

# Funding Proposal

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## **FP036: Pacific Islands Renewable Energy Investment Program**

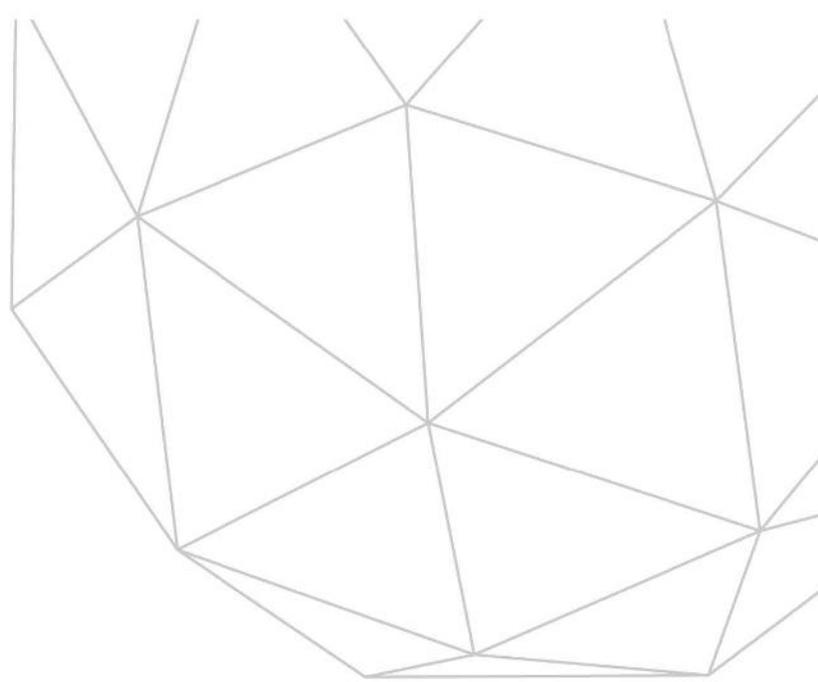
Cook Islands | Asian Development Bank (ADB) | Decision B.15/24

24 November 2016





GREEN  
CLIMATE  
FUND



# Funding Proposal

Version 1.1

**The Green Climate Fund (GCF) is seeking high-quality funding proposals.**

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: Pacific Islands Renewable Energy Investment Program

Country/Region: Pacific

Accredited Entity: Asian Development Bank

Date of Submission: 8 November 2016

## Contents

Section A	<b>PROJECT / PROGRAMME SUMMARY</b>
Section B	<b>FINANCING / COST INFORMATION</b>
Section C	<b>DETAILED PROJECT / PROGRAMME DESCRIPTION</b>
Section D	<b>RATIONALE FOR GCF INVOLVEMENT</b>
Section E	<b>EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA</b>
Section F	<b>APPRAISAL SUMMARY</b>
Section G	<b>RISK ASSESSMENT AND MANAGEMENT</b>
Section H	<b>RESULTS MONITORING AND REPORTING</b>
Section I	<b>ANNEXES</b>

### *Note to accredited entities on the use of the funding proposal template*

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

**Please submit the completed form to:**

[fundingproposal@gcfund.org](mailto:fundingproposal@gcfund.org)

<b>A.1. Brief Project / Programme Information</b>		
<b>A.1.1. Project / programme title</b>	Pacific Islands Renewable Energy Investment Program	
A.1.2. Project or programme	programme	
<b>A.1.3. Country (ies) / region</b>	Pacific: Cook Islands (COO), Tonga (TON), Republic of Marshal Islands (RMI), Federated States of Micronesia (FSM), Papua New Guinea (PNG), Nauru (NAU), and Samoa (SAM)	
<b>A.1.4. National designated authority (ies)</b>	<p><u>Cook Islands</u>. Office of the Prime Minister</p> <p><u>Tonga</u>. Ministry for Meteorology, Energy, Information, Disaster Management, Environment, Climate Change &amp; Communications</p> <p><u>Republic of Marshal Islands</u>. Office of Environmental Planning &amp; Policy Coordination, Office of the President</p> <p><u>Federated States of Micronesia</u>. Department of Finance and Administration</p> <p><u>Papua New Guinea</u>. Climate Change and Development Authority</p> <p><u>Nauru</u>. Department of Foreign Affairs and Trade</p> <p><u>Samoa</u>. Ministry of Finance</p>	
<b>A.1.5. Accredited entity</b>	Asian Development Bank	
A.1.5.a. Access modality	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
A.1.6. Executing entity / beneficiary	<p>Executing Entities and principal beneficiaries:</p> <p><u>Cook Islands</u> – Te Aponga Uira</p> <p><u>Tonga</u> –Tonga Power Limited</p> <p><u>Republic of Marshall Islands</u> – Marshalls Energy Corporation</p> <p><u>Federated States of Micronesia</u> – Chuuk Public Utilities Corporation; Kosrae Utility Authority; Pohnpei Utilities Corporation; Yap State Public Utilities Corporation</p> <p><u>Papua New Guinea</u> – PNG Power Limited</p> <p><u>Nauru</u> – Nauru Utility Corporation</p> <p><u>Samoa</u> – Electricity Power Corporation</p>	
A.1.7. Project size category (Total investment, million USD)	<input type="checkbox"/> Micro ( $\leq 10$ ) <input checked="" type="checkbox"/> Small ( $10 < x \leq 50$ ) <input type="checkbox"/> Medium ( $50 < x \leq 250$ ) <input type="checkbox"/> Large ( $> 250$ )	
A.1.8. Mitigation / adaptation focus	<input checked="" type="checkbox"/> Mitigation <input checked="" type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting	
A.1.9. Date of submission	Original Submittal: 11 October 2016 Revised Submittal: 10 November 2016	
A.1.10. Project contact details	Contact person, position	Anthony Maxwell, Principal Energy Specialist
	Organization	Asian Development Bank
	Email address	amaxwell@adb.org
	Telephone number	(63)2 632 4444
	Mailing address	6 ADB Avenue, Mandaluyong City 1550 Metro Manila, Philippines

A.1.11. Results areas (mark all that apply)

Reduced emissions from:

- Energy access and power generation  
(E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- Low emission transport  
(E.g. high-speed rail, rapid bus system, etc.)
- Buildings, cities and industries and appliances  
(E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- Forestry and land use  
(E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

- Most vulnerable people and communities  
(E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- Health and well-being, and food and water security  
(E.g. climate-resilient crops, efficient irrigation systems, etc.)
- Infrastructure and built environment  
(E.g. sea walls, resilient road networks, etc.)
- Ecosystem and ecosystem services  
(E.g. ecosystem conservation and management, ecotourism, etc.)

**A.2. Project / Programme Executive Summary (max 300 words)**

*Please provide a brief description of the proposed project/programme, including the objectives and primary measurable benefits (see [investment criteria in section E](#)). The detailed description can be elaborated in [section C](#).*

The Pacific Islands Renewable Energy Investment Program (the program) will support a paradigm shift from diesel power generation to renewable energy in seven Pacific Small Island Developing States (SIDS) and place the SIDS on a sustainable, climate resilient development pathway. Participating SIDS include Cook Islands, Tonga, Republic of Marshall Islands, Federated States of Micronesia, Papua New Guinea, Nauru and Samoa.

The current proposal requests GCF Board consideration for;

- (i) **Cook Islands subproject** including battery storage to allow upscaling of private sector investment in renewable energy and capacity building.
- (ii) **Program Support Technical Assistance (TA)** which will (a) support preparation of subsequent subprojects under the program in six SIDS, including feasibility studies and due diligence, and (b) implement the program.

The remaining six subprojects (Tonga, Republic of Marshall Islands, Federated States of Micronesia, Papua New Guinea, Nauru and Samoa) will be prepared under the TA and submitted for consideration at subsequent GCF Board meetings.

The program was requested by the seven SIDS, who have all provided no-objection letters. The program was developed and agreed as part of the GCF Pacific Roadmap developed during the GCF Pacific Regional meeting on 1-4 August 2016, which was attended by leaders and Ministers from all Pacific nations. Extensive ongoing dialogue and consultation has occurred, both in-country and external, to establish the proposed scope of works and national priorities. The proposed investments have all been identified by the SIDS as national priorities and (i) are in the SIDS's national energy sector development plans and (ii) are priorities under SIDS's intended nationally determined contributions (INDC's).

### Cook Islands subproject

The subproject in the Cook Islands will consist of procurement and installation of battery storage. The proposed subproject will allow upscaling of private sector investment in renewable energy consisting of (a) 1MW/4MWh for grid stability, to be installed at the diesel power station; (b) 2MW/8MWh for load shifting capability, to be installed at the Raratonga airport, and (c) capacity building activities for power utilities and Government departments. This additional battery storage capacity will enable an additional 6 MW of solar PV capacity to be connected to the grid, after which the Cook Islands' national electricity supply will be approximately 50% renewable energy.

Program Support Technical Assistance (TA). The TA will support the following activities:

- (i) Project preparation of renewable energy investment proposals, including feasibility studies and due diligence. Support for project preparation will be GCF financed.
- (ii) Sector reform and program support, including (i) knowledge transfer and sharing of lessons learnt, (ii) sector planning (renewable energy roadmaps and grid integration studies), (iii) power utility management reforms and capacity building, (iv) tariff review and reform measures, (v) review and revision of regulatory and policy frameworks, and (vi) greater private sector participation by identifying opportunities for independent power providers (IPP's), providing transaction advice, and designing guarantee products. Support for sector reform and program support will be ADB financed.

**Program Approach.** The program approach is considered optimal to assist the region transition to a sustainable, resilient energy infrastructure future as it will support (i) improved knowledge transfer and dissemination of lessons learnt, (ii) improved procurement through bundling of contracts across SIDS and centralized procurement support, (iii) improved sector reform through medium term engagement only available through a program on key issues such as sector planning (roadmaps and grid integration studies), power utility management reform and capacity building, tariff review and reform, and regulatory and policy frameworks, (iv) improved sector planning with medium to long term financing security, and (v) promotion of private sector.

**Program Impact.** The impact of the program as a whole will be a transformational shift away from the traditional reliance on fossil fuels toward a greater emphasis on renewable energy systems and reduced GHG emissions. The program will result in the following impact to the renewable energy mix and greenhouse gas emissions across all SIDS:

		Renewable energy current %	Renewable energy after program %	National renewable energy target %	Estimated Reductions in CO <sub>2</sub> emissions (tCO <sub>2</sub> e/annum)
1.	COO	15%	50%	100% by 2020	7,000
2.	TON	13%	57%	50% by 2020	20,000
3.	RMI	2%	6%	20% by 2020	10,000
4.	FSM	5%	TBD	30% by 2020	19,000
5.	PNG	50%	TBD	No target	21,000
6.	NAU	3%	38%	50% by 2020	10,000
7.	SAM	48%	TBD	100% by 2017	33,000
Total					120,000

COO = Cook Islands, TON = Tonga, RMI = Republic of Marshall Islands, FSM = Federated States of Micronesia, PNG = Papua New Guinea, NAU = Nauru, SAM = Samoa

**Mitigation.** The proposed mitigation investments across the program will include the following:

- Solar power generation (50MW at approximately 22 sites in 5 SIDS);
- Wind power generation (10MW at 5 sites in 3 SIDS);
- Hydropower generation (19MW at 8 sites in 2 SIDS);
- Energy storage facilities in 7 SIDS;
- Improved energy access; 25 renewable energy mini-grids (4 SIDS) and solar home systems (2 SIDS) and,
- Reduced greenhouse gas emissions; estimated 120,000 tCO<sub>2</sub>e/annum.

**Adaptation.** The proposed adaptation investments across the program will include the following:

- Samoa: flood diversion dam/hydropower reservoir to prevent flash flooding after cyclone activities, and
- Yap State, FSM: floating solar panels on water reservoir to minimize evaporation and secure water supply;
- Kosrae State, FSM: relocation of distribution lines which currently are located along the main island coastline and are being threatened by coastal erosion and storm-surge flooding; and
- All infrastructure supported by the investment program will incorporate climate proofing into technical design.

A summary of proposed mitigation and adaptation investments in each SIDS is summarized below:

1.	COO	Upscale Renewable Energy and IPP support: 3MW battery storage
2.	TON	Improved Energy Access: 6 mini-solar grids with battery storage, solar home systems Upscale Renewable Energy: 8MW grid-connected solar (6 sites), 6.6MW wind (3 sites), battery storage capacity of 9.8MW/ 21.1MWh
3.	RMI	Upscale Renewable Energy: diesel control upgrades, network strengthening, 2MW solar, battery storage
4.	FSM Yap	Upscale Renewable Energy: 2 wind turbines (2x275kW), battery storage Adaptation/Upscale Renewable Energy: 1.5MW floating solar
	FSM Pohnpei	Upscale Renewable Energy: 9MW Pohnlangas Solar, 5.5MW Lehnmesi/Nankawad Hydropower, battery
	FSM Chuuk	Improved Energy Access: 9 solar-diesel hybrid systems, solar home systems
	FSM Kosrae	Upscale Renewable Energy: 0.5MW solar, Adaptation: 42km distribution grid replacement/relocation
5.	PNG	Improved Energy Access: converting 10 provincial diesel centers to renewable energy (hydropower or solar)
6.	NAU	Upscale Renewable Energy: 8MW solar, battery storage
7.	SAM	Upscale Renewable Energy: Savaii Hydro (2MW), Savaii Wind Farm (2.75MW), rehabilitation of 2 hydropower plants damaged by Cyclone Evan (8MW) Adaptation: Alaoa Flood Control Dam and Hydropower (3MW)

**Paradigm shift.** The program has been designed to achieve a paradigm shift in the Pacific Island region to help the Pacific SIDS move rapidly away from their traditional energy pathway that has been almost entirely dependent on fossil fuels, to a more progressive and sustainable pathway that is low-carbon, climate resilient and improves energy access to marginalized populations in states where this is currently low. The program will support the following paradigm shifts:

- (i) **Transition to low-carbon energy.** The program will create a paradigm shift by supporting the SIDS to overcome the investment and technical barriers to integrating higher percentages of renewable energy. Technical integration of intermittent renewable energy poses significant challenges on small grids managed by utilities with relatively low capacity. To date, most Pacific countries have gained valuable experience with small percentages of grid-connected solar and wind, which existing diesel generators can integrate without significant issues. However, as integration percentages increase, the relatively simple diesel grids require significant upgrades (including battery storage) and improvements in system management capacity. In general, the Pacific is just commencing the investment cycle for renewable energy integration beyond small initial investments, and significant challenges remain which are best addressed through a program.
- (ii) **Increased private sector engagement.** The program will support a paradigm shift of promoting greater private sector participation and investment to support the structural shift towards renewable energy. This will be particularly important in SIDS which lack sufficient sovereign financing and require technical support to manage the transition.
- (iii) **Improved energy access.** There are currently significant disincentives for corporatized power utilities in SIDS that are reliant on high cost diesel based generation centers to increase energy access for customers in remote areas. Most Pacific countries lack budget resources to support rural electrification programs. Renewable energy for rural electrification offers a paradigm shift, as low cost power generation will allow power utilities to extend grids and improve access at lower power generation costs.
- (iv) **Increased knowledge sharing.** The program approach offers enhanced opportunities for sharing of lessons learnt among SIDS's. This will be facilitated by the regional project management unit and enhanced through regional workshops and knowledge products.

**Financing.** The proposed financing for the Cook Islands subproject and the TA is presented below:

Subproject	ADB Grant	Gov	GCF (grant)	Total
1. Cook Islands	0	4	12	16
2. Program Support Technical Assistance	5	0	10	15
<b>Total</b>	<b>5</b>	<b>4</b>	<b>22</b>	<b>31</b>

The anticipated financing for all program subprojects is presented below:

	ADB Loan	ADB Grant	Co-financing (grant) <sup>1</sup>	Gov	GCF	Total
1. COO	0	0	0	4	12	16
2. TON	7	7	5	3	55	77
3. RMI	0	2	0	2	16	20
4. FSM Yap	0	1	0	1	15	17
FSM Pohnpei	0	1	0	12	55	68
FSM Chuuk	0	1	0	1	23	25
FSM Kosrae	0	1	0	1	13	15
5. PNG	60	0	0	10	50	120
6. NAU	0	4	4	2	20	30
7. SAM	5	5	4	5	44	63
<b>Total</b>	<b>72</b>	<b>22</b>	<b>13</b>	<b>41</b>	<b>303</b>	<b>451</b>

COO = Cook Islands, TON = Tonga, RMI = Republic of Marshall Islands, FSM = Federated States of Micronesia, NAU = Nauru, PNG = Papua New Guinea, SAM = Samoa

1. Initial expressions of interest have been received for cofinancing. Cofinancing will be confirmed on a project basis during project preparation.

