**PACIFIC CENTRE FOR RENEWABLE ENERGY & ENERGY EFFICIENCY**

**CAPACITY BUILDING FRAMEWORK & STRATEGY: 2019 - 2021**

1. **INTRODUCTION AND BACKGROUND**

This framework intends to put in place recommended capacity building initiatives that will be adopted and carried out by the Centre with respect to its intention to strengthen and augment its roles as per its establishment for the Pacific Island Countries and Territories (PICTs).

The framework is directly related to two outcomes in the PCREEE Results Framework;

1. **Outcome 2** is about “Strengthened capacities of local key institutions and stakeholder groups through the up-scaling and replication of certified training and applied research programs and mechanisms”. Under Outcome 2, Output 2.1 is a multi-year framework to strengthen the local RE&EE capacities of key institutions and stakeholder groups are developed, adopted and under implementation.

At the time when the PCREEE was designed, there was no regional capacity development strategy on RE & EE in place and there was weak implementation of targeted capacity development activities in the region.

PCREEE therefore aims to have this Capacity Development Strategy validated by key stakeholder groups (incl. women groups) and gender mainstreaming mechanisms incorporated. It also aims to have at least 30% of the activities of the regional Capacity Development Strategy implemented by the end of the first operational phase of PCREEE (2017 – 2021).

1. **Outcome 4** on the other hand, is about “Increased RE&EE business opportunities for local companies and industry through the development and implementation of regional investment promotion programs and tailored financial schemes.” Under Outcome 4, Output 4.2 is on Strengthened local Sustainable Energy Industry for the PICTs.

In addition when the PCREEE was designed, there were low local value added RE&EE investments due to a lack of PICTs sustainable energy businesses and industry. There was also lack of opportunities for local entrepreneurs due to the absence of tailored support instruments.

PCREEE aims to adopt gender-sensitive strategy to promote local sustainable energy industry and entrepreneurship in the PICTs. It aims to at least produce 150 local sustainable energy hardware and service companies in the 22 PICTs and also provide financial support (at least 30% are in the manufacturing sector and at least 30% start-up companies). Further, it also aims to support at least 20 companies in the sustainable energy sector which are to be awarded through the established Clean Tech Innovation Program.

In developing this framework, reference has been made to earlier regional capacity needs assessments, conducted on the establishment of PCREEE. The assessments have captured the needs of the national governments and local technology industry and businesses. They have taken into account consultations with National Focal Institutions (NFIs) and also incorporated the feedback from participants in the earlier PCREEE-related training events. In addition the framework has also attempted to capture the needs of local public and private stakeholders to produce tailored training and certification modules covering various RE & EE issues and tools, in coordination with local business and industry groups (and also in local language too).

The framework identifies key stakeholders for the centre and recommends capacity building strategies that will enable it to nurture, develop, build and maintain capacities in the area of the Renewable Energy (RE) and Energy Efficiency (EE) in the PICTs. This will strengthen the Centre and facilitate the delivery of its roles in the region. The essence of the framework is to aggregate the different stakeholders and align specific interventions in terms of capacity building for the different identified groups that will bring about region-wide consistency in the mobilization of the private sector on RE & EE in the region.

1. **OBJECTIVE**

The ultimate objective of the CBFS 2019 – 2021 is basically to position the Centre through its secretariat and for its stakeholders to effectively deliver through improving PICTs economies through fully embracing Renewable Energy & Energy Efficiency and the intricacies inherent with its market and industry.

The immediate objectives include;

1. The strengthening of capacities of local key institutions and stakeholder groups through the up-scaling and replication of certified training and applied research programs and mechanisms”.
2. Increased RE&EE business opportunities for local companies and industry through the development and implementation of regional investment promotion programs and tailored financial schemes.
3. **NEEDS ASSESSMENT IN THE PICTs**

The PCREEE addresses gaps in the current effort to leverage existing barriers and strengthen drivers for sustainable energy markets, industries through regional methodologies and tools. The Centre focuses on up-scaling and replicating national efforts in the areas of capacity development, knowledge management, innovation, awareness raising and as well as investment and business promotion. The focus of the Centre is on the private sector and the industry while supporting targeted RE&EE programs to enhance the productivity and leverage green jobs in the various sectors of the economy.

1. **PCREEE Needs Assessment**

A few capacity building-related needs assessments have been conducted in the region. However, the needs assessment undertaken for the establishment of the Centre revealed that some PICTs have made considerable progress in the creation of enabling national environments for the promotion of renewable energy (RE) and energy efficiency (EE). However, in some of the countries the developments are still at the early stage and have not been transformed into real investments and the creation of vibrant markets for the sector. Furthermore, the areas of small and medium-sized grid-connected renewable energy plants, decentralised renewable energy solutions for rural areas and households (e.g. sustainable cooking, mini-grids, stand-alone systems, water heating) as well as energy efficiency improvements in different sectors (e.g. buildings, grid losses, appliances, industry) need a further boost.

The needs assessment mentioned above revealed that the Council of Regional Organisations of the Pacific (CROP) agencies are already assisting PICTs in addressing parts of these barriers through various projects and activities(e.g. coordination, policy advisory, (pre-) investment support for projects). However, PICTs have expressed an urgent need for concentrated regional technical capacities to promote local human resources, awareness and knowledge management, as well as businesses and industry in the sustainable energy sector. The increasing sustainable energy investments and the introduction of appropriate regulations and standards go hand in hand with the need to develop local capacities. Moreover, there is the impression that the local private sector and industry do not take advantage of the growing sustainable energy market and job opportunities. Such developments threaten the long-term sustainability of existing investments as they are usually conducted by enterprises from outside the region, without local representatives. PCREEE intends to play a key role in creating economies of scale and a competitive sustainable energy market and business sector / opportunity in the Pacific.

1. **PacTVET Training Needs Assessment**

The Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation (TVET) project is implemented by the Pacific Community (SPC) in partnership with the University of the South Pacific (USP) over a period of 5 years (2014 – 2018) for a total of 53 months with an overall budget of 6.1 million Euros.

The general objective is to enhance sustainable livelihoods in PACPs. Sustainable livelihoods are a high priority for Pacific Island communities and governments alike. They are central to current development policy including resource management and conservation but also in emerging policy to address threats such as climate change. The purpose of the project is to enhance and/or create PACPs' regional and national capacity of, and technical expertise to respond to climate change adaptation (CCA) and sustainable energy (SE) challenges.

In terms of Sustainable Energy, certificate level qualifications were derived to facilitate technical vocational education and training (TVET) in building national and regional capacity specific purposes as outlined below:

1. Raise the level of awareness and knowledge on alternative renewable energy sources and renewable energy technologies (RETs);
2. Develop technical skills and knowledge to support processes for installation, operation and maintenance of RETs, and
3. Undertake planning, development, monitoring, assessment and management of sustainable energy projects to promote energy efficiency, which will mitigate loss and damages from the effects of climate change.

These qualifications contribute to developing a Pacific Community to manage their energy resources in a sustainable way.

Certificates 1 and 2 in Sustainable Energy are generic qualifications, which include general learning on on-grid and off-grid power systems, renewable and non-renewable energy sources, energy efficiency and renewable energy technologies (RETs). Certificates 3 and 4 in Sustainable Energy foster specialization in the field of Renewable Energy and offers four strands: Micro-Hydro, Solar, Hybrid Wind systems, and Biomass. Certificate 3 also offers an elective in Energy Efficiency whilst Certificate 4 offers an additional elective in Energy Management.

