, Stand - Alone Solar PV Home System, domestic use in urban and rural areas	level 5 2 year Program	Dip in RE: Solar PV (On-Off Grid)	Characteristics of sunlight, semi-conductors, solar cells, properties and design, modules characteristics, solar PV system materials, stand-alone PV and Grid connected and specific purpose PV application Fundamentals of Electricity & Solar, Electrical wiring- Residential & Commercial, Fundamentals of refrigeration, Comfort System- Residential & Commercial, Refrigeration systems & practice, trouble shooting & maintenance.	Fiji National University, School of Electrical & Electronics.	Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics field, Prior knowledge through non-formal training	tradesman and technician
SE1	Solar Refrigeration	meat and medical use storage in areas without power source	level 5 2 year Program	Dip in RE: Solar Refrigeration	wind characteristics and resources, aerodynamics of wind turbine, mechanics and dynamics, electrical systems of wind turbine, wind turbine materials and components, design sitting and testing, Wind	Fiji National University, School of Mechanical Engineering, Department of Refrigeration & Air Conditioning	Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics	tradesman and technician

SE1	Wind Turbine Plant	power source for FEA, and heavy Electricity consumption companies and domestic use	level 5 2 year Program	Dip in RE: Wind Turbine Power	energy systems economics, environmental aspects, Wind Software: Wind Atlas, Analysis and Application Program (WAsP)  Biomass: Generation and utilization, plant derived, residues, aquatic and marine biomass, various wastes, Agriculture Crop & Forestry residues used as fuels , Properties of biomass,	Fiji National University, School of Electrical & Electronics.	field, Prior knowledge through non-formal training	
SE1	Hydro Plant (all sizes)	power source for domestic use installed beside water sheds	level 5 2 year Program	Dip in RE: Hydro Power	Classification of biomass and use of biomass as fuel, Types of Bio-fuels, Systems utilizing biomass – system optimization, Biochemical and Thermo-chemical Conversion of biomass, Biomass Gasification of Biomass gasifiers and Pyrolysis, Liquification	Fiji National University, School of Electrical & Electronics.		
SE1	Bio-mass and Bio gas	Increase alternative fuel products for domestic use, transportation, manufacturing, commercial cooking.	level 5 2 year Program	Dip in RE: Bio Fuel		Fiji National University, School of Agricultural Engineering		
	Energy Efficiency							
SE2	Refrigeration & Air Conditioning	produce alternatives or less hazardous R&AC installations	level 5 2 year Program	Diploma in EE: Installation & Maintenance, Auditing & Regulations	Evolution of Energy management, Implementing Strategic Energy Efficiency Plans, Efficiency program failures & success, Selling & funding energy programs & projects, Procurement & energy built analysis, Energy Audit & Instrumentation, Electrical systems, Remodification of Refrigeration and AC systems and solutions, Energy Planning and Management, policy development, maintenance skills	Fiji National University, School of Electrical & Electronics.	Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics field, Prior knowledge through non-formal training	tradesman and technician
SE2	Energy Auditing and Applying Energy Efficiency Solutions	monitor installations and maintenance						
SE2	Energy Sector Planning & Management	develop policies to monitor energy installations and stakeholders						
SE2	Domestic and Office Appliance/ Home and Office Appliance							
SE3	Efficient Land Transport	more research in hybrid units, water (oxygen-hydrogen separation)powered carts	level 4 1 year Program	Cert 4 in ST: Solar, Hybrid & Water	Hybrid & Solar Systems	Fiji National University, School of Automotive Engineering Road & Transport	Cert 3 & 4 in Automotive, Year 12 completion, 5 years work experience, Prior knowledge through non-formal training	tradesman and technician

SE4	Efficient Infrastructure: Sea Transport (traditional canoe)	inter-island cargo and dwellers transportation	level 3 1 year Program	Cert 3 in Sustainable Infrastructure	designing, procurement, management, construction, materials preservation and maintenance, sailing and navigation, documentation and education	Fiji National University, School of Building & Civil Engineering	Cert 3 & 4 in carpentry and joinery, ship building apprentice, Year 12 completion, 5 years work experience, Prior knowledge through non-formal training, traditional knowledge in crafting	tradesman and technician
SE4	Efficient Infrastructure: Construction (traditional)	traditional architecture and construction, materials processing, tourism construction industry,	level 4 1 year Program	Cert 4 and Dip in Sustainable Infrastructure	tropical architecture, traditional construction, cultural practises, carpentry and joinery, environmental management and adaptation and silviculture	Fiji National University, School of Building & Civil Engineering	Year 12 completion, Cert 3 carpentry and joinery, 5 years work experience, prior knowledge in indigenous practises or non-formal training	tradesman and technician
Groups	Programs	In-Country Needs	Levels	Courses	Competency Skills	Providers to offer	MER	Career Level
3	PROJECT MANAGEMENT Program							
PM1	Project Concept Drafting	equip project coordinators with research, administration, management, planning, documentation & presentation practises	level 4 1 year Program	Cert 4 in Project Management	Intro to PM (life cycle, org structure, translate needs to req. Selection & Planning (approaches, decision methods, evaluation technique, estimation n finances). Management & Leadership (special demands, selection of P Managers, Comms, organisation structure, characteristics of PManagers, styles and leadership, procedures) Planning & Estimation (work schedules, charts, budgeting, resource allocation) Risk & Quality (basics, methods of risk solutions, assessment, approach, simulation, roots) Project Execution & Control (execution, controls, finance, cost & schedule)	University of Fiji, Fiji National University	Year 12 and/or 13 in Sciences and Social Science, Cert 3 in Sciences, 5 years work experience, maturity and Prior knowledge.	tradesman and technician
	Logical Framework Analysis							
	Monitoring and Evaluation							
	Report Writing							
	Project Visibility							