### A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	<table border="1"> <thead> <tr> <th>Country</th> <th>ADB Board Approval</th> <th>Estimated Implementation start and end date</th> </tr> </thead> <tbody> <tr> <td>1. COO</td> <td>Q2 2017<sup>1</sup></td> <td>Q3 2017-Q1 2020</td> </tr> <tr> <td>2. TA</td> <td>Q1 2017</td> <td>Q2 2017-Q4 2024</td> </tr> </tbody> </table> <p>COO = Cook Islands, TA = Technical Assistance 1. ADB Board approval may exceed 120 days from GCF Board approval</p>	Country	ADB Board Approval	Estimated Implementation start and end date	1. COO	Q2 2017 <sup>1</sup>	Q3 2017-Q1 2020	2. TA	Q1 2017	Q2 2017-Q4 2024
Country	ADB Board Approval	Estimated Implementation start and end date								
1. COO	Q2 2017 <sup>1</sup>	Q3 2017-Q1 2020								
2. TA	Q1 2017	Q2 2017-Q4 2024								
Expected financial close (if applicable)	27 December 2024									
Estimated implementation start and end date	As above									
Project/programme lifespan	15 years									

## B.1. Description of Financial Elements of the Project / Programme

Please provide:

- *an integrated financial model in Section I (Annexes) that includes a projection covering the period from financial closing through final maturity of the proposed GCF financing with detailed assumptions and rationale; and a sensitivity analysis of critical elements of the project/programme*

### Cook Islands subproject

The financing plan for the Cook Islands subproject is presented below:

Source	Amount (\$ million)	Share of Total (%)
Green Climate Fund grant	12.0	75.0
Government	4.0	25.0
<b>Total</b>	<b>16.0</b>	<b>100.0</b>

Source: Asian Development Bank

The financial model for Cook Islands subproject is included in the Feasibility Study, attached as Annex C.

### Program Technical Assistance

The financing plan for the TA is presented below:

Source	Amount (\$ million)	Share of Total (%)
Green Climate Fund grant	10.0	75.0
Asian Development Bank	5.0	25.0
<b>Total</b>	<b>15.0</b>	<b>100.0</b>

Source: Asian Development Bank

The anticipated cost breakdown for the TA by country is presented below:

	ADB Grant	GCF (grant)	Total
Sector/program support	5.0	0.0	<b>5.0</b>
Project preparation			
1. COO <sup>1</sup>	0.0	0.0	<b>0.0</b>
2. TON	0.0	2.0	<b>2.0</b>
3. RMI	0.0	1.0	<b>1.0</b>
4. FSM	0.0	3.0	<b>3.0</b>
5. PNG	0.0	1.5	<b>1.5</b>
6. NAU	0.0	1.0	<b>1.0</b>
7. SAM	0.0	1.5	<b>1.5</b>
<b>Total</b>	<b>5.0</b>	<b>10.0</b>	<b>15.0</b>

1. project preparation of the Cook Islands component has been completed.

The project preparation component of the TA to be financed by GCF is estimated to cost \$10 million. The Governments of Tonga, Republic of Marshall Islands, Federated States of Micronesia, Papua New Guinea, Nauru and Samoa will provide counterpart staff, office supplies, secretarial assistance, local transportation, provision of office space, communication facilities for consultants, and other in-kind contributions. The detailed cost estimate is presented below.

<b>Cost Estimates and Financing Plan (\$'000)</b>	
<b>Item</b>	<b>Amount</b>
<b>A. Tonga</b>	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	1,330.0
ii. National consultants	225.0
b. International and local travel	105.0
2. Equipment <sup>a</sup>	10.0
3. Training, seminars, and conferences	10.0
4. Surveys and studies <sup>b</sup>	200.0
5. Miscellaneous administration and support costs	20.0
6. Contingencies	100.0
<b>Subtotal (A)</b>	<b>2,000.0</b>
<b>B. Republic of Marshall Islands</b>	
1. Consultants	
a. Remuneration and per diem	
i. International consultant	710.0
ii. National consultants	70.0
b. International and local travel	40.0
2. Equipment <sup>a</sup>	10.0
3. Training, seminars, and conferences	10.0
4. Surveys and studies <sup>b</sup>	100.0
5. Miscellaneous administration and support costs	10.0
6. Contingencies	50.0
<b>Subtotal (B)</b>	<b>1,000.0</b>
<b>C. Federated States of Micronesia</b>	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	1,980.0
ii. National consultants	400.0
b. International and local travel	120.0
2. Equipment <sup>a</sup>	10.0
3. Training, seminars, and conferences	10.0
4. Surveys and studies <sup>b</sup>	300.0
5. Miscellaneous administration and support costs	30.0
6. Contingencies	150.0
<b>Subtotal (A)</b>	<b>3,000.0</b>
<b>D. Papua New Guinea</b>	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	.0
ii. National consultants	.0
b. International and local travel	.0
2. Equipment <sup>a</sup>	10.0
3. Training, seminars, and conferences	10.0
4. Surveys and studies <sup>b</sup>	50.0
5. Miscellaneous administration and support costs	15.0
6. Contingencies	75.0
<b>Subtotal (A)</b>	<b>1,500.0</b>

**E. Nauru**

1. Consultants	
a. Remuneration and per diem	
i. International consultants	820.0
ii. National consultants	40.0
b. International and local travel	40.0
2. Equipment <sup>a</sup>	10.0
3. Training, seminars, and conferences <sup>d</sup>	10.0
4. Surveys and studies <sup>b</sup>	20.0
5. Miscellaneous administration and support costs	10.0
6. Contingencies	50.0
<b>Subtotal (A)</b>	<b>1,000.0</b>

**F. Samoa**

1. Consultants	
a. Remuneration and per diem	
i. International consultants	1,050.0
ii. National consultants	130.0
b. International and local travel	60.0
2. Equipment <sup>a</sup>	10.0
3. Training, seminars, and conferences	10.0
4. Surveys and studies <sup>b</sup>	150.0
5. Miscellaneous administration and support costs	15.0
6. Contingencies	75.0
<b>Subtotal (A)</b>	<b>1,500.0</b>

**Total (A+B+C+D+E+F)** **10,000.0**

<sup>a</sup> Equipment will include computers, printers, scanners, projectors and power system monitoring equipment.

<sup>b</sup> Surveys and studies will include social surveys, grid integration/stability studies, flora/fauna studies and renewable energy primary data collection.

Overall Pacific Islands Renewable Energy Investment Program

The anticipated financing plan for the overall Program covering the 7 SIDS is presented below:

<b>Source</b>	<b>Amount (\$ million)</b>	<b>Share of Total (%)</b>
Asian Development Bank		
Ordinary Capital Resources	49.0	11.0
Special Funds resources (loan)	23.0	5.0
Special Funds resources (grant)	22.0	5.0
Green Climate Fund	303.0	67.0
Other Co-financiers	13.0	3.0
Government	41.0	9.0
<b>Total</b>	<b>451.0</b>	<b>100.0</b>

Source: Asian Development Bank and participating SIDS

The anticipated cost breakdown of each subproject by financing source (not including project preparation) under the Program is presented below:

	ADB Loan	ADB Grant	Co- financing (grant)	Gov	GCF (grant)	Total
1. COO	0	0	0	4	12	16
2. TON	7	7	5	3	55	77
3. RMI	0	2	0	2	16	20
4. FSM Yap	0	1	0	1	15	17
FSM Pohnpei	0	1	0	12	55	68
FSM Chuuk	0	1	0	1	23	25
FSM Kosrae	0	1	0	1	13	15
5. PNG	60	0	0	10	50	120
6. NAU	0	4	4	2	20	30
7. SAM	5	5	4	5	44	63
<b>Total</b>	<b>72</b>	<b>22</b>	<b>13</b>	<b>41</b>	<b>303</b>	<b>451</b>

COO = Cook Islands, TON = Tonga, RMI = Republic of Marshall Islands, FSM = Federated States of Micronesia, NAU = Nauru, PNG = Papua New Guinea, SAM = Samoa

The integrated financial models for each subproject will be developed in accordance with the processing schedules of individual subprojects.

- *a description of how the choice of financial instrument(s) will overcome barriers and achieve project objectives, and leverage public and/or private finance*

#### Cook Islands subproject

Cook Islands has an ambitious national target of 100% renewable energy by 2020 and is planning a paradigm shift away from sovereign financing to greater private sector investment to realize the structural shift to renewable energy generation. This is primarily due to ongoing limited capacity of the national Government to raise sovereign financing due to (i) the small size of the economy, and (ii) limited headroom for borrowing. This constraint applies both to the national Government and the state owned power utility<sup>1</sup>.

In response, the Government is planning to increase private sector investment in renewable energy through both increased penetration of household solar and independent power providers (solar). However, the grid requires increased battery storage to manage the intermittent supply before it can accept any additional renewable energy. Battery storage is not considered suitable as a standalone private sector investment as the power utility needs to operate the system to ensure power quality is maintained from multiple independent suppliers. Increased battery storage is considered a necessary precondition to facilitate the paradigm shift towards more private sector investment in renewable energy, and is therefore suitable for grant financing. This additional battery storage capacity will enable an additional 6 MW of solar PV capacity to be connected to the grid, after which the Cook Islands' national electricity supply will be approximately 50% renewable energy. The proposed shift to greater private sector investment is unlikely to occur without GCF grant support.

<sup>1</sup> The state owned utility similarly restricted from financing from commercial banks as any additional utility debt is counted towards national debt as contingent liability.

- *a breakdown of cost estimates for total project costs and GCF financing by sub-component in local and foreign currency and a currency hedging mechanism:*

**Cook Islands subproject**

A cost breakdown for Cook Islands by subcomponent in local and foreign currencies is presented below.

Component	Sub-component (if applicable)	Amount (for entire project)	Currency	Amount (for entire project)	Local currency	GCF funding amount	Currency of disbursement to recipient
Renewable Energy Generation, Storage, Transmission and Distribution	Battery storage	16.0 million	USD	0.0	NZD	16 million	USD
Total project financing		16.0 million	USD	0.0	NZD	16 million	USD

- *a breakdown of cost/budget by expenditure type (project staff and consultants, travel, goods, works, services, etc.) and disbursement schedule in project/programme confirmation (term sheet) as included in section I, Annexes.*

**Cook Islands subproject**

The budget breakdown by expenditure type for Cook Islands subproject is presented below.

Item	Green Climate Fund	Government	Total Cost
<b>Investment Costs</b>			
1. Civil Works	11.4	0.9	12.3
2. Consulting services <sup>1</sup>	0.6	0.0	0.6
3. Taxes and Duties/in-kind contribution	0.0	3.1	3.1
<b>Total Cost</b>	<b>12.0</b>	<b>4.0</b>	<b>16.0</b>

<sup>1</sup>. Includes establishing Project Implementation Unit

Breakdown by expenditure type will be developed for subsequent program subprojects as they are fully developed. The disbursement schedule for Cook Islands subproject is presented below.

	2017		2018			Total
	Q4	Q1	Q2	Q3	Q4	
Cook Islands	2.0 million	2.0 million	2.0 million	2.0 million	4.0 million	12.0 million

**B.2. Project Financing Information**

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total financing	(a) = (b) + (c)	31	million USD (\$)		
(b) GCF financing to recipient	(i) Grants	22	million USD (\$)	Not applicable	Not applicable
	* Please provide economic and financial justification in <a href="#">section F.1</a> for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in <a href="#">section E</a> .				
	Total requested	22	million USD (\$)		

	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
(c) Co-financing to recipient	Grant	5	million USD (\$)	ADB			
	Grant	4	million USD (\$)	Government			
Lead financing institution: Asian Development Bank							

**B.3. Financial Markets Overview (if applicable)**

*How market price or expected commercial rate return was (non-concessional) determined?*

The proposed investment will be grant financed. Subproject financial viability has been determined through comparison of the weighted average cost of capital (WACC) and the financial internal rate of return (FIRR).

*Please provide an overview of the size of total banking assets, debt capital markets and equity capital markets which could be tapped to finance the proposed project/programme.*

Not applicable

*Please provide an overview of market rates (i.e. 1-year T-Bill, 5-year government bond, 5-year corporate bond (specify credit rating) and 5-year syndicate loan.*

Not applicable.

*Provide examples or information on comparable transactions.*

Not applicable.

## C.1. Strategic Context

*Please describe relevant national, sub-national, regional, global, political, and/or economic factors that help to contextualize the proposal, including existing national and sector policies and strategies.*

### Cook Islands subproject

The Cook Islands lies in the South Pacific Ocean about halfway between Hawaii and New Zealand. It consists of two groups: the northern Cook Islands - seven low-lying, sparsely populated, coral atolls; and the southern Cook Islands, where most of the population lives, consist of eight elevated, fertile, volcanic isles. The total population is 18,100 and the largest and most populated island is Rarotonga (67 km<sup>2</sup>). Like all Pacific nations, the Cook Islands are vulnerable to climate change. The infrastructure and ecosystems are highly exposed – notably to sea level rise, tropical storms and changes in precipitation, and capacity to adapt is limited by the geographical and economic remoteness.

Prior to 2012, all electricity was generated from diesel fuel. However, in 2012 the Government of the Cook Islands (GCI) adopted the Cook Islands Renewable Energy Chart and Implementation Plan (CIRECIP) and established a policy to transform to 100% renewable electricity by 2020. Since then 3MW of solar power capacity has been installed on Rarotonga, including a 1 MW solar PV array at the airport, and approximately 2 MW of distributed solar PV. CIRECIP also establishes priorities and a roadmap for revising policy, institutions and regulatory systems to provide an appropriate enabling environment for transformation to renewable energies, including fostering private sector participation. The current electricity consumption in the Cook Islands is approximately 34.5 GWh/year. Demand is dominated by Rarotonga (29 GWh/year), which has a resident population of 10,572 (2011 Census).

In terms of energy output in MWh, the share of solar is currently about 15% of total generation output. Grid integration studies indicate that when the solar share increases beyond 10-15% of the mix some intervention may be necessary for grid stability, and when the solar share increases beyond 25% of the mix some intervention is necessary for load shifting. The grid is starting to experience issues at current integration levels. Based on grid integration studies and feasibility assessment for energy storage, battery storage is the most attractive option to cover both grid stability and load shifting applications. Cook Islands is unable to progress past about 15% until battery storage is installed.

Cook Islands INDC states that total emissions of GHG in 2006 were estimated at 69,574 t CO<sub>2e</sub>, of which 34% was attributed to electricity generation. INDC endorses the target to fully transform to renewables for electricity production by 2020. The Cook Islands has also formally submitted a National Appropriate Mitigation Action (NAMA) request for support from UNFCCC to the transformation to renewable energies.

### Regional Context for Overall Program.

The seven small island developing states (SIDS) covered by the program are some of the smallest most isolated economies in the world. With the exception of PNG, the remaining six countries have a combined population of less than 500,000. The cost of power generation is amongst the highest in the world due to (i) reliance on imported diesel for generation, (ii) long supply chains of relatively small quantities of diesel result in high transportation costs, and (iii) low economies of scale for relatively small grids. In addition, many of the Pacific SIDS states have highly dispersed populations, i.e. the small populations are spread out over vastly distant islands. These geographical factors mean that achieving greater energy security and access is critical and highly challenging.

The SIDS are heavily dependent on diesel for power generation with five of the seven target countries relying on diesel for over 85% of electricity generation, which has resulted in high electricity tariffs. The average supply cost for electricity across the Pacific is about \$0.47/kilo-watt hour (kWh), which is high by international standards<sup>2</sup>. The cost of diesel power generation is even higher for the smaller and more isolated grids. The high cost of electricity is negatively impacting economic growth. Overreliance on diesel generation also depletes limited foreign reserves

<sup>2</sup> 2016. Pacific Power Association, *Performance Benchmarking Report for Pacific Power Utilities*, 2014 Fiscal Year

and exposes the economies to diesel price spikes. A summary of sector data is presented below:

	Country	Population	Access to Energy
1.	COO	18,000	99%
2.	TON	106,000	89%
3.	RMI	53,000	87%
4.	FSM	111,000	65%
5.	PNG	8,230,000	<10%
6.	NAU	10,000	100%
7.	SAM	190,000	99%

**Renewable Energy.** All program SIDS recognize the benefits available by converting diesel systems to renewable energy generation and have established ambitious renewable energy targets. Barriers to achieving these renewable energy targets are (i) high upfront costs of renewable energy and limited financing options, (ii) lack of private sector investment, (iii) lack of capacity for planning and implementation, and (iv) need for sector reforms. Conversion to renewable energy will benefit the program countries through (i) improved balance of trade by reducing fossil fuel imports, (ii) improved energy security, (iii) downward pressure on tariffs, and (iii) reduced greenhouse emissions. The SIDS have made some recent progress in converting to renewable energy in recent years, for example:

- (i) Cook Islands has increased from 3% to 15% generation since 2013.
- (ii) Republic of Marshall Islands has increased from 0% to 5% generation since 2013.
- (iii) Samoa has more than doubled renewable energy capacity since 2013 from 7.5MW to 15.4MW.
- (iv) Tonga will more than double renewable energy generation from 5.4% in 2013 to 13% by 2018.
- (v) Nauru has increased from 1% to 3.2% generation since 2013.

While the above progress demonstrates a strong commitment by the respective Governments, there are significant investments still to be made to reach the ambitious targets. Investments to date have generally not required sophisticated battery storage and grid management systems, which are increasingly required as integration of intermittent renewable energy increases. In general, Pacific SIDS are not currently on track to meet their aggressive renewable energy targets.

