

**ADB GEF PROJECT IMPLEMENTATION REPORT (PIR)**

(This report covers implementation period from July 1, 2019 to June 30, 2020  
including recently closed projects covering the reporting period)

**ADB Official Project Title:** Renewable Energy Sector Project  
**ADB Project Number:** 46453-002

**I. GEF PROJECT SUMMARY****Project Ratings:**

Development Objective Rating (IP): Satisfactory, (S)

Implementation Progress Rating (DO): Satisfactory, (S)

Risk Rating: Low Risk (L):

**Information on Progress, challenges and outcomes on project implementation activities**

Overall implementation progress is satisfactory, and the project is not facing any major risk that may threaten the successful delivery of expected outputs. As of 30 June 2020, (i) cumulative contract award for the current project is at \$28.64 million, or 82% of financing administered by ADB; and (ii) cumulative disbursements for the current project has reached \$22.11 million, or 64% of financing administered by ADB. The project is currently rated on track in the project performance rating system.

The Battery Energy Storage System (BESS) developed under the project to support additional solar PV installation, and funded by GEF, was installed and completed in September 2019 and has been operational since then (excepting minor faults and shutdowns).

In January 2024, the Cook Islands Government has sought a minor change in scope to utilize project savings from the GEF funded BESS, for the purpose of upgrading the Te Aponga Uira (electric utility) SCADA system. This minor change offers improved connectivity with distributed energy resources on Rarotonga (the main island of the Cook Islands), and is expected to result in more efficient utilization of renewable energy and reduced diesel generation.

**Information on Progress, challenges and outcomes on Environment and Social Safeguards**

The due diligence of the project site for the GEF BESS determined that the GEF component is classified as category B for environment, and C for both involuntary resettlement and indigenous peoples. On this basis, the stakeholder engagement plan established limited requirements for this project, consisting primarily of ongoing monitoring of environmental impacts from construction activities, and establishment and publication of a grievance redress mechanism for input from concerned external stakeholders. Environmental monitoring showed that the site was managed according to the requirements of the Construction Environmental Management Plan. No grievance has been raised to date.

**Information on Progress, challenges and outcomes on stakeholder engagement**

N/A

**Information on Progress on gender-responsive measures**

N/A as GAP was not required for this project under GEF financing.

**Knowledge activities/Products**

- Applied Energy Symposium and Forum, REM2016: Renewable Energy Integration with Mini/Microgrid Conference Proceedings of “Cook Islands: Planning 100% Renewable Energy in Different Guises” was published in December 2016 (<http://www.sciencedirect.com/science/article/pii/S1876610216314849>).
- Asia Clean Energy Forum, “The Promise of Storage: Implementing Renewable Energy in Mini-grids” was presented in June 2018 (<https://d2oc0ihd6a5bt.cloudfront.net/wp-content/uploads/sites/837/2018/06/Chris-Blanksby-and-James-Mason-The-Promise-of-Storage-Integrating-Renewable-Energy-in-Mini-Grids.pdf>)
- Asian Development Bank, Hybrid and Battery Energy Storage Systems: Review and Recommendations for Pacific Island Projects, August 2022 ([Hybrid and Battery Energy Storage Systems: Review and Recommendations for Pacific Island Projects | Asian Development Bank \(adb.org\)](#))

**Grievances**

None reported

**GEO LOCATION INFORMATION**

Location Name	Latitude (WGS84 Format)	Longitude (WGS84 Format)	GEO Name ID	Location Description	Activity Description
Rarotonga Airport, Cook Islands	-21.200743°	-159.800344°	GEF BESS	BESS installed with existing solar PV compound at the Rarotonga International Airport	Installing a BESS to support additional solar PV installation, by storing excess solar PV generation during the day for use at night

**Project map and coordinates**



**PROJECT MINOR CHANGE IN SCOPE/MINOR AMMENDMENTS**

- Results framework
- Components and cost
- Institutional and implementation arrangements
- Financial management
- Implementation schedule
- Executing Entity
- Executing Entity Category
- Minor project objective change
- Safeguards
- Risk analysis
- Increase of GEF project financing up to 5%
- Co-financing
- Location of project activity
- Other

In January 2024, the Cook Islands Government has sought a minor change in scope to utilize project savings from the GEF funded BESS, for the purpose of upgrading the Te Aponga Uira (electric utility) SCADA system. This minor change offers improved connectivity with distributed

energy resources on Rarotonga (the main island of the Cook Islands), and is expected to result in more efficient utilization of renewable energy and reduced diesel generation. The proposed SCADA upgrade will:

- Be located at the Rarotonga Power Station and interface to the GEF BESS, and other BESS and renewable generators on Rarotonga
- Will support improved real-time information communication, and the implementation of a control scheme to optimize dispatch of renewable energy
- Be completed by June 2025
- Utilise up to \$400,000 of savings from the GEF Grant