**Table 1** presents a summary of the priority training needs of the P-ACPs.



1. **Pacific Power Association & the Sustainable Energy Industry Development Project**

The objective of the PPA Sustainable Energy Industry Development Project (SEIDP) is to increase the data availability and enable power utilities of the Pacific Island Countries and Papua New Guinea (PNG) to enhance their ability to incorporate and manage renewable energy technologies and long-term disaster risk planning. The project is being implemented through the PPA. There are three components to the project;

1. The first component being the renewable energy resource mapping phase that is intended to carry out a resource-mapping assessment of solar and wind capacity across 10 PICs. Part of this particular component it is to enhance the awareness and knowledge of governments, utilities and the private sector about the resource potential for renewable technologies (solar and wind), and to provide governments with a spatial planning framework to guide investment in the RE sector.
2. The second component is the technical assistance that will entail implementing a program of activities designed to increase capacity within the utilities in 10 PICs and PNG in the following areas; a)planning for and management of the integration of variable RE in their systems, b) data collection and management, and c) knowledge - sharing across jurisdictions.
3. The third component is the project implementation support that is designed to enhance the PPA’s capacity for overall project coordination, management and monitoring. These activities include coordination, administration, technical operation, procurement, financial management (FM), environmental and social management, gender action plan implementation, monitoring and evaluation (M&E), and reporting.

Very briefly in terms of status, a component of the project involves the updating of the solar standards / guidelines for the Pacific Islands and also the establishment of another 13 standards to the existing five standards that have been established through the PPA. As part of this exercise the Secretariat has been requested to take the standards right down to the countries to facilitate endorsement at the national level. The consultant implementing this component of the project has been hosting workshops in 11 countries for the past months. The training agenda has focused on the following guidelines;

* 1. Operation and Maintenance of PV Systems (Grid connect)
1. Utility Scale Energy Storage
2. Design of Grid Connected PV Systems
3. Installation of Grid Connected PV Systems
4. Design of Off Grid PV Systems- including session on design of Hybrid Systems
5. Installation of Off Grid PV Systems- including a session on Hybrid Systems

The abovementioned training under the SEIDP component of the SEIDP will be completed in early December 2018, where it will be coming to an end in Tonga.

1. **ENERGY SITUATION IN THE PACIFIC**

The PICTs faces interrelated challenges of fossil-fuel dependence, climate change and physical geography, which affect their energy security and contribute to the region’s economic and social challenges. This trio of factors exerts significant impact in terms of the affordability, availability and reliability of energy supplies. Access to reliable and affordable modern energy remains a central challenge to approximately 10 million inhabitants in the PICTs. These unique geographical characteristics, where long distances separate sparsely populated areas or markets are too small to achieve cost savings through economies of scale in electricity production that result in high costs of supplying electricity, both for urban and rural areas. **Table 2** below outlines the estimation in terms of population, land area and the GDP Per Capital for the 22 PICTs.

Table 2: PICTs’ Population, Land Area and GDP Per Capita[[1]](#footnote-1)

| PICT | Population (2011) | Land area km2 | GDP per capita (US$) |
| --- | --- | --- | --- |
| Cook Islands |  15, 576  |  237  |  11, 917  |
| Fiji |  851, 745  |  18, 273  |  3, 472  |
| Kiribati |  102, 697  |  811  |  1, 664  |
| RMI |  54, 999  |  181  |  3, 130  |
| FSM |  10, 236  |  701  |  2, 889  |
| Nauru |  10, 185  |  21  |  7, 121  |
| Palau |  20, 643  |  444  |  10, 692  |
| PNG |  6,888, 297  |  46, 284  |  2, 700  |
| Samoa |  183, 617  |  2, 785  |  3, 706  |
| Solomon Islands |  553, 254  |  30, 407  |  1, 181  |
| Tonga |  103, 682  |  650  |  4, 394  |
| Tuvalu |  11, 206  |  26  |  4, 002  |
| Vanuatu |  251, 784  |  12, 281  |  3, 022  |
| American Samoa |  66, 692  |  199  |  7, 874  |
| Guam |  19, 209  |  541  |  23, 134  |
| Niue |  1, 446  |  259  |  11, 985  |
| Northern Mariana Isl. |  63, 517  |  457  |  16, 494  |
| New Caledonia |  252, 331  |  18, 576  |  37, 993  |
| French Polynesia |  271, 831  |  3, 521  |  21, 071  |
| Wallis & Futuna |  13, 193  |  142  |  1, 264  |
| Total |  **9, 746, 140**  |  **136, 796**  |  |

In addition, on average, 55% of electricity produced in the region is generated from fossil fuels and about 40% from hydropower. As in most small island states, the PICTs are vulnerable to the volatile prices of global oil markets due to their almost exclusively dependence on imported refined oil products to meet their power generation and transportation energy needs. As a result of this dependence, a good proportion of the individual countries foreign exchange reserves are spent on fossil-fuels; this is an unsustainable situation in a region where only PNG is an oil producer. Moreover, the reliance on diesel power plants also results in high electricity tariffs for consumers. PPA reported that in 2010 the region’s utilities had consumer electricity tariffs that averaged between USD 0.39 and 0.44/kWh, respectively, for household (<200 kWh/month) and commercial (<500 kWh/month) users[[2]](#footnote-2).

Hydropower is concentrated in Fiji, French Polynesia, New Caledonia, Samoa and PNG and statistically the four countries constitute about 85% of the total population in the region. Notwithstanding the above, electrification rates vary a great deal, PNG for instance with a population of about seven (7) Million, has an electrification rate of only 20%, the Republic of Vanuatu is sitting at around 25% and the Solomon Islands at 20%. With the situation the average electrification levels in the region is still at around a total of 70% of the population or close to 7 million people that do not have access to electricity in the PICTs[[3]](#footnote-3). Notwithstanding the above, it has been observed that most of the small island nations within the PICTs have done well in this regard and have edged close to the 100% electrification rate.

Climate change is another concern on the energy agenda of the PICTs. The region is only responsible for less than the 0.1% of global energy-related GHG emissions. Its impacts such as rising sea levels, changes in rainfall patterns and extreme weather events will further challenge the energy security of PICTs. The Climate change resilience of energy infrastructure becomes an important aspect of energy planning, maintenance, repair and replacement. The switch to renewable energy and increased energy independence, to adapt and to mitigate climate change and also to provide greater economic stability within PICTs is important. With the above situation, the investments made into various renewable energy technologies should now consider the changing weather patterns due to the effects of climate change. In the case of small hydropower, this means the effect on water availability particularly during the dry season is also an important issue for consideration.

Although efforts are being made, there is still a strong need to scale up the renewable energy and energy development across the region. In this sense the PCREEE will have a pivotal role, as through its activities in the areas of capacity development, knowledge management, awareness raising, as well as business and investment promotion, it will considerably improve the environment to allow the development of further projects.

In contrast to other ongoing initiatives, the Centre will address RE & EE holistically but would ensure a prioritized implementation that will result in the widespread realization of high impact benefits in the countries. Experience in the region has shown that a regional or multi-country approach is generally more cost-effective than national efforts for a wide energy sector assistance. A common market-place with certain guarantees will help to attract the awareness of potential public and private investors. Regional cooperation can also facilitate the expansion of sustainable energy markets while adding value, businesses and jobs for the region.

