

Concept Note

Project/Programme Title: Renewable Energy Mini-Grid Programme for the Pacific Island Countries and Territories (REMPP)

Country(ies): Multiple Countries in Pacific Island Countries and Territories

National Designated Authority(ies) (NDA): NDAs designated on the GCF website

Accredited Entity(ies) (AE): AE (e.g. ADB) _

Date of first submission/
version number: [YYYY-MM-DD] [V.0]

Date of current submission/
version number [YYYY-MM-DD] [V.0]



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Notes

- The maximum number of pages should **not exceed 12 pages**, excluding annexes. Proposals exceeding the prescribed length will not be assessed within the indicative service standard time of 30 days.
- As per the Information Disclosure Policy, the concept note, and additional documents provided to the Secretariat can be disclosed unless marked by the Accredited Entity(ies) (or NDAs) as confidential.
- The relevant National Designated Authority(ies) will be informed by the Secretariat of the concept note upon receipt.
- NDA can also submit the concept note directly with or without an identified accredited entity at this stage. In this case, they can leave blank the section related to the accredited entity. The Secretariat will inform the accredited entity(ies) nominated by the NDA, if any.
- Accredited Entities and/or NDAs are encouraged to submit a Concept Note before making a request for project preparation support from the Project Preparation Facility (PPF).
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A. Project/Programme Summary (max. 1 page)			
A.1. Project or programme	<input type="checkbox"/> Project <input checked="" type="checkbox"/> Programme	A.2. Public or private sector	<input checked="" type="checkbox"/> Public sector <input type="checkbox"/> Private sector
A.3. Is the CN submitted in response to an RFP?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, specify the RFP: _____	A.4. Confidentiality¹	<input type="checkbox"/> Confidential <input checked="" type="checkbox"/> Not confidential
A.5. Indicate the result areas for the project/programme	<p>Mitigation: Reduced emissions from:</p> <input checked="" type="checkbox"/> Energy access and power generation <input type="checkbox"/> Low emission transport <input type="checkbox"/> Buildings, cities and industries and appliances <input type="checkbox"/> Forestry and land use <p>Adaptation: Increased resilience of:</p> <input checked="" type="checkbox"/> Most vulnerable people and communities <input type="checkbox"/> Health and well-being, and food and water security <input type="checkbox"/> Infrastructure and built environment <input type="checkbox"/> Ecosystem and ecosystem services		
A.6. Estimated mitigation impact (tCO₂eq over lifespan)	Discussion needed	A.7. Estimated adaptation impact (number of direct beneficiaries and % of population)	Discussion needed
A.8. Indicative total project cost (GCF + co-finance)	Amount: USD 8,440,000	A.9. Indicative GCF funding requested	Amount: USD _To be discussed_
A.10. Mark the type of financial instrument requested for the GCF funding	<input checked="" type="checkbox"/> Grant <input type="checkbox"/> Reimbursable grant <input type="checkbox"/> Guarantees <input type="checkbox"/> Equity <input type="checkbox"/> Subordinated loan <input type="checkbox"/> Senior Loan <input type="checkbox"/> Other: specify _____		
A.11. Estimated duration of project/ programme:	a) disbursement period: 2019-2024	A.12. Estimated project/ Programme lifespan	2019-2024
A.13. Is funding from the Project Preparation Facility requested?²	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Other support received <input type="checkbox"/> If so, by who: _____	A.14. ESS category³	<input type="checkbox"/> A or I-1 <input type="checkbox"/> B or I-2 <input checked="" type="checkbox"/> C or I-3
A.15. Is the CN aligned with your accreditation standard?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <small>(micro (≤10), small (10<x≤50), medium (50<x≤250), and large (>250))</small>	A.16. Has the CN been shared with the NDA?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <small>To be shared with the NDA</small>
A.17. AMA signed (if submitted by AE)	Yes <input type="checkbox"/> No <input type="checkbox"/> If no, specify the status of AMA negotiations and expected date of signing: _____	A.18. Is the CN included in the Entity Work Programme?	Yes <input type="checkbox"/> No <input type="checkbox"/>
A.19. Project/Programme rationale, objectives and approach of programme/project (max 100 words)	<p>Most PICTs are heavily reliant on fossil fuel-based energy which causes greenhouse gas emissions and unstable electricity costs due to oil transportation cost fluctuations. Moreover, there are still countries with a low rate of electricity access in rural areas where more than half of the population is without electricity. To mitigate the issues in the region and achieve the nationally determined contributions (NDC) established by the Paris Agreement in 2015, decentralized renewable energy is essential. The Renewable Energy Mini-Grid Programme for the Pacific Island Countries and Territories (REMPP) is designed to mitigate greenhouse gas emissions while increasing energy access to improve livelihoods for communities throughout the Pacific.</p>		

¹ Concept notes (or sections of) not marked as confidential may be published in accordance with the Information Disclosure Policy ([Decision B.12/35](#)) and the Review of the Initial Proposal Approval Process ([Decision B.17/18](#)).

² See [here](#) for access to project preparation support request template and guidelines

³ Refer to the Fund's environmental and social safeguards ([Decision B.07/02](#))

B. Project/Programme Information (max. 8 pages)

B.1. Context and baseline (max. 2 pages)

Background

Pacific Island Countries and Territories (PICTs) include 22 members divided into three sub regional divisions, Melanesia, Micronesia, and Polynesia. A total of about 10 million inhabitants are spread out on the islands with a total land area of about 553,409 km². Many people are living on remote islands in rural areas with insufficient energy access. Papua New Guinea, Solomon Islands, Vanuatu, and Kiribati still have more than half of the population living without electricity. The remote geography of the islands remains a primary reason for making the energy supply difficult and expensive to deliver.

While the agriculture and tourism industry are important economic sources in the PICTs, a low rate of energy access hinders their economic growth throughout the region. Moreover, most of the PICTs are heavily reliant on fossil fuel energy sources which generate greenhouse gas emissions (GHG) making the islands more vulnerable from the weather events caused by climate change. Transportation of those energy resources also puts countries in high risk of oil spills. As a result of climate change, PICTs are experiencing serious influence from growing sea level rise throughout the region and natural hazards. According to IPCC report (IPCC 2013), 12 mm sea-level rise per year in the tropical Western Pacific has been observed.

To mitigate these energy issues in the PICTs, the Pacific Center for Renewable Energy and Energy Efficiency (PCREEE) was established as a knowledge hub with a focus on information exchange regarding regional interventions, tools, and methodologies in partnership with stakeholders to promote renewable energy in the PICTs. In recent years, decentralized renewable energy systems, called mini-grids, have become an important solution to provide electrification in remote islands with affordable costs. PCREEE, under the Pacific Community (SPC) owned by 26-member countries and territory members in the Pacific region with financial support from development partners and it focuses on the regional ownership in the process of the development in scientific and technical supports.

Promoting renewable energy is key benefits to replace fossil-fuel based energy source in transport and electricity generation particularly. Due to complex challenges in renewable energy mini-grid markets and industries, the Pacific Community is faced with many barriers to overcome. Although majority of countries have high access to power, about 80% of the primary energy source is from fossil fuels which are used for transportation 75% and electricity 20% according to the IRENA report in 2012. Due to a high dependency on oil imports, energy security in the PICTs is a main concern for sustainable development, as well as exposed risks for oil transportation and future oil spills could pose a risk to the delicate ecosystems in the PICTs.

Table 1 Pacific Island Countries Power Access and Status of Renewable Energy

PICTs	Power Access (%)	Rate of RE (%)	CO ₂ emissions (metric tons per capita)	Renewable Electricity Targets by 2020 (%)
Cook Islands	-	-	-	100%
Fiji	100	59	1.3	100%
Kiribati	48.1	2.6	0.6	10%
Marshall Islands	90	<1	0.9	20%
Micronesia (F.S.)	71.7	-	1.4	30%
Nauru	99.2	<1	4	50%
Palau	99.8	<1	12.3	20%
Papua New Guinea	20.3	35	0.8	No Target
Samoa	97.9	41	1	+10% ⁴
Solomon Islands	35.1	<1	0.4	50%
Tonga	95.3	<1	1.1	50%
Tuvalu	98.5	3	1	100%
Vanuatu	34.5	19	0.6	65%

Source: World Bank Data (2014), Power Access and CO₂ Emission. World Bank Data (2015), PPA (2011), RE rate, IRENA (2013), Pacific Lighthouses, French Development Agency (2014), Renewable Energy in Pacific Islands.

