Project Number: 49450-006
July 2018

Pacific Renewable Energy Investment Facility
Kingdom of Tonga: Outer Island Renewable Energy Project (Additional Financing)

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 13 July 2018)

Currency units – euro/s (€)/Australian dollar/s (A$)/pa'anga (T$)

€1.00	=	$1.17
$1.00	=	€0.86
A$1.00	=	$0.74
$1.00	=	A$1.35
T$1.00	=	$0.45
$1.00	=	T$2.25

ABBREVIATIONS

ADB	–	Asian Development Bank
DFAT	–	Department of Foreign Affairs and Trade (Australia)
GAP	–	gender action plan
GDP	–	gross domestic product
GEF	–	Global Environment Facility
MEIDECC	–	Ministry of Meteorology, Energy, Information, Disaster Management, Climate Change, and Communications
MFNP	–	Ministry of Finance and National Planning
MW	–	megawatt
MWp	–	megawatt-peak
O&M	–	operation and maintenance
PAM	–	project administration manual
PMC	–	project management consultant
RRP	–	report and recommendation of the President
TPL	–	Tonga Power Limited

NOTE

In this report, "$" refers to United States dollars, unless otherwise stated.

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PROJECT AT A GLANCE

1. Basic Data				**Project Number:** 49450-006
Project Name	Outer Island Renewable Energy Project –Additional Financing	**Department /Division**	PARD/PATE	
Country	Tonga	**Executing Agency**	Ministry of Finance and National Planning	
Borrower	Government of Tonga			

2. Sector	**Subsector(s)**		**ADB Financing ($ million)**
✓ **Energy**	Electricity transmission and distribution		5.50
		Total	**5.50**

3. Strategic Agenda	**Subcomponents**	**Climate Change Information**	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	High
Regional integration (RCI)	Pillar 2: Trade and investment		
4. Drivers of Change	**Components**	**Gender Equity and Mainstreaming**	
Partnerships (PAR)	Bilateral institutions (not client government) Official cofinancing	Effective gender mainstreaming (EGM)	✓
Private sector development (PSD)	Public sector goods and services essential for private sector development		
5. Poverty and SDG Targeting		**Location Impact**	
Geographic Targeting	No	Nation-wide	High
Household Targeting	No		
SDG Targeting	Yes		
SDG Goals	SDG1, SDG7		

6. Risk Categorization: Low

7. Safeguard Categorization **Environment:** B **Involuntary Resettlement:** C **Indigenous Peoples:** C

8. Financing

Modality and Sources	Amount ($ million)
ADB	**5.50**
Sovereign Project grant: Asian Development Fund	5.50
Cofinancing	**3.38**
Global Environment Facility Grant - Project grant (Full ADB Administration)	2.64
Government of Australia - Project grant (Full ADB Administration)	0.74
Counterpart	**0.00**
None	0.00
Total	**8.88**

Source: Asian Development Bank

I. BACKGROUND

1. On 22 June 2017, the Board of Directors of the Asian Development Bank (ADB) approved the Pacific Renewable Energy Investment Facility.[1] The facility will finance renewable energy projects in the 11 smallest Pacific island developing member countries[2] with an overall estimated cost of $750 million, including ADB financing of up to $200 million. Upon approval, the Board delegated authority to the President to approve loans and/or grants to each targeted country for qualifying projects.

2. This facility financing proposal will entail (i) a grant and (ii) the administration of grants, to be provided by the Global Environment Facility (GEF) and the Government of Australia through the Department of Foreign Affairs and Trade (DFAT), to the Kingdom of Tonga for the additional financing of the Outer Island Renewable Energy Project.[3] The original project was approved in June 2013 to help reduce Tonga's dependence on imported fossil fuels and give consumers greater access to more affordable electricity through solar power generation.

3. The additional financing will support (i) meeting cost overruns due to exchange rate fluctuations and the higher bid price for the solar generation turnkey package to be implemented on the four Ha'apai outer islands ('Uiha, Nomuka, Ha'ano, and Ha'afeva) and Niuatoputapu; and (ii) implementing changes in scope (a) for building a mini-grid system on the island of Niuatoputapu[4] and upgrading the existing electric service line on the four outer islands of Ha'apai because of the safety concerns of consumers,[5] and (b) for meeting current project management and technical advisory needs until the end of the current project.

II. THE PROJECT

A. Rationale

4. **Tonga's power sector.** Tonga is a kingdom of 177 islands divided into five island groups: 'Eua, Ha'apai, Niuas, Tongatapu, and Vava'u. Its 103,000 people inhabit about 36 of these islands. The peak demand of the four Tonga Power Limited (TPL) grids in 2016 was about 11.1 megawatts (MW), and yearly demand totaled about 55 gigawatt-hours.[6] An estimated 13 million liters of diesel were consumed to generate this electricity at a cost that was equivalent to about 10% of the year's total gross domestic product (GDP) and about 15% of the total value of imports. Peak demand is expected to increase to 17.2 MW by 2020. Petroleum dependency makes Tonga highly vulnerable to oil price shocks, which affect the affordability of food, goods, electricity, and transport.

5. **The original project.** ADB approved the Outer Island Renewable Energy Project on 27 June 2013 to reduce Tonga's dependence on imported fossil fuel for power generation and give consumers greater access to electricity generated by solar power at a reduced cost. The

[1] ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Pacific Renewable Energy Investment Facility*. Manila.
[2] The Cook Islands, the Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.
[3] ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Grant and Administration of Grant to the Kingdom of Tonga for the Outer Island Renewable Energy Project*. Manila.
[4] The funding contribution from the Government of Tonga for this component was delayed because of the recovery works associated with Cyclone Ian.
[5] The government requested an additional grant from ADB to include this component in the project scope.
[6] TPL is a vertically integrated government-owned public enterprise under the oversight of the Ministry of Public Enterprises and the government's cabinet.

original project, which became effective on 9 June 2014, was designed to (i) construct and install solar power systems with a total capacity of 1.25 megawatt-peak (MWp);[7] (ii) provide operation and maintenance (O&M) training and knowledge transfer to the implementing agencies for at least 5 years after commissioning of the solar systems, including development of a program manual for O&M of solar generation and distribution systems; and (iii) assist the implementing agencies to implement the project in an efficient and effective manner by recruiting project management consultants (PMCs) for at least 5 years after commissioning of the solar systems.