1. **STATUS OF SUSTAINABLE ENERGY IN THE PICTS**

The assessment of the energy sector baseline situation revealed that PICTs have made considerable progress in the creation of enabling national environments for the promotion of Sustainable Energy or RE&EE. Many countries have adopted specific targets which are further outlined in the table below. However, in some PICTs the developments and the implementation of commitments are still in the initial stage and have not transformed into real investments and the creation of a vibrant markets and business sectors. The areas of small and medium-sized grid-connected RE plants, decentralised renewable energy solutions for rural areas and households (e.g. cooking, mini-grids, stand-alone systems, hot water heating) as well as energy efficiency improvements in different sectors (e.g. buildings, grid losses, appliances, industry) need a further boost.

Table 3: Targets for renewable energy and emission reductions in some of the PICTs

| **No.** | **Country** | **Targets for renewable energy and emission reductions** |
| --- | --- | --- |
| 1. | CookIslands | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**50% of inhabited islands electricity needs to be provided by renewable energy in 2015, and 100% by 2020, through implementing the Cook Islands Renewables Energy Chart with key strategies that:1. Ensure the use of proven renewable electricity technology options2. Ensure the policy and regulatory environment is aligned with the 50% by 2015 and 100% by 2020 renewable energy goal3. Ensure ongoing education, awareness and advocacy for renewable energy and energy efficiency4. Strengthen the required capacity to implement the Cook Islands renewable energy targets |
| 2. | Fiji | **Fiji’s NDC and Energy Policy****Target 1**: To reduce 30% of BAU CO2 emissions from the energy sector by 2030.**Target 2**: As a contribution to Target 1, to reach close to 100% renewable energy power generation (grid-connected) by 2030, thus reducing an expected 20% of energy sector CO2 emissions under a BAU scenario.**Target 3**: As a contribution to Target 1, to reduce energy sector CO2 emissions by 10% through energy efficiency improvements economy wide, implicitly in the transport, industry, and electricity demand-side sub-sectors. **Fiji’s Energy Policy outlines the following commitments;**1. Percentage of population with electricity access 100% by 2030.
2. Energy Intensity (power consumption per unit of GDP in kWh/FJD to improve by 0.077 by 2030.
3. Renewable Energy share in electricity generation: 100% by 2030.
4. Renewable energy share in Total Energy Consumption to be 23% by 2030
 |
| 3. | FederatedStates ofMicronesia | **FSM Strategic Development Plan (2004-2013)**Decrease the import and use of imported petroleum fuels by 50% by 2020.10% of electricity in urban centres and 50% in rural areas will be generated using renewable energy sources by 2020.FSM will have a net gain of area covered by forests between now and 2020.FSM will have a net gain of area and health status of coral reefs between now and 2020FSM will remain a net importer of GHG through 2020. |
| 4. | Kiribati | Fuel reduction target for electricity generation in Kiribati by 2025:1. South Tarawa: 45%2. Kiritimati: 60%3. Rural public infrastructure: 60%4. Rural public and private institutions: 100% |
| 5. | Nauru | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**50% of electricity generation to be provided by renewable energy by 2020. |
| 6. | Niue | 100 % of electricity generation from renewables by 2020. |
| 7. | Palau | **Palau Strategic Action Plan Energy Sector**20% contribution of renewable energy to the energy mix by 2020.30% reduction in energy consumption though energy efficiency and conservation |
| 8. | PapuaNewGuinea | **UN Document FCCC/AWGLCA/2011/INF.1**Decrease GHG emissions at least 50% before 2030 while becoming carbon neutral before 2050. |
| 9. | RMI | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**Pursuant to the Republic of Marshall Islands 2009 National Energy Policy and Energy Action Plan, the 2011 National Climate Change Policy Framework and Joint National Action Plan (for climate change adaptation, energy security and disaster risk reduction), and the Green Energy Micronesia initiative:1. A 40% reduction in CO2 emissions below 2009 levels by 2020;2. Electrification of 100% of urban households and 95% of rural outer atoll households by 2015;3. The provision of 20% of energy through indigenous renewable resources by 2020;4. Improved efficiency of energy use in 50% of households and businesses, and 75% of government buildings by 2020;5. A 20% efficiency improvement in transportation sector fuel use by 2020;6. Feasibility studies and internationally supported financing plans for innovative ‘game-changing’ renewable energy and sustainable development opportunities including Majuro atoll waste-to-energy and Kwajalein/Ebeye atoll OTEC plants undertaken by 201540% reduction of CO2 emissions below 2009 levels by 2020, pursuant to the 2009 National Energy Policy and Energy Action Plan, and with subject to the provision of adequate international support. |
| 10. | Samoa | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**1. To reduce the growth rate in the volume of imported fossil fuels by 10% by 2016. The high level indicators for this overarching goal/objective are:a. Energy Sector Plan launched and implemented with at least 75% of targets achieved by 2016;b. Increase in the contribution of RE to total energy consumption by 10% by 2016;c. Increase in the supply of RE for energy services by 10% by 2016;2. Increase Public and Private investment on Renewable Energy in transport fuels and electricity generation.3. Energy regulatory function established. |
| 11. | SolomonIslands | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**1. Replace current use of imported fossil fuel for electricity generation by 100% by Year 20302. Increase access to reliable, affordable and stable electricity grid by 50% from thecurrent 12% by Year 20303. Reduce the price of electricity by half the present tariff rate by 20204. Increase access to Solar-Home-Systems by remote rural dwellers located far from electricity grid from current 8.7% to 30% by Year 2020. |
| 12. | Tonga | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**1. To reduce Tonga’s greenhouse gas emissions and improve energy security through 50% renewable energy mix in the Energy Transformation (TERM) sector by the end of the Tonga Energy Roadmap 2010-2020 implementation period.2. To improve efficiency of electricity supply and demand sides by 18% by the end of the TERM implementation period.3. All Tongans shall access to clean, reliable and affordable energy services by the end of TERM implementation period. Establish phased, comprehensive set of actionplans to put in place a long-term institutional arrangement, which provides strong leadership and coordination of energy sector activities. |
| 13. | Tuvalu | **Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States**1. Power Generation – 100% renewable energy between 2013 and 20202. Implementation Principles- Solar PV 60 – 95% of demand- Wind 0 – 40% of demand (if feasible)- Biodiesel 5% of demand (import)Energy Efficiency – improvements of 30% of current annual demand of Funafuti. |
| 14. | Vanuatu | 100% of energy from renewables with the following milestones:40% of power generation through renewables by 201565% of power generation through renewables by 2020 |

Notwithstanding the above commitments, there still exists a broad range of barriers that need to be addressed, in order to take full advantage of RE&EE potentials. While the potential for resources such as wind, solar, hydropower, biomass and geothermal energy is considered high, the PICTs face significant barriers for the development of commercially driven and sustainable energy markets. The lack of appropriate policies, capacities, knowledge, finance and the respective business environment are constraints that restrict the dissemination of RE&EE technologies and services. Apart from large hydropower, so far only a small fraction of the grid-connected electricity produced is from renewable sources such as PV, wind and biomass/biofuels including hybrid systems. The off-grid and decentralized sector particularly in rural areas (e.g. mini-grids, stand-alone systems) remains underdeveloped in the PICTs with significant rural populations.

In terms of the private sector, PPA and IPPs, please find attached a PRIF report on the 3rd Investment Forum

1. **SUSTAINABLE ENERGY (RE & EE) BARRIER ANALYSIS & CATEGORISATION**

To identify the capacity needs of the Centre, a survey was earlier undertaken as part of a needs assessment for its establishment. The survey was undertaken amongst RE&EE stakeholders in PICTs to ascertain, priority activities and issues that should be addressed by the Centre in the PICTs. The project team consisted of local consultants with an excellent regional understanding of the RE&EE market in the Pacific. As mentioned above, the needs assessment has been undertaken in collaboration with government institutions, the private sector, training and research institutions and the donor community.