**Access to energy.** Access to electricity across the program SIDS is relatively high, with the exception of FSM with an access rate of 65% and PNG which has an access rate <10%, which is the lowest of all ADB developing member countries. The low electrification rate is predominantly due to isolation of dispersed populations (small outer islands or isolated mountain villages) which results in (i) high costs for connection to centralized power grids, (ii) high costs for installation and operation of localized power systems, and (iii) capacity constraints related to operation and maintenance. The high cost of diesel generation leads to a disincentive for the corporatized power utility to connect extra customers where cost of supply exceeds revenue in high cost diesel centers.

**Regional Framework.** The regional *Framework for Action on Energy Security in the Pacific (FAESP) 2010-2020* was prepared by the Secretariat of Pacific Community, and was endorsed by Pacific Island leaders at the 41st Pacific Islands Forum, Vanuatu, 4-5 August 2010. FAESP assessed the threats to achieving energy security in the Pacific. It found that the threats arise from the interaction of a multitude of factors including: fast growing populations without economies to match; remoteness and distances from main centres and supply chain pathways; vulnerability of energy infrastructure to natural disasters such as cyclones, earthquakes, flooding and tsunamis; inability to take advantage of economies of scale due to small populations and limited industrial activity; old and poorly maintained energy infrastructure, such as electricity generation, transmission and distribution systems; lack of technical and safety standards for energy supply, conversion and consumption systems; pricing policies that do not encourage investment in maintenance; and inadequate understanding of the potential of locally available renewable energy sources.

**National Roadmaps.** Each of the SIDS have individual energy sector roadmaps, which detail national commitments to achieving regional targets established in the FAESP. A summary of the national energy sector roadmaps is presented below:

Country	Roadmap
1. COO	Cook Islands Renewable Energy Chart 2011-2020
2. TON	Tonga Energy Road Map 2010-2020
3. RMI	National Energy Policy and Energy Action Plan, 2009
4. FSM	Energy Policy (2012) and State Energy Action Plans (2013)
5. PNG	PNG Power Limited 15 Year Power Development Plan 2016-2030
6. NAU	Nauru Energy Road Map, 2014-2020
7. SAM	SAM Energy Sector Plan 2012-2016

**Intended nationally determined contribution (INDC).** All participating countries have recently submitted their INDC's to the UNFCCC, with climate change mitigation strategies and targets. These formal submissions are summarized in the following table:

	Total emissions Gg CO <sub>2</sub> eq	Contribution of electricity to emissions	Renewable electricity generation related target
COO	69.574 (2006)	34%	100% renewable energy by 2020
TON	300.54 (2006)	23%	50% of electricity generation from renewable sources by 2020; 70% by 2030.
RMI	150 (approx. 2005)	54%	Reduce emissions from energy by 66% in 2030
FSM	150 (2000)	42%	30% renewable energy by 2020
PNG	500-600 (2005)	Not specified	100% RE by 2030
NAU	80 (1990)	Not specified	The key mitigation intervention is to replace a substantial part of the existing diesel generation with solar systems.
SAM	352 (2004)	13%	100% renewable energy by 2025

**Vulnerability to Climate Change.** Due to their small size, remoteness, fragile economic structures, limited human resource pool and the challenging environment, the Pacific SIDS are exceptionally vulnerable to climate threats and climate change. This is particularly true for the more resource-poor countries and the outer-island groups. Overall estimates put the costs of preparing for climate change in the range 1.5 – 2.75% of the region's GDP.<sup>3</sup> Notably, energy infrastructure – power generation plants, electricity grids, power storage facilities – in the Pacific SIDS are vulnerable to degradation and destruction by climate events related to climate change. Conversely, having secure, low-carbon energy sectors will contribute to climate resilience across the region.

The concurrence of the above factors suggest that the Pacific SIDS face a unique, and potentially short-lived, opportunity to adopt a low carbon, resilient, socially equitable and economically efficient pathway for their energy sectors. The proposed program will assist in addressing the following barriers:

- **Technology barriers.** At low percentage of integration, intermittent renewable energy (e.g. wind and solar) is relatively straight forward to integrate onto a diesel grid. However, as integration increases towards the proposed renewable energy targets, integration becomes more complex and requires storage to manage transient supply, upgraded operating systems to manage dispatch, and increased capacity to manage multi-generational grids. This poses a significant risk to the smaller utilities with capacity constraints.
- **Government energy units and public utilities have low capacity.** This includes policy-making, managerial and technical capacity. Policy-making and coordination of investments is managed by small government energy units with a consequent low capacity to manage the power sector and absorb donors' support. Further, utilities suffer from a drain of qualified personnel, and develop 'generalist' staff, experienced in basic power systems, but with limited experience in design/implementation of major projects;

<sup>3</sup> The Economics of Climate Change in the Pacific, ADB, 2013

- **Tariff reform is required.** Although larger countries in the region have tariff setting regulation independent of utilities, in the smaller countries the tariffs are typically set by the utilities. Tariff settings which do not allow cost recovery can occur which results in under-investment in maintenance, requiring premature asset replacement. Tariffs at a level that allows utilities to generate sufficient revenues remains essential for sustainability;
- **Limited private sector involvement.** Investors are deterred by small project size, poor financial performance of power utilities and perceived political risk as well as off-taker risk. However there is a growing demand for Independent Power Producers (IPP's).
- **Limited availability of investment funds.** Rapidly transforming the sector will require substantial investments in the regional context in a short period of time. The ability of Pacific SIDS to access public and private financing for such investments is limited. Current available resources are insufficient to finance the structural shift from diesel generation to renewable energy.

## C.2. Project / Programme Objective against Baseline

*Describe the baseline scenario (i.e. emissions baseline, climate vulnerability baseline, key barriers, challenges and/or policies) and the outcomes and the impact that the project/programme will aim to achieve in improving the baseline scenario.*

### Cook Islands subproject

The Cook Islands has an aggressive national policy to achieve 100% renewable energy generation by 2020. Currently, 15% of national generation is by renewable energy. Approximately 84% of power is generated for consumption on the main island Raratonga, where there is currently about 3MW of installed solar capacity (approximately 2MW distributed rooftop solar and 1MW solar farm). The additional battery storage capacity under the subproject will enable an additional 6 MW of solar PV capacity to be connected to the grid, after which the Cook Islands' national electricity supply will be approximately 50% renewable energy.

### Program Technical Assistance

GCF financing will support project development of six subprojects which will be subsequently brought to the GCF Board for consideration. The estimated cost is \$10 million and will require 14 international consultants (256 months) and 3 national specialists (190 months) for project preparation in the six countries (Tonga, Republic of Marshall Islands, Federated States of Micronesia, Papua New Guinea, Nauru and Samoa). The TA will prepare an estimated 31 separate feasibility studies, as summarized below:

	Country	Feasibility Studies
1.	TON	Provincial mini-solar grids expansion
2.		Solar home system rollout
3-9.		Solar power plants (6 separate sites),
10-12.		Wind farm (3 separate sites)
13.	RMI	Majuro diesel control upgrades
14.		Majuro network strengthening
15.		Majuro solar power plant (2MW)
16.	FSM Yap	Yap Wind Farm (2x275kW)
17.		Floating solar power plant
18.	FSM Pohnpei	Pohnlangas Solar (9MW)
19.		Lehnmesi Hydropower
20.		Nankawad Hydropower
21.	FSM Chuuk	Provincial solar-diesel hybrid systems (9 sites)
22.		Solar home system rollout
23.	FSM Kosrae	Kosrae solar power plant (0.5MW)
24.		Distribution grid replacement/relocation
25.	PNG	Provincial renewable energy project
26.	NAU	Nauru solar power plant (8MW)
27.	SAM	Savaii Wind Farm (2.75MW)
28.		Savaii Hydro (2MW)
29-30.		Hydropower refurbishment project (2 plants damaged by Cyclone Evan
31.		Alaoa Flood Control Dam and Hydropower

### Overall Program

**Objective.** The program's objective is to transform the electricity production sectors across the Pacific to low carbon, climate resilient pathways. The program's outcome will be expanded access to clean, resilient and affordable energy.

**Baseline.** The program SIDS are highly dependent on diesel for energy and electricity generation, and this has many negative impacts, including GHG emissions. All countries are keen to rapidly increase the contribution of renewables and all have set ambitious official targets, mostly through their INDC. A summary of baseline data for the program SIDS is presented below:

Country	Current Renewable Energy %	National Renewable Energy Target	Annual Electricity Generation (MWh/annum)
1. COO	15%	100% by 2020	34,500
2. TON	13%	50% by 2020	55,400
3. RMI	2%	20% by 2020	101,000
4. FSM	5%	30% by 2020	72,000
5. NAU	3%	50% by 2020	31,700
6. PNG	50%	No target	217,250
7. SAM	48%	100% by 2017	140,000

In recent years, all SIDS have gained experience with integration of small amounts of intermittent renewable energy onto their grids. In the baseline the Pacific SIDS do face a great opportunity to rapidly transform to a low-carbon, renewable-based energy sector. Although the specific trends and barriers vary from country to country, several aspects of this opportunity are common across the region:

- The governments are strongly committed;
- The awareness and understanding of climate change, both mitigation and adaptation, has grown rapidly in recent years;
- In recent years all countries have gained some relevant experience, for example with solar PV, wind, hydro and and have started a process to develop capacity and to generate data and understanding;
- Several development partners are currently committed to supporting this process, including ADB, World Bank, Australia, New Zealand, Japan, European Union and the European Investment Bank;
- As the process to transform to renewables is still in the early stages, it is still possible to influence the process and ensure it delivers optimally on a range of benefits, not only energy security, but also on minimizing GHG emissions, ensuring climate resilience, and maximizing social access.

All countries in the region are highly exposed to climate threats and these are projected to increase with climate change. This increases the level of risk associated with infrastructure investments and increases the cost of investments. In the baseline, the response is to climate proof existing infrastructure, on a subproject by subproject basis. However, in the baseline, there is a need to go beyond climate proofing to develop new approaches and/or technologies that are climate resilient.

**Impact and outcomes.** The impact of the program will be conversion of the Pacific Island energy sector from fossil fuel based systems to low-carbon sustainable renewable energy based systems. The program's outcome will be expanded access to clean, resilient and affordable energy.

### C.3. Project / Programme Description

*Describe the main activities and the planned measures of the project/programme according to each of its components.*

#### Cook Islands subproject

The Government of the Cook Islands (GCI) is implementing a policy of having 100% renewable energy by 2020. Among the various islands, Rarotonga has the largest population, the largest electricity consumption, and presents the most technical complexity and challenges for implementing the 100% renewable energy policy. Almost 100% of the population on Rarotonga has grid-supplied electricity, which until recently was all supplied by diesel generation. As of late 2016, 3 MW of solar photovoltaic (PV) capacity was connected to the grid (grant funded), with an additional 1.2 MW expected to come online before year-end 2017. Converting to 100% renewable electricity is theoretically achievable with solar energy alone, but this will require an additional 2 MW of solar PV capacity and at least 60 megawatt-hours (MWh) storage. Ultimately this will eliminate conventional diesel use, although some biodiesel generation will be used as back-up. GCI and the Rarotonga utility (TAU) have committed to the 100% renewable electricity target by installing new high-speed diesels, certified to run on biodiesel, which will be used for back up generation in the future.

In 2016, cofinancing from the Global Environment Facility (GEF) was mobilized to fund a 1 MW / 4 MWh Energy Storage System (ESS) to be installed on Rarotonga. Lithium-ion battery technology has been specified for this subproject, which is hereafter referred to as the BESS subproject. With the 1 MW BESS subproject, total grid-connected solar capacity of just under 6 MW can be accommodated without compromising grid reliability, but additional storage and other grid enhancements are a prerequisite for further solar PV capacity additions. The BESS subproject is just the first step in the transformation of Rarotonga electricity system: at least 60 MWh of additional energy storage will be required to meet the 100% renewable energy target on Rarotonga, and additional storage capacity is needed before further expansion of grid-connected solar PV capacity.

The proposed GCF financing will include upscaling of battery storage and will comprise two components: (i) 1 MW / 4 MWh for grid stability, to be installed at the diesel power station; and (ii) 2 MW / 8 MWh for load shifting capability, to be installed at the airport. This additional storage capacity will enable an additional 6 MW of solar PV capacity to be connected to the grid, after which electricity supply on Rarotonga will be approximately 50% renewable energy. Based on the analysis of alternatives conducted for this study, battery storage is expected to be the preferred solution for this subproject, but the specific type of battery system is not being proposed at this point due to rapid evolution in various technologies with declining costs. The proposed design and detailed specifications including technology selection will be finalized going forward. This additional energy storage will allow variable solar output to be delivered to the grid as “firm” energy. The modelling undertaken shows that basic renewable energy output and grid reliability measures should improve with the subproject.

The subproject is being presented for financial support from the Green Climate Fund (GCF). Analysis of levelized costs of energy for diesel, solar PV, and storage indicate that the 100% renewable electricity objective can be achieved on a least-cost basis with solar PV plus storage and biodiesel-fired generation as back up. The subproject is economically and financially viable under ADB guidelines (EIRR > 12%, FIRR > WACC), but the financial rates of return are not sufficient to attract commercial [private sector] investment. Concessional funds are needed to ensure the subproject is implemented in a timely manner; otherwise the 100% renewable energy target may not be met by 2020. The subproject is a prototype for integration of energy storage with variable output renewable energy which can be replicated throughout the Pacific Region and in other developing and developed countries.

The proposed investment in battery storage will facilitate the transition of the grid to renewable energy which will increase the resilience of the power sector infrastructure. This is due to (i) reduced reliance on extended supply chains of diesel shipments which are subject to disturbance from cyclones, and (ii) decentralization of power generation sources which improves grid resilience by reducing reliance on single generation source (as is currently the case).

Program Technical Assistance (TA)

A TA will be established to address the sector barriers and upscale renewable energy in the target SIDS. The TA will implement the following activities:

- (i) Project preparation (GCF financed). The TA will prepare feasibility studies and conduct due diligence for renewable energy investments for subsequent subprojects, which will form the technical basis for GCF applications over the following three year period. Due diligence will include technical, economic, financial, governance (financial management, procurement, anticorruption and project management), safeguards (social and environment), poverty impact, gender and climate change.
- (ii) Sector reform and program support (ADB financed).
  - a. Sector planning documents. The TA will prepare sector planning documents required to underpin the grid transformation to renewable energy, including renewable energy roadmaps, grid integration studies, least cost generation analysis, and demand projection studies. While technical requirements vary between SIDS, all countries have requested support for development of planning documents.
  - b. Knowledge transfer. The TA will share technical and managerial lessons learnt between SIDS, who are often experiencing similar technical and management issues related to upscaling and integrating renewable energy on small grids. This knowledge will be shared between participating SIDS, and further across the Pacific region. Sharing of lessons learnt becomes increasingly important as grids move from small percentages of renewable energy integration to larger percentages where management of integration issues are more complicated. Knowledge sharing will occur by technical studies, social media, on-site tours, technical workshops and conferences. A knowledge dissemination plan will be prepared.
  - c. Capacity building. The TA will support capacity building of the implementing and executing agencies in each SIDS. Due to the small size of the SIDS, and limited human resources, capacity building is essential to support a smooth transition to renewable energy.
  - d. Sector Reform. Sector reform will include (a) utility reform, (b) tariff review and reform, and (c) regulatory reform. Sector reform requirements vary significantly between SIDS, however a number of SIDS have expressed interest in receiving support for their ongoing reform efforts. Successful sector reform relies on medium to long term dialogue, ongoing technical support and consistent Government commitment.
  - e. Private sector. The TA will support greater private sector participation by (a) screening opportunities for independent power providers (IPP's), (b) providing transaction advice, and (c) designing guarantee products, where appropriate.

The GCF financed component of the TA, which will prepare six subprojects for subsequent GCF Board consideration, will require 14 international consultants (256 months) and 3 national specialists (190 months) for project preparation in the six countries (Tonga, Republic of Marshall Islands, Federated States of Micronesia, Papua New Guinea, Nauru and Samoa). A summary of the anticipated consulting services required is summarized below:

**Summary of Tentative Consulting Services**

	<b>International Specialists</b>	<b>TON</b>	<b>RMI</b>	<b>FSM</b>	<b>PNG</b>	<b>NAU</b>	<b>SAM</b>
1.	Renewable Energy Engineer	12		10			
2.	Solar Power Engineer	8	2	8	6	10	
3.	Wind Power Engineer	6					6
4.	Hydropower Engineer			8			10
5.	Hydrologist						4
6.	Transmission and Distribution	8	8	8	10	4	4
7.	Battery Integration Specialist		2	6	6		
8.	Power Systems Engineer		3				
9.	Procurement Specialist	4	1	4	2	2	2
10.	Financial Specialist	3	2	8	2	2	3
11.	Economist	2	2	6	2	2	2
12.	Financial Management Specialist	2	1	4	1	2	2

13.	Social Safeguard Specialist	3	2	6	5	4	4
14.	Environment Specialist	2	2	6	2	4	4
<b>Total</b>		<b>50</b>	<b>25</b>	<b>74</b>	<b>36</b>	<b>30</b>	<b>41</b>
<b>National Specialists</b>							
1.	Power Engineer(s)	16	6	24	12		12
2.	Social Safeguard Specialists	12	4	24	6	6	8
3.	Environment Specialists	12	4	24	6	6	8
<b>Total</b>		<b>40</b>	<b>14</b>	<b>72</b>	<b>24</b>	<b>12</b>	<b>28</b>

### Overall Program Description

The Pacific Islands Renewable Energy Investment Program (Program) will assist seven Pacific SIDS to transition from diesel generation to renewable energy generation, and climate proof energy infrastructure. The Program will support investments in renewable energy, including but not limited to renewable energy generation (hydropower and grid-connected solar), storage systems for renewable energy, distribution and transmission, and energy access investments. It will also support sector reform, including (a) sector planning (roadmaps and grid integration studies), (b) power utility management reform and capacity building, (c) tariff review and reform, (d) review and revision of regulatory and policy frameworks, and (e) promotion of the private sector. The Program includes the following three outputs:

#### Output 1: Renewable Energy Generation, Storage, Transmission and Distribution

- 1.1: On-grid renewable energy generation. Investments in electricity generating plants based on renewable energy sources, notably solar PV, and hydropower.
- 1.2: Transmission and Distribution grids. Investments in the grids to ensure that they are fully compatible with the renewable energy sources, are highly efficient, and provide broad energy access as well as reductions in GHG emissions.
- 1.3: Battery storage. To complement the renewable energy plants, notably the solar PV systems, this component will invest and demonstrate effective, efficient storage of electricity.
- 1.4: Off grid RE generation. For those areas where grids are not practical and are currently using off-grid diesel energy, investments in off-grid renewable energy generation facilities.