### **Description of the SCADA project**

The upgrade of SCADA system is set to improve the efficiency and effectiveness of monitoring and controlling the generators, feeders, and new renewable generation especially the PV generation system in the network. There are several photovoltaic (PV) installations around the island ranging from small domestic 1 to 2kW units to larger 21 to 100kW sites connected to the low voltage network and a 900kW PV installation and two battery storage units at the Airport connected to the TAU HV network. The airport BESS is monitored and controlled by the SCADA and the airport south BESS and power station BESS are to be incorporated into the TAU SCADA for monitoring and control. The existing control system in MV Switchboard located in Switchroom 1 is unable to accommodate the new renewable systems. Since, it was commissioned in 1990s it fails to meet with the current supply requirements to include new renewable systems. It also no longer supports spares and is at its end of its economic life. Additionally, upgrade works are also carried out in Switchroom 2 since 2019 to further improvise the connection and controls of the network. Hence, these replacements will improve operational reliability and efficiency of the overall control system with existing and new renewable generating system into the network. This section outlines the key installation steps requires for Network connections and SCADA system upgrades for modification in Switchroom 1 and Switchroom 2, which comprise the proposed change to the project description.

The first stage involves a complete design of all hardware, software supply, engineering development, software development, installation, and commissioning of SCADA system. This is then followed by preparing Quality Assurance Manual (based on AS/NZS ISO 9001 or approved equivalent) and Operation and Maintenance Manual. The next stage will focus on Software development. We will develop generator and breaker screens. The generator page provides an overview of how each generator and engine are performing. There is a separate screen for each generator. The breaker status is shown and animated. Each breaker has a separate screen and displays the status of the breaker and the actual power, real power voltages and status information. The power station controller screen, power meter screen, airport BESS screen, airport overview screen, airport data screen, system screen and fuel system screen will be developed as remaining screen. The new BESS screen will have three controllers which are accessed over the network to allow control and monitoring from SCADA system. It will consist of BESS plant control which integrates multiple BESS units to a single plant controller, an external monitoring of BESS plant, BESS unit control, control BESS site. The SCADA screens will provide Airport south System Overview, system monitoring and alarms, battery controls, display dispatch control, 11kV feeder control communication alarms and ethernet communications. The reporting system will be redeveloped with a new layout and data prestatation incorporating the new data and improving reliability of the data. For communication network the existing site automation network infrastructure, bandwidth and data poling rates will be investigated and modified to ensure the integrity of all the data.

SCADA screens will provide a modern presentation of the existing and new layouts and the operating data with drill down selections to each device's detailed operational conditions.

The next stage comprises installation and commissioning. In this stage we will download new application onsite and commission. After this we will perform remote software modifications for each stage of the changeover. And the final step involves commissioning of SCADA and reporting. This will be followed by SCADA integration based on Factory acceptance test and Site Acceptance Test along with handover.

Next part involves SCADA system training and support. Training such as operation, maintenance, technical, engineering will be provided. Along with that offsite training for technician or engineer will be provided during factory acceptance test.

### **Impact potential of the SCADA Project**

#### **Expected tonnes of carbon dioxide equivalent:**

Use of the SCADA system will add to the benefits of the existing renewable energy systems by providing more efficient operation. In particular, visibility of all systems through the SCADA will allow improved management of diesel generating operating schedules under variable renewable energy conditions. This will allow less diesel generators to run as operators can rely on capacity of the BESS to provide spinning reserve. With less generators operating, loading increases and efficiency improves.

Compared to current operations, modelling has been undertaken and shows the number of operating generators are expected to be reduced by one (1) on average, increasing loading of other generators by approximately 20%, and conservatively improving their fuel efficiency approximately 2.2%.

With average gross generation of 3.4 MW, this will effectively save 650 MWh of generation annually. With an emissions factor of 753 ([https://unfccc.int/sites/default/files/resource/IFI%20Default%20Grid%20Factors%202021%20v3.1\\_unfccc.xlsx](https://unfccc.int/sites/default/files/resource/IFI%20Default%20Grid%20Factors%202021%20v3.1_unfccc.xlsx)), this equates to 480t annually or 9,600t over the 20 year expected life of the SCADA.

**Beneficiaries:** The benefits are measured as the population utilizing the TAU electricity grid (10,898 – population of Rarotonga), of which 50% are female. This represents 72% of the total population of Cook Islands.