In terms of the identified barriers they were categorized into 4 main groupings;

1. Specific Barriers for Renewable Energy,
2. Specific Barriers for Energy Efficiency;
3. General Regional Barriers and
4. Barriers Faced by Local Businesses.

The list of identified barriers is attached as **Annex 3**.

1. **Barrier Analysis**

An assessment of the identified barriers was undertaken and the following were identified in terms of categorization through the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **NO.** | **Barrier Classification** | **IDENTIFIED BARRIERS (REGIONAL)** | **Total** |
| **Renewable Energy Barriers** | **Energy Efficiency Barriers** | **General Regional Barriers** | **Local Business Barriers** |  |
| 1. | Capacity, Capabilities & Knowledge | 5 | 5 | 5 | 3 | 18 |
| 2. | Investment Issues | 6 | 1 | 3 | 1 | 11 |
| 3. | Government Policies & Targets | 5 | 1 | Nil | Nil | 6 |
| 4. | Legislations & Regulations | 4 | 2 | Nil | Nil | 6 |

**NB.** Please refer to **Annex 2** on the catergorisation of each barrier.

In terms of barrier analysis the table tries to capture the most prevalent or common occurring barrier that were affecting or was found to be an obstacle in the adoption of RE&EE in the PICTs. The barriers were categorized and listed in terms of prevalence;

1. Capacity, Capabilities and Knowledge Issues,
2. Investment Issues,
3. Govt Policy & Targets and
4. Legislations & Regulations.

Out of the four (4) different barriers acknowledged that the lack of “Capacity, Capabilities and Knowledge” as the most prevalent in the region, this was followed by the “Investment related Issues”, the “Government Policies and Targets” and the “Legislations & Regulations” that prevailed in the PICTs. The “Capacity, Capabilities and Knowledge” basically refers to the energy institutions in the countries, its ability to respond to the inherent tasks and its familiarity or lack thereof in terms know-how on the **level** of skills and tasks and the experience therein. In terms of “Government Policies and Targets” and “Legislations and Regulations”, it was basically the **level** in terms of the presence or existence of these instruments including those directly related to the technologies and also regarding Independent Power Producers and Feed-in-Tariffs. In addition the presence and level of biased subsidies on fossil fuels were also identified in the countries as shortcomings in terms of investment in renewable energy and energy efficiency.

Despite the potential contribution of RE&EE technologies and services to resolving some of the energy challenges in the region, markets for these technologies remain largely underdeveloped. It is important to note that the CBFS 2019 – 2021 that is being formulated is only for first 3 – 4 years of the Centre (First Operational Phase) at the conclusion of this time period there will perhaps new barriers that will need to be also considered as part of the current matrix and programme and activities that are not fully implemented will be carried over to the next period.

1. **Categorization of Barriers (Short & Medium Term Interventions)**

In terms of categorization of barriers, the consideration was on the urgency in terms of implementation of actions to address the barriers and also in terms of its impacts or the realization of the benefits as a result of implementing those actions.

**Annex 3** outlines specific barriers that have been extracted from the list of barriers and can be implemented in terms of “***Short - Medium***” interventions for the Centre and also has been incorporated as part of Capacity Building Strategy Framework.

1. **IDENTIFIED KEY STAKEHOLDERS**

The different stakeholders and beneficiaries for the Centre consist primarily of entities listed below;

1. Energy Planners
2. Energy Regulators
3. Utility Companies
4. Electrical Contractors
5. RE & EE Contractors
6. Financing Institutions
7. Development Partners
8. RE & EE Equipment Suppliers
9. Energy Entrepreneurs
10. IPPs / Domestic IPPs
11. Energy Training Providers
12. Youths / Students / Women in Energy
13. Consumers (Greater Population)

The main stakeholders are further regrouped on the table outlined below;

|  |  |  |
| --- | --- | --- |
| **NO.** | **STAKEHOLDERS** | **COMMON GROUPING** |
| 1. | Energy Regulators (FCCC, URA – Vanuatu, ICCC - PNG etc.) | Regulators |
| 2. | NFIs, Energy Officers, Energy Policy makers & those within the sector and from other sectors within Government (Agriculture, Tourism and Climate Change) | Government |
| 3. | Utilities (Dominant Utility and smaller or utilities operating in rural areas) | Utilities |
| 4. | Electrical Companies, RE & EE Contractors, RE & EE Equipment Suppliers, Energy Entrepreneurs  | Private Sector |
| 5. | Independent Power Producers (IPPs) & Domestic IPPs | IPPs |
| 6. | Training Providers Local & Overseas  | Training Institutions |
| 7. | Consumers including Gender (Women, Student Youths & Children) | Consumers |
| 8. | Financing Institutions & Development Partners | Financing Entities |

* 1. **Capacity Building for Stakeholders undertaken by the Centre since its establishment.**

Since its establishment the Centre has been involved in a number of training intended to strengthen SE capacity in the PICTs. Apart from the workshops the Centre have also developed 3 initiatives that are also discussed below;

1. **Promoting Sustainable Energy Entrepreneurship in the PICTs**

The workshop was one of the initial workshops undertaken by the Centre in October 2017. The participants for this particular workshop were the private sectors present in SE entrepreneurship in the region. Its intention was largely to take stock of private sector involved in this area of business in the PICTs and particularly learning from those that have made headway in the region. The exchange was intended to open up ideas and hopefully other potential business opportunities in the countries.

In addition it was also intended to showcase successful entrepreneurship on the ground – financial and technical business management practices, technical innovation and so forth. Further, it was also meant to motivate participants to see the business opportunities in their respective countries and commit themselves as a key driver of sustainable energy in their respective countries. Specific details on the training can be obtained from; <https://www.pcreee.org/event/promoting-sustainable-energy-entrepreneurship-picts-south-south-capacity-building-exchange>

1. **Framework for supporting RE and EE capacity of the business and industry sector**

The Centre together with the Ministry of Mines, Energy and Rural Electrification (MERE), the Solomon Islands Chamber of Commerce (CC) and the Department of Climate Change conducted a training workshop on Private Sector Businesses Development in the field of SE in Honiara on the 1st – 3rd of May 2018. The workshop, among other things, focused on supporting the private sector, groups and individuals who would benefit from the fast growing business opportunities in the areas of RE and EE.

The objectives of the workshop were as follows;

1. Promote entrepreneurship and private sector investment and job creation in sustainable energy.
2. Enhancing opportunities for private sector collaboration, and
3. Raising the awareness about the business opportunities in the Solomon Islands energy sector.

In terms of the programme, the various economic sectors in the SI were requested to present on the developments and future of the sector. In addition the banks and other supporting entities in the SI were also requested to discuss the opportunities inherent in the sector. Specific details can be obtained from the PCREEE Website; <https://www.pcreee.org/event/pcreee-workshop-private-sector-business-development-renewable-energy-and-energy-efficiency>

1. **Regional Workshop on Power Purchase Agreements**

The Centre was established as a vehicle for accelerating progress by empowering the private sector and the business community. This vision was further entrenched with the PICTs adopting a 100% RE for the region. With the vision a lot of projects had been funded through grant aid however, there was always a growing interest on commercial arrangements involving the private sector, thus the need for the Power Purchase Agreement (PPA) training.