6. **Changes in scope of the original project.**[8] Since effectiveness, the first minor change in scope was approved on 5 June 2015 to (i) increase total capacity of solar power systems to 1.32 MWp and (ii) install off-grid solar home systems on Niuatoputapu in lieu of connecting solar power generating systems to an existing mini-grid because the government's funding contribution was delayed and uncertain as a result of the recovery works associated with Cyclone Ian (footnote 9). On 12 October 2016, through the second minor change in scope, the project scope on Niuatoputapu was changed from the supply of solar home systems to the originally approved scope of connecting solar power system to the mini grid to be funded by the additional financing.

7. **Scaling up of the original project.** The original project encountered initial implementation delays for a variety of reasons, including significant damage caused by the most powerful storm ever recorded in Tonga.[9] Following the devastation caused when Cyclone Ian hit the northeast islands of Ha'apai in January 2014, the government requested a temporary suspension of project activities so it could focus on emergency assistance needed to reconstruct and strengthen the damaged electricity network and school facilities on the island group. After ADB approved the Cyclone Ian Recovery Project in May 2014,[10] activities related to the original project resumed, and the government requested ADB's support to rehabilitate TPL's power distribution system on 'Eua and Vava'u.

8. The power distribution system (grid) is part of the electricity supply chain and requires considerable investment and O&M efforts. Power distribution assets typically represent 20%–30% of the required power system investments in electricity industries worldwide, but this figure rises to about 42% for TPL. The standard losses in rural power distribution networks are generally about 5%, yet the rate is more than twice as high in Tonga at around 13%. Greater losses mean that more fuel is consumed in power generation, which makes improving the efficiency of the country's power system a matter of paramount importance for the government.

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[7] This total capacity comprises the following: (i) 0.80 MWp on 'Eua, Vava'u, and Ha'apai; (ii) 0.28 MWp on the four Ha'apai outer islands of 'Uiha, Nomuka, Ha'ano, and Ha'afeva; (iii) 0.15 MWp on Niuatoputapu; and (iv) 0.02 MWp on Niuafo'ou.

[8] The changes took into consideration (i) the latest solar photovoltaic module cost trends, (ii) an increase in the estimated number of potential consumers on Ha'afeva and 'Uiha islands, (iii) the lack of a proper grid network on Niuatoputapu, and (iv) a mismatch between the current peak demand and the proposed solar power generation on Vava'u.

[9] Cyclone Ian was a category 5 system, with winds of more than 200 kilometers per hour and gusts of about 300 kilometers per hour. About 5,000 people (66% of Ha'apai's population) were directly affected. According to TPL, the cyclone damaged 90% of the Ha'apai power network's distribution lines, 40% of the high-voltage poles, 70% of the low-voltage poles, 65% of the transformers, 90% of the transformer structures, one of the two generators, and 95% of the streetlights.

[10] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Grant and Administration of Grant to the Kingdom of Tonga for the Cyclone Ian Recovery Project.* Manila. Overall progress of rehabilitating the electricity network on the Ha'apai islands has been satisfactory.

9. To address the dual challenges of reducing high technical losses and incorporating climate resilience features for the grids in the outer islands of Tonga, ADB approved the two additional financings in 2015 and 2016.[11] Under the two previous additional financings, 100% of the existing grid network on 'Eua and 50% of existing grid network on Vava'u are being rehabilitated and upgraded. The current project,[12] especially the grid rehabilitation component, will (i) allow Tonga to reduce power distribution losses and fuel consumption while delivering the same amount of electricity to consumers, and (ii) improve the climate resilience feature of TPL's grids. This will be achieved by rehabilitating old and inefficient grid assets, i.e., cables, poles, distribution transformers, and switchgears.

10. **Needs for additional financing.** The additional financing will support

(i) meeting the current project's cost overruns due to exchange rate fluctuations[13] and the higher bid price for the solar generation turnkey package to be implemented in the four Ha'apai outer islands ('Uiha, Nomuka, Ha'ano, and Ha'afeva) and Niuatoputapu;[14] and

(ii) implementing changes in scope (a) for building a mini-grid system on the island of Niuatoputapu and upgrading the existing electric service line on the four outer islands of Ha'apai because of the safety concerns of consumers,[15] and (b) for meeting current project management and technical advisory needs, including in the areas of O&M, financial management, and performance under the gender action plan (GAP) until the end of the current project.[16]

11. **Performance of the current project.** The current project meets all the eligibility criteria for additional financing. As of the first quarter of 2018, (i) cumulative contract awards for the current project totaled $12.7 million, or 73.0% of financing provided by or administered by ADB;[17] and (ii) cumulative disbursements for the current project totaled $7.3 million, or 43% of financing administered by ADB. The current project has also conducted all necessary safeguards due diligence and is noted to be in compliance with ADB's Safeguard Policy Statement (2009). Since

[11] (i) ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Grant and Administration of Grants for Additional Financing to the Kingdom of Tonga for the Outer Island Renewable Energy Project*. Manila. ADB and the Second Danish Cooperation Fund for Renewable Energy and Energy Efficiency for Rural Areas provided $2.19 million and the European Union provided €3.00 million, all on a grant basis. TPL will provide $0.67 million as an in-kind contribution. The first additional financing was approved on 20 October 2015 and became effective on 30 November 2015. (ii) ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant for Additional Financing to the Kingdom of Tonga for the Outer Island Renewable Energy Project*. Manila. ADB provided a loan of $2.5 million equivalent and a grant of $2.5 million from ADB's Special Funds resources as well as an additional contribution from TPL of $0.60 million. The second additional financing was approved on 14 December 2016 and became effective on 28 March 2017.