#### **FOR SCCF/LDCF INDICATORS:**

Total Number of Beneficiaries	13,044 (population of Rarotonga – 2016 census, 100% electrification ensures that benefits of the project flow to the whole population) Male: 50% Female: 50%
Area of land managed for climate resilience (ha)	
Total no. of policies/plans that will mainstream climate resilience	
No. of risk and vulnerability assessments, and other relevant scientific and technical assessments carried out and updated	
Total number of people trained	Male: 18 Female: 1
No. of people trained to identify, prioritize, implement, monitor and/or evaluate adaptation strategies and measures	
No. of regional, national and sub-national institutions with strengthened capacities to identify, prioritize, implement, monitor and/or evaluate adaptation strategies and measures	
Contribute towards public awareness of climate change impacts, vulnerability and adaption (Tick if relevant)	
Expand access to improved climate information services (Tick if relevant)	
Expand access to improved climate related early-warning information (Tick if relevant)	
No. of regional, national and sector-wide policies, plans and processes developed or strengthened to identify, prioritize and integrate adaptation strategies and measures	
No. of sub-national plans and processes developed or strengthened to identify, prioritize and integrate adaptation strategies and measures	



## II. Project Profile

1. General Information	1	GEF ID	9067
	2	Focal Area(s)	Climate Change
	3	Region	Pacific
	4	Country	Cook Islands
	5	GEF Project Title	Cook Islands Renewable Energy Sector Project
	6	Project Size (FSP; MSP)	\$43.65 million
	7	Trust Fund (GEFTF; SCCF; LDCF)	\$4.26 million
2. Milestone Dates	8	GEF CEO Endorsement Date (mm/dd/yy)	07/13/16
	9	ADB Approval Date if the GEF Fund (mm/dd/yy)	08/29/16
	10	GEF Grant Signing of the GEF Fund (mm/dd/yy)	09/14/16
	11	Implementation Start Date of the Project and of the GEF Component (mm/dd/yy)	10/18/16
	12	Date of 1st GEF Grant Disbursement (mm/dd/yy)	09/01/17
	13	Final date of GEF Grant Disbursement (mm/dd/yy)	12/31/21
	14	Proposed/Revised Implementation End (mm/dd/yy)	06/30/25
	15	Actual Implementation End (mm/dd/yy)	To be determined
	16	Expected Financial Closure Date (mm/dd/yy)	To be determined
3. Funding	17	Actual Financial Closure Disbursement (mm/dd/yy)	To be determined
	18	PPG/PDF Funding (USD)	N/A
	19	GEF Grant (USD)	\$4.26 million
	20	Total GEF Fund Disbursement as of 30 June 2020(USD)	\$3.73 million
	21	Confirmed Co-Finance at CEO Endorsement (USD)	\$4.26 million
	21	Materialized Co-Finance at project mid-term (USD)	N/A
4. Evaluations	22	Materialized Co-Finance at project completion (USD)	N/A
	23	Proposed Mid-term date (mm/dd/yy)	06/25/20
	24	Actual Mid-Term date - if applicable (mm/dd/yy)	06/25/20 – 07/03/20
	25	Proposed Terminal Evaluation date (mm/dd/yy)	N/A
	26	Actual Terminal Evaluation Date (mm/dd/yy)	N/A
	27	Tracking Tools Required (Yes/No/ Focal Area TT)	
	28	Tracking Tools Date - if applicable (mm/dd/yy)	
		Midterm Tracking Tool Terminal Evaluation Tracking Tool	

### III. Project Implementation

#### A. Project Description:

On 21 November 2014, the Board of Directors of ADB approved a loan (L3193) of NZ\$12.98 million (\$11.19 million) from ADB's ordinary capital resources (OCR) and the administration of a grant (G0415) not exceeding €5.30 million (\$7.26 million) provided by the European Union for the original Renewable Energy Sector Project (original project). The Government of the Cook Islands (government) provided a contribution equivalent to \$5.83 million to bring the total investment cost to \$24.28 million. The loan and grant became effective on 9 February 2015 and were expected to close on 31 December 2017.

On 19 November 2014, the government appointed ADB as the agency to administer a grant (G0493) of \$4,264,654 from the Global Environment Facility (GEF) to expand the scale of the original project and deliver greater benefits. On 29 August 2016, ADB approved the first additional financing from GEF administered by ADB, which became effective on 18 October 2016. The first additional financing with the additional contribution from the government of \$1.31 million has increased the overall project investment from the current \$24.28 million to \$29.85 million.

The first additional financing allows installation of a battery energy storage system (BESS) with a preliminary capacity of 1.0 MW and 4.0 MWh, which will provide load shifting to offset renewable generation at the existing 1.0 MW solar photovoltaic (PV) facility at the Rarotonga Airport. The BESS, funded by GEF, will allow 2.0 MW of additional solar PV generation, which is about 8% progress towards the total estimated renewable generation.