#### Output 2: Energy Sector Reform

- 2.1: Sector planning (roadmaps and grid integration studies).
- 2.2: Power utility management reform and capacity building.
- 2.3: Tariff review and reform.
- 2.4: Review and revision of regulatory and policy frameworks, and
- 2.5: Promote private sector by identifying opportunities for independent power providers (IPP's) across the SIDS, providing transaction advice, designing guarantee products, and facilitating private sector investment.

#### Output 3: Climate Resilient Energy Infrastructure

- 3.1: Innovative climate resilient generation infrastructure, i.e. investments in electricity generation that are adapted to climate change and innovative for the region.
- 3.2: Climate resilient transmission and distribution, i.e. investments in electricity grids that are adapted to climate change and innovative for the region.
- 3.3: Climate proofing of energy sector infrastructure.

**Mitigation.** The proposed mitigation investments will include the following:

- Solar power generation (50MW at approximately 22 sites in 5 SIDS);
- Wind power generation (10MW at 5 sites in 3 SIDS);
- Hydropower generation (19MW at 8 sites in 2 SIDS);
- Energy storage facilities in 7 SIDS;
- Improved energy access; 25 renewable energy mini-grids (4 SIDS) and solar home systems (2 SIDS) and,
- Reduced greenhouse gas emissions; estimated 120,000 tCO<sub>2</sub>e/annum.

**Adaptation.** The proposed adaptation investments will include the following:

- Samoa: flood diversion dam/hydropower reservoir to prevent flash flooding after cyclone activities, and
- Yap State, FSM: floating solar panels on water reservoir to minimize evaporation and secure water supply;
- Kosrae State, FSM will relocate distribution lines which currently are located along the main island coastline and are being threatened by coastal erosion and storm-surge flooding;
- All infrastructure supported by the investment program will incorporate climate proofing into technical design.

A summary of proposed mitigation and adaptation investments per SIDS is summarized below:

1.	COO	Upscale Renewable Energy and IPP support: 3MW battery storage
2.	TON	Improved Energy Access: 6 mini-solar grids with battery storage, solar home systems Upscale Renewable Energy: 8MW grid-connected solar (6 sites), 6.6MW wind (3 sites), battery storage capacity of 9.8MW/ 21.1MWh
3.	RMI	Upscale Renewable Energy: diesel control upgrades, network strengthening, 2MW solar, battery storage
4.	FSM Yap	Upscale Renewable Energy: 2 wind turbines (2x275kW), battery storage Adaptation/Upscale Renewable Energy: 1.5MW floating solar
	FSM Pohnpei	Upscale Renewable Energy: 9MW Pohnlangas Solar, 5.5MW Lehnmesi/Nankawad Hydropower, battery
	FSM Chuuk	Improved Energy Access: 9 solar-diesel hybrid systems, solar home systems
	FSM Kosrae	Upscale Renewable Energy: 0.5MW solar, Adaptation: 42km distribution grid replacement/relocation
5.	PNG	Improved Energy Access: converting 10 provincial diesel centers to renewable energy (hydropower or solar)
6.	NAU	Upscale Renewable Energy: 8MW solar, battery storage
7.	SAM	Upscale Renewable Energy: Savaii Hydro (2MW), Savaii Wind Farm (2.75MW), rehabilitation of 2 hydropower plants damaged by Cyclone Evan (8MW) Adaptation: Alaoa Flood Control Dam and Hydropower (3MW)

**Program Approach.** The program approach is considered optimal to assist the region transition to a sustainable, resilient energy infrastructure future due to the following:

- (i) **Improved sector reform.** The program approach allows medium term engagement and support for sector reform. The TA will enter into early sector reform dialogue and provide ongoing technical support for reform programs. Sector reform requirements varies between SIDS but includes sector planning (roadmaps and grid integration studies), power utility management reform and capacity building, tariff review and reform, review and revision of regulatory and policy frameworks, and promotion of private sector investment. Medium term support for sector reform has continually been shown to be more effective than short term assistance.
- (ii) **Improved knowledge transfer.** The program approach allows comprehensive sharing of lessons learnt and innovative approaches between the participating SIDS, who are often experiencing similar technical and management issues. This becomes increasingly important as grids move from small percentages of renewable energy integration to larger percentages where management of integration issues become more important.
- (iii) **Improved Procurement.** The program approach allows bundling of equipment and works packages across countries. This will increase package sizes and therefore reduce costs. It will also attract additional bidders and encourage competition.
- (iv) **Improved Sector Planning.** Currently, medium term infrastructure planning is difficult due to lack of clarity over medium term funding, with development often being dependent on short term development partner funding availability. The program approach will provide medium term financing certainty which will assist in infrastructure planning and possibly encourage additional co-financing.
- (v) **Promotion of private sector.** through (i) identifying opportunities, (ii) targeting sovereign financing to supporting private sector, (iii) transaction advice, and (iv) provision of Guarantee Products.

- (vi) **Convening of stakeholders.** The implementation of a single initiative over many countries over many years will mobilize many stakeholders to participate in the initiative. This includes: (i) Pacific SIDS governments and regulators – who will be keen to benefit from the broad range of services and skills available; (ii) Pacific SIDS utilities – who will also be keen to benefit from the broad range of services and skills available; (iii) development partners – who appreciate the traction generated by such an initiative and will be committed to participating (iv) implementing and executing agencies, who will appreciate the opportunities for lesson learning and for increased efficiency;

#### C.4. Background Information on Project / Programme Sponsor (Executing Entity)

*Describe the quality of the management team, overall strategy and financial profile of the Sponsor (Executing Entity) and how it will support the project/programme in terms of equity investment, management, operations, production and marketing.*

##### Cook Islands subproject

The GCF Implementing Agency will be Te Aponga Uira (TAU). TAU will be responsible for day-to-day implementation. TAU is a government-owned power authority responsible for generation, distribution, and retailing of electricity on the main island of Rarotonga. Its operation is governed by the Te Aponga Uira O Tumu-Te-Varovaro Act 1991, Te Aponga Uira O Tumu-Te-Varovaro Amendment Act 1999, and the Cook Islands Investment Corporation Act 1992. TAU is mandated to provide reliable and economical energy, and to operate facilities efficiently and profitably.

An assessment of TAU's financial management was conducted in 2013 by the ADB during the preparation of the (now ongoing) Renewable Energy Sector Project. This assessment found that TAU has a sound accounting system following New Zealand's generally accepted accounting procedures. TAU has six qualified and experienced staff in its finance department. There had been no major accountability issues in the last 3 years.

According to the company's audited consolidated financial statements 2010–2013, total asset value increased at an annual average growth rate of 7% from NZ\$34.73 million to NZ\$44.75 million, and total owner's equity increased at an annual average growth rate of 8% from NZ\$32.01 million to NZ\$42.04 million. During the same time, gross revenue increased from NZ\$18.24 million to NZ\$21.18 million. TAU's financial performance was considered solid from 2010 to 2013; with no abnormal incident occurring over that period. In 2013, its operating ratio was around 92%, the return on net fixed assets was 3.7%, the current ratio was 9.66, and the debt to equity ratio was 1%. On-lending from the Ministry of Finance and Economic Management (MFEM) to TAU for the noncore subproject on Rarotonga was estimated at NZ\$2.45 million and was to bring the debt–equity ratio to less than 10%.

##### Program Technical Assistance

ADB will enter into Memorandum's of Understanding (MOU) for the program technical assistance with the executing and implementing agencies listed below in each country. The MOU's will detail the proposed scope of works, key responsibilities, implementation arrangements and implementation schedules.

##### Overall Program

The proposed executing and implementing agencies for each SIDS are summarized below:

Country	Executing Agency	Implementing Agency
1. COO	Prime Minister Office	Te Aponga Uira
2. TON	Ministry of Finance and National Planning	Tonga Power Limited
3. RMI	Ministry of Resources and Development	Marshalls Energy Company
4. FSM	Department of Resources and Development	Chuuk Public Utility Corporation Kosrae Utilities Authority Pohnpei Utilities Corporation Yap State Public Service Corporation
5. NAU	Ministry of Finance	Nauru Utility Corporation
6. PNG	Department of Petroleum and Energy	PNG Power Ltd
7. SAM	Ministry of Finance	Electricity Power Corporation

A summary of the responsibilities of the executing and implementing agencies is summarized below:

Executing Agency	<ul style="list-style-type: none"> <li>➤ Oversee implementation of the project.</li> <li>➤ Responsible for overall management of the project.</li> </ul>
Project Steering Committee	<ul style="list-style-type: none"> <li>➤ The PSC will be chaired by the Executing Agency and will have the members from key Government Departments.</li> <li>➤ Oversee implementation of the project.</li> <li>➤ Monitor progress of the project.</li> <li>➤ Rectify issues hindering progress of the project.</li> <li>➤ Guide the executing agency and the implementing agency.</li> <li>➤ Meet at least once each quarter.</li> </ul>
Implementing Agency	<ul style="list-style-type: none"> <li>➤ Implement the infrastructure components of the project.</li> <li>➤ Coordination of steering committee meetings.</li> <li>➤ Establish a Project Management Unit which will be responsible for day to day implementation of the projects, including: <ul style="list-style-type: none"> <li>➤ preparation of an overall implementation plan and annual budgets;</li> <li>➤ overall interagency coordination;</li> <li>➤ recruitment of the Project Management Consultants and award procurement and consulting contracts,</li> <li>➤ management of the bidding process,</li> <li>➤ management of capacity development activities,</li> <li>➤ project safeguards document preparation and safeguard plans implementation;</li> <li>➤ project financial management;</li> <li>➤ consolidation, review, and submission of regular progress and financial reports to Treasury, including the annual audit report and financial statements;</li> <li>➤ monitoring and evaluation of project outputs and results;</li> <li>➤ preparation of withdrawal applications for MoFT</li> </ul> </li> </ul>
Asian Development bank	<ul style="list-style-type: none"> <li>➤ Project financier and overall project administrator of the project on behalf of GCF</li> <li>➤ Lead on conducting regular project reviews</li> <li>➤ Monitor and support implementation and compliance with ADB policies and procedures in relation to technical, economic, financial, procurement, safeguards, governance, and anticorruption policies and procedures.</li> <li>➤ Overall coordination and advisory support.</li> </ul>

### C.5. Market Overview (if applicable)

*Describe the market for the product(s) or services including the historical data and forecasts.*

*Describe the competitive environment including the list of competitors with market shares and customer base and key differentiating factors (if applicable).*

*Provide pricing structures, price controls, subsidies available and government involvement (if any).*

Not applicable

### C.6. Regulation, Taxation and Insurance (if applicable)

*Provide details of government licenses or permits required for implementing and operating the project/programme, the issuing authority, and the date of issue or expected date of issue. Describe applicable taxes and foreign exchange regulations. Provide details on insurance policies related to project/programme.*

#### Cook Islands subproject

TAU is responsible for operating all electricity generation and transmission facilities on the island of Rarotonga. TAU will be responsible for ensuring all necessary permits are obtained and all necessary licenses issues for project development. TAU has been implementing similar projects for many years and has efficiently obtained all

necessary permits and licenses without causing any delays or other costs. ADB financed projects in Cook Islands are tax exempt, including import tax. There are no regulations that affect the import foreign currency as applicable under this project.

#### Overall Program

Each implementing agency has legislated authority for supply of electricity in their respective SIDS. Supply of electricity from independent power providers is either contracted directly to the power utility or covered by a licensing agreement with the Government. Project development permits (safeguard, development approval etc) are required based on country specific legislation and regulations. Taxes and duties on ADB financed projects are generally exempt, however application of this exemption varies between countries.

### C.7. Institutional / Implementation Arrangements

*Please describe in detail the governance structure of the project/programme, including but not limited to the organization structure, roles and responsibilities of the project/programme management unit, steering committee, executing entities and so on, as well as the flow of funds structure. Also describe which of these structures are already in place and which are still pending. For the pending ones, please specify the requirements to establish.*

#### Cook Islands subproject

The Implementing Agency in Cook Islands will be Te Aponga Uira (TAU). TAU is a government-owned power authority responsible for generation, distribution, and retailing of electricity on the main island of Rarotonga. TAU will be responsible for day-to-day implementation. TAU is responsible for operating all electricity generation and transmission facilities on the island of Rarotonga. TAU will be responsible for ensuring all necessary permits are obtained and all necessary licenses issues for project development. TAU has been implementing similar projects for many years and has efficiently obtained all necessary permits and licenses without causing any delays or other costs. TAU has demonstrated strong internal capacity for operating and maintaining power assets over an extended period. A Project Implementation Unit (PIU) will be established under TAU and will be responsible for procurement of all civil works and goods contracts, and monitor subproject activities.

**Disbursement Arrangements.** The loan and grant proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2015, as amended from time to time), and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.<sup>4</sup> Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control. Pursuant to ADB's Safeguard Policy Statement (2009) (SPS), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS.

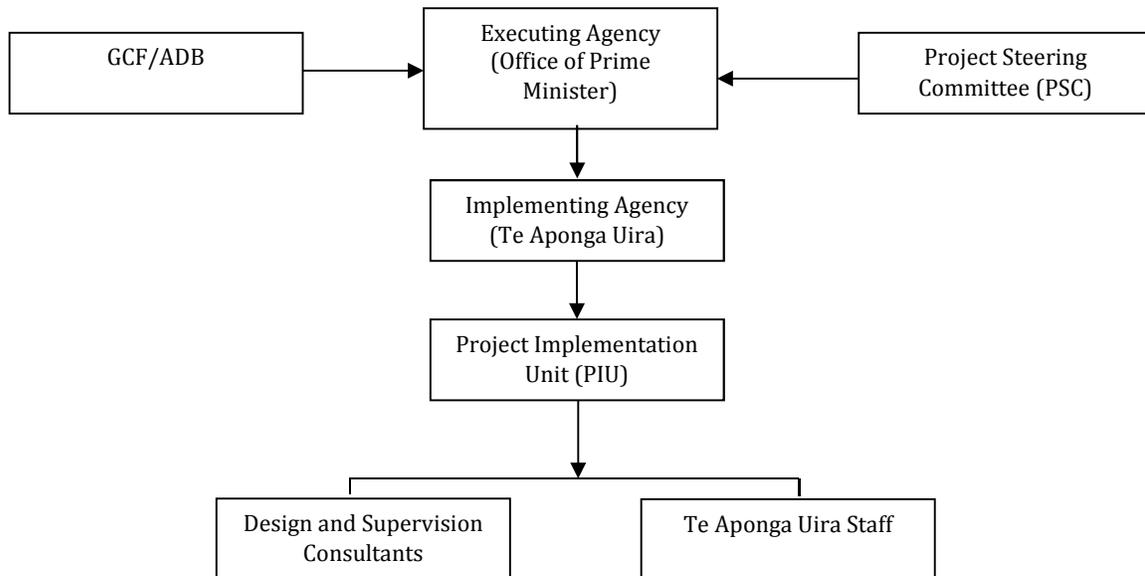
Only reimbursement and direct payment procedures will be used under the subproject. Imprest Accounts and Statement of Expenditures will not be used. The Project Management Unit (PMU) will be responsible for preparing disbursement projections. Te Aponga Uira will maintain project accounts. The PMU will coordinate internally within Te Aponga Uira to arrange allocation of counterpart funds for individual projects. The PMU will be responsible for collecting supporting documents, preparing withdrawal applications and submitting to Ministry of Finance, who will be responsible for screening withdrawal applications and submitting to ADB.