A PPA is an effective tool for attracting private sector investments. It gives all parties concerned confidence of a win-win-win arrangement based on agreed terms and conditions. PPAs are fairly new in the PICTs and there is only a few that are in operation in the region. Agencies have learnt by actually adopting and implementing it and there is a lot to be learnt and shared on PPAs. There is a need to urgently master the key tools, models, and lessons learnt for transforming and strengthening today’s energy sector. They need to familiarize themselves with the latest models in negotiating PPAs, in designing and managing a power market with increasing number of independent power producers, as well as attracting the right mix of renewable energy sources. The above was central to the workshop on the Regional Workshop on PPA conducted by the Centre, in Auckland, NZ.

The objectives of the workshop were to enable participants to successful structure PPAs, to manage competition in the electricity market and attract power sector investments and to provide inputs to the drafting of a PPA template for the Pacific Islands. Specific details can be found on the PCREEE Website; <https://www.pcreee.org/event/regional-workshop-power-puchase-agreements>

1. **Promoting Entrepreneurship in RE & EE for Youths (PERE4Y) in the Pacific**

This particular workshop was conducted in collaboration with the Global Green Growth (GGGI) Greenpreneurship Week – Jump Start Your Business in three (3) countries in the region namely; Fiji, Vanuatu and Kiribati. For PCREEE the outcome of the workshop essentially asserts the need to have strengthened capacities of stakeholders and increased RE & EE business opportunities for local companies through regional investment promotion programmes and tailored financial schemes.

The workshop had targeted the Youths and new businesses in the countries. It is estimated that Youths make up more than half of the population of the PICTs. Youths are not only energy customers / consumers they are also future entrepreneurs and employees too. With the informal partnership with the youths it is hoped that the PERE4Y will generate additional RE & EE investments in the PICTs and similarly result in the creation and engagement of more youths in “Green Jobs” in the region. The objectives of the workshop were essentially to;

1. Raise the awareness in Youths about the business and employment opportunities in the local energy sector;
2. Introducing youths to the requirements for business registration (taxes and other legal requirements) and job applications;
3. Raising awareness about the Training and Support opportunities that are available to Youths and
4. Introducing Youths to experiences from the ground and doing business on the internet and social media

Apart from the GGGI, the other partners included; the Green Business Centre of the Pacific Islands Development Forum (PIDF) and also national stakeholders (Ministry of Energy, Ministry of Climate Change and the Ministry of Youth and the Chamber of Commerce) in the three (3) countries.

In addition, as part of the programme the PCREEE will also be announcing and promoting its; i) PCREEE Sustainable Energy Research Fund (PSERF), ii) PCREEE Renewable Energy & Energy Efficiency Innovative Competition (PREEEIC) and iii) the PCREEE Sustainable Energy Entrepreneurship Facility (PSEEF) all of which would benefit youths in the PICTs.

Additional details on the training can be obtained on the following links;

* 1. Fiji:<https://www.pcreee.org/event/fijis-greenpreneurs-week-pcreee-gggi-joint-entrepreneurship-workshop>.
	2. Vanuatu:<https://www.pcreee.org/event/vanuatus-greenpreneurs-week-pcreee-gggi-joint-entrepreneurship-workshop>
	3. Kiribati: <https://www.pcreee.org/event/kiribatis-greenpreneurs-week-pcreee-gggi-joint-entrepreneurship-workshop>
1. **PCREEE Initiatives for Students and Small, Micro & Medium Enterprises**

Apart from the mainstream training, the PCREEE have also developed and promoted three initiatives for students and also those in the private sector. The initiatives include the following;

* 1. **PCREEE Competition on Renewable Energy & Energy Efficiency**

The particular competition aims to capture innovation in renewable energy and energy efficiency and to let the world know the efforts of the private sector and students to support energy development in the Pacific. Further details can be obtained from the following links; <https://www.pcreee.org/content/pcreee-competition-renewable-energy-energy-efficiency-innovation>

* 1. **PCREEE Sustainable Energy Entrepreneurship Facility (PSEEF)**

As a regional vehicle, PCREEE with its special focus on empowering the private sector, the PSEEF is aimed at supporting the private sector businesses in the region. The objective of the facility is to increase SE businesses in the region. The facility provides grants on a co-financing basis of up to 20% on investments in SE. More information can be obtained from the following links; <https://www.pcreee.org/content/pcreee-sustainable-energy-entrepreneurship-facility-pseef>

* 1. **PCREEE Sustainable Energy Research Support Fund (PSERSF)**

One of the outcomes of the Centre is the “Strengthening of the Capacities of the local industry and business sector and replication of certified training and applied research programs. The PSERSF intends to support and assist students in tertiary institutions intending to take part in terms of research to into SE. More information is available on the following links; <https://www.pcreee.org/content/pcreee-sustainable-energy-research-support-fund>

1. **MATRIX & PLANNED ACTIVITIES OR CAPACITY BUILDING STRATEGIES**

Meanwhile outlined below the initial matrix that provides an outlook on tentative outputs and activities envisaged under the outcomes of the Center. The activities focus primarily on Outcome 2 & 3 that specifically deals with Capacity Building and Awareness for the Centre. The activities are based on the gap analysis made under the abovementioned needs assessment that was undertaken for the establishment of the Centre.

1. **Outcome 2: Strengthened capacities of local key institutions and stakeholder groups through the up-scaling and replication of certified training and applied research programs and mechanisms**
2. Output 2.1 : A multi-year framework to strengthen the local RE&EE capacities of key institutions and stakeholder groups is developed, adopted and under implementation

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| --- |
| **Output 2.1**  |
| **Activities** | **Responsibility** |
| 2.1.1 Conduct a regional capacity needs assessment particularly reflecting the needs of the governments and local technology industry and business using existing studies and in cooperation with the NFIs. | PCREEE |
| 2.1.2 Develop a regional multi-year capacity development strategy particularly reflecting the needs of local public and private stakeholders (to be done in combination with activity 4.2.1 under output 4.2) | PCREEE |
| 2.1.3 Produce tailored training and certification modules covering various RE&EE issues and tools in coordination with local business and industry groups (also in local language).  | PCREEE |
| 2.3.4 Training for Regulators / Government / Utilities / Private Sector / IPPs / Training Institutes / Financing Institutions on PPA’s with the intention for developing a region wide template that can be adopted in each country. The template can be adapted to the different countries if required. However it is to be pegged on the principle to ensure equitable sharing of costs and gains for the different stakeholders.  | PCREEE |
| 2.3.5 Training for Regulators / Government / Utilities / Private Sector / IPPs / Training Institutes / Financing Institutions on Feed In-tariffs and also on Net Metering with the principle to ensure equitable sharing of cost and gains for the different stakeholders.  | PCREEE |
| 2.3.6 Work with Governments in terms of their respective NDC’s and develop frameworks that will enable the implementation of activities pertaining to RE & EE. This will also take into account energy efficiency improvements (low hanging fruit) to be considered such as building codes and other energy efficiency activities.  | PCREEE |
| 2.3.7 Conduct regional capacity building for smaller island countries to focus on the removal of monopolies in the power sector and also the need to put in place a regulator (looking at multi-sector regulation).  | PCREEE |
| 1. Output 2.2 : Pacific certification / accreditation scheme for individuals, organisations and products is created (in collaboration with SEIAPI) and operational
 |
| **Output 2.2**  |
| **Activities** | **Responsibility** |
| 2.2.1 Act as the secretariat for developing the training competency standards on RE&EE which was already started by USP/SEIAPI  | PCREEE, USP |
| 2.2.2 Act as the body accrediting training Centres and certifying trainers | PCREEE, USP |
| 2.2.3 Act as the secretariat for co-coordinating installation and products standards/guidelines | PCREEE, USP |
| 1. Output 2.3 : Key stakeholders are trained by the certified trainers on RE&EE aspects of high relevance for the local business and industry sector
 |
| **Output 2.3**  |
| **Activities** | **Responsibility** |
| 2.3.1 Train key policy makers in sustainable energy policy planning and incentive mechanisms (including sustainable cooking and transport) | PCREEE |
| 2.3.2 Train utilities and regulators regarding RE integration/grid stability and energy efficiency (e.g. demand side management)  | PCREEE, PPA |
| 2.3.3 Provide targeted RE&EE business development training for clean-tech SMEs and entrepreneurs (e.g. energy auditors, equipment installers, RE service providers) | PCREEE, SEIAPI |
| 2.3.4 Increase the capacity of stakeholders to mainstream gender and climate resilience into RE&EE policies and projects  | PCREEE, SIDS DOCK |
| 2.3.5 Increase the capacity of technical private-sector experts and start-ups to develop, install and maintain RE&EE projects and systems (including training on climate resilient energy infrastructure).  | PCREEE, PFAN and others |
| 2.3.6 Train experts on the financial structuring, design and planning of RE&EE projects (e.g. climate finance, RETScreen, HOMER)  | PCREEE |
| 1. Output 2.4 : Applied science research networks and technology transfer with high relevance for the local business and industry sector are promoted
 |
| **Output 2.4**  |
| **Activities** | **Responsibility** |
| 2.4.1 Conduct a baseline study on the research priority needs of the Pacific RE&EE industry and business sectors | PCREEE, PFAN and others |
| 2.4.2 Create a regional incentive model for the establishment of regional research programmes with high relevance for the local industry (e.g. call for proposals) | PCREEE |
| 2.4.3 Promote south-south and north-south technology transfer programs and projects | PCREEE |