Although most of the government in the PICTs announced RE penetration goals by 2020, the actual progress of renewable energy promotion falls far behind the announced goals. As seen in Table 1, the Electrification ratio is high in most PICTs with the notable exceptions of Papua New Guinea (20.3%) Vanuatu (34.5%) The Solomon Islands (35.1%) and Kiribati (48.1%).

⁴ 10% increase of RE consumption.

Major Findings of the Mini-grid Market

There are key challenges that constrain mini-grid promotion in PICTs. Although currently, there are growing number of mini-grid installation is under the way, many issues have hindered the development as it is originally scheduled. Moreover, there are many numbers of technical problems observed and reported. The following includes the key findings in the PICTs in mini-grid projects which must be overcome in order to transition to renewable energy.

1. While the market for mini-grid systems is trending upward across the Pacific, there are still many areas which can be improved. Generally, gaps arise which could be filled by increased private sector involvement, especially in the operation and maintenance of mini-grids.
2. While the dissemination of knowledge has greatly increased because of the involvement of organizations such as PCREEE and the SPC, more could be accomplished through the systematic assessment of projects in order to create a database which identifies common mistakes and technical troubles that occur during the planning, installation, and maintenance of mini-grids.
3. With limited financial resources, governments must make tough decisions regarding the allocation of funding, especially in the energy sector. Renewable energy based mini-grid projects have very compelling socio-economic benefits but in order for mini-grid projects to be among the highest priority for the government’s funding decisions, the operational performance of mini-grid projects must be proven to be reliable and satisfactory, and the anticipated socio-economic outcomes must be fulfilled through sustainable operation.
4. The existing hurdles and risks are high for private companies doing mini-grid projects in the PICTs. The remote nature of islands in the PICTs poses challenges due to accessibility issues and the lack of economies of scale. Such unfavorable physical conditions result in a high cost and high risk of doing business, and prevent private companies from actively coming in and pursuing business opportunities. As a result, there has been a vacuum of responsibility for the sustainable operation of mini-grid projects, which in turn results in unsatisfactory operational performance and unfulfilled socio-economic benefits of mini-grid projects.
5. Most PICTs announced ambitious goals of renewable energy contributions, from 20 to 50 percent by 2020 to 2025, however, those goals have not been achieved yet despite the rich renewable energy sources and promising potential benefits. In order for the active promotion of renewable energy in the PICTs, it is critical to encourage the active participation of private companies by reducing the hurdles and risks posed to private companies doing mini-grid business in the PICTs. It is believed that the mini-grid market and industry in the PICTs can grow and be nurtured only through the active participation of the private sector.
6. Since small market base hinders involvement of private sector, combining a number of projects might make a business case for investment.

The design of a mini-grid programme for the Pacific island countries and territories must overcome the challenges for PCREEE to promote a decentralized mini-grid system to enhance rural electrification throughout the region. The programme aims to provide economically, environmentally and socially sustainable energy to local inhabitants. It includes three main outcomes including market intelligence, capacity building and partnerships, and technical advancement of the mini-grid system. Through the outcomes of the mini-grid programme, it is expected to expand the development of mini-grids to increase clean, reliable and affordable energy access for local people living in the PICTs.

B.2. Project/Programme description (max. 3 pages)

Development Objective

The goal of the Renewable Energy Mini-Grid Programme for the Pacific Island Countries and Territories (REMPP) is to increase energy access and improve livelihoods for the Pacific Community through the development of mini-grid systems to achieve the Sustainable Development Goals (SDG) including; (i) SDG 7, “to ensure access to affordable, reliable, sustainable and modern energy for all”, (ii) SDG 9, “to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”, (iii) SDG 13, “to take urgent action to combat climate change and its impacts”. The REMPP is proposed to improve energy supply for local communities, to reduce carbon emissions, build climate resilience of the private sector businesses.

The design has specific objectives to generate outcomes in order to overcome challenge in the region; (i) to enhance awareness of mini-grid market and strengthen market intelligence development, (ii) to empower local communities and the private sector, and to promote project development through capacity building, networking and partnerships programs, and

(iii) to improve sustainability of mini-grid systems and implement standardized technical equipment and design through technical advancement.

Component 1. Market Intelligence Development

(Outcome: Enhanced awareness of mini-grid markets and strengthen market knowledge through market intelligence development.)

The first outcome is to develop a shared market database on a web-based platform to include regional up to date mini-grid development. The activities include, (i) a web-based market knowledge platform to disseminate market knowledge and information in the region, (ii) up to date market information including policies, legislation and tariffs for stakeholders to utilize in their business development, (iii) mini-grid data storage including system performance and technical troubles per type of installation, and web-based GIS maps to visualize regional information and promote business opportunities.

The purpose of market intelligence development is to enhance awareness of mini-grid markets and strengthen market knowledge to share with stakeholders including institutions, development partners, the private sector, and local communities. The up to date information will play an important role for businesses to participate in actual mini-grid projects. Most importantly, a performance record and database of common technical troubles of mini-grid systems will provide both governments, public agencies and private participants with valuable knowledge concerning the optimal design and operation of mini-grid systems in the future.

Component 2. Capacity Building and Public and Private Partnerships

(Outcome 2: Empowered local institutions and private sector and increased project developments through capacity building and reinforced strong networks and partnerships between stakeholders.)

The second outcome of the design is to develop human capacity and promote mini-grid projects through networking and partnerships. The activities include, (i) a 5P business development model curriculum and guidelines to reduce business risks and promote active participation from the private sector, (ii) capacity building programs in project development, funding models and technical operations and maintenance (O&M) with the needs of all stakeholders, (iii) promotion of mini-grid investment through regular workshops and networking events and strengthened public and private partnerships, and (iv) the establishment of national sustainable energy industry associations.

The capacity building and public-private-partnership program is expected to empower local communities and contribute to strong partnership which expand mini-grid project development. The 5P based curriculum and guidelines will leverage the approach of partnerships to increase the participation of the private sector. Moreover, regular workshops and networking events are expected to generate project opportunities and partnerships for local businesses. Lastly, the industry association will play a key role in further PPP cooperation to shorten the gaps to achieve RE policy goals.

Component 3. Technical Advancement of the Mini-grid System

(Outcome 3: Improved sustainability of mini-grid system and implemented standardized technical equipment and design.)

The last outcome of the design is to improve the technical portion of the mini-grid system. The activities include, (i) developing guidelines for the standardized of mini-grid systems including technical equipment, mini-grid design and assessment methodology, (ii) developing an integrated operations and maintenance (O&M) platform to ensure the technical quality of the system.

The technical standards for mini-grid systems in the PICTs have not been developed yet although there is a potential need for standardization. The design of a mini-grid system can be standardized by different geographical conditions and socio-economic characteristics of the energy environment; key components of a mini-grid system can be customized to fit into specific climate and geographical conditions of the PICTs. Standardized and customization, if achieved to a proper level, is expected to help promote mini-grid systems in PICTs and increase the performance of mini-grid systems. Poor operation and maintenance practices have been found to be the biggest challenge to achieving the sustainability of mini-grid projects in the PICTs. An integrated operation and maintenance platform which provides timely and professional technical support to individual mini-grid systems whose remote locations and sizes prevent the affordability of necessary technical services on site. To sustain the quality of the mini-grid system, standardization will need to be implemented as well as an operations and maintenance platform which can operate independently.