Before the submission of the first withdrawal application, the government should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is US\$100,000 equivalent. Individual payments below this amount should generally be paid by Te Aponga Uira and subsequently claimed to ADB through reimbursement, unless otherwise accepted by ADB. ADB reserves the right not to accept withdrawal applications below the minimum amount. Withdrawal applications and supporting documents will demonstrate, among other things that the goods, and/or services were produced in or

<sup>4</sup> Disbursement eLearning. [http://wpqr4.adb.org/disbursement\\_elearning](http://wpqr4.adb.org/disbursement_elearning)

from ADB members, and are eligible for ADB financing. All procurement will be undertaken in conformity with ADB's *Procurement Guidelines* (March 2015, as amended from time to time)<sup>5</sup> and ADB's *Guidelines on the Use of Consultants* (March 2013, as amended from time to time).<sup>6</sup>

The subproject organizational structure is presented below;



#### Program Technical Assistance (TA)

It is estimated that preparation of feasibility studies, support for sector reform and program support will cost \$15 million. ADB has allocated \$5 million to support sector reform and program support. The proposed GCF grant funding for the TA (\$10 million) is required to prepare subsequent subprojects in the participating SIDS.

The TA will be administered by ADB, in close consultation with participating SIDS. Scope of works will be determined in consultation with the implementing agency and the executing agency in each participating country, as listed in Section C.4. Following consultation a memorandum of understanding will be signed with each participating SIDS outlining the agreed scope of works. A project steering committee will oversee implementation, monitor progress, and provide guidance to the executing agency in each Pacific SIDS.

One or more consulting firms will be engaged using the quality- and cost-based selection (QCBS) method with a quality–cost ratio of 90:10. Usage of individual consultant selection, framework agreement or indefinite delivery contracts may also be considered. All consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time). The proceeds of the TA will be disbursed in line with ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time).

The TA will be implemented over a 5-year period between March 2017 and March 2022. Project Implementation Units (PIU's) will be established within each implementing agency in each country to implement the subprojects. The national PIU's will provide the services of counterpart staff where available. The national PIU's will be responsible for procurement of all civil works and goods contracts. A project steering committee (PSC) will be established in each participating country to oversee implementation, monitor progress, and provide guidance to the implementing agency. The PSC will meet at least quarterly and will be chaired by the national executing

<sup>5</sup> Available at: <http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf>

<sup>6</sup> Available at: <http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf>

agency. The respective national PIU will host the project steering committee and will act as the secretariat.

The TA will also establish a regional FSU (financed by ADB), which will:

- (i) provide centralized technical and procurement support to the national PIU's established in each participating SIDS;
- (ii) engage and manage consultants for project preparation and detailed engineering, and support for sector reform;
- (iii) conduct early sector reform discussions with all participating SIDS and provide technical assistance, which will allow for early engagement and adequate time for reform implementation prior to investment decisions<sup>7</sup>;
- (iv) disseminate technical and procurement lessons learnt between national PIU's;
- (v) identify options for bulk procurement (equipment, civil works and independent power providers), and
- (vi) identify opportunities for private sector investment.

#### Overall Program

**ADB Procedures.** For each subproject, working closely with concerned government and utility, ADB will oversee the preparation of the appraisal and design documents. ADB will apply its internal processes and procedures to all activities and subprojects to ensure full feasibility (technical, economic, financial) and due diligence. ADB appraisal and review process will ensure that each subproject, before being submitted to GCF, is fully in line with GCF and ADB requirements for this Program.

**Project Management Units.** Project Implementation Units (PIU's) will be established within each implementing agency to implement the subprojects. The national PIU's will provide the services of counterpart staff where available. The national PIU's will be responsible for procurement of all civil works and goods contracts. The TA will finance additional consultants and equipment to support the PIU in implementing the outputs. The TA will also establish a regional PMU, based in either ADB headquarters, Manila or a centralized location in the Pacific. The regional PMU will:

- (vii) provide centralized technical and procurement support to the national PMU's established in each SIDS;
- (viii) engage and manage consultants for subproject preparation, design and construction supervision, and support for sector reform;
- (ix) conduct early sector reform discussions with all participating SIDS and provide technical assistance, which will allow for early engagement and adequate time for reform implementation prior to investment decisions<sup>8</sup>;
- (x) disseminate technical and procurement lessons learnt between national PMU's;
- (xi) identify and facilitate bulk procurement (equipment, civil works and independent power providers), and
- (xii) identify opportunities for, and design guarantee funds to support private sector investment.

**Consultant Recruitment.** A single or multiple consulting firm(s) will be engaged for subproject preparation, detail design, tendering and subproject supervision for one or multiple subprojects, using the quality- and cost-based selection method with a quality-cost ratio of 90:10. Individual consultant selection will be used to hire consultants for the regional PMU. All consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants (2015, as amended from time to time)*. A subproject steering committee will oversee implementation, monitor progress, and provide guidance to the executing agency in each SIDS. The regional PMU will (i) provide oversight over the consulting firm(s), (ii) support the national PIUs, including sharing of lessons learnt between PIUs, (iii) provide independent technical review between feasibility and detail design, and (iv) monitor and report on processing and implementation progress. Since ADB will be administering co-financing resources, universal procurement will apply to all procurement packages under the subproject.

<sup>7</sup> Medium to long term engagement on sector reform by a centralized project support unit with medium to long term financing through a facility is considered preferable to project by project short term engagement on sector reform.

<sup>8</sup> Medium to long term engagement on sector reform by a centralized PMU with medium to long term financing is considered preferable to subproject by subproject short term engagement on sector reform.

### C.8. Timetable of Project/Programme Implementation

*Please provide a project/programme implementation timetable in section I (Annexes). The table below is for illustrative purposes. If the table format below is used, please refer to the activities as numbered in Section H. In the case of outputs, please mark when all the required activities will be completed.*

#### Cook Islands subproject Implementation Plan

Activity	2016		2017			2018			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Turnkey Bidding Documents and Bidding	X	X	X	X					
Turnkey Contract Award					X				
Construction						X	X	X	
Interim Evaluation							X		
Commissioning and Test Run									X
O & M Training by Turnkey Contractor									X
Final Evaluation									X

#### Program Technical Assistance Implementation Schedule

		Engage Consultants	Prepare Feasibility Studies	GCF Board Approval	ADB Approval
1.	TON	Q1 2017	Q1-Q2 2017	Q2 2017	Q3 2017
2.	RMI	Q1 2017	Q1-Q3 2017	Q3 2017	Q4 2017
3.	FSM	Q2 2017	Q2 2017 – Q2 2018	Q3 2018	Q4 2018
4.	PNG	Q3 2017	Q3 2017 – Q2 2018	Q3 2018	Q4 2018
5.	NAU	Q2 2017	Q3 2017 – Q2 2018	Q4 2018	Q1 2019
6.	SAM	Q2 2017	Q3 2017 – Q4 2018	Q4 2018	Q1 2019

## D.1. Value Added for GCF Involvement

*Please specify why the GCF involvement is critical for the project/programme, in consideration of other alternatives.*

### Cook Islands subproject

The Cook Islands have an opportunity to transform to a low carbon, resilient electricity sub-sector. However, without significant support, this is uncertain and will take an extended period. With support from GCF and other partners, it should be possible to quickly take renewable energy electricity generation (and associated storage) in the Cook Islands to a 'tipping point', from where private and national investment can quickly achieve the renewable energy targets. The targeted support currently required in Cook Islands is installation of battery storage to catalyse private sector to upscale renewable energy. Battery storage is not considered suitable as a standalone private sector investment and due to ongoing restrictions in sovereign and commercial financing, investment in battery storage requires GCF support.

### Overall Program

GCF involvement in financing the Pacific Islands Renewable Energy Investment Program is critical for the following reasons:

- (i) **Fill the financing gap.** The financing required to transition the Pacific energy infrastructure asset base from diesel to renewable energy significantly exceeds available sovereign financing sources through traditional multilateral and bilateral sources. In addition, attracting private sector interest to most of the countries is difficult, and commercial financing is limited. GCF is uniquely positioned to introduce financing at scale to overcome the initial renewable energy investment hurdle (diesel generators are inexpensive to buy and expensive to operate, while renewable energy has a high investment hurdle but are inexpensive to operate). Without GCF, the seven countries are unlikely to access sufficient financing to reach their renewable energy targets and will continue to rely on fossil fuels for power generation.
- (ii) **Improve access to financing.** Many of the smaller SIDS have economies with history of debt distress and relatively weak economies so are unable to attract sovereign debt. For example, ADB does not provide loans to three of the seven SIDS (grant-only) and a further two are only eligible for a blend of grant and relatively small allocations of highly concessional lending<sup>9</sup>. Additionally, due to national debt headroom limitations, many SIDS are unable to borrow. They are therefore reliant on relatively small amounts of external grant financing for infrastructure development, which is generally inadequate and sporadic in nature, which makes sector planning difficult. Without grant support from GCF, many of the countries will be unable to access sufficient funding to transition to renewable energy.
- (iii) **Facilitate community service obligations.** The energy access components (solar mini-grids, hybrid grids solar home system and grid expansion) are beneficial from a social perspective and have strong economic rationale, however are rarely financially viable. As a result they are generally funded through community service obligations, rather than by corporatized power utilities. Due to budget limitations for the SIDS, the energy access components are unlikely to be funded and are therefore reliant on GCF grant support.
- (iv) **Provide adaptation financing.** The adaptation components are relatively expensive and may not be financed through Government budget given tight fiscal conditions. As discussed above, financing options are limited. Examples include (i) relocating distribution grids in Kosrae to avoid coastal erosion, (ii) installing floating solar panels on water storage compounds to Yap to minimize evaporation and secure water supply, and (iii) constructing dual purpose flood diversion dam and hydropower reservoir in Samoa

<sup>9</sup> ADB grant only countries consist of Republic of Marshall Islands, federated States of Micronesia and Nauru. Additionally Samoa and Tonga are only eligible for a blend of grant and small amounts of concessional lending.

to prevent recurrence of flash flooding.

In addition, GCF financing introduces the following benefits:

- (i) The GCF is aligned with the UNFCCC and has an objective to reduce GHG emissions. The countries in the region are committed to implementing the UNFCCC and reducing GHG emissions, however, they recognize that they require political and financial support from within the UNFCCC framework. As a UNFCCC associated mechanism, GCF support will receive full political support from the participating countries;
- (ii) GCF commitment to the Pacific region. The GCF has demonstrated its commitment to investing in the Pacific for both climate change adaptation and mitigation. This has led to a constructive atmosphere of trust and mutual support between GCF and Pacific SIDS. For this reason the countries and stakeholders in the region are committed to supporting GCF initiatives;
- (iii) GCF neutrality and GCF's ability to facilitate and coordinate stakeholders. The countries and stakeholders in the region recognize that GCF is neutral and this gives it the ability to facilitate many initiatives and reforms in countries that other development partners cannot. This also gives it the ability to convene stakeholders – from both within the region and development partners;

## D.2. Exit Strategy

*Please explain how the project/programme sustainability will be ensured in the long run, after the project/programme is implemented with support from the GCF and other sources, taking into consideration the long-term financial viability demonstrated in E.6.3. This should include a description of strategies for longer term maintenance of physical assets (if applicable).*

### Cook Islands subproject

The proposed battery storage investments in Cook Islands are considered to be sustainable due to:

- (i) The battery storage is required to allow increased integration of renewable energy, particularly from the private sector. Once the additional renewable energy is constructed, TAU will become reliant on the battery storage for a significant proportion of its revenue, and therefore has a strong incentive for operating and maintaining the battery storage.
- (ii) TAU has demonstrated strong internal capacity for operating and maintaining power assets over an extended period.

The Cook Islands Government has demonstrated strong governance in establishing regulatory systems which have provided adequate revenue generation for operation and maintenance of power sector assets.

### Overall Program

The program will support seven SIDS transition from diesel generation to sustainable power generation based on renewable energy. The transition is considered sustainable due to the following:

- (i) Firstly, renewable energy on all grids will be least cost compared to diesel, and given the decline in cost of renewable energy, it is considered unlikely the SIDS will revert to diesel generation.
- (ii) Secondly, all assets will be incorporated into the national power utility asset base, and operated and managed accordingly. All national power utilities are corporatized and most have adequate management capacity and a tariff regime sufficient for full cost recovery which allows for adequate operation and maintenance.
- (iii) Thirdly, where deficiencies are identified in utility management or tariff regimes during project preparation, the program will support reform dialogue and provide technical assistance.
- (iv) Finally, once the initial barriers to renewable energy are addressed and the transition to renewable energy is largely complete, it is expected that traditional financing sources will become engaged in financing of upgrades or refurbishments of renewable energy assets.

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's [Investment Framework](#), should be addressed where relevant and applicable. This section should tie into any request for concessionality made in [section B.2](#).

## E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

### E.1.1. Mitigation / adaptation impact potential

*Specify the mitigation and/or adaptation impact, taking into account the relevant and applicable sub-criteria and assessment factors in the Fund's investment framework. When applicable, specify the degree to which the project/programme avoids lock-in of long-lived, high emission or climate-vulnerable infrastructure.*

#### Cook Islands subproject

The Cook Islands subproject will (i) displace approximately 7,884 MWh per year of diesel generation, and (ii) reduce an estimated 6,370 tCO<sub>2e</sub> per year greenhouse gas emission. The proposed subproject will install battery storage systems which will allow an increase in renewable energy generation by 6 MW, which will enable Cook Islands to increase their renewable energy percentage from 15.0% to 49.6%.

#### Overall Program

The impact of the program will be a transformational shift away from the traditional reliance on fossil fuels toward a greater emphasis on renewable energy systems and reduced GHG emissions. The program will result in the following impact to the renewable energy mix and greenhouse gas emissions:

		Renewable energy current %	Renewable energy after program %	National renewable energy target %	Estimated Reductions in CO <sub>2</sub> emissions (tCO <sub>2e</sub> /annum)
1.	COO	15%	50%	100% by 2020	7,000
2.	TON	13%	57%	50% by 2020	20,000
3.	RMI	2%	6%	20% by 2020	10,000
4.	FSM	5%	TBD	30% by 2020	19,000
5.	PNG	50%	TBD	No target	21,000
6.	NAU	3%	38%	50% by 2020	10,000
7.	SAM	48%	TBD	100% by 2017	33,000
Total					120,000

COO = Cook Islands, TON = Tonga, RMI = Republic of Marshall Islands, FSM = Federated States of Micronesia, PNG = Papua New Guinea, NAU = Nauru, SAM = Samoa

**Mitigation.** The proposed mitigation investments will include the following:

- Solar power generation (50MW at approximately 22 sites in 5 SIDS);
- Wind power generation (10MW at 5 sites in 3 SIDS);
- Hydropower generation (19MW at 8 sites in 2 SIDS);
- Energy storage facilities in 7 SIDS;
- Improved energy access; 25 renewable energy mini-grids (4 SIDS) and solar home systems (2 SIDS) and,
- Reduced greenhouse gas emissions; estimated 120,000 tCO<sub>2e</sub>/annum.

**Adaptation.** The proposed adaptation investments will include the following:

- Samoa: flood diversion dam/hydropower reservoir to prevent flash flooding after cyclone activities, and
- Yap State, FSM: floating solar panels on water reservoir to minimize evaporation and secure water supply;

- Kosrae State, FSM will relocate distribution lines which currently are located along the main island coastline and are being threatened by coastal erosion and storm-surge flooding;
- All infrastructure supported by the investment program will incorporate climate proofing into technical design.

The program will lock in long-lived low emission infrastructure and climate resilient power sector infrastructure.

### E.1.2. Key impact potential indicator

*Provide specific numerical values for the indicators below.*

#### Cook Islands subproject

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO <sub>2</sub> eq) to be reduced or avoided (Mitigation only)	Annual	6,370
		Lifetime	95,550
	<ul style="list-style-type: none"> <li>• Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</li> <li>• Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)</li> </ul>	Total	10,000 (5,000 female)
		Percentage (%)	-
Other	As above.		

*Provide specific numerical values for the indicators below.*

#### Overall Program

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO <sub>2</sub> eq) to be reduced or avoided (Mitigation only)	Annual	120,000
		Lifetime	3,000,000
	<ul style="list-style-type: none"> <li>• Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</li> <li>• Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)</li> </ul>	Total	580,000
		Percentage (%)	-
Other	As above.		

*Describe the detailed methodology used for calculating the indicators above.*

Emissions factor for diesel generator sets is 0.808 tCO<sub>2e</sub>/MWh assuming 33% efficiency. A 3MW battery storage system enables full output of 6 MW PV (at 15% plant load factor) directly displacing diesel generation. GHG reduction is 6 MW x 8760 hours/year x 0.15 x 0.808 tCO<sub>2e</sub>/MWh = 6,370 tCO<sub>2e</sub>/year. Over a 25 year lifetime, this equates to a total reduction of 159,256 tCO<sub>2e</sub>.

*Describe how the project/programme's indicator values compare to the appropriate benchmarks (i.e. the indicator values for a similar project/programme in a comparable context).*

Cook Islands subproject

**Mitigation**

The COO subproject will reduce an estimated 95,550 tCO<sub>2e</sub> for a total project cost of \$16 million (generation components only) at a rate of \$167 per tCO<sub>2e</sub>. As this is the first GCF mitigation investment for the Pacific region, comparison has been made with Solomon Islands: Solar Power Development Project. \$290 per tCO<sub>2e</sub>. Hence the proposed program compares favorably with appropriate benchmarks of similar renewable energy projects in the Pacific.