**Table 2:** A matrix on the gaps and needs analysis for TVET programs in Fiji

## **TRAINING NEEDS & GAPS ANALYSIS & DISCUSSION**

### **Training Needs & Gaps**

According to the matrix developed, all the probable courses envisioned to be developed and offered through this EU PACTVET project can be offered in Fiji through the three universities; USP, FNU and UniFiji. These tertiary providers currently have the potential and ability in term of qualified staff and suitable facilities to offer them as they are currently offering similar programs and thus would have the appropriate facilities and qualified staff and guided by a conducive educational framework that is relative to a diverse entry requirements. The targeted groups for these programs range from Yr 12/13 school leavers, tertiary students, workers with or without qualifications but have vast work experiences in the relevant trade and those that hold some sort of non-formal certificates from short course trainings.

**Disaster Risk Management** is one of the programs needed to be offered in Fiji based on the lack of necessary skills and knowledge in assessing our vulnerable systems to natural hazards. Many governing sectors related to this field do not have the systematic approaches and critical analytical skills to report and document realistic findings of different hazards/scenarios, as a result the course needs to incorporate skills in assessing vulnerable environments, gathering data from site which involves observational skills, gathering data skills, and analytical skills for multiple contexts and activities. Running the course needs to be placed at either USP-FSTE or UniFiji as they both have the capacity in place. We have two options for DRM programs, due to its extensive area of study, it can be offered both as a full time for 2 years or in Modules 1, 2 and 3 similar to train of trainers course which are mostly short and intense covered within a month or two, the reason is because the course requires more practical applications rather than theory. This means that DRM can be progressed in stages; stage 1 observation and documentation, stage 2 requires setting up management systems and stage 3 could involve policy planning and executing projects. The MER should vary at different stages, stage 1 can be as low as community reps without any qualifications but has knowledge and experiences about their community sites.

**Integrated Farming** is another needed program consolidated especially for sustainable livelihood systems. In Fiji, we have agriculture, agroforestry, mari-culture and aquaculture running separately on their own without being coordinated to be recognized as some of the solutions supporting sustainable livelihood alternatives. Establishing successfully in rural communities requires extensive knowledge in a wide scope of area simply because the exposure and the availability of these resources to them than to those in urban settings. This program should not only involve agricultural farming but agroforestry, mari-culture, aquaculture for alternative sources of livelihood within communities to reduce pressure on the marine resources, in addition, more research is needed in designing new crop/animal breed that are more tolerant to salt, drought & disease. This course covers a wide range of farming areas, which may need to be offered at FNU Koronivia campus starting from Certificate 3 level and onwards. The targeted groups should include Year 11-13 students and those with vast experiences but do not have any qualification. The course is fit for tradesman and technicians.

**Biodiversity (terrestrial & marine) REDD+ (RDF and Mangrove Areas) training** is a great need to be developed in Fiji so that communities and relevant stakeholders are equipped with skills and knowledge in the protection of forests as a strategy to mitigate Climate change and disaster risks.

Based on the consultative meeting, there is an aggravating training need on forest biodiversity and its conservation and the need for afforestation and reforestation programs, Ecosystem-based management, identification of Endangered Species & “hotspots”, Sustainable Harvesting- Sustainable consumption and production, carbon sinks - absorbs and stores carbons in trees to reduce concentrations in the atmosphere. Reforestation & afforestation programs within degraded systems and mangroves to be part of this program promoted within communities as a mitigation action, EIAs, developing national policies, protection of reserves for the conservation of rare and endangered species, protection of watersheds, ridge-to-reefs system approaches, seawater desalination plants, protection of watersheds indigenous knowledge systems, environmental protection, policies and regulations. The program is proposed to be offered at Level 5 as Diploma in Biodiversity Conservation which are suitable for targeted groups in year 12 and 13 or pre-tertiary in Sciences, Cert 4 completion in science and those already in the field with less related qualifications but loads of experiences.

**Traditional Environmental Practises** is one of the lacking components with many climate change project teams that do not have sufficient knowledge and skills in indigenous knowledge systems that relates to environmental sustainable concepts that are practised in their communities that could be used for sustainable livelihood opportunities. Like other PIC's, Fiji has its own traditional environmental practises for land and marine conservation connected to the leadership and members of the community, this course will enable students to understand and be aware of traditional protocols, procedures in establishing networks with traditionally rooted communities and site access procedures. This course will equip students with systematic approaches when doing site assessments, collaborating with communities and most of all understanding traditional environmental practises. This course could be a stand-alone or incorporated into Biodiversity Conservation program as a subset. The course may be offered at Cert 3 level which could target Year 10-13, those in the related field of work and prepared for tradesman and technicians only.