1. **Outcome 3: The awareness and knowledge base of local key institutions and stakeholder groups on RE&EE are strengthened**
2. Output 3.1 An effective online RE&EE information management system addressing the needs of investors, private sector and industry is created and operating

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| --- |
| **Output 3.1**  |
| **Activities** | **Responsibility** |
| 3.1.1 Contribute to the establishment of the interactive PCREEE website (www.pcreee.org) and link it to the Pacific Regional Data Repository for SE4ALL | PCREEE, SPC |
| 3.1.2 Compile an inventory of relevant experiences/projects and papers/study reports/research reports and documents on best practices, skills, know-how, knowledge, technology suppliers in each PICT (disseminated through the information system) | PCREEE |
| 3.1.3 Create a database of RE&EE stakeholders, including governments, training institutes, industry and NGO’s (to be disseminated through the information system) | PCREEE |
| 3.1.4 Develop guidelines on energy data verification, quality and harmonisation in cooperation with the NFIs | PCREEE |
| 3.1.5 Create a database of RE&EE standard investment opportunities for the region to facilitate matching available funds to real projects (particularly in alignment with the activities under outcome 4)  | PCREEE |
| 3.1.6 Produce and publish and RE&EE resource atlas and facilitate resource mapping in the PICTs (data to be disseminated through the information system) | PCREEE |
| 3.1.7 Map existing sustainable energy projects including their key information (manufacturer, installer, status of operation, generated energy, etc) and disseminate information through the information system | PCREEE |
| 1. Output 3.2 Awareness and knowledge base of key stakeholder groups on various RE&EE aspects are strengthened
 |
| **Output 3.2**  |
| **Activities** | **Responsibility** |
| 3.2.1 Organize at least one major annual conference on different RE&EE aspects  | PCREEE, SPC, SIDS DOCK, UNIDO  |
| 3.2.2 Contribute to the production a RE&EE Industry report in cooperation with REN-21 and link the Pacific to the Asia-Pacific portal as well as the global tracking framework to the SE4ALL initiative  | PCREEE, REN-21, SIDS DOCK |
| 3.2.3 Design and implement at least one regional RE&EE awareness campaign targeting the residential, commercial or industrial sectors | PCREEE |
| 3.2.4 Provides energy policy support to CROP agencies, especially to SPC, as well as Member States  | PCREEE |

1. **IMPLEMENTATION OF THE CAPACITY BUILDING STRATEGY & FRAMEWORK (2019 – 2021)**

The uniqueness in the construct of the Centre emanates from the establishment of the joint hosting of the Centre as the main hub and with the supporting spokes/thematic hubs hosted at the following regional organizations; the Pacific Islands Forum Secretariat (PIFs), the Pacific Power Association, the Secretariat of the Pacific Regional Environment Programme (SPREP) and the University of the South Pacific. The Centre reflects the principles of maximizing impact, avoiding the duplication of efforts and strengthening existing local capacities. It will develop and execute its activities through the network of Thematic Hubs (THs) and National Focal Institutions (NFIs) that are strategically positioned to deliver on the overall objective and mandate of the centre.

Notwithstanding the above, the Centre will also work in collaboration with other regional and international organisations in the promotion and delivery of its CBSF (2019 – 2021) in the PICTs.

Further apart to the above the Centre will also work together with the SPC and also in tandem with other entities to in terms of attracting funding for the implementation of the framework.

1. **CONCLUSION**

The outputs and activities that have been listed above portrays most if not all the urgent requirements or needs in terms or capacities enhancement required for the PCREEE and its stakeholders. The success in terms of implementation of the recommendations will also determine the rate in which the changes(adoption of RE & EE) takes place in the local and regional energy sector.

**ANNEX 1**

Outlined line below the different barriers that have been identified as part of the inception of the PCREEE. The Project Team had conducted a needs assessment among the RE&EE Stakeholders in the PICTs. The Team consisted of local consultants with understanding of the RE&EE in the region. They had also undertaken needs assessment for government institutions, the private sector, training and research institutions and the donor community.

In terms of the assessment, respondents were sent an email requesting their assistance in the survey along with a questionnaire. Telephone and in-person interviews were then conducted, with the outcome being registered by the project team. However the majority of the respondents had filled in and the sent their questionnaires by email.

The needs assessment conducted as part of the preparatory work for the Centre has identified the following barriers for sustainable energy (RE & EE) in the PICTs.

For information also indicated in blue are the various timelines or the level or urgency that is associated with the barrier. That is either it is **“short”, “Medium” or “Long Term”**. The **“short – medium”** term have been incorporated as part of the CBSF 2019 – 2012.