Programme Theory of Change

The REMPP aims to overcome challenges by soft and hard methodologies to support and enhance renewable energy development in the Pacific Community comprised with a majority of developing countries in the region. The measures in the programme aim particularly to increase energy access and transition for low-emissions in electricity generation and climate resilient society from energy access.

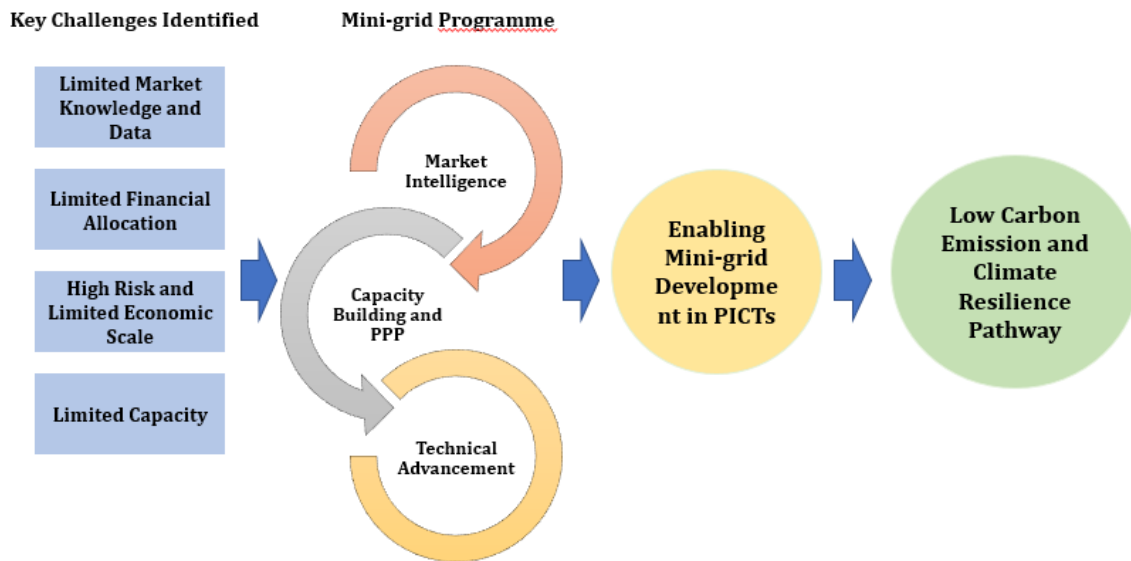


Figure 1 PCREEE REMPP Theory of Change

Accredited Entity Description and Implementing Arrangements

(To be discussed with AE)

Risk Analysis & Mitigating Measures

While this REMPP is considered to have less environmental risk, it still has risks involving financial, legal and regulatory, and technical risks which need to be mitigated with stakeholders. With strong support from financing and key stakeholders, these risks can be highly reduced.

Table 2 Risk Analysis

Type	Risk	Mitigating Measures
Financial Risk	<ul style="list-style-type: none"> Risk that the necessary fund for design and development may not be raised Risk that expenditure for operation may exceed the budget Risk that the fees for service to mini-grid systems may not be collected due to poor management of projects at sites 	<ul style="list-style-type: none"> Consult with international donor organizations on the programme to secure possibility of co-funding Consult with international donor organizations, local mini-grid operators and stakeholders on key financial issues and variables and incorporate their inputs into the final plan of the project
Legal and Regulatory Risk	<ul style="list-style-type: none"> Risk that each of PICTs may have different policies or regulatory practices which prevent coordinated and integrated regional information and O&M practices Risk that may fail to acquire voluntary collaboration from governments to be involved in the practices 	<ul style="list-style-type: none"> Consult with key stakeholders including governments in PICTs from the early stage of project development and incorporate their inputs into the final plan of the project
Environmental Risk (O&M)	<ul style="list-style-type: none"> Risk that devastating environmental events may take place which fail or prevent scheduled services 	<ul style="list-style-type: none"> Consider contingency measures into the operational plan, for example, storing key parts and components at local sites in case of such emergency, and planning of emergency operation of mini-grid systems

<p>Technical Risk</p>	<ul style="list-style-type: none"> • Risk that lack of ICT connection may hinder access to the knowledge database • Risk that Integrated O&M standard may not apply to specific conditions or needs of each project site • Risk that in some remote islands, the existing wireless communication infrastructure may be underdeveloped and therefore not support necessary communication between TOC and local sites • Risk that a certain types of system troubles that exceed the coverage of TOC's regular or emergency repairs • Risk that no properly trained operators at project sites are available 	<ul style="list-style-type: none"> • Supports from government are needed to have ICT connections to access the platform and monitor O&M issues • Conduct a thorough research about the condition of existing mini-grid projects and environment in collaboration with local partners including SPC (South Pacific Community) and PCREEE. • Prepare design and plan of the platform based on the research
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B.3. Expected project results aligned with the GCF investment criteria (max. 3 pages)

GHGs reduction scenario

The REMPP is the programme that helps to achieve each country's RE policy goal by mitigating market challenges. The replacement of fossil-fuel based electricity generation is expected to reduce GHG emissions in the region. At the same time, it will enable indigenous people to access electricity which contributes to enhance their livelihood to be more resilient by reaching the information of unexpected weather events. The following table of GHGs reduction has three different scenarios in reduction. With the strong support from donor organizations, REMPP aims to achieve RE goals fully in the region. Each scenario represents 30%, 60% and 100% of achievement and reduced emissions are calculated to 36,229 metric tons of CO₂e, 1,076,067 metric tons of CO₂e, and 2,824,737 metric tons of CO₂e, respectively.

Table 3 GHGs Reduction Scenario in PICTs

Country Name	RE target	RE output (GWh)	Total electricity output (GWh)	Scenario 1 (30% achievement of RE target)			Scenario 2 (60% achievement of RE target)			Scenario 3 (100% achievement of RE target)		
				RE target output from total electricity output (GWh)	Amount of RE electricity to increase (GWh)	Reduced CO ₂ equivalent calculated from increased RE electricity output (Metric Ton)	RE target output from total electricity output (GWh)	Amount of RE electricity to increase (GWh)	Reduced CO ₂ equivalent calculated from increased RE electricity output (Metric Ton)	RE target output from total electricity output (GWh)	Amount of RE electricity to increase (GWh)	Reduced CO ₂ equivalent calculated from increased RE electricity output (Metric Ton)
Cook Islands	100%	2.40	29.40	8.82	6.42	4,778 (5,267t)	17.64	15.24	11,342 (12,502t)	29.40	27.00	20,094 (22,150t)
Fiji	100%	411.62	914.40	-	-	-	548.64	137.01	101,968 (112,401t)	914.40	502.77	374,171 (412,453t)
Kiribati	10%	2.00	27.50	-	-	-	-	-	-	2.75	0.75	558 (615t)
Marshall Islands	20%	0.20	85.70	5.14	4.94	3,678 (4,054t)	10.28	10.08	7,505 (8,272t)	17.14	16.94	12,607 (13,897t)
Micronesia, Fed. Sts.	30%	1.10	68.70	6.18	5.08	3,783 (4,170t)	12.37	11.27	8,384 (9,242t)	20.61	19.51	14,520 (16,005t)
Nauru	50%	0.10	25.10	3.77	3.67	2,728 (3,007t)	7.53	7.43	5,530 (6,095t)	12.55	12.45	9,266 (10,213t)
Palau	20%	0.00	94.85	5.69	5.69	4,235 (4,669t)	11.38	11.38	8,471 (9,337t)	18.97	18.97	14,118 (15,562t)
Papua New Guinea	No Target	1442.00	4176.00	-	-	-	2505.60	1063.60	791,549 (872,534t)	4176.00	2734.00	2,034,689 (2,242,861t)
Samoa	+10%	40.70	134.10	-	-	-	-	-	-	44.77	4.07	3,029 (3,339t)