**Sustainable Energy** trainings is evidently proven through the consultative workshop carried out in Fiji for this EU PACTVET project to be lacking immensely in many areas. With the high retail fuel and electricity prices, Fiji, under our National strategic planning documented needs to target for renewable energy solutions. The availability of local natural resources through advance research to meet the energy demands domestically and commercial needs within has proven to be a way forward and an alternative to the consumption of fossil fuels. Based on the outcomes of the meeting and survey, only solar PV has been covered widely in the market, compared to other energy initiatives. Solar refrigeration has a great demand but lack of supply and expertise to provide training, wind turbine is another which lacks popularity due to unprecedented factors accounted from a previous project. Hydro power system has been spotted and trialled in a number of site in Kadavu and Vanua Levu but needs experts to conduct local training and installation. Biomass and Biogas fuel extracts have found itself on our top list due to recent findings through FNU educational research and Department of forestry's initiatives identifying a couple of fuel wood (i.e. namely Glyricidia & Acacia) that are grown locally which has high calorific content perfect for the task. The SE related courses involving photovoltaic lighting, solar refrigeration, wind turbine, hydro systems and Biomass/biogas can be combined into a Diploma in Renewable Energy program as one complete program rather than having them as separate exits and also due to overlapping of some units at the initial stages before covering the five trades in later stages where the course can be broken down into 4 semesters for 2 years or 5 trimesters as a Diploma in

Renewable Energy course. In scoping the structures for these courses, it is likely that each trade could be covered within a semester or at least within 15 – 18 weeks which fits into both semester and trimester period.

The SE programs will target year 12 and 13 completion with strong Science background in pure science subjects or pre-tertiary at Foundation level. Entry can also be opened to those already in the field that do not meet the requirements but have at least 10 years of experience in this field. Levels of opportunities for work includes tradesman for assistance and technicians for installation and maintenance. The program can be offered at the Fiji National University due to the potential capacity and availability of similar course currently offered at the university in Electrical, Refrigeration, and Agricultural Department.

**Energy Efficiency** programs is also a needed area in Refrigeration and AC, energy auditing, energy sector planning and stand-alone systems needs to be clustered into one program at Diploma level (level 5) as Diploma in Energy Efficiency integrating Management & Maintenance, Auditing, Planning & Regulations. The target groups will be entry from Year 12 and/or 13 in Tech or Pure Sciences, Cert 4 in electrical & electronics, 5 years work experience in electrical & electronics field and prior knowledge through non-formal training. This course can also be offered FNU due to the availability of resources related to this program at the university. Career opportunities at this level can be of tradesman and technicians.

Sustainable Efficient Land Transport and Sea Transport will not be combined due to the nature of their trades, however, Sea Transport and Traditional construction have similar trades which can be grouped into one program called Sustainable Construction. The targeted entry for Sustainable Construction program sets out from Cert 3 because it involves a lot of carpentry, joinery and plumbing & sheet-metal maritime navigation, traditional design and crafting whereas the Land transport program will start off from Certificate 4 level as these involves some background in automotive rewiring, solar systems and chemistry. Entry levels for Cert 3 includes year 10 and upwards, experienced tradesman in construction in ship-building (modern and traditional canoes) and building construction (modern and traditional) whereas year 12 and 13 for Cert 4 programs. Job opportunities can be of tradesman and technicians for both trade programs.

**Project Management** is another lacking field in Fiji that needs to be addressed through this EU PACTVET project to equip project coordinators or supervisors with the necessary techniques to facilitate research based or field work type projects successfully. Managing projects in Fiji has become an issue of concern with donors and recipients due to its poor facilitation and coordination. This has stirred a lot of emphasis in this project to revitalize the deliberation of Project Management course to be developed in order to train interested locals. As mentioned, this course is one of the vital programs identified through this project that will serve to offer trainings equipping project coordinators with research, administration, management, planning, documentation & presentation practises to carry baseline impact vulnerability assessments, analysis of data collection, Developing Action Plan, Skills in communication, how to develop Project Proposals in order to get Financial Funding and Rural/Community Enterprise Development. The Certificate 4 in Project Management will be a qualification designed to bridge the gap between professional Project Managers and fieldwork tradesman applying knowledge and advanced technical skills in his/her area of expertise and generate



a range of solutions to the technical problems faced in the field, collaboration with partners, logistical planning, consultation approaches, supervisory responsibility of tradesmen and leadership roles in performance ranging from high level decision making to technical tasks, presentation skills, generating reports and communiqués as required in the industry. Students should be employable in technical areas where Project coordinators technologists and technicians where decision making is required at a middle management level. The graduate may have the technician's role in employment, become a supervisor/ middle manager or proceed to higher education studies to become a fully qualified professional Project Manager. With few years of field experience these graduates can play leadership roles as a team leader or a line supervisor. Moreover, students shall be able to contribute within a wide range of Management work such as schematic set out, feasibility development, cost control, programming and management.