[12] The current project includes the original project and the two previous additional financings.

[13] The applied foreign currency exchange rate is A$1.00 = $1.00 as per the original report and recommendation of the President (RRP). However, the average exchange rate from the effectiveness month (June 2014) of the original project until April 2018 was A$1.00 = $0.77.

[14] The bid price from the lowest substantially responsive bidder is about 31% greater than the original estimate.

[15] As the funding contribution from the government for the Niuatoputapu mini-grid component was delayed because of recovery works associated with Cyclone Ian, the government decided to use the national allocations of $2,639,269 from GEF. In November 2017, the GEF chief executive officer endorsed the full-sized project proposal. Moreover, the government requested the additional grant from ADB to include the upgrade of the service lines component in the project scope.

[16] The additional financing comprises (i) $1.92 million for cost overruns and (ii) $6.96 million for changes in scope.

[17] Once the additional financing is approved and becomes effective, the signed solar generation turnkey contract can be awarded in the ADB system, which will increase the funding commitment up to about 95%. The remaining 5% will be used to cover the expected contract variation for the existing PMC contract and contingency for the current project.

the fourth quarter of 2017, the current project has not performed well because of the following exogenous reasons:

(i) The government formally requested to hold the processing of the additional financing and consideration for approval until 2018 because the latest debt sustainability analysis in 2017 determined that Tonga had a high risk of debt distress and is eligible in 2018 for 100% grant from the Asian Development Fund.[18]

(ii) In August 2017, the King of Tonga dissolved the Legislative Assembly of Tonga (government) of Prime Minister (PM). Therefore, general elections were held in Tonga on 16 November 2017, resulting in a reelection of the incumbent Prime Minister, ʻAkilisi Pōhiva. Because of the dissolution of the government by the King, the government assumed a caretaker role until the beginning of 2018.

(iii) Tropical Cyclone Gita made landfall in Tonga on 12–13 February 2018, causing widespread damage across the islands of Tongatapu and ʻEua. The total economic value of the effects caused by Cyclone Gita was T$356.6 million ($164.3 million equivalent). This is equivalent to 37.9% of Tonga's nominal 2017 GDP[19] and illustrates the scale of the impact. Of these effects, T$209.1 million ($96.3 million equivalent) was attributable to damage and T$147.5 ($68.0 million equivalent) to losses.[20]

12. Given these exogenous reasons, (i) the signing of the solar generation turnkey package was delayed because of the postponement of the additional financing and the dissolution of the government by the King and (ii) rehabilitation works on Vava'u were delayed because of Cyclone Gita. Therefore, contract awards and disbursement have underachieved compared with projections in the project performance rating system, which is the main reason that the current project is not performing well. Project performance and associated issues are described in more detail in the summary of project performance.[21]

13. **Impact of the additional financing.** The current project will not meet its development objectives without the additional financing. Other than the identified cost overruns and changes in scope, the current project currently faces no major risks that might impede successful delivery of its expected outputs or timely delivery according to its revised implementation schedule. The overall project[22] would be completed within 3 years of the current closing date of the original project. Therefore, scaling down, fully canceling, or restructuring the project would not be a feasible option. Once the additional financing is approved and becomes effective, the project's poor performance can be improved.[23]

14. The overall project will remain technically and economically viable, and financially sustainable with the additional financing component. The safeguards categorization of the overall project will also remain unchanged. The additional financing component will enhance the current project's original design and add effective support for its development of the solar photovoltaic plants by adding the mini-grid and upgrading the poor electric service lines—one of the

[18] ADB (SPD). 2018. Debt Distress Classifications for Concessional Assistance-only Countries. Memorandum. 23 February (internal).
[19] The share is calculated for the nominal 2017 GDP, which was estimated at T$941.9 million.
[20] Government of Tonga. 2018. *Tonga Post-Disaster Rapid Assessment Tropical Cyclone Gita*. Nuku'alofa.
[21] Summary of Project Performance (accessible from the list of linked documents in Appendix 2).
[22] The overall project includes the current project and the proposed additional financing.
[23] Both the current *potential problem* rating in the project performance rating system and the "not performing well" status will be immediately corrected once the additional financing is approved and becomes effective.

government's key priorities. The additional financing component will allow to achieve the impact and outcome of the project, as well as ADB's contribution to power sector development in Tonga.

15. **Alignment of development plans.** The additional financing is in line with ADB's 2009 Energy Policy objectives to promote energy efficiency and renewable energy; provide access to energy for all; and support reform, capacity building, and improved governance in the energy sector.[24] It is included in ADB's country operations business plan for Tonga, 2017–2019, which makes energy a priority area of support and sets a primary goal of reducing the country's dependence on imported fossil fuels through energy efficiency and conservation operations, including support for power generation from renewable energy sources.[25]

16. **Processing under the Pacific Renewable Energy Investment Facility.** Financing for the additional financing will be processed under the Pacific Renewable Energy Investment Facility. The additional financing also meets the following qualifying criteria as set out in the report and recommendation of the President (RRP) for the facility:

(i) The project scope includes renewable energy generation and support for energy sector infrastructure such as (a) installation of battery energy storage system, (b) construction of the mini-grid system, and (c) rehabilitation of the existing power grid.
(ii) Tonga is one of the 11 smallest Pacific island developing member countries (footnote 2).
(iii) The project is included in the Tonga Renewable Energy Road Map.[26]
(iv) The project is classified as category B for environment.[27]

B. Impact and Outcome

17. The impact and outcome of the overall project will remain unchanged with the additional financing. The impact will remain the reduction of Tonga's dependence on imported fossil fuel for power generation. The outcome of the overall project will remain the optimization of on-grid and off-grid generation systems to provide increased consumer access to electricity generated by solar power at a reduced cost.