The impact of the current project will be increased energy security in an environmentally sustainable manner. The outcome will be increased access to a higher share of electricity generated by renewable energy sources. The current project will: (i) construct up to five solar photovoltaic (PV) power plants with a total installed capacity of about 2-megawatt peak (MWp) coupled with batteries to store electricity from solar energy; (ii) rehabilitate the existing distribution network for Phase 1 subprojects; and (iii) provide institutional strengthening to the government to develop the energy efficiency policy implementation plan. The project owner's engineer (POE) has been providing project management support to the implementing agencies to help implement the current project.

In December 2016, GCF's Board approved a grant of \$12,000,000, which was processed as the second additional financing (G0548) to the project. The grant was approved on 30 October 2017 and is administered by ADB. The additional GCF grant, plus the additional contribution from the government of \$1.80 million, has increased the overall project investment to \$43.65 million. The grant was declared effective on 30 July 2018.

#### B. Implementation Progress (IP) Rating:

Overall implementation progress is satisfactory, and the project is not facing any major risk that may threaten the successful delivery of expected outputs. As of 30 June 2020, (i) cumulative contract award for the current project is at \$28.64 million, or 82% of financing administered by ADB; and (ii) cumulative disbursements for the current project has reached \$22.11 million, or 64% of financing administered by ADB. The current project is currently



rated on track in the project performance rating system. The latest implementation status of the current project is summarized in Table 1.

**Table 1. Summary of Implementation Status**

Site	Progress to Date
Phase 1	
Mangaia	<ul style="list-style-type: none"> <li>Contractor (NETcon) completed and commissioned works in October 2018 for renewable energy power station construction and integration.</li> <li>No distribution upgrade was required on Mangaia</li> <li>No safeguards or other issues</li> </ul>
Mauke	<ul style="list-style-type: none"> <li>Power station and distribution upgraded, completed, and commissioned May 2018</li> <li>Number of minor defects – most rectified by Contractor but some outstanding pending relaxing of COVID-19 travel restrictions</li> <li>Safeguards monitoring: a noise complaint was raised by a landowner but has been satisfactory addressed by installation of noise proofing at the power station; lease agreements for substation sites to be finalized (being worked on by CIIC)</li> <li>Distribution variation commenced to install customer meters – some issues due to access to properties and quality of existing wiring being worked through with Contractor – currently delayed due to COVID-19 travel restrictions.</li> </ul>
Mitiaro	<ul style="list-style-type: none"> <li>Power station and distribution rehabilitation completed and commissioned March 2018</li> </ul>
Atiu	<ul style="list-style-type: none"> <li>Contractor completed solar power station in September 2018</li> <li>No distribution upgrade required</li> <li>No safeguards or other issues.</li> </ul>
Phase 2	
Aitutaki	<ul style="list-style-type: none"> <li>Contractor (PowerSmart) completed design and construction commenced in February 2019 and completed in June 2019</li> <li>Small number of minor defects being rectified by Contractor</li> <li>No safeguards issues</li> </ul>
Rarotonga	<p><b>GEF BESS</b></p> <ul style="list-style-type: none"> <li>Airport West 1 MW/4 MWh modular/containerized BESS installed at Rarotonga airport</li> <li>Contract was awarded to MPower Australia in June 2017 and became effective in August 2017 with a scheduled completion date of April 2018</li> <li>Contractor (MPower) commenced site works in June 2018 and completed the majority of installation works in December 2018 (approximately 8 months behind schedule)</li> <li>Contractor returned to site in April, and May 2019 to finalize punch list items and defects, and then again in September 2019 to complete commissioning and provide training to operators.</li> <li>Completion certificate was issued September 2019, noting some remaining minor defects to be resolved by the Contractor. These have not yet been resolved as the Contractor planned their resolution in March 2020 and was impacted by COVID-19. However, the BESS has been operational since completion.</li> <li>MPower Turnkey Contract: The substantial delays in delivery of this project were attributed primarily to Contractor resourcing issues, where it had overcommitted on several projects awarded at the same time (hence not known at tendering evaluation time). The IAs held numerous meetings with the Contractor and issued relevant notices in respect of the delays, but were not able to force improvements. Delay liquidated damages were enforced, capped at 10% of contract fee.</li> <li>The noted defects were not associated with any major technical flaws. Instead, these related primarily to either a) quality control and simple finalization of all tasks or b) control system development, testing and troubleshooting (while the Contractor had an existing control scheme, it was found to be relatively immature and bespoke, somewhat reflecting the maturing state of the BESS industry at the time).</li> <li>Additionally, the battery module component supplier, LG Chem had experienced fires in South Korea. In order to upgrade protection systems, a reconfiguration and replacement of some of the LG Chem battery components was required.</li> </ul>