## Present & Future Demand Market

Based on on-going consultation during and after the consultative workshop with major stakeholders in Fiji, a list of workforce training needs and priority sectors for skill development are summarised in a table format below. The table is categorized into 3 skill sets which are knowledge-based, transferrable skills and personal skills required for streamlining and capturing Climate Change and Sustainable Energy competency skills for developing specialized training in the two areas. According to one of the major objectives of the workshop, participants were able to develop the necessary skills (Table 3).

Type of Skills	Skills Description		
	Sustainable Energy	Climate Change Adaptation	
Knowledge-based  Knowledge of specific subjects, procedures, and information necessary to perform particular tasks Such knowledge-based skills are acquired through education, training, and on-the-job experience	<b>Renewable Energy Skills</b>		
	Engineering Mathematics skills	CC Adaptation assessment skills	Basic marine conservation skills
	Engineering Graphics skills	Disaster risk reduction (DRR) skills.	Sea-food processing and preservation skills
	Computer Programming skills	Crop resilience knowledge-based skills	Knowledge-based skills on fish species and breeding cycles.
	Occupational Health & Safety skills	Soil adaptability knowledge-skills.	Knowledge-based skills on sustainable fishing methods.
	Engineering Physics skills	Crop seasonal cycles knowledge-based skills	Budget and marketing skills
	Electrical & electronics Engineering skills	Crop/food preservation skills	Simple Bookkeeping skills
	Fluid Mechanics and Machinery skills	Pest/weed control skills	Water collection and preservation skills
	Biomass and thermal skills	Aqua-culture and agro-forestry knowledge-based skills	Rainwater harvesting skills
	Materials engineering skills	General food handling and hygiene skills	Water pumping and purification skills
	Solar Energy system skills	Feasibility study skills	Seedling nursing
	Wind Energy system skills	Protection of reserves for endangered species skills	Mari-culture skills
	Electrical machine drives and control skills	Protection of water sheds	Seawater desalination plants skills
	Engineering management skills	Ridge to reef skills	
	Energy conservation skills	Install and operate radio equipment skills	
	Installation and maintenance skills	Basic radio Morse code skill	
	wind characteristics and resources)	international radio pro-words and radio operators phonetic alphabets skills	
	aerodynamics of wind turbine skills		
	mechanics and dynamics skills		

	electrical systems of wind turbine skills		
	wind turbine materials and components skills		
	design sitting and testing, Program (WAsP) skills		
	Wind energy systems economics skills		
	Environmental aspects skills		
	Wind Software skills		
	Wind Atlas Analysis and Application skills		
	Generation and utilization skills		
	plant derived residues skills		
	Aquatic and marine biomass skills,		
	Agriculture Crop & Forestry residues skills		
	Classification of biomass and use of biomass skills		
	Types of Bio-fuels Systems utilizing biomass – system optimization skills		
	Biochemical and Thermo-chemical Conversion of biomass skills		
	Biomass Gasification of Biomass gasifiers and Pyrolysis, Liquification skills		
	<b>Energy Efficiency Skills</b>		
	Designing traditional canoe skills		
	Procurement skills		
	Management skills		
	Canoe construction skills		
	Materials preservation and maintenance skill		
	Sailing and navigation skills		
	Documentation and education skills		
	Marketing traditional design skills		
	Filming and Television skills		
	Tropical architecture skills		
	Traditional building construction		
	Cultural practises skills		
	Carpentry and joinery skill		
	Environmental management and adaptation skill		
	Silviculture		
	Energy Auditing skills		
	Remodification of Refrigeration and AC systems and		

	solutions skills		
	Energy Planning and Management skills		
	Policy development skills		
	Maintenance skills		
<b>Transferable/Functional Skills</b>  <b>These are actions taken to perform a task, transferable to different work functions and industries and the skills are based on ability and aptitude</b>	Organizing and Planning		
	Project Concept or Proposal writing skills.		
	Project Management skills		
	Communication Skills		
	Analyzing skills		
	Ethics & Governance skills		
	Public Speaking skills		
	Coaching & Mentoring skills		
<b>Personal Traits/Attitude</b>  <b>Traits or personality characteristics that contribute to performing work. Such skills are developed in childhood and through life experience</b>	Interpersonal skills		
	Process minded skills		
	Succession Planning skills		
	Resource Sharing skills		
	Language awareness skills (in case		
	Patience Skill		
	Diplomatic Skills		
	Result-oriented skills		
	Independence skills		

**Table 3:** A list of workforce training needs and priority sectors for skill development in Fiji.

## Training Supply: TVET Providers

Fiji has a total of 125 Secondary schools with 51 Secondary/Vocational schools with 9 Technical Vocational centres established to cater for Secondary levels registered with the Ministry of Education and 35 Tertiary training institutions registered with the Fiji Higher Education Commission. Within the 35 training providers, there are 3 universities established and providing extensive courses closely related to the training needs contemplated in this EU PACTVET project. Given below is a matrix providing relevant information on courses offered at the three universities (refer to Appendix 2).