C. Outputs

18. Output 1 under the current project is the construction and installation of solar power systems with a total capacity of 1.32 MWp on nine outer islands and the rehabilitation by TPL of the existing grid network on the islands of Vava'u and 'Eua by replacing cables, poles, distribution transformers, switchgears, and other equipment. Under the additional financing, output 1 of the overall project will be expanded to include construction of the new mini-grid on Niuatoputapu and rehabilitation of the poor-quality, old existing electric service lines network near the solar power generation systems on the four outer islands of Ha'apai. Output 2 under the current project will remain unchanged with the additional financing. Under the additional financing, output 3 of the overall project will expand to include (i) support on the detailed design of the O&M contract between the government and TPL for the growing outer island power asset base, (ii) extension of project management services, (iii) support on financial management and accounting services, and (iv) support on implementation of the GAP.

[24] ADB. 2009. *Energy Policy*. Manila.
[25] ADB. 2016. *Country Operations Business Plan: Tonga, 2017–2019*. Manila.
[26] Government of Tonga. 2010. *Tonga Energy Road Map, 2010–2020*. Nuku'alofa.
[27] Footnote 1, para. 31.

D. Investment and Financing Plans

19. The government has requested (i) a grant of $5.5 million from ADB's Special Funds resources; (ii) a grant not exceeding $2,639,269 from the GEF;[28] and (iii) a grant not exceeding A$1.00 million ($0.74 million) from DFAT.[29] The grant from ADB will be used to (i) meet cost overruns for the solar generation turnkey package; (ii) implement changes in scope for building a mini-grid system and upgrading the existing electric service lines; and (iii) cover additional contingencies. The grant from GEF will also be used for both mini-grid system and the existing electric service lines. The grant from DFAT will be used to (i) establish and finalize an O&M contracting arrangement with TPL for the growing outer island power asset base; (ii) extend project management services; (iii) recruit financial management and accounting support services; and (iv) recruit a gender specialist to promote, develop, implement, monitor, and improve reporting against the GAP. These grants will raise investments by about 47% from the $18.83 million for the current project to $27.71 million for the overall project. Since ADB is administering cofinancing resources in the form of grants from the Government of Australia and the GEF for operations financed by the Asian Development Fund, universal procurement will apply to all procurement packages under the project. The revised project investment and financing plans are in Tables 1 and 2.

Table 1: Project Investment Plan
($ million)

Item	Current Amount[a]	Additional Financing[b]	Total
A. Base Cost[c]			
1. Goods, works, and services (solar power capacity for nine outer islands and project management consultant)	6.17	1.70	7.87
2. Administrative costs, including land lease cost	0.30	0.00	0.30
3. Goods, works, and services (power distribution network)	10.91	6.22	17.13
Subtotal (A)	**17.38**	**7.92**	**25.30**
B. Contingencies[d]	**1.28**	**0.92**	**2.20**
C. Financing Charges	**0.17**	**0.04**	**0.21**
Total (A+B+C)	**18.83**	**8.88**	**27.71**

[a] Refers to the original amount and any previous additional financing, comprising (i) a $2.50 million loan from concessional loan of the Asian Development Bank (ADB); (ii) $11.44 million grants from ADB's Special Funds resources; (iii) a A$5.50 million ($5.24 million equivalent) grant from the Government of Australia, administered by ADB; (iv) a €3.00 million ($3.57 million equivalent) grant from the European Union, administered by ADB; (v) a $0.75 million grant from the Second Danish Cooperation Fund for Renewable Energy and Energy Efficiency for Rural Areas; (vi) a $2,639,269 grant from the Global Environment Facility (GEF), administered by ADB; and (vi) the government's contribution of $1.57 million as an in-kind contribution. Excludes taxes and duties, because as per the Electricity (Amendment) Act 2010 (dated 24 September 2010), all plant and machinery required for setting up a power plant in Tonga are exempted from all kinds of taxes and duties.

[b] ADB will provide a grant of $5.50 million. The Government of Australia will provide a grant of A$1.0 million. The GEF will provide a grant of $2.64 million.

[c] In mid-2018 prices.

[d] A contingency of about 9% has been allocated for the overall project.

Source: ADB estimates.

[28] On 9 November 2017, the GEF chief executive officer endorsed the grant amount of $2,639,269.

[29] An amendment to the cofinancing agreement between ADB and DFAT was signed on 7 June 2017. The applied foreign currency exchange rate was A$1 = $0.74, as of 15 May 2017.

Table 2: Revised Financing Plan

Source	Current[a] Amount ($ million)	Current[a] Share of Total (%)	Additional Financing Amount ($ million)	Additional Financing Share of Total (%)	Total Amount ($ million)	Total Share of Total (%)
ADB	8.44	44.8	5.50	61.9	13.94	50.3
ADF (Grant)	5.94	31.5	5.50	61.9	11.44	41.3
Ordinary capital resources (concessional loan)	2.50	13.3	0.00	0.0	2.50	9.0
Government of Australia[b]	4.50	23.9	0.74	8.3	5.24	18.9
European Union[c]	3.57	19.0	0.00	0.00	3.57	12.9
Second Danish Cooperation Fund for Renewable Energy and Energy Efficiency for Rural Areas	0.75	4.0	0.00	0.0	0.75	2.7
Global Environment Facility[d]	0.00	0.0	2.64	29.7	2.64	9.5
Government of Tonga[e]	1.57	8.3	0.00	0.0	1.57	5.7
Total	**18.83**	**100.0**	**8.88**	**100.0**	**27.71**	**100.0**

ADB = Asian Development Bank, ADF = Asian Development Fund.