Solomon Islands	50%	2.19	96.79	14.52	12.33	9,175 (10,114t)	29.04	26.85	19,980 (22,024t)	48.40	46.21	34,387 (37,905t)
Tonga	50%	3.27	55.41	8.31	5.04	3,749 (4,133t)	16.62	13.35	9,934 (10,951t)	27.70	24.43	18,181 (20,041t)
Tuvalu	100%	2.00	7.10	2.13	0.13	96.7 (107t)	4.26	2.26	1,682 (1,854t)	7.10	5.10	3,796 (4,184t)
Vanuatu	65%	13.50	63.50	-	-	-	24.77	11.27	8,384 (9,241t)	41.28	27.78	20,671 (22,785t)
Niue	100%	0.07	3.39	1.02	0.95	707 (708t)	2.03	1.97	1,464 (1,614t)	3.39	3.32	2,474 (2,727t)

Source: World Bank Data (2015), EPA Emission Factor Calculation (<https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>)

Expected impacts aligned with the GCF Investment Criteria

Impact potential

The programme has a high impact on mitigating climate change through enabling mini-grid development in the market. P CREEE is comprised of 22-member countries which are highly dependent on diesel electricity generation. It is expected to have a positive impact on the Pacific Community as a whole. As the REMPP aims to overcome challenges of mini-grid development in the region, total about 9.5 million people in independent island countries are expected to get benefitted directly and indirectly from the programme. Moreover, the programme aims to vitalize cooperation between governments and industries to strengthen partnerships. Aligned with active guidance from PCREEE, regional industries and governments can be well coordinated for the future mini-grid projects. Moreover, the Pacific Community is strongly linked with Small Island Developing States (SIDS) and share similar challenges in mini-grid development market. Once the programme is successfully implemented, it is expected to have high potential on small island countries.

Paradigm shift potential

REMPP has a high potential for scaling-up and replication as mentioned above in the impact potential. Considering Small Island Developing States share similar challenges, it can be replicated in the Caribbean, Africa and Mediterranean island countries. In addition, there are many small islands in developing countries in South East Asia which also can scale up the project. As REMPP focuses on both soft and hard activities, it contributes in both ways. First, the soft activity contributes to RE policy and regulatory work together with industry association to form investment friendly environment and let both industry and government to build ability to develop project and maintain the system. Secondly, the hard activity will enable better access in operation and maintenance information to monitor and control the system to function. This high level of activities involved in making mini-grid friendly market environment which lead the high potential of RE development. The REMPP suggests three categorizations of renewable energy for small islands. If it is successfully implemented, this standardization of the model will bring a paradigm shift in clean energy transition for the involved islands.

Table 4 Categorization of Islands

	Main Islands (Group A)	Outer Islands (Group B)	Remote Islands (Group C)
Existing power system and environment	<ul style="list-style-type: none"> Centralized grid operated by a public utility corporation Size of average load larger than 10MW Still majority of power generation based on diesel 	<ul style="list-style-type: none"> Small grid operated by a public utility or a private company Size of average load between 1 to 10MW Mostly diesel-based generation 	<ul style="list-style-type: none"> No reliable power system, or small independent power system on diesel base Size of average load less than hundred kW
Constraints and conditions for commercial scale mini-grid projects	<ul style="list-style-type: none"> Dominant and monopolistic position of existing utility 	<ul style="list-style-type: none"> High demand of mini-grid with RE and ESS Economies of scale needed to make a bankable commercial project 	<ul style="list-style-type: none"> Challenging logistics conditions for delivery and construction Poor local capacity for construction and O&M
Feasible technical model	<ul style="list-style-type: none"> Grid tied RE systems utilizing local RE sources ESS for voltage support and frequency regulation as RE increases 	<ul style="list-style-type: none"> Hybrid of mini-grid systems with RE, ESS and diesel to reduce the dependency of diesel 	<ul style="list-style-type: none"> SHS (Small Solar Home System), or Hybrid mini-grid system
Feasible Business model	<ul style="list-style-type: none"> IPP with private funding 	<ul style="list-style-type: none"> Community or private business model with a blended funding that includes concessional loan from public sector 	<ul style="list-style-type: none"> Public program

<p>Technical System Design</p>	<ul style="list-style-type: none"> • Diesel as the main power source responsible for CVCF with RE supporting PQ function 	<ul style="list-style-type: none"> • RE as the main power source responsible for CVCF with diesel supporting PQ function 	<ul style="list-style-type: none"> • Small solar home system, or mini-grid with RE as the main source but with: no CVCF or PQ functions. Black out or supply interruption allowed
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Sustainable development potential

The REMPP is focused on climate change mitigation by promoting clean mini-grid development in the Pacific Community. The conventional energy sources from fossil fuels have heavily impacted climate change. Although renewable energy sources still have environmental risk in the development process, it is still considered environmentally clean in a long run. With the recent technology development, energy efficiency of solar PV, wind turbine, ESS and etc. have greatly increased in the mini-grid system. The programme will leverage the development to contribute clean environment. Moreover, increasing energy access in the rural area will help their local economy. A successful intervention will bring the positive outcome to meet existing needs and creating new services in need. Most importantly, energy access has the potential to alleviate poverty through stimulating rural livelihood options. This can occur through establishment of new energy-based industries, creation of new job opportunities, construction and maintenance. It can allow indigenous people to engage in diverse income activities.

Socially, Building, operating, and maintaining mini-grids have generated positive social impacts in addition to economic benefits. They encourage integrated government cooperation and the participation of the private sector in all aspects of mini-grid implementation. Rural communities in developing nations stand to benefit greatly from electrification and the opportunities that come with it. Affordable and clean energy is a requirement in developing countries and inclusive implementation has been shown to generate a positive impact. The process of sharing power and resources to achieve a common goal helps to bring communities together to invest in future progress.

Modern energy access has the potential to improve health in rural areas both directly- by powering healthcare facilities- and indirectly, by providing cleaner fuel sources and reducing hard labor activities. The inefficient combustion of solid fuels combined with inadequate ventilation contributes to poor health in many households. These high levels of indoor air pollution often result in decreased pulmonary function, particularly amongst women and children. In addition, access to lighting in the home increases the time available for study and hence may positively impact achievement levels. Lighting at the schools themselves can remove restrictions on school times making night classes a viable possibility or allowing schools to double as community centers in the evenings. Electrification can also affect education infrastructure through the integration of modern resources such as computers and internet access.

Gender-sensitive development impact (Proportion of men and women in jobs created)

The programme is designed to have gender balance and equality in the implementation process. Especially for the capacity development component, gender balance of the training program will be highly considered and prioritized in the process.

Needs of recipient

The Pacific Community as a part of Small Island Developing States are countries most vulnerable to climate change due to sea level rise and unexpected weather events. The main beneficiaries of the project are the local population from the actual mini-grid development. In order to lead the actual projects, the soft activity must proceed to implement the hard activities. Currently, stakeholders involving governments, private sectors, developers, cooperatives and related donor organizations share market challenges in the region, causing problems and troubles to sustain the system successfully. The direct beneficiaries from the programme is investors, governments and utilities, private businesses, developers and cooperatives from the programme.

Country ownership

PCREEE as a main unit for renewable energy and energy efficiency, it is comprised with strong support of member countries. The regional programme highly respects the opinions and comments from member countries to operate the program. The programme is highly aligned with each country national goal to mitigate GHGs and national climate strategy. PCREEE will be executing office of the programme partnering with member countries to participate such as market knowledge management, capacity building and technical installment and guidelines. PCREEE hosted the SPC steering committee on (Scheduled on November 22) to receive feedback from each government and stakeholders to initiate the programme.

Efficiency and effectiveness

As the programme is expected to support each country's RE development, it is expected to reduce 36,229 metric tons of CO₂e (30% RE goal), 1,076,067 metric tons of CO₂e (60% RE goal), and 2,824,737 metric tons of CO₂e (100% RE goal) respectively. Moreover, it has high benefits to local community having electricity access to rich their livelihood which would re

sult in local economy vitalization. Although it is hard to quantifying the benefits to local people by having new energy access, it will contribute highly on the quality of livelihood for the local communities.