## Supply and Demand Market

Code	Subject Area	University of the South Pacific	Fiji National University	University of Fiji	Total
	<b>CLIMATE CHANGE PROGRAMS</b>				
CC1	Disaster Risk Management	x		x	2
CC2	Integrated Farming	x	x		2
CC3	Biodiversity, Mangrove and Water Security	x	x	x	3
CC4	Traditional Environmental Epistemologies	x	x		2
	<b>SUSTAINABLE ENERGY PROGRAMS</b>				
	<b>Renewable Energy</b>				
SE1	Solar PV System (On & Off Grid), Stand-Alone, Wind Turbine, Hydro Plant & Biomass/Biogas and Refrigeration	x	x	x	3
	<b>Energy Efficiency</b>				
SE2	Refrigeration & Air Con	x	x	x	3

<b>SE2</b>	Energy Auditing and Applying Energy Efficiency Solutions	x	x	x	3
<b>SE2</b>	Energy Sector Planning & Management	x	x	x	3
<b>SE2</b>	Domestic and Office Appliance/ Home and Office Appliance	x	x	x	3
<b>SE3</b>	Efficient Land Transport	x	x		2
<b>SE4</b>	Efficient traditional Sea Transport & Construction	x	x		2
	<b>Project Management</b>				
<b>PM1</b>	Project Concept Drafting	x			1
	Logical Framework Analysis	x			1
	Monitoring and Evaluation	x			1
	Report Writing	x			1
	Project Visibility	x			1

**Table 4:** Summary Matrix of Courses to be provided and potential tertiary providers in Fiji

Code	Subject Area	University of the South Pacific	Fiji National University	University of Fiji
<b>A.</b>	<b>Training facilities and Course designing</b>			
	Relevant and up-to-date practical equipment	x	x	
	SE/RE/CCA course designing and mainstreaming.	x	x	
	Facilitate support to TVETs for Training Facilities		x	
	Strategies pathways from TVET to HE		x	
	Development and upgrading of informal skills	x	x	
	Promotion of Low carbon growth	x	x	
<b>B.</b>	<b>Qualification</b>			

	TVET Teaching Qualification		x	
	Qualified Teacher Retention Strategy		x	
	Incentivized to retain more local staff to enhance learning	x		
	Local capacity to designing micro-hydropower	x	x	
	Feasibility study skills	x	x	
	Electrical wiring skills	x	x	
	Air conditioning and Refrigeration maintenance skills		x	
	Motor re-winding skills		x	
	Solar PV system sizing skills	x	x	
	Solar PV systems O&M skills	x	x	
	Energy Auditing skills	x	x	
	Training of Trainers on CCA	x		
<b>C.</b>	<b>Work Readiness/ Networking</b>			
	Difficulty in putting theory into practice			
	Lack of confidence at workplace			
	Supervision required	x	x	
	Need to communicate in English at work place	x	x	
	Low self-esteem		x	
	Innovative skills	x	x	
	Communication skills	x	x	
	Alignment of relevant Policies on CCA	x		
	Awareness in dramas, videos, news articles	x	x	
	Sharing of lessons learnt	x	x	
	Traditional records of natural disasters	x		
	Policy Awareness	x	x	x



	Technical Working Groups	X		
	Establishment of Information System	X	X	X
<b>D.</b>	<b>Resources Utilization</b>			
	Under-load staff cannot be utilized due to limited teaching breadth	X	X	X
	No equitable staffing allocation	X	X	X
	Less in-house mentoring			
	Minimal awareness and less sense of the values underpinning TVET, resulting in less productivity and no professionalism at work		X	
	Lack of innovative ideas to venture into establishment of industrial or business partnership		X	
	Lack of or less innovative ideas in creating income generating activities for the colleges		X	
<b>E.</b>	<b>Management/Financial and Administrative</b>			
	PALS – Compliances (Energy Division and Customs) to reinforce the regulations	X	X	
	College Management Plan, If there is one then there is no strict adherence to it.	X	X	
	Training and education be coordinated and incentivized to ensure support for relevant training	X		
	Improved Information flow through networking	X		
	Migration of qualified Instructors to other towns in search for better paid job		X	
	Performance Development - Quarterly reporting of staff and institution operation	X	X	X
	System Performance – ensuring resources are deployed to their best uses in the technical institution	X	X	X

**Table 5:** A summary of supply & demand within the three Tertiary Providers in Fiji

## **CONCLUSION & RECOMMENDATION**

Based on the consultative meetings analysis and training needs and gaps analysis captured for Fiji, there are a some suggestions that are highlighted below that would provide insights for further deliberation and decision making.