[a] Refers to the original amount and any previous additional financing.

[b] Administered by ADB. This amount includes ADB's administration fee, audit cost, and bank charges to the extent that these items are not covered by the interest and investment income earned on this grant, or any additional grant contribution by the Government of Australia.

[c] Administered by ADB. This amount includes ADB's administration fee, audit cost, and bank charges to the extent that these items are not covered by the interest and investment income earned on this grant, or any additional grant contribution by the European Union. Based on the exchange rate on 7 January 2015.

[d] Administered by ADB.

[e] The government's in-kind contribution or $0.30 million will be in administration costs. Tonga Power Limited will provide $1.27 million as its in-kind contribution for additional financing.

Source: ADB estimates.

E. Implementation Arrangements

20. The executing agency will be the Ministry of Finance and National Planning (MFNP). The Energy Department under the Ministry of Meteorology, Energy, Information, Disaster Management, Climate Change, and Communications (MEIDECC) and TPL will be the implementing agencies of the additional financing component with assistance from the project management unit. Output 1 will be implemented by the MEIDECC and output 3 will be implemented by both the MEIDECC and TPL.[30] The existing project steering committee will remain for the implementation of the overall project.

21. The implementing agencies will be continually assisted by the PMC for the overall project. The implementation and financing arrangements, updated for the additional financing, are summarized in Table 3 and described in detail in the project administration manual (PAM).[31]

[30] TPL is expected to be engaged by the MEIDECC to construct the mini-grid on Niuatoputapu and upgrade the service lines on the four outer islands of Ha'apai using force account.

[31] The existing financing arrangements will be selectively amended, if necessary. Project Administration Manual (accessible from the list of linked documents in Appendix 2).

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	August 2013–December 2020		
Project completion date	31 December 2020		
Loan and grant closing date	30 June 2021		
Management			
(i) Oversight body	Outer Island Renewable Energy Project Steering Committee CEO of the Ministry of Finance and National Planning (chair) CEO of the MEIDECC, head of Energy Department of the MEIDECC, CEO of the Ministry of Public Enterprises, CEO of Tonga Power Limited, head of the Tonga energy road map implementing unit (members)		
(ii) Executing agency	Ministry of Finance and National Planning		
(iii) Implementing agencies	Energy Department of the MEIDECC and Tonga Power Limited		
(iv) Implementation consultant	The project management consultant will be supported by a team of specialized experts.		
Procurement (additional financing)[a]	International competitive bidding	1 contract	$2.77 million
	Shopping	5 contracts	$0.99 million
	Direct contracting[b]	1 contract	$0.03 million
	Consulting services	4 contracts	$0.70 million
	Force account[c]	1 contract	$2.21 million
Retroactive financing and/or advance contracting	Advance contracting and retroactive financing will apply for procurement of civil works (solar generation turnkey contract). The amount to be retroactively financed will not exceed $1.1 million (equivalent to 20% of the ADB grant under the additional financing) and may finance costs incurred prior to grant effectiveness, but not later than 12 months before the signing date of the grant agreement.[c]		
Disbursement	All loan and grant proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed upon between the government and ADB. ADB will disburse the cofinanced funds based on the specific components and different ratios for which the cofinancing has been provided.		

ADB = Asian Development Bank; CEO = chief executive officer; MEIDECC = Ministry of Energy, Information, Disaster Management, Climate Change, and Communications.

[a] Since the overall project is financed with ADB-administered cofinancing resources, universal procurement will apply following ADB. 2013. *Blanket Waiver of Member Country Procurement Eligibility Restrictions in Cases of Cofinancing for Operations Financed from Asian Development Fund Resources.* Manila.

[b] Direct contracting in this instance is justified as the engagement is low value and the Electrical Commission is the only certified entity in Tonga that can undertake this work.

[c] The additional grants will finance the incremental labor costs Tonga Power Limited incurs in carrying out the project civil works because of the scattered nature of the works to be conducted, using force account. Tonga Power Limited has been successfully implementing the similar project on Haʻapai and the current project on ʻEua and Vava'u, using force account.

Source: ADB.

III. DUE DILIGENCE

A. Technical

22. The overall project has been assessed as technically viable based on extensive study of the load and energy demand records provided by the MEIDECC, TPL, field investigations, experience from the current project, and ADB's Cyclone Ian Recovery Project. The selection of equipment has been carefully analyzed based on best engineering practices. The equipment is specifically designed for hard marine environments and remote island conditions. The

implementing agency quantified the equipment necessary for the network refurbishment, assessed the grid condition, and calculated the potential reduction in grid power losses. The equipment will incorporate adequate climate-proofing measures to increase resilience to climate and disaster risks throughout the project's life cycle.

B. Economic and Financial

23. The overall project, including the additional financing, is considered financially unviable. This is mainly because the additional financing, especially installation of the mini-grid on Niuatoputapu and the upgrading of the existing electric service lines on the four outer islands of Ha'apai, does not entail significant incremental revenue. However, with the shift to greater solar generation projected to generate sufficient revenue to cover lower O&M costs, the overall project is deemed financially sustainable. Sustainability can be further strengthened through a renewed emphasis on O&M by prioritizing funding and building local capacity for regular O&M works.[32]

24. As the overall project involves greater benefits (clean energy access in the outer islands) from an economic point of view, the overall project feasibility can therefore be justified on economic grounds. From a basic needs or basic public goods and services provision perspective, additional financing is warranted, as non-delivery of project outputs would adversely affect the livelihoods and well-being of vulnerable communities in Tonga's outer islands that have limited access to reliable and affordable electricity. Further, proceeding with this third round of additional financing is justified from an economic perspective as returns to the overall economy still exceed the economic opportunity cost of capital. The overall project, including the additional financing, is considered economically viable since the estimated economic internal rate of return of 7.7% is greater than the economic discount rate of 6.0%.[33] To gauge the project's impact on various stakeholders, distribution analysis was undertaken by comparing financial flows with broader economic benefits. These results confirm that the overall project could have outsized impacts on Tonga's poor and vulnerable and could at least indirectly contribute to ongoing poverty alleviation efforts by the government.