1. **Specific barriers for Renewable Energies**
2. Lack of firm plans and targets on RE&EE: Although 13 PICTs have specific targets for RE adoption and for rural electrification some lack technical studies, infrastructure and allocated budget for achieving the targets. Due to these factors some of the targets are likely not to be achieved. The current FAESP does not include explicit regional renewable energy and energy efficiency targets. That does not reflect the pro-active commitments of countries on national levels - **(Policy / Plans / Targets) & (S/M)**.
3. There is a lack of concrete follow-up measures to implement national policy commitments and targets (e.g. laws, standards, investment plans, incentive schemes, public procurement). This goes hand in hand with existing knowledge and capacity gaps concerning sustainable energy implementation. Regional RE&EE targets in the FAESP and a guided regional implementation process could help to facilitate the implementation of national commitments - **(Policies)** & **(S/M)**.
4. Existing RE support policies in many cases are considered as insufficient by the private sector. Project developers usually require financial support from bilateral and multilateral institutions, in the form of grants and concessional loans, to pass the different stages of project development. Moreover, often they do not consider energy efficiency improvement as a complementary activity – **(Policies) & (S/M)**.
5. Electricity generation sector is not attractive to Independent Power Producers: Governments have not been able to establish support schemes such as feed-in-tariffs to deem RE projects economically viable. There is also the particular case in Fiji where biomass power plants are not economically sustainable due to low tariffs combined with technical issues – **(Policies / Legislations / Regulations) & (S/M)**.
6. Monopoly by utilities: Utilities in the PICTs are vertically integrated (usual practice in small island states) combining generation, transmission and distribution, and frequently, also regulation. This can be seen as a conflict of interest especially by the utilities in terms of dealing with independent power producers – **(Legislations & Regulations) & (S/M)**.
7. Lack of technical capacity to formulate and enforce policies. Usually, the technical capacity in the Pacific islands is confined to the staff of the utilities. Governments and regulators often lack the resources to formulate consistent sustainable energy policies and regulations in line with the local environment and social aspects. This is frequently due to the limited number of persons in these institutions but also because of their technical skills – **(Policies & Regulations) & (M/L)**.
8. Low grid stability: The reliability of the PICTs power systems is low due to lack of investments in the generation, transmission and distribution networks. Adding intermittent sources of energy as is the case of the majority of RE sources such as solar and wind could contribute to further interruptions in the grid when the power plants are not able to meet the demand. As in many PICTs only intermittent RE sources are available an efficient interplay with the conventional production units is of high importance. The outdated diesel engines in some PICTs make that difficult - **(Investment) & (S/M)**.
9. Subsidies to fossil fuels: One of the key constraints to investments in renewable energy and energy efficiency is the biased subsidies to fossil fuels – **(Policies & Regulations) & (M/L)**.
10. Lack of trained O&M personnel to operate and maintain the power systems. This has caused that a significant number of RE projects (mostly PV) to stop operating - **(CCK) & (S/M)**.
11. Lack of RE resource assessments and feasibility studies. The potential for hydro, wind, biomass and tidal/wave energies in many PICTs is not entirely understood. Although some studies have already identified potential sites are identified, there was no follow up for conducting feasibility studies. This is the result of the lack of allocation of funds by governments and utilities, and the reduced technical capacity in the region to conduct these technical studies – **(CCK) & (M/L)**.
12. Apprehension in making new investments. The economic slowdown and the increase in frequency of extreme climate events (e.g. cyclones and floods), has led to business owners to hold back on potential RE&EE investments. This is the case in the hospitality industry that prefer not to install solar water heaters, an equipment which has usually very short payback times when electricity tariffs are as high as in the PICTs – **(Investment) & (S/M)**.
13. Land use/availability: Land in small islands is limited as its use is often sensitive. As most RE technologies require significant land usage, investors can be weary of projects that entail land acquisitions/lease – **(Investment) & (M/L)**.
14. Low electrification rates. Efforts to electrify peri-urban and rural areas, especially in PNG and Vanuatu, need to be significantly scaled-up in order to tackle their low electrification rates. Besides availability of finance, the main barrier is the lack of regulatory framework to allow private businesses such as RE services companies to operate in this market. It is also important to link these mechanisms with other access-to-energy programmes (e.g. rural electrification and efficient cooking stoves) **– (Investment & Regulations) (M/L)**.
15. Due to lack of knowledge and awareness, renewable energy technologies are still perceived as expensive although some are already cost-competitive when they compete with conventional alternatives under specific conditions. Moreover, decision makers often do not have the full understanding of the potential benefits of existing technologies - **(CCK) & (S/M / L)**.
16. Equipment not appropriate to local environment. The selection of system components often is based only in the price without taking into consideration the local environment conditions such as high temperatures, salinity and climatic variability found in PICTs. This leads to an increased risk of equipment failure and high maintenance costs – **(CCK) & (M/L)**.
17. Quality standards for renewable energy equipment are not existing or implemented sufficiently. Presence in the market of low quality equipment can lead to a negative uptake of RE technologies, and interviews in some PICTs confirm that this is the case. Consumers need to be educated regarding the options when purchasing equipment. It is also urgent to address waste management issues of the equipment when they reach the end of their life. There is a lack of certification of equipment such as the Lighting Africa programme from World Bank which tests and certifies off-grid lighting products. Failed demonstration projects lead to the perception that RE technologies are not reliable -**(CCK) & (S/M/L)**.
18. Stakeholders have also mentioned the lack of reliable and updated energy data. Renewable energy projects will often require information, which may not be readily available, including historic weather-related data such as sun radiation, wind speed, biomass availability and precipitation - **(CCK) & (S/M / L)**.
19. The up-front costs for RE tend to be high (but operational costs low) and there is a lack of tailored financial schemes for small scale to medium scale projects available. Another challenges is that most ongoing renewable energy investments are fully financed from outside. Systems tend to be fully (or over-) subsidised leading to a lack of ownership, especially in small scale projects. Markets cannot very well develop under these conditions – **(Investment) & (S/M/L)**.
20. **Specific barriers for energy efficiency**
21. Although energy efficiency is part of PICTs national energy policies and plans, there is often no clear responsibility within the government for developing and implementing EE efforts, no priorities and little or no budget support – (**Policy & Investment) & (S/M/L)**.
22. There are weak or no minimum energy performance standards for new buildings, building renovations, appliances, lights, air conditioning and refrigeration, vehicles, etc – **(CCK) & (M/L)**.
23. There is limited human and institutional capacity to carry out energy audits, provide energy efficiency training, help arranging the finance, guarantee results, etc – **(CCK) & (M/L)**.
24. Although energy efficiency improvements are often the “low hanging fruit” and cost-competitive they are not considered or there is lack of awareness options. For the business community, there are no guaranteed benefits for the costs incurred and sometimes a lack of trust in energy auditors, who may be linked to equipment suppliers. Renewable energy solutions are implemented without energy efficiency measures what leads to higher costs (e.g. change of light bulbs) - **(CCK) & (S/M/L)**.
25. Decisions (regarding appliance choice, new building design, vehicle purchases, etc.) tend to be made on the basis of initial cost, not operating or life-cycle costs - **(CCK) & (S/M/L)**.
26. There is no incentive or legal requirement for the power utilities to provide energy efficiency services and usually little or no capacity to do so. They tend to concentrate on expanding supply and distribution. The area of commercial losses is not very well managed - **(CCK) & (M/L)**.
27. In much of the Pacific, power tariffs (at least for households) have traditionally been lower than actual costs of supply, encouraging waste in the use of electricity - **(CK & Investment) & (M/L)**.
28. Utility short-to-medium term planning (often donor supported) largely ignores demand-side (end-use) efficiency opportunities and seldom if ever considers end-use efficiency as an alternative to new generation - **(CCK) & (M/L)**.
29. **General Regional Barriers**