There are needs and gaps identified in the industry and the market to be strengthen through developing appropriate trainings in certain areas:

### **Sustainable Energy**

- Solar PV
- Refrigeration
- Wind turbine
- Hydro systems
- Biomass biogas
- Sea Transport
- Traditional Construction

### **Climate Change**

- Disaster Risk Management
- Integrated farming
- Biodiversity conservation
- Project management

The Fiji Higher Education Commission governs all educational qualification frameworks which involves all programs offered in any local tertiary provider. It is understood that the three universities identified in this report have recently been registered under their amended promulgation act. This qualifies these universities to be able to offer the programs that are currently being proposed in this project.

The Fiji Qualification Framework through the Fiji Higher Education Commission is recognized regionally and internationally and also aligns itself with the Pacific Regional framework by the SPBEA-EQAP. The industry advisory committees also play a vital role in consulting with the alignment of programs in order to meet the needs of the market force.

It is recommended that the climate change programs such as disaster risk management, integrated farming and Project Management to be offered mainly at USP-FSTE and University of Fiji whereas the Sustainable Energy courses could be well accommodated for at the Fiji National University, largely due to the existing programs offered, facilities available and the qualified teaching staff available with these respective institutes. Programs proposed to be offered through this project is mainly circulated around Certificate 3 – 5 levels which targets Minimum entry requirements at Year 11-13, Cert 3 completion, experienced tradesman and technicians with or without qualifications.

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# APPENDIX

## Appendix 1

DAY 1: Wednesday, 1 <sup>st</sup> July, 2015		
Time	Activities	Facilitator
9:00 am	Registration	Ashmita Devi
	Workshop Opening - Invitation sent to Minister for Education and EU Ambassador	
9:45 am	Welcome and Introduction to Workshop ❖ Outline EU-PACTVET Project <ul style="list-style-type: none"> <li>➤ Outline Rationale</li> <li>➤ Objectives/Purpose</li> <li>➤ Country Expectation</li> </ul>	Dr. Sarah Hemstock PacTVET Project Team Leader
<b>10:15 am</b>	<b>Morning Tea Break</b>	
Time	Activities	
	<b>Gauging Linkages to Sustainable Energy and Climate Change Adaptation</b>	
10:45 am	<b>Stakeholders Presentations ( 5 – 7 minutes each)</b>  <i>Ministry of Education - TVET Education in Fiji</i> <i>Ministry of Foreign Affairs – Climate Change Unit</i> <i>Fiji Department of Energy</i> <i>Fiji National Disaster Management Office</i> <i>Ministry of Agriculture</i> <i>Ministry of Fisheries and Forests</i> <i>Ministry of Local Government, Housing, Environment, Infrastructure and Planning</i> <i>Ministry of Youth</i> <i>APTC</i>	
<b>12:15 pm</b>	<b>Lunch Break</b>	
1:00 pm	<b>Continue Stakeholders Presentation</b>  <i>USP Pacific TAFE</i> <i>SPC Energy Programme</i> <i>SPC Disaster Reduction Programme</i> <i>SPC USAID Enhanced CC Resilience of Food Production Systems Project</i> <i>USP PACE-SD EU Global Climate Change Alliance Project</i> <i>SPC EU GCCA Project</i> <i>USP School of Education (TVET)</i> <i>USP Renewable Energy Programme</i> <i>USP Edulink LEAP Programme</i>	
2:00 pm	“Aspects of each Sector relating to Sustainable Energy and Climate Change – Linkages outlined” Group Work Discussions	Nixon Kua – PacTVET PMU
2.30pm	Group Presentations and Discussion	
	Wrap – up of Day 1	
<b>3.45pm</b>	<b>Afternoon Tea</b>	
DAY 2: Thursday, 2 <sup>nd</sup> July, 2015		
Time	Activities	Facilitator
9:00 am	Welcome, Recap of Day 1	
9:45 am	<i>Presentations from Fiji National University:</i> <ul style="list-style-type: none"> <li>• Solar Refrigeration</li> <li>• Solar Electrical</li> </ul>	