Site	Progress to Date
	<ul style="list-style-type: none"> <li>• While awaiting component replacement (which experienced delays due to COVID-19, the BESS remained in service due as its low power rating relative to the battery component capacity was deemed low risk. Component replacement has now been completed and replaced battery modules returned to the supplier.</li> </ul> <p><b>GCF BESS:</b></p> <ul style="list-style-type: none"> <li>• Contract for Airport South 2 x 1 MW/4MWh load shifting BESS awarded to Vector in September 2018 and for completion in March 2020 (4 months delay in mobilization)</li> <li>• Project is now complete and commissioned as of March 2020, with no issues.</li> <li>• Contract for Power Station 1 x 6MW/3MWh modular/containerized grid stability BESS to be installed at Rarotonga power station awarded to Vector in May 2020.</li> <li>• Project was completed in March 2021.</li> </ul>

**a. GEF Grant Disbursement**

On 1 June 2017, the battery energy storage system (BESS) turnkey contract of \$3.06 million (about NZ\$4.37 million) funded by GEF was awarded and as of 30 June 2020, disbursements totaled \$3.73 million.

A variation to the project owner’s engineers’ contract to include support for the BESS implementation was also made and awarded in the amount of \$387,289.66. Disbursements as of 30 June 2020 totaled \$276,963.66.

GEF funds also partially funded Phase 1 Solar Photovoltaic Plants (for islands Atiu, Mangaia, Mauke and Mitiaro) when the EU component of the project suffered a shortfall due to foreign currency fluctuation. \$771,796.16 was awarded for this, of which \$619,681.28 have been disbursed as of 30 June 2020.

**b. Stakeholders Engagement**

N/A

**c. Gender Action Plan Implementation Status**

N/A as GAP was not required for this project under GEF financing.

**d. Social and Environmental Safeguard Plan Implementation Status**

**Overall status of Safeguards implementation** - The GEF component is classified as category B for environment, and C for both involuntary resettlement and indigenous peoples. No significant environmental impacts are envisaged from the onsite installation of the BESS system. The initial environmental examination was updated to include the additional project scope and necessary mitigation measures for the on-site installation, operation and decommissioning of the BESS. A due diligence report was also prepared and proved that no land acquisition or displacement will result and that the people of the project area do not meet the ADB criteria (distinctiveness and vulnerability) of indigenous peoples. All safeguard documentation was prepared in accordance with the Government of Cook Islands national laws, policies and guidelines and ADB’s Safeguard Policy Statement (2009). Semi-annual safeguard monitoring reports since the GEF component became effective up to date have been submitted and have identified no issues during construction or operations.

**Status of loan covenant compliance related to Safeguards** – The grant covenants related to safeguards are all being complied with.

**Corrective action, if any** – N/A

**C. Global Environmental Benefits (GEB) Objective/ Development Objective (DO) Rating:**

Satisfactory. The project has achieved most of the key indicators set out in the DMF as of 30 June 2020.

The project feasibility identified potential direct greenhouse gas savings from the GEF financed component of 1,370 t(CO<sub>2</sub>e) per year. This was based on enablement of additional 2 MW solar PV installation that would not otherwise be possible. To date, this additional installation has not yet been achieved, although planning is underway and progressing. A comprehensive monitoring program has not currently been carried out. However, indicative metrics are available for the project benefits to date. Based on TAU data, approximately 700 kW additional solar PV was installed since the GEF financed BESS was commissioned, allowing load shifting of the airport solar PV to make way for this additional solar. The approximate benefit is therefore 480 t(CO<sub>2</sub>e) per year for each of the four years since commissioning.

The reasons why additional solar PV has not been installed yet are multi-faceted:

- TAU had not yet installed its planned Control System to compliment the BESS and provide curtailment services for distributed solar
- COVID-19 response redirected utility resources and finances towards supporting and maintaining immediate local community interests, allowing little capacity to progress developments
- TAU has experienced delays in attracting local interest in private sector solar PV projects, and a TAU 2MW equity solar PV project planned for the Rarotonga airport has been delayed due to revised civil aviation security requirements.

TAU is addressing these issues through:

- Tendering for the Control System in 2024.
- Completing, in 2022, preparation of a feed-in-tariff rate, contract and technical specifications for connection of new private sector solar PV, including communication and information sections with key private sector stakeholders
- Issuing a public call for expressions of interest in private sector solar PV in 2023, and refining the submissions through a technical evaluation process to identify approximately 1 MW of private sector solar IPP that can be contracted during 2024.
- Investigating an alternate site for the 2MW equity solar PV project (to be confirmed Q2 2024)

**D. Risk Rating:**

The BESS turnkey contract has been awarded in June 2017 and then the awarded contractor has commenced works, which have since been completed with minor defects since resolved. Moreover, no additional land acquisition is required. Therefore, the GEF

component is not facing any major risk that may threaten the successful delivery of expected outputs.

