FINANCIAL ANALYSIS

A. Introduction

- 1. This financial analysis has been conducted in accordance with the *Financial Management and Analysis of Projects* of the Asian Development Bank (ADB). The analysis covers the third round of additional financing for the Outer Island Renewable Energy Project (the project), which includes a \$2,639,269 grant from the Global Environment Facility (GEF) and \$0.74 million from the Australian Department of Foreign Affairs and Trade (DFAT)—to be administered by ADB—and \$5.5 million of Asian Development Fund (ADF) grant assistance.
- 2. The original project was approved in June 2013 to help reduce Tonga's dependence on imported fossil fuels and expand consumers' access to more affordable electricity through solar power generation. The original project comprised a \$2.0 million ADF grant and a \$4.5 million grant from the Government of Australia, administered by ADB. A first round of additional financing was approved in October 2015, which included a \$1.4 million ADF grant and the administration of a \$3.6 million equivalent grant from the European Union and a \$0.75 million grant from the Second Danish Cooperation Fund for Renewable Energy and Efficiency for Rural Areas. This first round of additional financing expanded the project's scope to include rehabilitation of the existing grid network near solar power generation systems in 'Eua and Vava'u. A second round of additional financing (a \$2.5 million ADF loan and a \$2.5 million ADF grant) was approved in December 2016 to scale up the grid rehabilitation component of the project.
- 3. The third round of additional financing will support (i) meeting cost overruns because of the higher bid price for the solar generation turnkey package to be implemented on the four Ha'apai outer islands (Ha'afeva, Ha'ano, Nomuka and 'Uiha) and Niuatoputapu; (ii) meeting financing gaps for building a mini-grid system on Niuatoputapu and upgrading the existing electric service line on the four outer islands of Ha'apai; ⁵ (iii) meeting financing gaps caused by exchange rate fluctuations; ⁶ and (iv) meeting ongoing project management and technical advisory needs until the end of the current project in 2019. Upgrades and rehabilitation of the Ha'apai power distribution system shall be financed by the \$2,639,269 GEF grant, ADB's Special Funds resources amounting to \$5.5 million in ADF grants, and \$0.74 million in DFAT grants.

B. Financial Analysis

4. **Financial costs and benefits.** All costs and benefits are expressed in 2018 prices. Financial cost streams included in calculating the financial internal rate of return are capital investment and operation and maintenance (O&M) costs at market prices. Financial benefits

¹ ADB. 2005. Financial Management and Analysis of Projects. Manila.

² 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.

³ 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.

⁴ 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.

⁵ The Government of Tonga was not able to confirm the funding contribution for this component in a timely manner.

⁶ The applied foreign currency exchange rate is A\$1.00 = \$1.00 as per the original report and recommendation of the President. However, the average exchange rate from the effectiveness month (June 2014) of the original project until April 2018 was A\$1.00 = \$0.77.

include additional electricity sales with reduced losses and the lowering of some O&M expenditures. The project financial costs include the (i) initial costs of the hardware and electrical works needed for integrating the solar power plants with the existing Tonga Power Limited (TPL) electricity grid; (ii) additional investment costs of upgrading and rehabilitating the existing electricity distribution networks on the four outer islands of Ha'apai (to be funded by the third additional financing); and (iii) annual and periodic O&M expenditures, including necessary parts replacements. Physical and price contingencies are included in the total costs. Under the Electricity (Amendment) Act 2010, the plant and machinery required for setting up a power plant are exempt from taxes.

5. **Weighted average cost of capital.** Considering this third round of additional financing, the weighted average cost of capital (WACC) has been updated to reflect the amount and weighting of all funding sources (Table 1). GEF grant financing amounts to 9.5% of total funds (\$2,639,269), the ADF loan component 9.0% (\$2.5 million), and the ADF grant component increases to 44.0% (\$12.2 million). The opportunity cost of grants is estimated at 5%, equivalent to the cost of equity financing. After adjusting for inflation, the WACC for the overall project is calculated at 2.3%.