- Co-financing ratio (total amount of the Fund's investment as percentage of project) (To be discussed)
- Economic and financial rate of return (To be discussed)
 - With the Fund's support (To be discussed)
 - Without the Fund's support (To be discussed)

B.4. Engagement among the NDA, AE, and/or other relevant stakeholders in the country (max ½ page)

Engagement with NDAs in PICTs and AE (to select)
(To be discussed with NDA)

Accredited Entity
(To be discussed with AE)

Please describe how engagement among the NDA, AE and/or other relevant stakeholders in the country has taken place and what further engagement will be undertaken as the concept is developed into a funding proposal.

C. Indicative Financing/Cost Information (max. 3 pages)

C.1. Financing by components (max ½ page)

Please provide an estimate of the total cost per component/output and disaggregate by source of financing.

Component/Output	Indicative cost (USD)	GCF financing		Co-financing		
		Amount (USD)	Financial Instrument	Amount (USD)	Financial Instrument	Name of Institutions
Market Intelligence	2,195,000					
Capacity Building and Public and Private Partnerships	2,640,000					
Technical Advancement	3,605,000					
Indicative total cost (USD)	8,440,000					

C.2. Justification of GCF funding request (max. 1 page)

The Pacific Centre for Renewable Energy and Energy Efficiency, based in Tonga, was established to promote renewable energy and energy efficiency with the initiative from the Pacific Community (SPC), the Sustainable Energy Island and Climate Resilient Initiative (SID DOCK) and the United Nations Industrial Development Organization (UNIDO) to initiate the organization. It is a regional network body in order to coordinate and provide supports for sustainable energy development. The organization aims to improve energy access to modern, affordable and reliable energy services, energy security and mitigation of negative externalities of energy system by promoting renewable energy and energy efficiency investments, markets and industries in PICTs.

The REMPP is the one of the core programmes designed by PCREEE to overcome existing market challenges to vitalize mini-grid development with related stakeholders including governments, industries, project developers, academia, NGO and local cooperatives and development partners. To be able to enable the programme, international supports, particularly from GCF is needed along with the aligned the objective of the GCF's goal to mitigate GHGs and achieve Sustainable Development Goals (SDGs) for clean energy access. Especially, PCREEE as an organization representing 22 pacific island countries and territories recognizes the need for support in the renewable energy sector to sustain resilient local communities who are exposed to the vulnerability to climate change. Most of island countries have limited economic scale and relatively low-income status which hinders to run the mini-grid programme. PCREEE can play a key role to act as a coordinator to lead the clean energy future for the renewable energy market in PICTs.

A GCF contribution to this project is critical to enable investments in accessing to the mini-grid development towards low-carbon pathways. Without GCF intervention, the programme will experience a great insufficient funding modality to enable specific components presented to overcome challenges in the market. As indicated previously on the GCF Investment Criteria, the program has high impact potential and paradigm shift to the clean energy access to the most vulnerable countries to climate change. The GCF contribution would help to overcome financial hardship in implementing the programme. GCF resources, therefore, are considered essential to implement in order to shorten the existing gaps in mini-grid development. Without GCF support, the current market challenges will remain and hinder further growth in clean energy access in PICTs. The GCF funds will serve the mitigation benefits to the local population and it will enable adaptation strategy through energy sources. In order to make an urgent action on climate change to build resilient community in PICTs, the renewable energy sources are critical to be developed in the near future.

Table 5 Economy and Population of Pacific Island Countries

Country	ODA US\$ in millions	ODA Received per Capita	Population (2012)	Land area (km ²)	GDP per capita (WB)		GDP growth rate per capita (WB)	
					US\$	Year	%	Year
Cook Island	8.09	536.22	15,087	237	15,002	2014	6.2	2014
Fiji	102.48	114.87	855,545	18,273	4,922	2015	5.56	2015
Kiribati	64.95	577.81	106,886	811	1,424	2015	3.5	2015
Marshall Is.	57	1,076.72	53,679	181	3,386	2015	0.63	2015
Micronesia (F.S.)	81.39	779.35	102,948	701	3,016	2015	3.77	2015
Nauru	31.25	2505	10,292	21	8,053	2015	2.81	2015
Palau	13.93	654.36	17,445	444	13,501	2015	9.36	2015
PNG	589.74	74.46	7,229,077	462,840	2,183	2015	8.53	2014
Samoa	93.72	483.69	187,610	2,785	4,149	2015	1.63	2015
Solomon Is.	190	323.47	587,068	30,407	1,922	2015	3.73	2015
Tonga	68.4	643.1	103,276	650	4,094	2015	3.71	2015
Tuvalu	49.65	4,513.23	10,732	26	2,970	2015	2.64	2015
Vanuatu	186.56	705.06	257,031	12,281	2,806	2015	-0.8	2015
Average	118.24	999.03	-	-	5,187	-	3.94	-

Source: Aggregated data from Pacific Power Association. (2012), World Bank Data (2015), OECD (2015), UN data (2014).

Grants with repayment contingency is considered appropriate source of funding due to unstable economic conditions in the Pacific Community to build renewable energy friendly market which enable actual mini-grid system construction and O&M. As this program does not aim to provide electricity generation to compensate the investment, a support source of grant is highly desirable to found fundamental base for the renewable energy market. The REMPP can be funded with multiple different donors for each component. There is a potential leverage of public funds from one of donor countries to support. The REMPP will indirectly make positive impact on local population through having business knowledge and ability to develop the system which can provide electricity to remote area. The direct beneficiaries are governments, industries, developers, local cooperatives and NGOs who are involved with mini-grid project development and, Operations and Maintenance (O&M). It has high potential of increasing clean energy sources from the programme designed by PCREEE. It is desirable to be considered to implement the programme to make the development feasible in PICTs.

C.3. Sustainability and replicability of the project (exit strategy) (max. 1 page)

The REMPP addresses importance of overcoming challenges to enable the friendly environment for mini-grid market development. The period of the programme is total 5 years to implement successfully in soft and hard activities. The programme support to overall policy and regulatory, market knowledge and database, capacity development and technical assistance which will enable conditions to allow industries to participate actively in the mini-grid development. The programme support to the overall activities will support the project development in a long run. This includes set of standards in business and technical models, trainings and technical supports.

The programme would support advancement of previous mini-grid projects and continue to promote for renewable energy development contributing to the resilient society in PICTs. The programme will focus on establishing the enabling environment for the actual projects to minimize the gaps in mini-grid market. It includes policy gaps, industry gaps, financial gaps, and technical gaps to continue to promote in a long-term sustainability. As a result, final beneficiaries can fully get outcomes from the programme and local people will be able to sustain the most of mini-grid system activities and O&M.

Once the REMPP is successfully implemented, the development of renewable energy can last in the long run and monitored in a proper way with the support from the GCF and other funding partners. The programme is targeting multiple stakeholders in governments, industries, cooperatives and ngos to react actively in market opportunities in renewable energy, so users in remoted area can fully benefit from energy access. In the high possibility of scaling up to other island countries, this programme is expected to build fundamental foundation of mini-grid market environment. In the long run, this will significantly contribute to each country's NDC (Nationally Determined Contributions) according to UNFCCC in order to mitigate and adapt to climate change in a long term.

After fully the programme is implemented, PCREEE secretariat can sustain the sources and data to continue the programme with developing partners to provide additional support where it is needed with member countries in PICTs. The programme will last for five years and success indicators have identified in the result based logical frame attached in the Annex separately.