C. Governance

25. **Financial management.** The financial management capacity of each of the implementing agencies, TPL and the MEIDECC, has been newly assessed[34] and found to be adequate to ensure that loan and grant funds are utilized for their intended purposes. Overall risk (inherent and control) is moderate with regard to TPL and the MEIDECC as a whole. TPL's external auditor has expressed unqualified (clean) opinions for all financial years. Tonga has a solid legal and regulatory framework that sets out budgeting, expenditure, and accountability structures, with oversight by the Legislative Assembly. More detailed financial management, internal control and

[32] More detailed sustainability analysis was conducted and is presented in the Financial Analysis (accessible from the list of linked documents in Appendix 2).

[33] ADB. 2017. *Guidelines for the Economic Analysis of Projects.* Manila. These guidelines provide further justification for applying a lower discount rate of 6% as the minimum required economic internal rate of return for projects that generate environmental benefits (e.g., pollution control), such as the Outer Island Renewable Energy Project. This accounts for the very long-term impacts of environmental protection and conservation projects, as with the current subproject.

[34] In accordance with ADB. 2005. *Financial Management and Analysis of Projects*. Manila; and ADB. 2009. *Financial Due Diligence: A Methodology Note*. Manila.

risk assessments, and the financial management action plan have been prepared, as shown in the PAM.

26. **Procurement.** The PMC has assisted the implementing agencies in procuring all project goods, works, and services under the current project. Procurement of goods, works, and related services under the additional financing project will be carried out by the MEIDECC with assistance from TPL and the project management unit, in accordance with ADB's Procurement Guidelines (2015, as amended from time to time). In addition to international competitive bidding, national competitive bidding, shopping methods, direct contracting, and force account methods will be used for some packages to be funded by the additional financing. Direct contracting will be used for house-wiring test works to be done by the government's certified entity, the Electrical Commission, at an estimated cost of about $30,000. Direct contracting in this instance is justified as the engagement is low value and the Electrical Commission is the only certified entity in Tonga that can undertake this work. TPL will prepare the final technical and engineering designs and be responsible (under the MEIDECC's supervision) for the installation of the component to build the mini-grid system on Niuatoputapu and to upgrade service lines on the four outer islands of Ha'apai to be funded by the additional financing. The additional grants will finance the labor costs of TPL to carry out construction of the mini-grid system on Niuatoputapu and rehabilitation of the service lines on the Ha'apai outer islands. TPL has successfully implemented similar works on Ha'apai under the Cyclone Ian Recovery Project and on Vava'u and 'Eua using force account under the current project, and it is capable of carrying out the construction without disrupting the grid's functioning. The use of direct contracting and force account methods has been justified based on the relevant sections of ADB's Procurement Guidelines (2015 as amended from time to time). Four individual consulting packages have been created to expand output 3.

27. Advance contracting for some packages using international and national competitive bidding, shopping, and direct contracting methods will be undertaken in conformity with ADB's Procurement Guidelines (2015, as amended from time to time). The mini-grid solar generation turnkey package was signed in April 2018.[35] The executing agency and implementing agencies have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government, the MFNP, the MEIDECC, and TPL. The specific policy requirements and supplementary measures are described in the PAM.

D. Poverty and Social

28. The primary beneficiaries of the overall project are the people of the outer islands of Tonga who will benefit from an alternative, cheap, and reliable means of power supply. Primary beneficiaries will include low-income households relying on existing lifeline electricity tariffs. Under the additional financing, the people of the four Ha'apai outer islands (about 655 customers per 2,626 population) and Niuatoputapu (about 194 customers per 730 population) will particularly gain from a reliable electricity supply, which will result in more efficient electricity consumption and provide incentives to households and local businesses to maximize power supply for income-generating and productive activities. Provision of social services, such as health and education, are also expected to improve through the provision of a consistent power supply.

29. Rural women in Tonga perform multiple roles, often with limited resources and challenging work environments, such as lack of access to electricity. The provision of an affordable, reliable

[35] The advance payment of $370,000 equivalent will be paid by the government and reimbursed through retroactive financing.

power supply[36] to beneficiary households will enable women to perform their roles more efficiently. Women's lack of opportunities for paid employment (The employment rates for women are 51% on the four outer islands of Ha'apai and 53% on Niuatoputapu) would also be potentially addressed by the growth of enterprises dependent on reliable electricity supply and the employment opportunities created during project implementation. The activities proposed under the additional financing will not require any changes to the existing GAP of the overall project, which is categorized as effective gender mainstreaming. The PMC, with the assistance of the gender focal points from TPL and the MEIDECC, will continue to satisfactorily implement the proposed activities and targets under the GAP.[37] TPL has successfully engaged eight women out of a total of 15 trained workers at the current project sites. Four of these women previously completed the same tasks on the Ha'apai islands under the Cyclone Ian Recovery Project. TPL's effort may create long-term employment opportunities for these female workers. The implementation progress of the GAP will continue to be reported quarterly to ADB and the government.

E. Safeguards

30. **Environment.** The areas to be affected by activities under the additional financing are classified as category B for the environment. Initial environmental examinations were prepared in accordance with ADB's Safeguard Policy Statement (2009). No significant environmental impacts will result from the implementation of the overall project.