Table 1: Calculation of Weighted Average Cost of Capital

Table II Calculation of Troightou / troi age cool of Capital										
	Item	ADF Grant	ADF Loan	Gov't of Australia	EU	GEF	Gov't of Tonga	Total		
Α	Amount (\$ million)	12.2	2.5	5.2	3.6	2.6	1.6	27.7		
В	Weighting (%)	44.0	9.0	18.9	12.9	9.5	5.7	100.0		
С	Nominal cost (%)	5.0	1.5	5.0	5.0	5.0	5.0	26.5		
D	Tax rate (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Е	Tax-adjusted nominal cost [C x (1-D)] (%)	5.0	1.5	5.0	5.0	5.0	5.0	26.5		
F	Inflation rate (%)	2.5	2.5	2.5	1.4	2.5	2.7	14.0		
G	Real cost [(1+E)/(1+F)– 1] (%)	2.5	(0.9)	2.4	3.6	2.5	2.2	12.2		
Н	Weighted component of WACC [G x B] (%)	1.1	(0.1)	0.5	0.5	0.2	0.1	2.3		

^{() =} negative, ADF = Asian Development Fund, EU = European Union, GEF = Global Environment Facility, Gov't = government, WACC = weighted average cost of capital.

Note: For the purposes of WACC computation, the \$0.75 million grant from the Second Danish Cooperation Fund for Renewable Energy and Efficiency for Rural Areas is included in the ADF grant. Source: ADB.

6. **Financial viability.** The current project's financial net present value, inclusive of the first two rounds of additional financing, was estimated at \$0.83 million.8 Upon adding the costs of upgrading and rehabilitating power distribution systems on the four outer islands of Ha'apai—estimated at \$6.9 million in financial terms—the overall project's financial net present value at the updated WACC becomes negative, indicating lack of financial viability (Table 1).

⁷ This rate is based on TPL's target return on equity, as stated in its annual report for fiscal year 2014. According to the National Reserve Bank of Tonga website, yields for a 4-year bond issued in 2016 were 2.5%–3.5% (returns for 6-year and 7-year bonds issued in 2014–2015 were 3.0%–3.5%). With risk-free interest rates consistent with medium-term inflation of 1% or lower, the analysis assumes a cost of equity of 5%.

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⁸ 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. Financial Analysis (accessible from the list of linked documents in Appendix 2). Manila.

7. Although the project will likely become financially unviable with these higher costs, not proceeding with the additional financing would heighten the risk of expected project benefits remaining unrealized because of a lack of complementary investments to rehabilitate power distribution grids, which would mute the impacts of ongoing investments in renewable generation systems. From a basic needs or basic public goods and services provision perspective, additional financing is warranted, as nondelivery of project outputs would adversely affect the livelihoods and well-being of vulnerable communities in Tonga's outer islands that currently only have limited access to reliable and affordable electricity. Further, proceeding with the 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.⁹

C. Financial Sustainability

8. In view of the financial unviability of the overall project, a financial sustainability analysis has been undertaken to ascertain the likelihood of adequately funding annual O&M costs, which would ensure that project assets and services successfully reach their expected lifespans.

Table 2: Financial Sustainability Projections for Fiscal Year 2017–2018

(\$ 000)											
Item	2018	2019	2020	2021a	2022a	2023a	2024a	2025a			
Outer Island Renewable											
Energy Project											
Revenue from electricity sales	201.6	295.1	299.4	303.7	308.2	312.8	317.5	322.2			
O&M expenditures	(323.0)	(321.7)	(320.3)	(319.0)	(317.6)	(316.3)	(315.0)	(313.7)			
Balance	(121.4)	(26.6)	(20.9)	(15.2)	(9.5)	(3.6)	2.5	8.6			
MEIDECC											
Revenues	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7			
Transfers	25,862.7	56,932.7	55,188.1	45,994.5	52,705.1	51,295.9	49,998.5	51,333.2			
Local fund	2,897.2	2,976.6	3,060.1	2,978.0	3,004.9	3,014.3	2,999.1	3,006.1			
Revolving fund	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5			
Development partner budget support	7,145.7	6,827.3	7,149.4	7,040.8	7,005.9	7,065.4	7,037.4	7,036.2			
Development partner (in-kind)	15,798.4	47,107.3	44,957.1	35,954.2	42,672.9	41,194.7	39,940.6	41,269.4			
Expenditures	25,862.7	56,932.7	55,188.1	45,994.5	52,705.1	51,295.9	49,998.5	51,333.2			
Balance	320.7	320.7	320.7	320.7	320.7	320.7	320.7	320.7			

() = negative; MEIDECC = Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change, and Communications; O&M = operation and maintenance.