D. Supporting documents submitted (OPTIONAL)

- Map indicating the location of the project/programme
- Diagram of the theory of change
- Economic and financial model with key assumptions and potential stressed scenarios
- Pre-feasibility study
- Evaluation report of previous project
- Results of environmental and social risk screening

Self-awareness check boxes

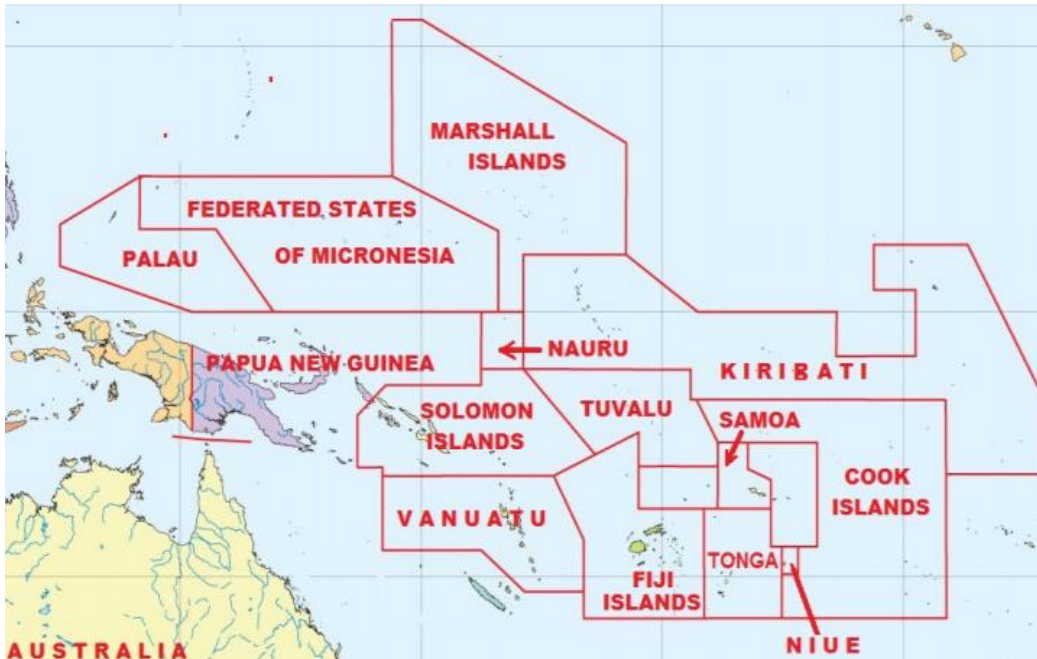
Are you aware that the full Funding Proposal and Annexes will require these documents? Yes No

- Feasibility Study
- Environmental and social impact assessment or environmental and social management framework
- Stakeholder consultations at national and project level implementation including with indigenous people if relevant
- Gender assessment and action plan
- Operations and maintenance plan if relevant
- Loan or grant operation manual as appropriate
- Co-financing commitment letters

Are you aware that a funding proposal from an accredited entity without a signed AMA will be reviewed but not sent to the Board for consideration? Yes No

Annex I. A map indicating the location of the project/programme

Source: Dornan M. (2015)



Map of Pacific Island Countries and Territories

Annex II. Result based framework of the REMPP

Development Objective (ultimate outcome)	Indicators	Baseline and targets	Means of verification	Risks and assumptions
Increased clean energy access and improved livelihoods throughout the Pacific community through the development of mini-grid systems to achieve sustainable development goals.	<p>Percent increase of affordable and reliable energy access in PICTs</p> <p>Increased business and income generation activities in rural communities</p> <p>Percent decrease in fossil fuel-based electricity generations</p> <p>Number of local businesses which participate in mini-grid projects</p> <p>Increased employment opportunities in local communities</p>	<p>Baseline:</p> <p>There are countries which have not yet reached full energy access for the local communities and most countries in PICTs have a high dependency on fossil fuel-based energy generation</p> <p>Target(s):</p> <p>20% increase of affordable and reliable energy access for local communities in PICTs region by mini-grid system</p> <p>20% decrease in fossil fuel-based electricity generations</p> <p>80% permitted local businesses in mini-grid project developments</p> <p>10% additional job creation of the local communities from distributed mini-grid systems</p>	<p>Regional statistics in energy balance</p> <p>Regional data in permissions and licenses provided</p> <p>Assessment report of NDC in PICTs</p>	<p>Regional energy environments are expected to be favorable to development of mini-grid projects</p> <p>Criteria for funding modality in international standard is expected to be still high</p> <p>Each country's internal security in development and stable political condition will highly influence on mini-grid projects</p>
Intermediate Outcome (mid-term)	Indicators	Baseline and targets	Means of verification	Risks and assumptions
Outcome 1: Enhanced awareness of mini-grid markets and strengthen market knowledge through market intelligence development.	<p>Strengthened regional mini-grid market information</p> <p>Percent of the population in PICTs with awareness of the mini-grid programme</p> <p>Percent of information gathered throughout the PICTs</p> <p>Number of stakeholders utilizing the knowledge sharing database</p>	<p>Baseline:</p> <p>Although dissemination of knowledge of RE has greatly increased from PCREEE, there are still areas for improvements in the market intelligent including updated market information and specific standardized guidelines in order to increase awareness from stakeholders and build further development opportunities based on existing information gathered of mini-grid projects.</p> <p>Target(s):</p> <p>An established platform of market intelligence</p> <p>Awareness increase between beginning of the programme and end of the programme</p> <p>90% of mini-grid market information gathered from each country's utility</p>	<p>Shared documents and market information on a web-platform</p> <p>Statistics of data access of market intelligence</p> <p>Registered stakeholders and attendance</p> <p>Qualitative measurement of awareness of local communities</p>	<p>Availability of each market information from countries</p> <p>Staff resources to manage up to date market intelligence in a timely manner</p> <p>Quantifying the result-based achievement</p> <p>Access to the web platform from remote islands</p>
Outcome 2: Empowered local institutions and private sector and increased project developments through capacity building and reinforced networks and	<p>Strengthened knowledge and technical capabilities to be applied in mini-grid systems</p> <p>Yearly developed capacity building strategies and curriculums</p>	<p>Baseline:</p> <p>There are gaps for private sector involvement in the mini-grid development process. PCREEE can play a key role in minimizing the gaps as an intermediary organization through promoting investment and</p>	<p>The progress report on regional capacity building based on the strategies and curriculums</p> <p>Amount of investment increased</p>	<p>Coordination with the governments in PICTS</p> <p>Participation of stakeholders in funding promotion events</p> <p>Willingness of local business participation</p>