31. **Involuntary resettlement and indigenous peoples.** The additional financing is classified as category C for involuntary resettlement and indigenous peoples per ADB's Safeguard Policy Statement (2009). The due diligence report confirmed that it will not require any land acquisition, displace people, and impact on any assets and livelihood. No distinct and vulnerable indigenous peoples will be affected. All the activities in the overall project will be implemented in a culturally appropriate and participatory manner.

F. Risks and Mitigating Measures

32. No significant issues are expected to arise in implementing the overall project except the high foreign currency exchange risk (Table 4). Other key risks and mitigating measures are described in detail in the risk assessment and risk management plan.[38]

Table 4: Summary of Risks and Mitigating Measures

Risk	Mitigating Measures
Foreign exchange risk	The Asian Development Bank requires that 15% of the grant proceeds remain unallocated as reserve for foreign exchange risks. The grant agreements clearly indicate that the borrower and recipient shoulder the foreign exchange risk. The additional financing will provide enough contingencies.

Sources: Government of Tonga, Ministry of Finance and National Planning; and Asian Development Bank.

[36] The provision of an affordable, reliable power supply can be achieved by the project scope, which includes the following: (i) solar power generation system, (ii) battery energy storage system, (iii) energy management system, and (iv) emergency backup diesel generators.

[37] The PMC will actively promote the involvement of women in employment, such as by hiring at least 30% women through local construction contracts and encouraging the participation of 50% women in training sessions rolled out during project implementation.

[38] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

IV. ASSURANCES

33. The government, the MFNP, the MEIDECC, and TPL have assured ADB that implementation of the project shall conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and the grant documents.

34. The government, the MFNP, the MEIDECC, and TPL have agreed with ADB on certain covenants for the project, which are set forth in the grant agreements and project agreement.

V. PRESIDENT'S DECISION

35. On the basis of the approval by the Asian Development Bank (ADB) Board of Directors for the provision of loans and/or grants under the Pacific Renewable Energy Investment Facility in an aggregate amount not exceeding the equivalent of $200,000,000, the President approves a grant not exceeding $5,500,000 to the Kingdom of Tonga from ADB's Special Funds resources (Asian Development Fund) for additional financing of the Outer Island Renewable Energy Project, on terms and conditions that are substantially in accordance with those set forth in the draft grant and project agreements attached to this proposal.

36. The President, acting under the authority delegated by the Board, has approved:

(i) the administration by ADB of a grant not exceeding $2,639,269 to the Kingdom of Tonga for the additional financing of the Outer Island Renewable Energy Project, to be provided by the Global Environment Facility; and
(ii) the administration by ADB of a grant not exceeding A$1,000,000 to the Kingdom of Tonga for the additional financing of the Outer Island Renewable Energy Project, to be provided by the Government of Australia.

Takehiko Nakao
President

31 July 2018

REVISED DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with

Current project
Tonga's dependence on imported fossil fuel for power generation reduced.

Overall project
Unchanged.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome **Current project** On-grid and off-grid generation systems are optimized and provide increased consumer access to electricity generated by solar power at a reduced cost.	**Current project** By 2022: At least 2,103 MWh of solar electricity supplied to customers: 1,314 MWh on 'Eua, Ha'apai, and Vava'u, and 789 MWh on Ha'apai outer islands and Niuas. About 2,010 tons of annual carbon dioxide emissions are avoided: 'Eua and Ha'apai—1,380 tons; Ha'apai outer islands and Niuas—630 tons. (Baseline: none).	TPL annual report TPL annual report	The site selection process is politicized. Environmental issues delay implementation.
Overall project Unchanged.	**Overall project** Overall, about 2,483 MWh of solar electricity (2,103 MWh original project + 380 MWh additional financing) are supplied to customers annually. Overall, about 2,310 tons (2,010 tons original project + 300 tons additional financing) of annual carbon dioxide emissions are avoided.		
Outputs **Output 1** **Current project** The project will construct and install solar power systems with a total capacity of 1.32 MWp on nine outer islands of Tonga, and the	1a. **Current project** By the end of 2017: (i) solar photovoltaic generators are installed and connected to existing electricity distribution networks (0.2 MWp on 'Eua,	1a. Project progress reports TPL annual report ADB's project completion report	The price of raw materials and power plant components increases unexpectedly.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
existing grid network on the islands of Vava'u and 'Eua rehabilitated by TPL.	repair program on Vava'u and 0.55 MWp on Ha'apai); (ii) solar photovoltaic generators are installed and connected to existing community-owned and community-managed electrical mini-grids on four Ha'apai outer islands (100 kWp on 'Uiha, 70 kWp on Nomuka, 70 kWp on Ha'ano, and 150 kWp on Ha'afeva); (iii) 23 kWp SHS capacity in Niuafo'ou and 160 kWp SHS are installed in Niuatoputapu; and (iv) 80% of existing grid networks on 'Eua and 20% on Vava'u are rehabilitated. At least 65 households headed by women in Ha'apai outer islands (50 households) and Niuas (15 households) will benefit from the project. (Baseline: All 350 existing households) Women make up a targeted 30% of the workforce for local construction contracts for solar power installations.		Government approval processes for procurement are slow. The procurement process is weak. The project management unit is not established in a timely manner and has rapid staff turnover. Counterpart staff lacks interest in O&M training. Counterpart staff and communities lack interest in the training program. Counterpart support, performance, and coordination are weak and inadequate.
Overall project In addition to the current project output 1, the rehabilitated grid network portions on Vava'u and 'Eua are expanded.	**Overall project** By the end of 2020: Output 1: Original project: Construct and install 1.32 MWp solar system (output indicators [i]–[iii]) on nine outer islands Additional financing: Construction of new mini-grid on Niuatoputapu and upgrading of the existing service lines on Ha'apai. Women make up 30% of workforce for construction and O&M of the new mini-grid on Niuatoputapu and		