Source: Asian Development Bank estimates; Government of Tonga Fiscal Year 2017–2018 Budget estimates; and Tonga Power Limited estimates and projections.

9. Solar mini-grids and power distribution systems on the outer islands are owned, operated, and maintained by the community under the regulation of the Ministry of Meteorology, Energy, Information, Disaster Management, Climate Change, and Communications (MEIDECC).

⁹ Economic Analysis (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President).

^a Projections. The Tonga budget for fiscal year 2017–2018 estimates only projected MEIDECC revenues and expenditures up to 2020. These projections are extended to 2021–2025 using 3-year moving averages of respective revenue and expenditure items.

Projected financial flows for the project show that annual electricity sales revenues from solar mini-grids are just about enough to cover the MEIDECC's yearly O&M expenses for project assets (Table 2). Revenues are forecast to gradually increase as solar generation farms are completed and reach full generation capacity, as well as with modest expected increases in tariffs (less than 1% per annum), such that by 2024 income from electricity sales would be sufficient to fund routine O&M costs.

- 10. In the interim, and also in years when more intensive repair and maintenance works are necessary (assumed to be every 10 years), additional O&M funding may be sourced from the MEIDECC fiscal envelope. MEIDECC expenditures are fully funded by allocations from the national government and development partners, with a modest surplus from the government's own revenue-generating activities. However, in the fiscal year 2017–2018 budget, MEIDECC's allocations for O&M are \$234,000, or only about 1% of its total budget. This appears to be a continuation of the de-prioritization of O&M from the previous fiscal year, when allocations were originally budgeted to almost triple but instead fell by 18% amid broader fiscal difficulties.
- 11. The recent declining trend needs to be reversed, and O&M allocations should be restored to more ideal levels. As recently as fiscal year 2015–2016, the MEIDECC's O&M allocations were about \$433,000, or 6.6% of its total budget. A return to similar, more reasonable O&M allocation levels would promote the sustainability of MEIDECC assets, including the project's solar mini-grids and power distribution networks.
- 12. The project includes capacity building and training in the O&M of solar mini-grids to support the sustainability of systems supported by the project. Further, the lower annual O&M requirements of solar hybrid mini-grids relative to the current diesel generation systems in the outer islands—which can be more expensive by up to \$800,000 per annum because of the high cost of transporting large volumes of imported diesel to remote communities—will also help ease the current strain in the MEIDECC's funding allocations for O&M.
- 13. The shift to greater solar generation is projected to generate sufficient revenue to cover lower O&M costs, and could potentially provide space for tariff reductions in the future. On this basis, the overall project is 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.

D. Financial Appraisal of Tonga Power Limited

14. The principal business activity of TPL involves generation and supply of electricity in Tonga's four main island groups of Tongatapu, Vava'u, 'Eua, and Ha'apai. TPL also undertakes electrical contracting work, particularly for private customer service lines. Table 3 shows balance sheets, Table 4 shows pro forma financial statements, and Table 5 shows audited income statements of TPL for fiscal years 2012–2020.