<p>partnerships between stakeholders</p>	<p>Number of local businesses participation in mini-grid projects</p> <p>Number of mini-grid projects including co-funded developments</p> <p>Amount of financial resource investment (US\$) for mini-grid project development</p> <p>Number of established national sustainable energy industry association</p> <p>Up to date alumni database management for regular contacts</p> <p>Job creations from local socio-economic development</p> <p>Gender balance and equality in the mini-grid project developments</p>	<p>capacity building program</p> <p>Target(s):</p> <p>Development of capacity building strategies and curriculums</p> <p>At least 20 mini-grid projects to be developed and funded</p> <p>90% of registered businesses for energy industry association</p> <p>Up to date alumni database management for regular contacts</p> <p>At least 10% increase of job creation for local communities</p> <p>Gender balance of the energy development to be included throughout the curriculum to increase awareness</p>	<p>Developed solid strategies and curriculum for capacity building programs</p> <p>Mini-grid proposals and concept note by local with PCREEEs guidance</p> <p>Alumni data and attendance of events</p> <p>Registration of private sustainable energy businesses</p>	<p>Securing specialized instructors.</p> <p>Logistic of training programs for participation in PICTs</p>
<p>Outcome 3: Improved sustainability of mini-grid system and implemented standardized technical equipment and design.</p>	<p>Percent of utilization of standard model of mini-grid systems</p> <p>Percent of installed standardized parts and equipment</p> <p>Percent of technical quality improvement of mini-grid systems</p> <p>Percent of decrease in problems occurred in the system</p>	<p>Baseline:</p> <p>Due to the development of separated donor funded mini-grid systems, there is no integrated model developed to improve O&M at the regional level. It remains as a challenge to make the standardized RE for sustainable operations. Lack of capabilities in the local communities for operations and maintenance hinder the efficient system operation and sustainable energy access.</p> <p>Target(s):</p> <p>50% of utilization of standard model of mini-grid systems</p> <p>50% of installed standardized parts and equipment</p> <p>20% of technical quality improvement of mini-grid systems</p> <p>20% of decrease in problems occurred in the system</p>	<p>Proposed mini-grid system with standardized design and equipment</p> <p>Statistics on O&M registered on the platform</p> <p>Progress reports in quality assurance</p>	<p>Coordination between technical developers and O&M local companies</p> <p>Financial stability to provide long-term technical assistance to implement and settle O&M management</p> <p>Staff resources to sustain management</p>
<p>Outcome 1: Enhanced awareness of mini-grid market and strengthen market knowledge through the market intelligence development.</p>				
<p>Activities</p>	<p>Indicators</p>	<p>Baseline and targets</p>	<p>Means of verification</p>	<p>Risks and assumptions</p>
<p>Activity 1.1 A web-based market knowledge platform to be established to disseminate the knowledge in the region. (e.g. Market information, Database, Helpdesk)</p>	<p>The website to be launched for the mini-grid programme by PCREEE in the connection to PCREEE's website</p> <p>Number of website visitors</p> <p>Volume of inquiry through the helpdesk</p> <p>Satisfactory survey to be conducted</p>	<p>Baseline:</p> <p>No existing regional base market information platform</p> <p>Target(s):</p> <p>The website to be launched for the mini-grid programme by PCREEE</p> <p>90% of members to visit and access to the market intelligence platform</p> <p>Timely mannered response to inquiries</p>	<p>A website to disseminate the market information</p> <p>Statistics of inquiries through website to be developed</p>	<p>There is growing interest in mini-grid development throughout the region</p> <p>The web-based platform can act as intermediary start point for private participation in mini-grid project development</p>

<p>Activity 1.2 Up to date market trends to be shared including policies, legislation and tariffs in the region related to the mini-grid system and share business opportunities (e.g. legislations, business opportunities, licenses and permits by countries)</p>	<p>Market trend section by countries to be established on the web platform</p> <p>Number of updates made for PICTs in a regular basis</p> <p>Web-based guideline to be developed for each categories of market information</p> <p>Number of certified & permitted businesses</p>	<p>Baseline:</p> <p>There is no existing regional mini-grid market information platform</p> <p>Target(s):</p> <p>Market trend section by countries to be developed</p> <p>Manual of permit and licenses to be developed</p> <p>Market trend updates related to each country in PICTs</p> <p>20% increase of certified & permitted businesses</p>	<p>Updates and documents shared through a website</p> <p>Permits and licenses guidelines shared through a web platform</p>	<p>Up to date market information in the region</p> <p>Private sector to get better information in the stage of mini-grid development as a regional basis</p>
<p>Activity 1.3 The mini-grid system data in the region to be stored in the database including system performance and technical troubles per type of installation and GIS mapping including cooperation with utilities in the PICTs.</p>	<p>% of information gathered in the database from mini-grid systems in PICTs</p> <p>Effective mapping with mini-grid location including basic information</p> <p>Up to date information</p>	<p>Baseline:</p> <p>There are online libraries which collect publications but no existing consolidated statistical database to extract and analyze the current system</p> <p>Target(s):</p> <p>90% of information gathered in the database</p> <p>Visualization map with available summaries in the Pacific region</p> <p>Bi-annually updated information</p>	<p>Dedicated database which comprises all electricity generation and system performance records of mini-grid systems in the PICTs</p> <p>GIS with summaries of mini-grid developments in the region</p>	<p>Statistical data is expected to be analyzed for system improvements</p> <p>GIS is widely used to map out the status of installation</p>
<p>Outcome 2: Empower local institutions and private sector, and increased project developments through capacity building and reinforced networks and partnerships between stakeholders.</p>				
Activities	Indicators	Baseline and targets	Means of verification	Risks and assumptions
<p>Activity: 2.1 5P Business Development Model Curriculum and Guidelines to be developed by identified categorization of mini-grid groups in order to reduce business risks and promote active participation from private businesses.</p>	<p>Applied 5P guideline to the PICTs local condition</p> <p>Number of local business participations in mini-grid projects</p> <p>Percent of awareness in PICTs of the 5P model.</p>	<p>Baseline:</p> <p>Currently, most of mini-grid projects are funded by international donors. However, there are opportunities for the private sector to get involved.</p> <p>Target(s):</p> <p>5P model by categorization in PICTs to be developed as manual</p> <p>At least 50% of new projects suggested under the 5P model</p> <p>Increase of awareness in PICTs of the methods in 5P model</p>	<p>Detailed guidelines applied in PICTs through 5P model project development</p>	<p>5P model is developed guideline from UNESCAP and is well recognized</p>

<p>Activity 2.2 Capacity building program to be developed and managed by PCREEE including the programs in project development, funding modality and technical operations and maintenance with consideration of gender balance.</p>	<p>Organized training curriculum to be developed with gender balance</p> <p>Number of proposals made for mini-grid projects</p> <p>Number of training programs organized</p> <p>Percent of skills to be applied in the mini-grid development and O&M</p> <p>Satisfactory survey to be conducted</p> <p>Number or participants attended in the training programs</p>	<p>Baseline:</p> <p>As RE sector has a growing attention, there is still room for capacity building to minimize gap in knowledge and skills to keep up with global trends</p> <p>Target(s):</p> <p>Organized training curriculum to be developed</p> <p>At least 20 project proposals a year to be submitted for mini-grid projects</p> <p>Project development and O&M training programs to be organized</p> <p>80% of received skills to be applied in the mini-grid development and O&M</p> <p>Satisfactory survey to be conducted</p> <p>90% of invited participants attend the training programs</p>	<p>Capacity plan development documents</p> <p>Developed project documents</p> <p>Utilization of O&M platform</p> <p>Record of certification from trainings</p> <p>Attendance and evaluation of trainings</p> <p>Curriculums and training materials</p>	<p>There are greater number of private sector businesses interested in mini-grid development</p>
<p>Activity 2.3 Promotion of investment of mini-grid and technology sharing through regular workshops and networking events between stakeholders to strengthen partnerships and contribute to the PCREEE training and alumni network.</p>	<p>Number of stakeholders to participate in the workshop</p> <p>Number of collaborations of the project</p> <p>Investment volume (US\$) for mini-grid projects gathered</p> <p>Number of alumni registered in the database</p>	<p>Baseline:</p> <p>PCREEE is recently launched and the organization is in the developing stage. Regular workshops and networking events can create solid network for mini-grid programme and it will contribute to strengthen partnerships and attract funding for the development. Currently there is no record of existing network information shared through training and events.</p> <p>Target(s):</p> <p>90% of stakeholders to participate in the workshop</p> <p>At least 15% increase of collaboration in project development</p> <p>At least 30% increase in volume of funding (US\$) for mini-grid projects gathered</p> <p>Alumni registered in the database</p> <p>Bi-annual updates</p>	<p>Statistics on funding results</p> <p>Prepared workshop documents</p> <p>Attendance of stakeholders</p> <p>Agreements of collaborations</p> <p>Alumni data and track of records in attendance of events</p>	<p>There are growing interests in private sector involvement and events will help gathering people to make business opportunities</p> <p>Alumni can participate and vitalize partnerships</p>
<p>Activity 2.4 Establishment of national sustainable energy industry associations.</p>	<p>Number of businesses to register for the association</p> <p>Number of collaborations of the mini-grid development project</p>	<p>Baseline:</p> <p>There is no currently integrated industry association which covers the region. The association can work together with each government for public private partnership and regional standard for mini-grid design.</p> <p>Target(s):</p> <p>90% of registered businesses for energy industry association.</p> <p>At least 20% increase of PPP performed from the association.</p>	<p>Registration numbers of industry</p> <p>Regular meetings held</p>	<p>Industry association can collaborate in integrated model and PPP in mini-grid projects</p>

Outcome 3: Improved sustainability of mini-grid system and implemented standardized technical equipment and design.