	<ul style="list-style-type: none"> <li>• Pico Hydro</li> <li>• Electrical Wiring</li> <li>• Mechanical</li> <li>•</li> </ul>	
<b>10:15 am</b>	<b>Morning Tea Break</b>	
Time	Activities	
10:45 am	<p><i>Presentations from Fiji National University continue:</i></p> <ul style="list-style-type: none"> <li>• Agricultural waste for cooking Gas</li> <li>• low cost compact solar energy lighting solutions</li> <li>• Coastal engineering</li> <li>• Regional town and country planning</li> <li>• Flattener rotor based model ship building wind energy propulsion system</li> <li>• Sustainable sea transport</li> </ul> <p><i>Fiji Higher Education Commission</i>  <i>SPC Educational Quality and Assessment Programme (EQAP)</i>  <i>GlZ Coping with Climate Change in the Pacific Island Region Programme (CCCPIR)</i></p>	
<b>12:15 pm</b>	<b>Lunch Break</b>	
1:00 pm	<i>Pacific Power Association</i> <i>Fiji Electricity Authority</i> <i>IUCN Oceania – Energy Programme</i> <i>Fiji Red Cross</i> <i>Live and Learn</i> <i>WASH Programme</i> <i>Monfort Boys Town</i> <i>Conservation International – Fiji Office</i> <i>Fiji Meteorological Services</i> <i>Water Authority of Fiji</i> <i>Suva City Council</i>	
3.30pm	Wrap-up of Day 2	
<b>3.45pm</b>	<b>Afternoon Tea Break</b>	
<b>3<sup>rd</sup> July, 2015</b>	<b>DAY 3: Friday, 3<sup>rd</sup> July, 2015</b>	
Time	Activities	
	<b>Training Needs and Gap Analysis</b>	
9:00 am	Presentation: (Training/Technical) Needs and Gaps Analysis – Basic Outline	
9:20 am	Discussion	
9:45 am	Plenary Session: <i>Creating National and Regional capacity and technical expertise to respond to CCA and SE challenges</i>	
10:45 am	Morning Tea Break	
11:00 am	<p>Group Work: National training needs in SE and CCA.</p> <p>Group Work</p> <ol style="list-style-type: none"> <li>1. Sustainable Energy: (RE/Electrical wiring/Energy Efficiency; Refrigeration and Air-conditioning and Sustainable Sea Transportation)</li> <li>2. Climate Change Adaptation: Food Security (Agriculture and Fisheries); Disaster Risk Reduction; Vulnerability and adaptation assessment; Water security and Forestry</li> </ol> <p><b>Participants are divided into 3 Groups:</b></p> <p>Tasks:</p> <p><b>Group 1 Discussion Topic:</b> “Gauge out the technical skills required/demanded by the industries in the Solomon Islands, present and future. Rank them in order, from HIGH DEMAND to LOW DEMAND</p> <p><b>Group 2 Discussion Topic:</b> “Identify technical Institutions in the country (formal and non-formal) that provide formal and informal technical skills in SE and CCA. List down the following:</p>	

	<ul style="list-style-type: none"> <li>i. Courses,</li> <li>ii. Durations,</li> <li>iii. Award/accreditation</li> <li>iv. Equivalent course and accreditation in the region and internationally; and</li> <li>v. Potential industry(ies) that needs such skills</li> </ul> <p><b>Group 3: Discussion Topic:</b> "Gauge out the technical skill and knowledge required for communities (both rural/ remote and urban) to be better equipped to adapt to the adverse effects of Climate Change"</p>	
<b>12:30pm</b>	<b>Lunch Break</b>	
1:30 pm	<p>Matching the industries Demand to the Technical Skills Training Courses Supply</p>  <p>Group 2 to split up between Group 1 and Group 3 and do the Demand and Supply matching</p>	
2.30pm	<p>Group Reporting</p> <ul style="list-style-type: none"> <li>i. Group 1</li> <li>ii. Group 2</li> <li>iii. Group 3</li> </ul> <p>Matching Demand to Supply Reporting – SPC</p>	
3:30 pm	Wrap-up of 3-day Workshop (Summary of Main Outcomes)	
<b>3:45 pm</b>	<b>END of Workshop</b>	
	<b>Afternoon Refreshments</b>	



## Training Providers

Table TP1 provides information on Fiji-based training institutes identified in the desktop study. At the time of writing, only FNU has responded to the survey and their response is shown in Table TP2.

**Table TP1: Fiji Training Institutes**

Institute	Contact	Position	E-mail	Phone
University of South Pacific	Dr. Atul Raturi	Head of Engineering and Physics	Atul Raturi atul.raturi@usp.ac.fj	(679) 3232430
Pacific Technical and Further Education - University of the South Pacific	Mr. Hasmukhlal	Director	lal_ha@usp.ac.fj	(679) 3231222
Fiji National University	Mr. Marfaga Solomone	Manager, EEEITD	<a href="mailto:meeitd@fnu.ac.fj">meeitd@fnu.ac.fj</a>	(679) 3392000
Technical Training Division - Fiji National University	Mr. Peni Taoi	Deputy Director	<a href="mailto:peni.taoi@fnu.ac.fj">peni.taoi@fnu.ac.fj</a> ; <a href="mailto:ddtt@fnu.ac.fj">ddtt@fnu.ac.fj</a>	(679) 3392000 Ext 4505/ (679) 9990748
National Training Center and Productivity Center (part of FNU)	Mr. Kamlesh Prakash	Director	<a href="mailto:DNTPC@fnu.ac.fj">DNTPC@fnu.ac.fj</a>	Phone +679 3311004, ext. 4005 Mobile: +679 999 3080
Division of Business and Information Technology	Mr. Sachin Deo	Deputy Director	<a href="mailto:ddbit@fnu.ac.fj">ddbit@fnu.ac.fj</a>	(679) 3311004 Ext: 4006 999 0763
APTC Fiji East campus			<a href="mailto:enquiries@aptc.edu.au">enquiries@aptc.edu.au</a>	+679 334 3958 Fax: +679 334 3971
APTC Fiji West campus			<a href="mailto:enquiries@aptc.edu.au">enquiries@aptc.edu.au</a>	+679 672 7342 Fax: +679 672 7345