#### **E. Overall Rating of the Project:**

Overall implementation progress since effectiveness is satisfactory and the overall project is not facing any major risk that may threaten the successful delivery of expected outputs. The overall project is currently rated on track in the project performance rating system. The latest implementation status of the current project is summarized in Table 1.

#### **F. Additional Comments – Good Practices and Lessons Learned:**

None.

#### **G. Knowledge activities / products:**

- Applied Energy Symposium and Forum, REM2016: Renewable Energy Integration with Mini/Microgrid Conference Proceedings of “Cook Islands: Planning 100% Renewable Energy in Different Guises” was published in December 2016 (<http://www.sciencedirect.com/science/article/pii/S1876610216314849>).
- Asia Clean Energy Forum, “The Promise of Storage: Implementing Renewable Energy in Mini-grids” was presented in June 2018 (<https://d2oc0ihd6a5bt.cloudfront.net/wp-content/uploads/sites/837/2018/06/Chris-Blanksby-and-James-Mason-The-Promise-of-Storage-Integrating-Renewable-Energy-in-Mini-Grids.pdf>
- Asian Development Bank, Hybrid and Battery Energy Storage Systems: Review and Recommendations for Pacific Island Projects, August 2022 ([Hybrid and Battery Energy Storage Systems: Review and Recommendations for Pacific Island Projects | Asian Development Bank \(adb.org\)](#)

#### **H. Location Data:**

The project was completed at the Rarotonga International Airport, (latitude 21.20075°S longitude 159.8003°E), as shown below:



This is consistent with the proposed location as described below:

The plan for the GEF-funded subproject on Rarotonga was to install a Battery Energy Storage System (BESS) into the Rarotonga grid. The BESS was to be housed in containers positioned on one of two potential sites located on government-owned freehold land at the Rarotonga airport on the northwest coast of Rarotonga. Access to both sites would be from public roads across the parcels in question. Storage of materials and staging during construction would be on the same respective parcels.

The preferred and most likely site for the BESS is on the airport property inside the security fence encircling the existing solar photovoltaic (PV) array just southwest of the terminal building (see Figure 1, right, and Figure 2, next page).

The second option is on the south side of the runway adjacent to the substation that serves the airport and its PV array (Figure 2, next page). Both options are technically feasible.



Figure 1. Photo taken in 2016 showing existing PV installation (inside yellow ring).

Figure 3 (below) shows an aerial photo of the area with GIS overlays of coastal hazard zones (red, blue, and yellow fill) and cadastral boundaries (dashed white lines). The boundary shown in fluorescent-green marks the preferred BESS location inside the security fence surrounding the existing PV array. The alternate site at the Te Aponga Uira o Tumu Te Varovaro (TAU) substation is marked by an olive-green dot on the south side of the runway.

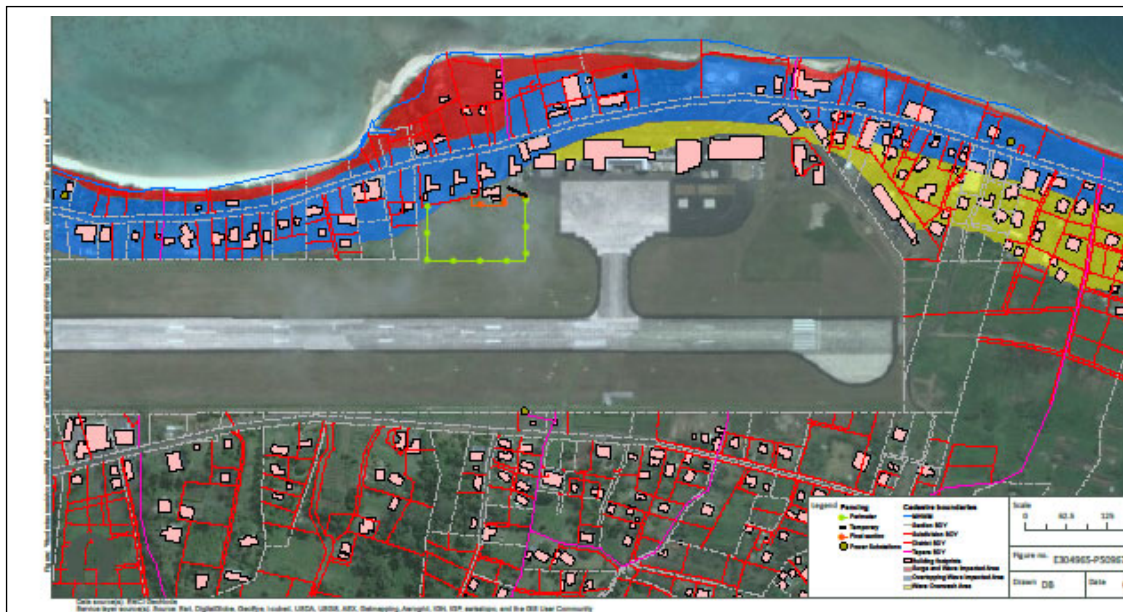


Figure 3: The preferred location of the BESS is inside the security fence (marked in green) that encircles the perimeter of the existing solar array. The alternate site is at the TAU substation (marked by an olive-green dot on the south side of the runway).