**Adaptation**

The COO subproject will benefit 10,752 beneficiaries, at a cost of \$16 million, or approximately 0.67 beneficiaries/\$1,000 of GCF invested. By comparison:

- Tuvalu coastal adaptation Project, approved by GCF in June 2016, will have 6,600 beneficiaries for \$36 million of GCF investment – 0.18 beneficiaries/\$1,000.
- Fiji Urban Water Supply and Wastewater Management Project, will have 290,854 beneficiaries for \$31 million of GCF investment – 9.4 beneficiaries/\$1,000.

Hence the project compares favourably to the Tuvalu Project – more than five times the number of beneficiaries per \$ invested, but less favourably to the Fiji Project. This reflects the fact that the population density on Fiji is relatively high compared to most other Pacific SIDS.

**E.2. Paradigm Shift Potential**

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

**E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)**

*Describe how the proposed project/programme's expected contributions to global low-carbon and/or climate-resilient development pathways could be scaled-up and replicated including a description of the steps necessary to accomplish it.*

The program has been designed to achieve a paradigm shift in the Pacific region, to help rapidly move the Pacific SIDS from their current energy pathway that is almost entirely dependent on fossil fuels, to a pathway that is low-carbon, climate resilient and provides greatly increased levels of access to marginalized populations in states where this is currently low. The program will support the following paradigm shifts:

- (i) **Transition to low-carbon energy sector through renewable energy.** The proposed comprehensive program will create a paradigm shift by supporting the SIDS to overcome the investment and technical barriers to higher integration percentages. Most of the Pacific Islands have limited options for upscaling renewable energy apart from solar power, and relatively small amounts of wind power. Some countries have hydropower resources, however where they exist, these have largely been fully developed. A low carbon renewable energy future for most countries will include significant investment in grid connected intermittent solar and wind with large storage facilities (mainly battery). The main issue with wind and solar is its fluctuating generation (e.g. when a cloud goes over a solar farm it can lose 80% of its generation within minutes), and its unreliability as baseload (wind is unreliable and solar is only available during the day). These technical integration issues pose significant challenges on small grids managed by utilities with relatively low capacity. To date, most Pacific countries have gained valuable experience with small percentages of grid connected solar and wind, which existing diesel generators can integrate without significant issues. However, as integration percentages increase, the relatively simple diesel grids require (i) upgrades to the diesel generators to grid management systems, (ii) installation of battery storage to level out the intermittent generation, and (iii) installation of battery storage to store power. In general, the Pacific is just commencing the investment cycle to allow increased renewable energy integration, and significant

challenges remain. The involvement of GCF allows the major barriers to be addressed on a scale which would not otherwise be possible. By approaching the issues on a Pacific regional scale, the sector will be transformed to a point where renewable energy technology is the normal and capacity is built to a point where systems can be managed.

- (ii) **Increased private sector engagement.** The program will support a paradigm shift of introducing private sector to support the structural shift towards renewable energy. This will be particularly important in SIDS which are unable to mobilize sufficient sovereign financing and require technical support to manage the transition.
- (iii) **Improved energy access.** There are currently significant disincentives for Pacific Island corporatized power utilities to increase access for customers from high cost diesel based generation centers. Most Pacific countries lack budget to support rural electrification programs. Renewable energy for rural electrification offers a paradigm shift as low cost power generation will allow power utilities to extend grids and improve access at lower power generation costs.
- (iv) **Increased knowledge sharing.** The program approach offers enhanced opportunities for sharing of lessons learnt between SIDS's. This will be facilitated by the regional project management unit and enhanced through regional workshops and knowledge products.

#### E.2.2. Potential for knowledge and learning

*Describe how the project/programme contributes to the creation or strengthening of knowledge, collective learning processes, or institutions.*

The program will include a centralized PMU which will share lessons learnt across the SIDS. This will include (i) technical lessons learnt on integration issues, (ii) procurement support, and (iii) sector reform lessons learnt. Given that there is a lot of commonality across the countries with renewable energy opportunities, barriers and solutions, there is considerable potential for lesson learning. Sharing of lessons learnt will include:

- the creation of knowledge products (website, lesson learnt files, guidance documents);
- the provision of opportunities for inter-island visits to observe successes and lesson learnt;
- cooperation with regional stakeholders and regional coordination bodies.

#### E.2.3. Contribution to the creation of an enabling environment

*Describe how proposed measures will create conditions that are conducive to effective and sustained participation of private and public sector actors in low-carbon and/or resilient development that go beyond the program.*

Cook Islands subproject

The proposed investment in battery storage is specifically designed to enable the Cook Islands Government to upscale the involvement of IPP's. The conversion of the grid to renewable energy is considered sustainable as;

- (i) The battery storage is required to allow increased integration of renewable energy, particularly from the private sector. Once the additional renewable energy is constructed, TAU will become reliant on the battery storage for a significant proportion of its revenue, and therefore has a strong incentive for operating and maintaining the battery storage.
- (ii) TAU has demonstrated strong internal capacity for operating and maintaining power assets over an extended period.
- (iii) The Cook Islands Government has demonstrated strong governance in establishing regulatory systems which have provided adequate revenue generation for operation and maintenance of power sector assets.

Overall Program

The overall investment program will create an enabling environment which will encourage the following:

- (i) **Public sector utilities.** The program will convert diesel generation assets to low carbon infrastructure (renewable energy).
- (ii) **Private sector contracting industry.** The large scale of the program will encourage private sector contractors into the Pacific to support the growing market.
- (iii) **Private sector Independent Power Providers (IPP).** The program will identify and support potential IPP transactions.

*Describe how the proposal contributes to innovation, market development and transformation. Examples include (i) introducing and demonstrating a new market or a new technology in a country or a region, (ii) using innovative funding scheme such as initial public offerings and/or bond markets for projects/programme*

The program includes several innovative technologies and approaches. Most are innovative for the region, some are innovative at a global level. These include:

- **Battery storage at scale.** This is new to the region and relatively new globally. There is still much to be learnt in terms of appropriate technologies, performance, integration into transmission networks, operation and maintenance, etc;
- **Risk guarantees.** While this is a common financing modality in other regions, there are no examples currently in the Pacific SIDS. The Regional PMU will enter into dialogue with all SIDS's to identify potential applications for guarantee funds. The Regional PMU will then design and implement as required.
- **IPP market development.** By promoting private sector development and bundling transactions, the program will develop the IPP market in the Pacific.

E.2.4. Contribution to regulatory framework and policies

*Describe how the project/programme strengthens the national / local regulatory or legal frameworks to systematically drive investment in low-emission technologies or activities, promote development of additional low-emission policies, and/or improve climate-responsive planning and development.*

Cook Islands subproject

The Cook Islands has received significant support for sector reform in recent years and has implemented key sector reform. The technical assistance will provide capacity building support for the power utility (TAU) to manage the increased integration of renewable energy.

### Overall Program

The proposed program will include a \$5 million technical assistance package (ADB funded) which will include the following sector reform activities. These activities will build on the ongoing reform in each country and will include:

- Sector planning (roadmaps and grid integration studies).
- Power utility management reform and capacity building.
- Tariff review and reform.
- Review and revision of regulatory and policy frameworks, and
- Promote private sector by identifying opportunities for independent power providers (IPP's), providing transaction advice and designing guarantee products.

## E.3. Sustainable Development Potential

### Wider benefits and priorities

#### E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

**Environmental co-benefits.** The anticipated environmental co-benefits from the program include the following:

- (i) Reduction in local air pollution and noise impacts on local communities from closing down or reducing the use of diesel generated electricity.
- (ii) Reduced use of diesel will lower risk of fuel spills and land/water contamination (both at sea when transporting the fuel and on land when stored or being used).

**Social co-benefits.** The anticipated social co-benefits from the program include the following:

- (i) Improved reliability of power supply on some grids will support household income generating activities.
- (ii) Improved affordability of power supply will reduce household expenditure on energy, releasing income for alternative uses such as education and food.
- (iii) Increased access to electricity in PNG will result in significant social benefits, including improved education, income generation at household levels, reduced household expenditure on kerosene, lowered fire risk from kerosene lighting, and reduced fuel wood consumption.

**Economic co-benefits.** The anticipated economic co-benefits from the program include the following:

- (i) Improved reliability of power supply supports local businesses.
- (ii) Downward pressure on tariffs supports business activity, including household income generation and small local businesses.
- (iii) Improved access to electricity.
- (iv) Reduced fuel importation improves the national bill of payments and improves national energy security.
- (v) Increased local jobs.
- (vi) Improved balance of payments.
- (vii) Benefit to tourism sector.

**Gender co-benefits.** The anticipated gender co-benefits from the Cook Islands subproject include the following:

- (i) Improved household access to electricity disproportionately benefits women.
- (ii) Lower cost of electricity disproportionately benefits women.

## E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

### E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

*Describe the scale and intensity of vulnerability of the country and beneficiary groups, and elaborate how the project/programme addresses the issue (e.g. the level of exposure to climate risks for beneficiary country and groups, overall income level, etc).*

Pacific Island Countries are exposed to a wide variety of natural hazards, including cyclones, droughts, earthquakes, electrical storms, extreme winds, floods, landslides, storm surges, tsunami and volcanic eruptions. Vulnerability is a function of geographical remoteness and isolation, their dispersion across a large area in the Pacific Ocean, and economic and social challenges and degradation of natural resources. Vulnerability to extreme climate events is now increasing with population growth and migration (internal and external), poor coastal development and land use planning, unplanned urban growth, and water and ecosystem degradation including pollution of sub-surface and coastal waters. Vulnerability is exacerbated for the poorest populations, who live in small communities on remote outer-islands, often on lands which are vulnerable to flooding and cyclones, and who rely on subsistence-farming and fishing for their livelihoods. Women also suffer more from climate extremes than men, because they tend to depend more on natural resources for livelihood and subsistence, and are vulnerable to gender-based violence in the aftermath of disasters. Some natural hazards will be exacerbated by climate change:

- Average ocean and land temperatures are increasing, and the seasonality and duration of rainfall is changing;
- In the coming decades, tropical cyclones are expected to increase in intensity, though not necessarily in frequency. They are also expected to move closer to the equator, therefore impacting some islands that have not previously experienced them;
- The sea level is rising, thereby worsening coastal erosion and saline intrusion and increasing the severity of storm surges.

These impacts adversely affect agriculture, infrastructure, fisheries, coastal zones, water resources, health, and ecosystems and thus threaten entire communities and economies. The mere existence of low-lying atoll island nations like RMI is threatened by sea level rise and storm surges. In global ranking of country's vulnerability to climate change, Pacific SIDS always occupy many of the top places.

The Program directly supports adaptation in Samoa, where it will finance a large flood and drinking water reservoir in the country's largest catchment – along a river that has caused serious damage to government infrastructure, commercial facilities, properties and communities in the past;

Indirectly, by fostering energy security, and the use of modern, resilient, appropriate energy technologies, the program contributes to establishing a climate resilient energy sector across the region – which is a necessary basis for all socio-economic, climate resilient development.

### E.4.2. Financial, economic, social and institutional needs

*Describe how the project/programme addresses the following needs:*

- *Economic and social development level of the country and the affected population*

Cook Islands subproject. The Cook Islands population of approximately 15,000 live mostly on the largest island, Rarotonga. In comparison, the outer islands are sparsely populated, and there is a trend of internal migration from the outer islands to Rarotonga, and an external migration from the Cook Islands to New Zealand, Australia and further afield. Reduced cost of power generation and downward pressure on tariffs will lower the cost for business and improve employment opportunities in Rarotonga.

Overall Program. Although geographically spread out and diverse, the Pacific SIDS share many common socio-economic characteristics. Notably in recent years they have mostly experienced low and volatile growth. Their

economies are dominated by the service sector and by the public sector. Their economies are characterized by limited diversification. They are highly dependent on imports, and in many cases they are reliant on external income. As a result, they are all economically vulnerable. Finally, poverty is significant but extreme poverty is rare. Inequality is a concern across the Region. This program, by establishing a more secure electricity sector, will directly support the countries with these socio-economic challenges.

- *Absence of alternative sources of financing (e.g. fiscal or balance of payment gap that prevents from addressing the needs of the country; and lack of depth and history in the local capital market)*

Cook Islands subproject. The program is specifically targeted to promoting private sector investment as an alternative source of financing to finance the transition to renewable energy.

Overall Program. The small population, remoteness, limited economic diversity and low involvement of the private sector mean that the Pacific SIDS have limited access to sources of finance. Access to private sector finance, in particular, is very limited for innovative investments, as the perceived risks for private sector investment are generally high. The program will promote private sector investment in the Pacific energy sector.

Moreover, the Governments revenue is limited and hence there are limited government funds for investments. As a result, the Pacific SIDS are highly dependent on funding from multi-development banks and bilateral partners. The small GDP means that countries quickly reach their debt ceiling and are unable to borrow further – even for investments that clearly make strong economic and financial sense. Accordingly, most Pacific SIDS are simply unable to take on extra loans – even highly concessional - to finance investments in the energy sector. The ongoing ADB program in most countries is heavily weighted towards grants. This situation is an important barrier to transformation of the electricity generation sub-sector. The program will fill an important financing gap necessary to fund the transition to renewable energy. The borrowing status of ADB for the seven countries is summarized below:

Country	ADB Borrowing
1. COO	Concessional lending only
2. TON	Grant and concessional lending blend
3. RMI	Grant only
4. FSM	Grant only
5. NAU	Grant only
6. PNG	Concessional lending only
7. SAM	Grant and concessional lending blend

- *Need for strengthening institutions and implementation capacity.*

Cook Islands subproject. Cook Islands have relatively strong capacity in the implementing agency and have undertaken a range of sector reform in recent years. The program will focus specifically on technical capacity building to allow TAU to manage the transition to higher integration of renewable energy.

Overall Program. The small population of most Pacific SIDS means there is a limited human resource pool, and in turn limited technical and managerial capacity and limited institutional capacity. This can be exacerbated by out migration. Accordingly, capacity development and institutional strengthening have been included into the program.

## E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

*Please describe how the project/programme contributes to country's identified priorities for low-emission and climate-resilient development, and the degree to which the activity is supported by a country's enabling policy and institutional framework, or includes policy or institutional changes.*

### Cook Islands subproject

The Cook Islands strategy is set out in the Cook Islands Renewable Energy Chart Implementation Plan (2012 – 2020), updated in 2016. The 2012 target was to transform the country from dependency on fossil fuel as an energy source to a future of renewable energy. The established target was 100% renewable sources by 2020. The Cook Islands INDC establishes renewable energy as a key area of intervention.

### Regional Framework

The regional Framework for Action on Energy Security in the Pacific (FAESP) 2010-2020 was prepared by the Secretariat of Pacific Community, and was endorsed by Pacific Island leaders at the 41st Pacific Islands Forum, Vanuatu, 4-5 August 2010. FAESP assessed the threats to achieving energy security in the Pacific. It found that the threats arise from the interaction of a multitude of factors including: fast growing populations without economies to match; remoteness and distances from main centres and supply chain pathways; vulnerability of energy infrastructure to natural disasters such as cyclones, earthquakes, flooding and tsunamis; inability to take advantage of economies of scale due to small populations and limited industrial activity; old and poorly maintained energy infrastructure, such as electricity generation, transmission and distribution systems; lack of technical standards for energy supply, pricing policies that do not encourage maintenance, and; inadequate understanding of locally available renewable energy.

### National Frameworks

Each of the countries have individual energy sector roadmaps, which detail national commitments to achieving regional targets established in the FAESP. A summary of the national energy sector roadmaps is presented below:

Country	Roadmap
1. COO	Cook Islands Renewable Energy Chart 2011-2020
2. TON	Tonga Energy Road Map 2010-2020
3. RMI	National Energy Policy (2009)
4. FSM	FSM Energy Policy (2012) and State Energy Action Plans (2013)
5. NAU	Nauru Energy Road Map, 2014-2020
6. PNG	PNG Power Limited 15 Year Power Development Plan 2016-2030
7. SAM	SAM Energy Sector Plan 2012-2016

### Intended nationally determined contribution (INDC)

All participating countries have recently submitted their INDC's to the UNFCCC, with climate change mitigation strategies and targets. These formal submissions are summarized in the following table:

	Total emissions Gg CO <sub>2</sub> eq	Contribution of electricity to emissions	Renewable electricity generation related target
COO	69.574 (2006)	34%	100% RE by 2020
TON	300.54 (2006)	23%	50% of electricity generation from renewable sources by 2020; 70% by 2030.
RMI	150 (approx. 2005)	54%	Reduce emissions from energy by 66% in 2030
FSM	150 (2000)	42%	30% renewable energy by 2020
PNG	500-600 (2005)	Not specified	100% RE by 2030
NAU	80 (1990)	Not specified	The key mitigation intervention is to replace a substantial part of the existing diesel generation with PV systems.
SAM	352 (2004)	13%	100% RE by 2025

#### E.5.2. Capacity of accredited entities and executing entities to deliver

*Please describe experience and track record of the accredited entity and executing entities with respect to the activities that they are expected to undertake in the proposed project/programme.*

**Asian Development Bank (ADB).** ADB is a multilateral development finance institution providing loans, grant and technical assistance. ADB is composed of 67 members, 48 of which are from the Asia and the Pacific region. ADB clients are its member governments, who are also the ADB shareholders. In addition, ADB provides direct assistance to private enterprises of development member countries through equity investments and loans. In 2015, ADB loan and grant approvals to developing member countries amounted to \$16.29 billion. Private sector operations amounted to an additional \$2.63 billion. Further, ADB mobilized, with donor support, more than \$10.74 billion in Cofinancing, bring total operations for 2015 to \$27.17 billion. ADB was the first regional development bank to be accredited to the GCF, and the first Accredited Entity to mobilize GCF funding to the Pacific region (Fiji). ADB has the largest energy sector portfolio amongst development partners in the Pacific, covering electricity generation, transmission and distribution.