1. Small market size does not allow economies of scale especially among the smaller PICTs – **(Markets) & (M/L)**
2. Distance between islands and from manufacturers significantly increase the cost of equipment and spare parts. Moreover, this is further exacerbated by the small size of the local markets – **(Markets) & (M/L)**.
3. Staff turnover tend to be high in governments and developing partners. This tends to result in complications in the implementation of projects and programmes. Brain drain in the energy sector is a general challenge - **(CCK) & (M/L)** .
4. The distinct geographical, environmental, cultural and social aspects in the region difficult the creation of one-size fits all approach. This is an issue when developing capacity building activities and selecting appropriate technologies and business models for different islands - **(CCK) & (M/L)**.
5. Lack of continuity and planning of capacity building, awareness raising and investment promotion activities in the sustainable energy sector combined with the fact that most of them are led by external organisations. This leads to the wheel being reinvented several times, efficient use of resources and demotivation by regional institutions and individuals who feel that their views and needs are not addressed - **(CCK) & (M/L)**.
6. Some sustainable energy areas such as transport, cooking, solar thermal heating and cooling or energy storage systems are not very well integrated in regional activities. Particularly transport would be a high impact area as it consumes most of the energy in PICTs. The area of sustainable cooking is a high priority area with high expected impacts for the population in PICTs - **(CCK) & (M/L)**.
7. Gender and climate change resilience of energy infrastructure are not well integrated in the energy sector planning and policy in PICTs. This leads to the situation that the needs of women are not well addressed - **(CCK) & (M/L)**.
8. **Barriers Faced by Local Businesses**
9. Local businesses, especially suppliers and installers of RE&EE equipment are generally not benefiting from donor funded projects. This is mostly due to the size of the projects which tend to be of a scale not appropriate to the capacity of local companies. Also, external companies tend to be able to offer significantly cheaper prices as they are able to buy bulk quantities - **(CCK) & (M/L)**.
10. Lack of technical capacity of local staff. Local companies tend to be set-up by self-taught individuals who then have to train their own staff as the know-how is not present in the labour market. They also face difficulties when trying to approach new markets/technologies as there is limited experience in the region or the experience/lessons learned have not been disseminated (e.g. setting-up renewable energy service companies). During the needs assessment it was also mentioned that installation manuals and training materials are often not available in local languages - **(CCK) & (M/L)**.
11. Equipment and technologies are not appropriate to the market environment. Due to the small size of the market, there is a lack of options to answer the needs of users, especially for pico and micro applications - **(CCK) & (M/L)**.

**ANNEX 2**

**IDENTIFIED BARRIERS REQUIRING SHORT - MEDIUM TERM INTERVENTIONS**

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| --- | --- | --- |
| **NO.**  | **BARRIERS****(Short – Medium Term Interventions)** | **Actual Nos.** |
| 1. | Lack of firm plans and targets on RE&EE: Although 13 PICTs have specific targets for RE adoption and for rural electrification some lack technical studies, infrastructure and allocated budget for achieving the targets. Due to these factors some of the targets are likely not to be achieved. The current FAESP does not include explicit regional renewable energy and energy efficiency targets. That does not reflect the pro-active commitments of countries on national levels - **(Policy / Plans / Targets) & (S/M)**. | 1. |
| 2. | There is a lack of concrete follow-up measures to implement national policy commitments and targets (e.g. laws, standards, investment plans, incentive schemes, public procurement). This goes hand in hand with existing knowledge and capacity gaps concerning sustainable energy implementation. Regional RE&EE targets in the FAESP and a guided regional implementation process could help to facilitate the implementation of national commitments - **(Policies)** & **(S/M)**. | 2. |
| 3. | Existing RE support policies in many cases are considered as insufficient by the private sector. Project developers usually require financial support from bilateral and multilateral institutions, in the form of grants and concessional loans, to pass the different stages of project development. Moreover, often they do not consider energy efficiency improvement as a complementary activity – **(Policies) & (S/M)**. | 3. |
| 4. | Electricity generation sector is not attractive to Independent Power Producers: Governments have not been able to establish support schemes such as feed-in-tariffs to deem RE projects economically viable. There is also the particular case in Fiji where biomass power plants are not economically sustainable due to low tariffs combined with technical issues – **(Policies / Legislations / Regulations) & (S/M)**. | 4. |
| 5. | Monopoly by utilities: Utilities in the PICTs are vertically integrated (usual practice in small island states) combining generation, transmission and distribution, and frequently, also regulation. This can be seen as a conflict of interest especially by the utilities in terms of dealing with independent power producers – **(Legislations & Regulations) & (S/M)**. | 5. |
| 6. | Low grid stability: The reliability of the PICTs power systems is low due to lack of investments in the generation, transmission and distribution networks. Adding intermittent sources of energy as is the case of the majority of RE sources such as solar and wind could contribute to further interruptions in the grid when the power plants are not able to meet the demand. As in many PICTs only intermittent RE sources are available an efficient interplay with the conventional production units is of high importance. The outdated diesel engines in some PICTs make that difficult - **(Investment) & (S/M)**. | 7. |
| 7. | Lack of trained O&M personnel to operate and maintain the power systems. This has caused that a significant number of RE projects (mostly PV) to stop operating - **(CCK) & (S/M)**.  | 9. |
| 8. | Apprehension in making new investments. The economic slowdown and the increase in frequency of extreme climate events (e.g. cyclones and floods), has led to business owners to hold back on potential RE&EE investments. This is the case in the hospitality industry that prefer not to install solar water heaters, an equipment which has usually very short payback times when electricity tariffs are as high as in the PICTs – **(Investment) & (S/M)**.  | 11. |
| 9. | Due to lack of knowledge and awareness, renewable energy technologies are still perceived as expensive although some are already cost-competitive when they compete with conventional alternatives under specific conditions. Moreover, decision makers often do not have the full understanding of the potential benefits of existing technologies - **(CCK) & (S/M / L)**. | 14. |
| 10. | Quality standards for renewable energy equipment are not existing or implemented sufficiently. Presence in the market of low quality equipment can lead to a negative uptake of RE technologies, and interviews in some PICTs confirm that this is the case. Consumers need to be educated regarding the options when purchasing equipment. It is also urgent to address waste management issues of the equipment when they reach the end of their life. There is a lack of certification of equipment such as the Lighting Africa programme from World Bank which tests and certifies off-grid lighting products. Failed demonstration projects lead to the perception that RE technologies are not reliable -**(CCK) & (S/M/L)**.  | 16. |
| 11. | Stakeholders have also mentioned the lack of reliable and updated energy data. Renewable energy projects will often require information, which may not be readily available, including historic weather-related data such as sun radiation, wind speed, biomass availability and precipitation - **(CCK) & (S/M / L)**.  | 17. |
| 12. | The up-front costs for RE tend to be high (but operational costs low) and there is a lack of tailored financial schemes for small scale to medium scale projects available. Another challenges is that most ongoing renewable energy investments are fully financed from outside. Systems tend to be fully (or over-) subsidised leading to lack of ownership, especially in small scale projects. Markets cannot very well develop under these conditions. | 18. |
| 13. | Although energy efficiency is part of PICTs national energy policies and plans, there is often no clear responsibility within the government for developing and implementing EE efforts, no priorities and little or no budget support – (**Policy & Investment) & (S/M/L)**. | 19. |
| 14. | Although energy efficiency improvements are often the “low hanging fruit” and cost-competitive they are not considered or there is lack of awareness options. For the business community, there are no guaranteed benefits for the costs incurred and sometimes a lack of trust in energy auditors, who may be linked to equipment suppliers. Renewable energy solutions are implemented without energy efficiency measures what leads to higher costs (e.g. change of light bulbs) - **(CCK) & (S/M/L)**.  | 22. |
| 15. | Decisions (regarding appliance choice, new building design, vehicle purchases, etc.) tend to be made on the basis of initial cost, not operating or life-cycle costs - **(CCK) & (S/M/L)**. | 23. |

**END**

1. Benchmarking Report, 2012, PPA [↑](#footnote-ref-1)
2. Pacific Power Utilities: Benchmarking report 2012 (PPA, 2013) [↑](#footnote-ref-2)
3. PPA, Project Brief - SEIDP, PPA, 2018, <https://www.ppa.org.fj/seidp-background/> [↑](#footnote-ref-3)