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**For Projects that have conducted Midterm Review Mission (from 1 July 2019 to 30 June 2020)****IV. Midterm Review****Midterm Project Ratings:**

Development Objective Rating at MTR (IP): Satisfactory, (S)

Implementation Progress Rating at MTR (DO): Satisfactory, (S)

Risk Rating at MTR: Low Risk (L)

**Information on Progress, challenges and outcomes on stakeholder engagement (based on the description of the Stakeholder engagement plan included at CEO Endorsement/Approval)**

N/A

**Information on Progress on gender-responsive measures as documented at CEO Endorsement/Approval in the gender action plan or equivalent**

N/A

**Knowledge activities / products (based on the Knowledge management approach approved at CEO Endorsement / Approval) and lessons learned (if available)**

- Applied Energy Symposium and Forum, REM2016: Renewable Energy Integration with Mini/Microgrid Conference Proceedings of “Cook Islands: Planning 100% Renewable Energy in Different Guises” was published in December 2016 (<http://www.sciencedirect.com/science/article/pii/S1876610216314849>).
- Asia Clean Energy Forum, “The Promise of Storage: Implementing Renewable Energy in Mini-grids” was presented in June 2018 (<https://d2oc0ihd6a5bt.cloudfront.net/wp-content/uploads/sites/837/2018/06/Chris-Blanksby-and-James-Mason-The-Promise-of-Storage-Integrating-Renewable-Energy-in-Mini-Grids.pdf>)
- Asian Development Bank, Hybrid and Battery Energy Storage Systems: Review and Recommendations for Pacific Island Projects, August 2022 ([Hybrid and Battery Energy Storage Systems: Review and Recommendations for Pacific Island Projects | Asian Development Bank \(adb.org\)](https://www.adb.org/publications/hybrid-and-battery-energy-storage-systems-review-and-recommendations-for-pacific-island-projects))

**Main Findings of the MTR**

Minor changes to reallocate GEF and GCF grant proceeds were approved in Q1 and Q2 2019, including the extension of closing date for all funding sources up to 31 December 2021. The PAM Detailed Cost Estimate by Financier and by Year were also revised accordingly. Government’s comments and confirmation of proposed amendments to GEF and GCF grant agreements have been done.

Procurement of two GCF-funded BESS packages are significantly delayed. Lot 2 was awarded in September 2018, after 8 months of delay. Lot 1 contract negotiations failed after over 6 months and is now for rebidding. The invitation for bids was posted on 27 May 2019 and bid submission deadline was 7 August 2019. This has been finally awarded in May 2020. Commissioning of GEF BESS is 6 months delayed. Recent technical issues with the battery and

continued absence of the contractor's personnel on site are among the reasons for delay. Except for the proposed new consulting package for O&M services, all contracts have been awarded.

Demand-side issues arose in some outer islands, particularly in Atiu where the island council has requested additional BESS capacity. It was discussed and agreed among ADB and the EA, that the O&M services contract will include awareness raising and capacity building on demand-side management and energy efficiency, subject to approval by ADB.

The project is assessed as "in compliance" with all 11 safeguard covenants and with the PMU operating with good safeguards capacity, the project is rated as satisfactory for safeguard compliance. As of January 2020, all semi-annual safeguard monitoring reports have been submitted.

Overall implementation progress is satisfactory and On Track based on the five indicators in ADB's project performance rating system: Outputs, Contract Awards, Disbursements, Financial Management, and Safeguards. The project is not facing any risk that may threaten delivery of expected outputs. All outer islands subprojects are completed, commissioned and running on about 95% renewable energy.



**For Projects that have conducted Completion Mission/Completed TA or PCR Report and GEF TER (from 1 July 2019 to 30 June 2020)**

**V. Terminal Evaluation Report**

**Terminal Evaluation Ratings:**

Development Objective Rating at MTR (IP):

Implementation Progress Rating at MTR (DO):

Risk Rating at MTR:

**Information on Progress, challenges and outcomes on stakeholder engagement**

**Information on Progress on gender-responsive measures, indicators and intermediate results**

**Knowledge activities / products and lessons learned**

**Main Findings of the TE**

**Core Indicators:**

## VI. Materialized Cofinancing

Sources of Co-financing <sup>1</sup>	Name of Co-financer	Type of Co-financing <sup>2</sup>	Amount Confirmed at CEO endorsement / approval	Actual Amount Materialized at Midterm	Actual Amount Materialized at Closing
GEF Agency	Asian Development Bank	Loan	11,190,000.00 <sup>*</sup>	11,190,000.00	N/A
Donor Agency	European Union	Grant	7,260,000.00 <sup>**</sup>	7,260,000.00	N/A
Donor Agency	Green Climate Fund	Grant	12,000,000.00	12,000,000.00	N/A
TOTAL					

<sup>\*</sup>Equivalent to NZ\$12.98 million.