**Cook Island Implementing Agency.** The Implementing Agency in Cook Islands will be Te Aponga Uira (TAU). TAU is a government-owned power authority responsible for generation, distribution, and retailing of electricity on the main island of Rarotonga. TAU will be responsible for day-to-day implementation. TAU is responsible for operating all electricity generation and transmission facilities on the island of Rarotonga. TAU will be responsible for ensuring all necessary permits are obtained and all necessary licenses issues for project development. TAU has been implementing similar projects for many years and has efficiently obtained all necessary permits and licenses without causing any delays or other costs. TAU has demonstrated strong internal capacity for operating and maintaining power assets over an extended period. A Project Implementation Unit (PIU) will be established under TAU and will be responsible for procurement of all civil works and goods contracts, and monitor project activities.

**Overall Program.** Nine of the ten implementing agencies are currently implementing ADB supported projects and are considered to have adequate capacity for project implementation, with appropriate technical assistance support. Prior to approval of each project a capacity assessment will be carried out on each implementing agency including procurement capacity and financial management capacity.

#### E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

*Please provide a full description of the steps taken to ensure country ownership, including the engagement with NDAs on the funding proposal and the no-objection letter.*

For most countries, the initial contact with country level partners for the program was in the form of a proposal from the national power utility or Ministry responsible for energy to ADB. Several rounds of consultation followed after that, notably involving:

- The National Designated Authority in each country;
- Relevant Government energy agency in each country;
- The public utility in each country. Notably detailed technical discussions have been held with the relevant power utilities to ensure that the proposed works are in line with existing national infrastructure plans, and utility priority investments;
- Development partners active or planning activities in each country, notably Australia, New Zealand, Japan, European Union and World Bank.
- The proposed program was presented to the Pacific Region Infrastructure Facility (PRIF) Energy Sector Working Group, which includes technical staff from the main development partners working in the Pacific.

*Please also specify the multi-stakeholder engagement plan and the consultations that were conducted when this proposal was developed.*

Cook Islands subproject. During the project preparatory technical assistance, consultations were held with women community groups, landowners, Government officials, and representatives from key stakeholders of relevant departments. The social safeguards specialist will ensure ongoing consultation with these stakeholders during project

implementation, and develop a stakeholder consultation, participation, and communication plan. These stakeholders will provide inputs to the PMU on implementation activities through these consultations. The PMU will also monitor and ensure the poor household's and the women's participation in consultation activities; provision of gender awareness to target groups; encouraging the poor household and the women participation in subproject related contracts; and collection of the poor household and the gender related data for monitoring and evaluation purposes. The population in the project area comprises the mainstream population of the Cook Islands. The subproject is not expected to affect any distinct and vulnerable group of indigenous peoples as defined under ADB's Safeguard Policy Statement (2009). The project team will consider engaging with a Civil Society Organization, if necessary, in the further project design making process.

Overall Program. A stakeholder consultation plan will be prepared and implemented during preparation of each subproject under the program, in accordance with ADB standard procedures. The stakeholder consultation plan will be included in the Project Administration Manual for each subproject.

## E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

### E.6.1. Cost-effectiveness and efficiency

*Describe how the financial structure is adequate and reasonable in order to achieve the proposal's objectives, including addressing existing bottlenecks and/or barriers; providing the least concessionality; and without crowding out private and other public investment.*

#### Cook Islands subproject

Grant financing of battery storage is considered essential as;

- (i) Due to the small size of the economy, Cook Islands has ongoing national debt ceiling issues, and is unable to fund the transition to renewable energy within a reasonable timeframe. As a result, Cook Islands is actively pursuing private sector investment to fund the transition.
- (ii) However, the grid is unable to absorb any additional intermittent power supply from private power providers.
- (iii) The battery storage will facilitate the paradigm shift towards renewable energy and overcome the key barrier by allowing additional private sector investment onto the grid, resulting in 'crowding in' of the private sector.

The proposed battery storage is not considered suitable for private sector investment. The proposed GCF financing will therefore not displace private sector financing.

#### Overall Program

The proposed mainly grant financial structure is considered reasonable to meet the program's objectives of increased renewable energy integration. Three out of the seven SIDS are unable to borrow from ADB and are only eligible for grants, due to recent debt distress and poor economic performance. It is not considered reasonable for GCF to extend loans to these SIDS. While public sector grant financing has supported the majority of renewable energy investments to date in the SIDS, there is insufficient public sector financing, either grant or concessional lending, to transition to the levels of renewable energy integration stated in national targets within the proposed timeframes. Therefore, the proposed program will not crowd out public sector financing.

The program will support development of private sector investment in renewable energy. All renewable energy generation proposals were screened and dialogue held with SIDS regarding whether they were suitable for private sector investment. For reasons discussed on a subproject basis in Annex 3, the subprojects proposed for concessional financing are not considered suitable for private sector investment, and therefore the program will not be crowding out private sector financing.

*Please describe the efficiency and effectiveness, taking into account the total project financing and the mitigation/adaptation impact that the project/programme aims to achieve, and explain how this compares to an appropriate benchmark. For mitigation, please make a reference to [E.6.5 \(core indicator for the cost per tCO<sub>2</sub>eq\)](#).*

The adaptation and mitigation benefits are summarized in the previous section. The benefits per \$ invested by GCF compare favorably with other projects in this region. Anticipated GCF cost per tCO<sub>2</sub>eq removed is US\$15/tCO<sub>2</sub>eq (refer Section E.6.5). This compares favorably with the Solomon Islands Solar Power Development Project (total project cost \$15.2 million for 2MW installed) at \$290/tCO<sub>2</sub>eq. Note, however, that the Cook Islands component is for battery storage only, while the Solomon Islands project is for the solar plant installation including battery storage. There are currently limited comparable battery storage sites for comparison in the Pacific.

#### E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

*Please provide the co-financing ratio (total amount of co-financing divided by the Fund's investment in the project/programme) and/or the potential to catalyze indirect/long-term low emission investment.*

##### Cook Islands subproject

The requested GCF investment in the Cook Islands is \$12 million, or 60% of the overall investment.

##### Overall Program

The proposed GCF grant financing accounts for \$303 million, or 67% of the overall investment.

*Please make a reference to [E.6.5 \(core indicator for the expected volume of finance to be leveraged\)](#).*

Total leveraged co-financing for the program is \$151 million, including \$4 million of co-financing leveraged in Cook Islands.

#### E.6.3. Financial viability

*Please specify the expected economic and financial rate of return with and without the Fund's support, based on the analysis conducted in [F.1](#).*

##### Cook Islands subproject

The financial internal rate of return (FIRR) of the Cook Islands subproject is 18.4%, with an financial net present value (FNPV) of NZ\$21.4 million. Given a Weighted Average Cost of Capital (WACC) of 7.34%, this demonstrates the project's financial viability and sustainability. This economic analysis yields an economic internal rate of return (EIRR) of 18.1% for the Base Case scenario of the proposed investment. With an EIRR higher than the hurdle rate of 12%, the subproject is deemed economically viable.

##### Overall Program

Financial and economic analysis of each subproject will be carried out in accordance with the relevant ADB's guidelines, including (i) *Financial Management and Analysis of Projects (2005)*, (ii) *Financial Due Diligence Methodology Note (2009)*, (iii) *Financial Management Assessment Questionnaire*, (iv) *Technical Note of the Preparation and Presentation of Cost Estimates for Projects Financed by ADB (2008)*, and (v) *Guidelines for the Economic Analysis of Projects (1997)*. Financial management assessment of all implementing agencies will be assessed.

*Please describe financial viability in the long run beyond the Fund intervention.*

The financial analysis detailed above will consider the financial viability over the projected life of the asset.

*Please describe the GCF's financial exit strategy in case of private sector operations (e.g. IPOs, trade sales, etc.).*

Not applicable

#### E.6.4. Application of best practices

*Please explain how best available technologies and practices are considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices.*

##### Cook Islands subproject

Industry best practice has been applied in the Cook islands subproject. The Feasibility Study has identified that battery storage is the least cost storage solution amongst available storage options. However, the precise technology to be deployed at the site (i.e. battery type) will be left to the turnkey contractors to propose based on speciation's to be included in bidding documents. This will ensure value for money and maximized benefits from recent price reductions in some forms of batteries.

##### Overall Program

The feasibility studies for each subproject will identify the broad technology required, considering Pacific specific requirements, and stipulate international standards in the bidding documents. Selection of specific technologies (e.g. brand of wind turbines) will be proposed by the turnkey contractors.

#### E.6.5. Key efficiency and effectiveness indicators

<i>GCF core indicators</i>	Estimated cost per t CO <sub>2</sub> eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)	
	<u>Investment Program</u> (estimates)	
	(a) Total Program financing	US\$451 million
	(b) Requested GCF amount	US\$303 million
	(c) Expected lifetime emission reductions overtime	To be determined
	(d) Estimated cost per tCO <sub>2</sub> eq (d = a / c)	To be determined
	(e) Estimated GCF cost per tCO <sub>2</sub> eq removed (e = b / c)	To be determined
	<u>Cook Islands</u>	
	(a) Total project financing	US\$16 million
	(b) Requested GCF amount	US\$12 million
(c) Expected lifetime emission reductions overtime	95,550 tCO <sub>2</sub> eq	
(d) Estimated cost per tCO <sub>2</sub> eq (d = a / c)	US\$167 / tCO <sub>2</sub> eq	
(e) Estimated GCF cost per tCO <sub>2</sub> eq removed (e = b / c)	US\$125 / tCO <sub>2</sub> eq	
<i>Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.</i>		
Solar Power Development Project. \$290 per tCO <sub>2e</sub> . Hence the proposed program compares favorably with appropriate benchmarks of similar renewable energy projects in the Pacific.		
Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)		
The Cook Island subproject is expected to leverage \$4 million public sector investment (Government).		
<i>Describe the detailed methodology used for calculating the indicators above.</i>		
The regional PMU will undertake comprehensive dialogue with SIDS's to identify areas of private sector engagement. Estimates of public sector investment as a result of the program		

	<p>will be determined on a country by country basis as a result of this dialogue.</p> <p><i>Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.</i></p> <p>No appropriate benchmarks were identified in the Pacific, or similar regions.</p>
<p>Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)</p>	<p>Not applicable</p>

## F.1. Economic and Financial Analysis

*Please provide the narrative and rationale for the detailed economic and financial analysis (including the financial model, taking into consideration the information provided in [section E.6.3](#)).*

### Cook Islands subproject

Refer Feasibility study in Annex C

### Regional Program

Financial and economic analysis of each program subproject will be carried out in accordance with the relevant ADB's guidelines prior to approval, including sensitivity analysis. Applicable ADB guidelines include (i) *Financial Management and Analysis of Projects (2005)*, (ii) *Financial Due Diligence Methodology Note (2009)*, (iii) *Financial Management Assessment Questionnaire*, (iv) *Technical Note of the Preparation and Presentation of Cost Estimates for Projects Financed by ADB (2008)*. The financial analysis will calculate Weighted Average Cost of Capital (WACC), Financial Net Present Value (FNPV) and the Financial Internal Rate of Return (FIRR). A project is considered financially viable if the FIRR is equal to or greater than the WACC. With regards to the economic analysis (see *Guidelines for the Economic Analysis of Projects*, ADB, 1997), generally, a decision to proceed with the project is taken when (i) the Net Present Value (NPV) is greater than zero and (ii) the Economic Internal Rate of Return (EIRR) is greater than the discount rate. The economic analysis will assess sensitivity of the NPV and EIRR to changes in key factors such as delays in construction and changes in cost of diesel.

*Based on the above analysis, please provide economic and financial justification (both qualitative and quantitative) for the concessionality that GCF provides, with a reference to the financial structure proposed in section B.2.*

Refer Section B-1

## F.2. Technical Evaluation

*Please provide an assessment from the technical perspective. If a particular technological solution has been chosen, describe why it is the most appropriate for this project/programme.*

### Cook Islands subproject

The proposed technical solution for Cook Islands was selected based on an energy sector development plans and a project specific feasibility study, including the following:

- (i) demand forecasts and grid integration modelling to determine equipment sizing and timing of investment;
- (ii) least cost analysis to assess alternative technologies, and
- (iii) technical design to ensure optimum sizing and compatibility with existing infrastructure.

### Overall Program

The proposed technical solution for each SIDS has been proposed by the relevant utility and is part of the SIDS national plans. The proposed technical solution has been screened by ADB sector specialists and discussed thoroughly with key stakeholders in the SIDS. While the proposed technology (e.g. wind or solar or hydropower) is considered suitable for proceeding to feasibility study stage, the following analysis will be carried out for each subproject to confirm the technology selected;

- (iv) demand forecasts to determine equipment sizing and timing of investment;
- (v) least cost analysis will assess alternative technologies and assess the least cost option for the specific grid, and
- (vi) technical design to ensure optimum sizing and compatibility with existing infrastructure.

The following technologies are being considered for support under the program;

- (i) Grid-connected solar. In many small SIDS, grid connected solar is the main option for increasing renewable energy penetration. Grid connected solar PV is a suitable technology for the Pacific as it is proven technology with robust supply chains, has an experienced contractor base, is suitable for local utilities to manage operation and maintenance, and is modular in nature so suitable for easy upscaling. Due to high corrosion environments, non-tracking solar modules are preferred. All SIDS have adequate solar resources, however consideration should be given to dispersed installations to minimize loss of supply at one location due to cloud cover. Floating solar is a relatively new innovation and care with design will be required.
- (ii) Solar home systems. Solar home systems are a proven technology for supplying household level energy services. The main innovation with solar home systems is the roll-out model adopted to ensure sustainability.
- (iii) Wind power. Some SIDS have acceptable wind resources, however adequate long term wind resource monitoring based on dedicated wind towers is required. Adequate wind resources are generally limited to ridge lines and need to be located near load centers of high transmission costs can reduce financial viability. Maintenance of wind turbines is generally not suitable for SIDS utilities to manage.
- (iv) Hydropower is a proven technology with good supply chains and an adequate contractor base. Long term stream gauging is required for design.
- (v) All SIDS are considering increased battery storage to (i) manage transient nature of intermittent renewable energy (solar, wind) and (ii) store energy for evenings and for cloudy periods.

However, globally, renewable energy technologies are rapidly evolving. The Program will monitor technological developments and introduce additional innovative technologies as possible and as appropriate. It will develop capacity in the country to optimally exploit technological developments.

### F.3. Environmental, Social Assessment, including Gender Considerations

*Describe the main outcome of the environment and social impact assessment. Specify the Environmental and Social Management Plan, and how the project/programme will avoid or mitigate negative impacts at each stage (e.g. preparation, implementation and operation), in accordance with the Fund's Environmental and Social Safeguard (ESS) standard. Also describe how the gender aspect is considered in accordance with the Fund's Gender Policy and Action Plan.*

#### Cook Islands subproject

The Cook Islands subproject has been classified as Environment Category B, Land Acquisition Category C and Indigenous Peoples Category C.

#### Overall Program

All subprojects will be assessed and implemented in accordance with ADB's *Safeguard Policy Statement (2009)*. The program will only support activities which are Category B (i.e.: few, if any, potential adverse impacts that are site-specific, and are if any are irreversible, in most cases mitigation measures can be designed readily) or in Category C (i.e.: minimal or no adverse impacts). A Land Acquisition and Review Framework (LARF) and an Environment Assessment and Review Framework (EARF) have been prepared, refer Annex C. These outline social and environment safeguard procedures to follow for subsequent subprojects.

- (i) For all subprojects rated as Category B for environment, an Initial Environmental Evaluation (IEE) and Environmental Management Plan will be prepared. These will set out the potential adverse environmental impacts of the activities, and the measures to be taken to manage and to mitigate these impacts.
- (ii) For all subprojects rated as Category B for involuntary resettlement, a Resettlement plan will be prepared. This will describe the population affected by resettlement, and will describe how they are to

- be assisted.
- (iii) For all subprojects rated as Category B for indigenous peoples, an Indigenous peoples plan (IPP) will be prepared. These plans will set out the potential adverse impacts of the activities on Indigenous people, and it will describe the measures to be taken to manage and to mitigate these impacts.
- (iv) For all subprojects, a Gender Action Plan (GAP) will be prepared, setting out the measures to be taken to mainstream gender concerns and to improve gender equality.