**Table TP2: FNU Capabilities**

Does the TVET have any department that could conduct any of the following types of courses	Yes or No?	If Yes, please state which department	Contact Person	Contact E-mail	Contact Phone
Renewable Energy Technologies?	No				
Grid Connect PV Systems?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 4998
Off Grid PV Systems?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 4999
Solar Hot water?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 5000
Wind Power Systems?	No				
Hydropower?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 4998
Micro-Hydro Power?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 4999
Biomass?	No				
Biogas?	No				
Geothermal	No				
Others technologies?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 4998
Energy Efficiency?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000 ext: 4999
refrigeration?	Yes	RAC	SULIASI RAVUNIKAU	<a href="mailto:suliasi.ravunikau@fnu.ac.fj">suliasi.ravunikau@fnu.ac.fj</a>	3392000 ext: 4710
air-conditioning?	Yes	RAC	SULIASI RAVUNIKAU	<a href="mailto:suliasi.ravunikau@fnu.ac.fj">suliasi.ravunikau@fnu.ac.fj</a>	3392000 ext: 4710
Electrical wiring?	Yes	DEL	MARFAQA	<a href="mailto:MEEEITD@fnu.ac.fj">MEEEITD@fnu.ac.fj</a>	3392000

efficient land and water transport systems?	No				
Energy sector planning and management?	No				

In the last 5 years, FNU has conducted courses in the following areas:

- Renewable energy technologies (e.g. solar PV, solar water heaters, biogas, wind power and micro-hydropower)
- Energy efficiency (e.g. refrigeration and air-conditioning maintenance, motor mechanic, electrical wiring and rewiring of electric motors, efficient land and water transport systems)

FNU has an ongoing electrical course, which includes using tools to repair actual equipment and wiring practice for single and three phase systems. From previous contact with FNU, GSES is aware that they have conducted some solar courses but they did not provide any further details. The course they conduct is approved by the University Senate and is classed as a Level 3 course.

During the VECTEC project, seven trainers from USP and FNU were trained to conduct off-grid solar training courses and, of this 7, 5 have conducted training. Table TP3 details of these trainers; when they were trained and which of them has conducted training courses.

**Table TP3: Trainers trained under VECTEC project**

Institution	Name of Trainer	Contact Number	Email	Course Type	Date Trained	Trainings Delivered
University of South Pacific	Radesh Lal	+ 679 927-8640	<a href="mailto:radesh.lal@usp.ac.fj">radesh.lal@usp.ac.fj</a>	Small Off Grid PV systems	Jan-13	1
University of South Pacific	Viti Buadromo	+ 679 923-8254	<a href="mailto:buadromo_v@usp.ac.fj">buadromo_v@usp.ac.fj</a>	Small Off Grid PV systems	Jan-13	1
University of South Pacific	Joape Cawanibuka	+ 679 979-7357	<a href="mailto:cawanibuka_j@usp.ac.fj">cawanibuka_j@usp.ac.fj</a>	Small Off Grid PV systems	Jan-13	1
University of South Pacific	Binal Raj	<+6798386886>	<a href="mailto:binal.raj@usp.ac.fj">binal.raj@usp.ac.fj</a>	Small Off Grid PV systems	Jan-13	1
Fiji National University	Jone Filipe	+679 722-5289	<a href="mailto:jone.filipe@fnu.ac.fj">jone.filipe@fnu.ac.fj</a>	Small Off Grid PV systems	Jan-13	1
Fiji National University	Sautoki Buka	+ 679 718-2500	<a href="mailto:setoki.buka@fnu.ac.fj">setoki.buka@fnu.ac.fj</a>	Small Off Grid PV systems	Jan-13	0
Fiji National University	Praveen Rajan	9936466	<a href="mailto:praveen.rajan@fnu.ac.fj">praveen.rajan@fnu.ac.fj</a>	Small Off Grid PV systems	Jan-13	0

From the experience of the project team and from survey responses, 14 courses were identified as having been conducted in Fiji in the last 5 years. Information on these courses is contained in Appendix 4.

In Summary these included;

- Design and Install Grid connect PV Systems
- Overview of Grid Connect PV Systems
- VECTEC Train the Trainer Course 1

- VECTEC Train the Trainer Course 2
- VECTEC Technician Course 1 USP
- VECTEC Technician Course 2 USP
- VECTEC Technician Course 1 FNU
- VECTEC Technician Course 2 FNU
- VECTEC Wind Policy Workshop
- VECTEC Micro Hydro Policy Workshop
- Household energy survey training for surveyors and power utility staff- Part of 3 year program 2012-2015 The Pacific Appliance Labelling and Standards Program (PALS)
- Light Vehicle Mechanical Technology
- Technicians course at FNU
- Grid-Connected Photovoltaic Workshop

The grid connect PV course was conducted by GSES, a company which is a Registered Training Organisation in Australia. Those who passed are eligible to apply for industry certification under the Pacific Power Association (PPA) and Sustainable Energy Association of Pacific Islands (SEI API) certification and accreditation program.

The VECTEC course was intended to provide capacity building in these areas.