<sup>\*\*</sup>Equivalent to EUR5.30 million.

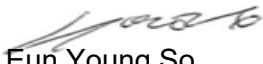
<sup>1</sup> Sources of Co-financing may include: Bilateral Aid Agency(ies), Foundation, GEF Agency, Local Government, National Government, Civil Society Organization, Other Multi-lateral Agency(ies), Private Sector, Other.

<sup>2</sup> Type of Co-financing may include: Grant, Soft Loan, Hard Loan, Guarantee, In-Kind, Other

## VII. Project Contacts

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EA Project Officer Name and Agency Email	Mr. Garth Henderson, Financial Secretary Ministry of Finance and Economic Management <a href="mailto:garth.henderson@cookislands.gov.ck">garth.henderson@cookislands.gov.ck</a>
Co-Implementing Partner Name and Agency Email	Mr. Ben Ponia, Chief of Staff Office of the Prime Minister <a href="mailto:ben.ponia@cookislands.gov.ck">ben.ponia@cookislands.gov.ck</a>
Project Coordinator/Manager Name and Agency Email	Mr. Romani Katoa, Manager Project Management Unit <a href="mailto:romani.katoa@cookislands.gov.ck">romani.katoa@cookislands.gov.ck</a>

Signature:

Name of Project Officer:   
Position: Energy Specialist  
Date:

Endorsed by:   
Division Director  
Olly Norojono  
Energy Division, Pacific Department

## Annex 1: DEFINITION OF RATINGS

### Implementation Progress Ratings

**Highly Satisfactory (HS):** Implementation of **all** components is in substantial compliance with the original/formally revised implementation plan for the project. The project can be presented as “good practice”.

**Satisfactory (S):** Implementation of **most** components is in substantial compliance with the original/formally revised plan except for only a few that is subject to remedial action.

**Moderately Satisfactory (MS):** Implementation of **some** components is in substantial compliance with the original/formally revised plan with **some** components requiring remedial action.

**Moderately Unsatisfactory (MU):** Implementation of **some** components is not in substantial compliance with the original/formally revised plan with **most** components requiring remedial action.

**Unsatisfactory (U):** Implementation of **most** components is not in substantial compliance with the original/formally revised plan.

**Highly Unsatisfactory (HU):** Implementation of **none** of the components is in substantial compliance with the original/formally revised plan.

### Global Environment Objective/Development Objective Ratings

**Highly Satisfactory (HS):** Project is expected to achieve or exceed **all** its major global environmental objectives, and yield substantial global environmental benefits, without major shortcomings. The project can be presented as “good practice”.

**Satisfactory (S):** Project is expected to achieve **most** of its major global environmental objectives, and yield satisfactory global environmental benefits, with only minor shortcomings.

**Moderately Satisfactory (MS):** Project is expected to achieve **most** of its major relevant objectives but with either significant shortcomings or modest overall relevance. Project is expected not to achieve **some** of its major global environmental objectives or yield some of the expected global environment benefits.

**Moderately Unsatisfactory (MU):** Project is expected to achieve of its major global environmental objectives with major shortcomings or is expected to achieve only **some** of its major global environmental objectives.

**Unsatisfactory (U):** Project is expected **not** to achieve **most** of its major global environment objectives or to yield any satisfactory global environmental benefits.

**Highly Unsatisfactory (HU):** The project has failed to achieve, and is not expected to achieve, **any** of its major global environment objectives with no worthwhile benefits.

### Risk Rating

Risk ratings will assess the overall risk of factors internal or external to the project which may affect implementation or prospects for achieving project objectives. Risks of projects should be rated on the following scale:

**High Risk (H):** There is a probability of greater than 75% that assumptions may fail to hold or materialize, and/or the project may face high risks.

**Substantial Risk (S):** There is a probability of between 51% and 75% that assumptions may fail to hold and/or the project may face substantial risks.

**Modest Risk (M):** There is a probability of between 26% and 50% that assumptions may fail to hold or materialize, and/ or the project may face only modest risks.

**Low Risk (L):** There is a probability of up to 25% that assumptions may fail to hold or materialize, and/ or the project may face only modest risks.