**Gender.** The Cook Islands subproject has been reviewed and categorized in accordance with ADB procedures. A gender action plan (GAP) has been prepared and is included in Annex C. The GAP includes the following performance targets and activities:

- (v) During design and implementation, community consultation and participation activities will include at least 50% women involvement, and consultations will be scheduled at a time when women can easily attend
- (vi) Encourage employment of women in support activities (administration, clerical, clearing of vegetation, tree lopping) during design and construction phase (at least 30%) and provide institutional support such as separate sanitary facilities for women. Contractors appointed for construction will be informed of the required facilities before bidding.
- (vii) Women's wages will be paid directly to them.
- (viii) Construction workers and community members will be provided orientation/information on HIV/AIDS and STD issues and concerns.
- (ix) Contractors will be required to pay equal wages to men and women for work of equal value.
- (x) Contractors will provide separate rest rooms for women and child-care facilities, if required.
- (xi) Contractors will be required to provide safety gears and protective equipment where applicable to keep both men and women workers safe on the job.
- (xii) Contractors will be required to implement adequate working time arrangements for both men and women workers.
- (xiii) Contractors will ensure protection benefits (e.g. medicare or hospital assistance) in case of employment injury for both men and women workers.
- (xiv) Provide gender awareness training to PIU/project staff.
- (xv) Enhance capacity to Te Aponga Uira to include gender perspective into its operations through gender awareness training for Te Aponga Uira management: at least 50% of Te Aponga Uira management staff receives gender awareness training by 2018.
- (xvi) Implement technical training program for Te Aponga Uira staff, including on-the-job training during construction and operation as well as course work accreditation (including target 20% women participation) by December 2020.
- (xvii) Provide orientation/training of Civil work contractors' staff and workers on HIV/AIDS/STD concerns and prevention interventions.
- (xviii) Disaggregate project performance indicators by gender to track progress of performance indicators in DMF, along with proposed activities in the GAP.
- (xix) Report the progress of GAP activities in regular quarterly progress reports.
- (xx) Include a Social Specialist who will assess, consult, train and help manage the implementation of GAP.
- (xxi) Include at least one woman member in the grievance redress mechanism.
- (xxii) Conduct procurement and financial management training for PIU staff (minimum 20% women) and Te Aponga Uira management by September 2018

The GAP will be implemented by the Project Implementation Unit established within the implementing agency (Te Aponga Uira). The PIU will be supported by a social development/gender specialist, financed by the subproject, who will be responsible for incorporating the GAP into project planning and program, including awareness workshops and establishment of gender-disaggregated indicators for project performance and monitoring. The PIU will include reporting on progress of GAP activities in quarterly progress reports to ADB and the Government.

#### F.4. Financial Management and Procurement

*Describe the project/programme's financial management and procurement, including financial accounting, disbursement methods and auditing.*

##### Overall Program

A regional Project Management Unit (PMU) will be established in ADB to oversee the program and manage the regional components and disseminate information between the SIDS. Separate national Project Implementation Units (PIU's) will be established within the state owned power utility of each SIDS and will be responsible for implementation of subprojects in respective SIDS. A Steering Committee will be established in each of the seven participating SIDS to provide strategic guidance to the PMU and monitor the programs performance and compliance. Procurement of goods and works will be undertaken in accordance with ADB's *Procurement Guidelines* (2015, as amended from time to time).

During project preparation, financial capacity of counterpart agencies will be assessed, including financial management assessment. A financial management specialist will be engaged to assist in setting up the PMU financial management systems and train the relevant PMU financial staff on ADB requirements. Details of each subprojects financial accounting, disbursement procedures and auditing requirements will be developed during preparation of each project, and included the Project Administration Manual.

##### Cook Islands Subproject

**Financial Reporting and Auditing.** Te Aponga Uira will maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project following accrual-based accounting following the International Financial Reporting Standards. Te Aponga Uira will prepare consolidated project financial statements in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

Te Aponga Uira will cause the detailed consolidated project financial statements to be audited in accordance with International Standards on Auditing and with the Government's audit regulations, by an independent auditor acceptable to ADB. The audited project financial statements will be submitted in the English language to ADB within six months of the end of the fiscal year by Ministry of Finance and Treasury.

The audit report for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the loan and grant were used only for the purpose(s) of the project; and (iii) whether the borrower or executing agency was in compliance with the financial covenants contained in the legal agreements (where applicable).

In addition to annual audited financial statements, Te Aponga Uira shall (i) provide its annual financial statements prepared in accordance with national accrual-based financing reporting standards acceptable to ADB; (ii) have its financial statements audited annually by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB, in accordance with international standards for auditing or the national equivalent acceptable to ADB; and (iii) furnish to ADB, no later than 1 month after approval by the relevant authority, copies of such audited financial statements in the English language and such other information concerning these documents and the audit thereof as ADB shall from time to time reasonably request.

Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

The Government and Te Apongs Uira have been made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements. When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (i)

the audit documents are overdue; and (ii) if they are not received within the next six months, requests for new contract awards and disbursement such as processing of new reimbursement, and issuance of new commitment letters will not be processed. When audited project financial statements have not been received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as processing of new reimbursement, and issuance of new commitment letters. ADB will (i) inform the executing agency of ADB's actions; and (ii) advise that the loan may be suspended if the audit documents are not received within the next six months. When audited project financial statements have not been received within 12 months after the due date, ADB may suspend the loan.

ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the government), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Public Communications Policy 2011.<sup>10</sup> After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter, additional auditor's opinions, and audited entity financial statements will not be disclosed.

**Procurement Plan.** The procurement plan for the Cook Islands subproject and program TA is presented below:

#### Basic Data

<b>Project Name:</b> Pacific Islands Renewable Energy Investment Program: Cook Islands	
<b>Country:</b> Cook Islands	<b>Executing Agency:</b> Office of the Prime Minister
<b>Project Procurement Classification:</b> B	<b>Implementing Agency:</b> Te Aponga Uira
<b>Procurement Risk:</b> Low	
<b>Project Financing Amount:</b> \$16.0 million <b>Green Climate Fund (ADB Admin):</b> \$12.0 million <b>Government:</b> \$4.0 million	<b>Project Closing Date:</b> December 2019
<b>Date of First Procurement Plan:</b> 11 November 2016	<b>Date of this Procurement Plan:</b> 11 Nov 2016

#### A. Methods, Thresholds, Review and 18-Month Procurement Plan

##### 1. Procurement and Consulting Methods and Thresholds

Except as the ADB may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works	
Method	Threshold
International Competitive Bidding (ICB) for Works	Above \$300,000
Shopping for Works	Below \$300,000

<sup>10</sup> Public Communications Policy: <http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications>

## 2. Goods and Works Contracts Estimated to Cost \$1 Million or More

The following table lists goods and works contracts for which the procurement activity is expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Procurement Method	Review [Prior / Post/Post (Sampling)]	Bidding Procedure	Advertisement Date (quarter/year)	Comments
W01	Battery Storage	US\$12.3 million	International Competitive Bidding	Prior	1S1E	Q2 2017	Design, Supply and Installation

1S1E = Single stage single envelope

## 3. Consulting Services Contracts Estimated to Cost \$100,000 or More

The following table lists consulting services contracts for which the recruitment activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value <sup>1</sup>	Recruitment Method	Review (Prior / Post)	Advertisement Date (quarter/year)	Type of Proposal	Comments
C01	Design and Supervision Consultants (Cook Islands)	\$600,000	Quality and Cost Based Selection	Prior	Q2 2017	Simplified	90:10
C02	Project Preparation Consultants (Program TA)	\$9,100,000	Quality and Cost Based Selection	Prior	Q2 2017	Full Technical Proposal	90:10 1-3 Lots
C03	Specialist Support (Program TA)	\$900,000	Individual Consultant Selection	Prior	Q3 2016		

TA = Technical Assistance

1. the estimated value includes proposed GCF financing. The contract value may be increased if the scope of works combined with ADB financed technical assistance.

## G.1. Risk Assessment Summary

*Please provide a summary of main risk factors. Detailed description of risk factors and mitigation measures can be elaborated in G.2.*

The main risk factors identified for the Cook Islands subproject include (i) private sector fails to invest in solar power generation, (ii) low diesel prices, and (iii) low capacity of the utilities. The risk factors and proposed mitigation measures are detailed below. A risk assessment, with mitigation strategies, will be prepared for each sub-project, in line with standard ADB procedures.

## G.2. Risk Factors and Mitigation Measures

*Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.*

### Selected Risk Factor 1 Private sector fails to invest in solar power generation

Description	Risk category	Level of impact	Probability of risk occurring
Installation of the battery storage is designed to allow additional solar power independent power providers (IPP's) to supply to the grid.	Financial	Medium (5.1-20% of project value)	Low

#### Mitigation Measure(s)

*Please describe how the identified risk will be mitigated or managed. Do the mitigation measures lower the probability of risk occurring? If so, to what level?*

The following mitigation measures will be employed:

- Private sector has indicated interest in investment in solar power generation.
- The project will support outreach to private sector and transaction support.

Subsequent to these measures, the risk should be reduced to low impact, with low probability of occurring.

### Selected Risk Factor 2 Low diesel price

Description	Risk category	Level of impact	Probability of risk occurring
If the price of diesel falls significantly, it may undermine the competitiveness of renewable energy technologies over the short term.	Financial	Low (<5% of project value)	Medium

#### Mitigation Measure(s)

*Please describe how the identified risk will be mitigated or managed. Do the mitigation measures lower the probability of risk occurring? If so, to what level?*

If diesel prices sharply decline, the competitiveness of renewable energy would be reduced. It should be noted however, that SIDS commitment to renewable energy transition is based on a number of factors, including increased energy security, stability, independence and improved local environment. These should be sufficient to ensure that any impacts on the overall project performance of a drop in diesel price is low or very low. The situation will be monitored.

<b>Selected Risk Factor 3    Low capacity of the utilities</b>			
Description	Risk category	Level of impact	Probability of risk occurring
The risk is that Te Aponga Uira do not maintain sufficient technical staff to implement, operate and maintain renewable energy assets.	Technical and operational	Medium (5.1-20% of project value)	Low
Mitigation Measure(s)			
<p><i>Please describe how the identified risk will be mitigated or managed. Do the mitigation measures lower the probability of risk occurring? If so, to what level?</i></p> <p>There is a low risk that Te Aponga Uira will fail to maintain adequate staff to implement, operate and maintain the proposed battery storage. To avoid this occurring, the mitigation measures are:</p> <ul style="list-style-type: none"> <li>• Multiple staff will be trained in operation and maintenance of the battery storage facilities to ensure that there is a broad body of technically qualified people in each country.</li> <li>• Conduct capacity assessments during project preparation and design consulting service packages to address capacity gaps.</li> </ul> <p>Subsequent to these measures, the risk should be reduced to low impact, with low probability of occurring.</p>			
<b>Other Potential Risks in the Horizon</b>			
<p><i>Please describe other potential issues which will be monitored as “emerging risks” during the life of the projects (i.e., issues that have not yet raised to the level of “risk factor” but which will need monitoring). This could include issues related to external stakeholders such as project beneficiaries or the pool of potential contractors.</i></p> <p>None identified</p>			

## H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's [Performance Measurement Framework](#) under the [Results Management Framework](#).

### Cook Islands subproject

The Cook Islands subproject will support a paradigm shift from diesel power generation towards the national target of 100% renewable energy. The Government is unable to raise sovereign financing to finance the transition due to (i) the small size of the economy which limits overall borrowing, and (ii) current lack of headroom for borrowing. As a result, Cook Islands is actively pursuing private sector investment to fund the transition. However, the grid is unable to absorb any additional intermittent power supply from private power providers due to lack of battery storage. The battery storage will facilitate the paradigm shift towards renewable energy and overcome the key barrier by allowing additional private sector investment onto the grid, resulting in 'crowding in' of the private sector.

### H.1.1. Paradigm Shift Objectives and Impacts at the Fund level

#### Paradigm shift objectives

<i>Choose appropriate expected result</i>	Please elaborate on the paradigm shift objectives to which the project/programme contributes.					
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
<b>Cook Islands Subproject Fund-level impacts</b>						
<i>M1.0 Reduced emissions through increased low-emission energy access and power generation</i>	M1.1 Tons of carbon dioxide equivalent (t CO <sub>2eq</sub> ) reduced or avoided from gender-sensitive energy access and power generation (Cook Islands)	Project reports	69.574 (2006) Gg CO <sub>2eq</sub>	Not applicable	7,000 tCO <sub>2e</sub> /annum	Increased diesel generation to meet demand growth will not exceed benefits of reduced emissions
<i>A3.0 Increased resilience of infrastructure and the built environment to climate change</i>	A3.1b Value (US\$) of the investments in physical assets constructed, improved or modified to increase resilience to climate variability and change. (Cook Islands)	Project reports	0.0	Not applicable	\$16 million	Co-financiers provide indicated support

### H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
<b>Project/programme outcomes</b>	<b>Outcomes that contribute to Fund-level impacts</b>					

M6.0 Increased number of small, medium and large low-emission power suppliers	M6.1 proportion of low-emission power supply in a jurisdiction or market (Cook Islands)	Te Aponga Uira (utility) annual reports	15%	N/A	50%	Private sector invests in additional capacity
	M6.2 Number of households, and individuals (males and females) with improved access to low emission energy sources (Cook Islands)	Utility customer numbers in Te Aponga Uira annual reports	0	N/A	10,000	
	M6.3 MWs of low emission energy capacity installed, generated and/or rehabilitated (Cook Islands)	Te Aponga Uira annual reports	3MW	N/A	9MW	Battery storage will create enabling environment for private sector investment ion additional 6MW solar power generation
<b>Project/programme outputs</b>	<b>Outputs that contribute to outcomes</b>					
1. Solar power generation installed	M6.3 MWs of low emission energy capacity installed, generated and/or rehabilitated (Cook Islands)	Te Aponga Uira (utility) annual reports	3MW	N/A	9MW	
2. Energy storage facilities installed	M6.3 MWs of low emission energy capacity installed, generated and/or rehabilitated (Cook Islands)	Te Aponga Uira (utility) annual reports	1MW / 4MWh	N/A	Additional (i) 1MW/ 4MWh grid stability, and (ii) 2 MW/ 8MWh load shifting	
3. Capacity building activities completed	Number reforms supported (Program TA)	Project Quarterly Reports	0.0	N/A	4 workshops	
4. Feasibility studies prepared	No. reports prepared (Program TA)	Funding Proposals received by GCF Secretariat	0.0	N/A	31	
5. Sub-projects fully prepared and submitted to GCF for approval	No. subprojects received by GCF Secretariat (Program TA)	Funding Proposals received by GCF Secretariat	1.0	N/A	7.0	
6. Consultants recruited to prepare feasibility studies	No. person months (Program TA)	Project Quarterly	0.0	N/A	14 international	

		Report			consultants (256 months) and 3 national specialists (190 months)	
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## H.2. Arrangements for Monitoring, Reporting and Evaluation

*Besides the arrangements (e.g. semi-annual performance reports) laid out in AMA, please provide project/programme specific institutional setting and implementation arrangements for monitoring and reporting and evaluation. Please indicate how the interim/mid-term and final evaluations will be organized, including the timing. Please provide methodologies for monitoring and reporting of the key outcomes of the project/programme.*

The regional PMU will be responsible for program level monitoring/reporting. The regional PMU will prepare bi-annual reports on progress, the current level for all indicators, the implementation challenges and the financial status. The regional PMU will organize one independent evaluation at the financial close of the program. Most monitoring activities take place at the subproject level, including Cook Islands subproject, as follows:

- A detailed Project Administration Manual will be prepared setting out the reporting, monitoring and evaluation activities, responsibilities and budget.
- ADB will undertake one project reviews a year to assess progress of project implementation activities, compliance with covenants and project agreements, monitor progress in achieving project outputs and agree on any required modifications.
- ADB will undertake a mid-term review within 3 years of a subproject being effective or at any time that ADB and the concerned Government consider it necessary. The midterm review mission will (i) review institutional, administrative, organizational, technical, environmental, social, economic, and financial aspects of the project based on the assumptions and risks included in the design and monitoring framework and updated PPR; (ii) review covenants to assess whether they are still relevant or need to be changed, or waived due to changing circumstances; (iii) assess the need to restructure or reformulate the project and the effects of this on the immediate objectives (purpose) and long-term goals of the project; and (iv) update the project's design and monitoring framework if restructuring or reformulation is necessary or its immediate objectives will change.
- Project implementation will be monitored on an ongoing basis by ADB resident missions.
- Within 6 months of physical completion of the Project, the national executing agency will submit a project completion report to ADB.
- Monitoring and reporting will comply with the relevant requirements as stated in the Accreditation Master Agreement (AMA), which is still under negotiation.

Throughout the life of the subproject, the national executing agency will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; and (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions; (c) updated procurement plan and (d) updated implementation plan for next 12 months.

## I. Supporting Documents for Funding Proposal

### Investment Program

- Annex A: NDA No-objection Letters;
- Annex B: Outline of Subprojects 2 through 6;
  - Annex B-SP2 Tonga
  - Annex B-SP3 Republic of Marshall Islands
  - Annex B-SP4 Federated States of Micronesia
  - Annex B-SP5 Papua New Guinea
  - Annex B-SP6 Nauru
  - Annex B-SP7 Samoa

### Cook Islands

- Annex C: Feasibility Study
- Integrated Financial Model (excel spreadsheet submitted separately)
- Annex C: Safeguard Documents
  - Initial Environmental Examination (IEE)
  - Involuntary Resettlement Due Diligence Report
  - Gender Action Plan (GAP)
- Map indicating the location (included in feasibility Study)
- Timetable of project implementation (included in feasibility Study)