Outputs	Indicators	Baseline and targets	Means of verification	Risks and assumptions
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<p>Activity 3.1 Guidelines for standardized technical equipment, design and assessment methodology by categorization of islands to have optimal mini-grid system in the region.</p>	<p>Standard technical guidelines for the project development</p> <p>Implemented standardized equipment, designs, and assessments</p> <p>Percent of improvement in mini-grid system quality</p>	<p>Baseline:</p> <p>PICTs have unique territories with remote islands, so it can be categorized into three groups based on the size. Although there are standardized suggestions on technical equipment, it is not widely applied throughout the region.</p> <p>Target(s):</p> <p>Developed guidelines for standardized technical equipment, design, and assessment methodology of mini-grid system by each volume of energy generation</p> <p>At least 50% of project applied through the technical model guidelines</p> <p>30% improvement in mini-grid system quality</p>	<p>Standardized technical design documents</p> <p>Assessment documents and progress reports</p>	<p>Strong cooperation from donor organizations is needed</p> <p>Regular basis assessment will ensure the technical quality of the system</p>
<p>Activity 3.2 Integrated O&M platform to be managed to ensure the technical quality for the system. (e.g. Standard O&M Manual, Platform Structure Design, Energy Management System, Component Management, Communication)</p>	<p>Number of mini-grid system utilize O&M platform</p> <p>Percent of up-to-date information.</p> <p>Number of problems fixed through O&M platform</p> <p>Percent of quality improvement by utilizing the O&M platform</p>	<p>Baseline:</p> <p>Isolation is the main challenge for O&M in order to sustain the quality of the system. Moreover, there is no existing consolidated O&M management platform to monitor the mini-grid system. The lack of technical skills and transportation time are challenging to fix any technical issues in a timely manner.</p> <p>Target(s):</p> <p>At least 50% of mini-grid system utilize O&M platform</p> <p>Real time basis record for O&M</p> <p>At least 30 % of fixed problems through O&M platform</p> <p>20% increase of quality improvement by utilizing the O&M platform</p>	<p>O&M platform statistics</p>	<p>The mini-grid system linked with ICT connection is important</p>

Annex III. Financial Budget Details

Component 1. Market Intelligence Development

Activity / Task	Projected Budget by Year					Budget	Budget comments
	2019	2020	2021	2022	2023	Total	
Activity 1: Web-based market knowledge platform	150,000	0	0	0	0	150,000	
a. Design of Web-based knowledge platform	50,000	0	0	0	0	50,000	
b. Construction or overhaul of web-based platform	100,000	0	0	0	0	100,000	
Activity 2: Up-to date market information	95,000	250,000	100,000	100,000	100,000	645,000	
a. Reorganization of existing SPC data repository	30,000	0	0	0	0	30,000	
b. Collection and update of existing mini-grid projects in PICTs (including communication with member countries)	30,000	150,000	0	0	0	180,000	
c. Staffing of Web platform operation	35,000	100,000	100,000	100,000	100,000	435,000	1 staffs in year 2019, additional 2 staff in year 2020 and 2021
Activity 3: Database of Mini-grid projects in PICTs	400,000	700,000	100,000	100,000	100,000	1,400,000	
a. Design of data base, data format, data collection	150,000	0	0	0	0	150,000	
b. Training of operational staffs at project sites for data collection and communication	0	300,000	0	0	0	300,000	10 countries x 3 sub units
c. Construction and operation of web-based data communication platform	200,000	300,000	0	0	0	500,000	
d. Staffing of data base operation and update	50,000	100,000	100,000	100,000	100,000	450,000	1 staffs in year 2019, additional 1 staff in year 2020 and 2021
Total	645,000	950,000	200,000	200,000	200,000	2,195,000	

Component 2. Capacity Building and Public and Private Partnerships

Activity / Task	Projected Budget by Year					Budget	Budget comments
	2019	2020	2021	2022	2023	Total	
Activity 1: 5P business development model curriculum	275,000	25,000	25,000	25,000	25,000	375,000	
a. Program design	150,000	0	0	0	0	150,000	
b. Office and equipment for lecturing, discussion, and networking	100,000	0	0	0	0	100,000	To share existing PCREEE and SPC offices
c. Printing and textbook publication	25,000	25,000	25,000	25,000	25,000	125,000	
Activity 2: Capacity building program	330,000	180,000	180,000	180,000	180,000	1,050,000	
a. Training of key staff members and leadership	30,000	30,000	30,000	30,000	30,000	150,000	10 key staff members and program leaders
b. Training of local operating units	300,000	150,000	150,000	150,000	150,000	900,000	10 countries x 3 sub units
Activity 3: Promotion of mini-grid and public private partnerships	165,000	200,000	200,000	200,000	200,000	965,000	

a. Support and training of government officers of member countries	50,000	50,000	50,000	50,000	50,000	250,000	10 governments x 2 officers
b. Networking events and conference for private and public partnership	50,000	50,000	50,000	50,000	50,000	250,000	1 conference and 1 networking event each year
c. Monitoring and evaluation of public and private partnership practices	30,000	30,000	30,000	30,000	30,000	150,000	
d. Staffing for networking and and program operation	35,000	70,000	70,000	70,000	70,000	315,000	1 staff in year 2019, additional 1 staff in year 2020 and 2021
Activity 4: Industry Association	50,000	50,000	50,000	50,000	50,000	250,000	
a. Staffing	35,000	35,000	35,000	35,000	35,000	175,000	
b. Operation cost	15,000	15,000	15,000	15,000	15,000	75,000	
Total	820,000	455,000	455,000	455,000	455,000	2,640,000	

Component 3. Technical Advancement of the Mini-grid System

Activity / Task	Projected Budget by Year					Budget	Budget comments
	2019	2020	2021	2022	2023	Total	
Activity 1: Guidelines for standardized mini-grid system	200,000	150,000	150,000	50,000	50,000	600,000	
a. Workshops for mini-grid technical standards	30,000	30,000	30,000	30,000	30,000	150,000	One event each year
b. Task force team operation of public and private (locals and foreigners)	150,000	100,000	100,000	0	0	350,000	10 to 15 T/F members x 3 meetings in 2019 and 2 meetings in 2020 and 2021
c. Guideline manual and publications	20,000	20,000	20,000	20,000	20,000	100,000	1 staffs in year 2019, additional 2 staff in year 2020 and 2021
Activity 2: Integrated Operations and maintenance (O&M) platform	865,000	610,000	510,000	510,000	510,000	3,005,000	
a. Design of platform configuration and operational logics, on-line communication, operational manuals, and schedule of key parts and components	500,000	0	0	0	0	500,000	
b. Upgrade of wireless communication network at TOC	250,000	0	0	0	0	250,000	
c. Upgrade of wireless communication network between TOC and sites	N/A						To be addressed by member countries
d. Staffing for design and test operation at TOC	70,000	100,000	100,000	100,000	100,000	470,000	2 staffs in year 2019, additional 1 staff in year 2020 and 2021
e. Training of staffs in TOC	30,000	0	0	0	0	30,000	Including overseas trip for training
f. Training of local operators at sites	0	150,000	50,000	50,000	50,000	300,000	10 countries x 5 sites
g. Inventory of key components and spare parts to be located at TOC	0	250,000	250,000	250,000	250,000	1,000,000	solar modules, inverters and IGBT components, repair tools
h. Regular site check-up and A/S	0	50,000	50,000	50,000	50,000	200,000	2 times per year
i. Emergency dispatch for A/S	0	30,000	30,000	30,000	30,000	120,000	
j. Evaluation and knowledge sharing	15,000	30,000	30,000	30,000	30,000	135,000	
Total	1,065,000	760,000	660,000	560,000	560,000	3,605,000	