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	upgrading of the existing service lines on Ha'apai.		
Output 2 **Current project** O&M knowledge transferred through training.	2a. **Current project** By the end of 2020: (i) the manual for solar electric equipment is finalized; and (ii) knowledge of solar electric and hybrid equipment is transferred in 5 years after commissioning of the systems.	2a. Project progress reports, TPL annual report, training attendance sheets, and ADB's project completion report Annual asset maintenance plan	
Overall project Unchanged.	**Overall project** Unchanged.		
Output 3 **Current project** Project implemented and managed efficiently.	3a. **Current project** By the end of 2020: (i) consultancy services provided through the appointment of the PMC team, comprising one electrical solar engineer to act as project manager, one power electric planning and field engineer to act as deputy project manager, one financial and procurement specialist, and one social safeguards specialist; (ii) continuous capacity building program conducted for each group of islands for 5 years after systems commissioned. Training includes: (i) project planning and asset management and maintenance for the staff of the Energy Department and TPL and existing community electric societies (with an expected minimum 50% female participants); (ii) procurement, anticorruption, safeguards, and O&M training for solar–	3a. Project progress reports, TPL annual report, semiannual safeguards monitoring reports, training attendance sheets, and ADB's project completion report	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	diesel hybrid energy systems (expected minimum of 50% female participants); (iii) asset management concepts, theories, and practical project applications for the staff of TPL and electric societies; (iv) asset management program for staff of TPL and electric societies (expected minimum of 10% female participants); (v) efficient use by management of solar power services for customers of TPL and electric societies; (vi) consumer training on power budget management for each of the nine outer islands (expected minimum of 50% female participants); and (vii) demand-side management for customers of TPL and electric societies (expected minimum of 50% female participants).		
Overall project Unchanged.	**Overall project** Additional financing: (i) support on the detailed O&M model for the growing outer island power asset base, (ii) extension of project management services, (iii) recruitment of financial management and accounting support services, and (iv) recruitment of a gender specialist.		

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Key Activities with Milestones **1. Construct and install 1.32 MWp solar power capacity in the project areas, construct mini-grid on Niuatoputapu, and rehabilitate electric service lines network on the four outer islands of Ha'apai.** 1.1 Carry out tender process for turnkey contract (package 1) for 0.75 MWp on-grid solar photovoltaic plants (January–May 2015) (complete). 1.2 Carry out tender process for turnkey contract (package 2) for 0.57 MWp mini off-grid solar photovoltaic system (September 2016–January 2017) (complete). 1.3 Evaluate and report on bids, and award contracts: package 1 (June–December 2015) (complete). 1.4 Evaluate and report on bids, and award contracts package 2 (January 2017–April 2018) (complete). 1.5 Install, test, and commission systems, including trial operation of on-grid solar photovoltaic plants (December 2015–May 2017) (complete). 1.6 Install, test, and commission systems, including trial operation of mini and off-grid solar photovoltaic system (June 2017–December 2018) (changed). 1.7. Carry out tender process for rehabilitation of power distribution network on 'Eua and Vava'u (January 2016–December 2017) (complete). 1.8 Install, test, and trial operation of the rehabilitated power network on 'Eua and Vava'u (January 2016–December 2019) (changed). 1.9. Carry out tender process for construction of mini-grid on Niuatoputapu and rehabilitation of service lines on Ha'apai: (January 2018–December 2019) (changed). 1.10 Install, test, and trial operation of construction of mini-grid on Niuatoputapu and rehabilitation of service lines on Ha'apai (June 2018–December 2020) (changed). **2. Conduct O&M training.** 2.1 Design O&M program. 2.2 Conduct O&M training for solar electric and hybrid equipment for 5 years after commissioning (Q1 2017–Q4 2020) (changed). **3. Provide efficient project implementation and management.** 3.1 Recruit and field PMC team (Q1 2014) (complete). 3.2 Prepare detailed project implementation schedule, technical designs, safeguards, and gender action plan components (Q3 2014–Q2 2019) (changed). 3.3 Develop and implement a capacity-strengthening program for staff of Energy Department, TPL, community electricity societies, and TPL customers (every year until 2020). 3.4 Evaluate training programs and report (once a year until 2020). 3.5 PMC teams prepare final report after 5 years of activities (Q4 2020).			
Inputs ADB: Government of Australia: \$5.94 million (current, grants) \$2.50 million (current, loan) \$5.50 million (additional) \$13.94 million (overall) \$4.50 million (current) \$0.74 million (additional) \$5.24 million (overall)			

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
European Union:	$3.57 million (current) $0.00 million (additional) $3.57 million (overall)		
Second Danish Cooperation Fund for Renewable Energy and Energy Efficiency for Rural Areas:	$0.75 million (current) $0.00 million (additional) $0.75 million (overall)		
Global Environment Facility:	$0.00 million (current) $2.64 million (additional) $2.64 million (overall)		
Government of Tonga:	$1.57 million (current) $0.00 million (additional) $1.57 million (overall)		

ADB = Asian Development Bank, kWp = kilowatt-peak, MWh = megawatt-hour, MWp = megawatt-peak, O&M = operation and maintenance, PMC = project management consultant, Q = quarter, SHS = solar home system, TPL = Tonga Power Limited.
Source: ADB.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/LinkedDocs/?id=49450-006-RP

1. Grant Agreement: Special Operations
2. Grant Agreement: Externally Financed – Government of Australia
3. Grant Agreement: Externally Financed – Global Environment Facility
4. Project Agreement
5. Sector Assessment (Summary): Energy
6. Project Administration Manual
7. Summary of Project Performance
8. Development Coordination
9. Financial Analysis
10. Economic Analysis
11. Country Economic Indicators
12. Summary Poverty Reduction and Social Strategy
13. Gender Action Plan
14. Initial Environmental Examination
15. Land Due Diligence Report (Updated)
16. Risk Assessment and Risk Management Plan