Table 3: Audited Income Statements of Tonga Power Limited, Fiscal Year 2012–2020

(T\$) Item 2012 2013 2014 2016 2017 2018 2019 2020 Actual Actual Projected Projected 48.456.558.0 44.038.707.0 41.782.742.0 45.978.110.0 43.309.822.0 43.373.657.0 49.604.288.3 50.858.987.0 52,102,006,4 Revenue Cost of sales (32.518.309.0) (30.482.683.0) (32,384,338,0) (28.809.647.0) (26,243,208,0) (28.955.321.0) (29.615.343.1) (28.860.557.0) (29.413.230.4) Gross profit 11,520,398.0 11,300,059.0 13,593,772.0 14,500,175.0 17,130,449.0 19,501,237.0 19,988,945.2 21,998,430.0 22,688,775.9 Selling and distribution expenses (2,901,073.0) (2,439,243.0) (5,957,572.0) (5,025,182.0) (4,896,135.0) (5,300,678.0) (8,698,320.5) (10,231,212.9) (8,540,639.4) Administrative and other expenses (5.088.634.0) (5,413,895.0) (5,783,174.0) (6.715.743.0) (6.515.661.0) (8,128,700.0) (8,675,161.3) (8.588.819.3) Other income 117.615.0 75.070.0 2.219.496.0 2.717.369.0 2.425.090.0 2.859.995.0 3.704.200.2 3.718.412.5 3.746.863.4 8,143,743.0 Operating profit 3,648,306.0 3,521,991.0 4,072,522.0 5,476,619.0 8,931,854.0 6,319,663.6 7,341,398.7 7,832,139.1 (451,644.0) (558,693.0) (2,931,117.0) (817,883.0) (1,172,968.0) (1,058,293.3) (919,437.4) (583,332.0) (1,196,539.0) Finance costs Unrealized foreign exchange loss 3,196,662.0 3,513,829.0 5,123,124.6 6,283,105.5 6,912,701.7 Profit/(loss) before income tax 2,938,659.0 2,545,502.0 7,325,860.0 7,758,886.0 (2,233,043.5) (1,728,175.4) (780,314.0) (713,692.0) (878,457.0) (636,376.0) (1,831,465.0) (1,280,781.1) (1,570,776.4) Income tax (expense)/credit Profit/(loss) from continuing operations 2,416,348.0 2,224,967.0 2,635,372.0 1,909,126.0 5,494,395.0 5,525,842.5 3,842,343.4 4,712,329.1 5,184,526.3 Gains on revaluation of equipment -3,955,396.0 5,300,109.0 Depreciation transfer on revalued assets 502,158.0 6,371,744.0 7,935,481.0 3,842,343.4 4,712,329.1 5,184,526.3 Total comprehensive income for the year 2,727,125.0 1,909,126.0 5,494,395.0 5,525,842.5 Revenue growth rates (%) (5.8) 0.1 11.7 92.0 86.8 87.5 94.7 93.2 92.5 96.0 93.6 Gross profit as percentage of revenues (%) 26.2 27.0 29.6 33.5 39.5 40.2 40.3 43.3 43.5 Operating profit as percentage of revenues (%) 8.3 8.4 8.9 12.6 18.8 18.4 12.7 14.4 15.0 Net income as percentage of revenues (%) 14.5 6.5 17.3 4.4 12.7 11.4 7.7 9.3 10.0

() = negative

Source: Tonga Power Limited estimates and projections.

Table 4: Pro Forma Income Statements of Tonga Power Limited, Fiscal Year 2012–2020

(T\$) lte<u>m</u> 2012 2013 2014 2015 2016 2017 2018 2019 2020 Actual Actual Actual Actual Actual Actual Projected Projected Projected 44,156,322 41,857,812 48,197,606 46,027,191 45,798,747 51,316,553 53,308,489 54,577,399 55,848,870 Revenue Expenses (35.312.049) (33,501,319)(39,024,672)(34,458,488)(30,804,271)(34,255,999)(38,313,664) (38.822.337) (39,644,443)**EBITDA** 17.060.554 15.755.063 8.844.273 8.356.493 9.172.934 11.568.703 14.994.476 14.994.825 16.204.426 Depreciation (5,195,967)(4,834,502)(5,100,412)(6,092,084)(6,850,733)(8,128,700) (8,675,161)(8,413,664) (8,372,287)Interest (451,644)(583, 332)(558,693)(2,931,117)(817,883)(1,172,968)(1,196,539)(1,058,293)(919, 437)3,196,662 2,938,659 3,513,829 2,545,502 7,325,860 7,758,886 5,123,125 6,283,105 6,912,702 Net profit before tax Income tax (780, 314)(713,692)(878, 457) (636, 376)(1,831,465)(2,233,044)(1,280,781)(1,570,776) (1,728,175)2,416,348 2,224,967 5,525,843 Net profit after tax 2,635,372 1.909.126 5.494.395 3.842.343 4.712.329 5.184.526 (866,721) (779,094) (1,000,000) (1,900,000) Provision for dividend (2,800,000)(3,000,000)(3,000,000)(3,000,000)(3,000,000)1,549,627 1,445,873 2.694.395 2.525.843 842,343 Transfer to retained earnings 1,635,372 9,126 1,712,329 2,184,526

() = negative; EBITDA = earnings before interest, taxes, depreciation, and amortization. Sources: Asian Development Bank estimates; and Tonga Power Limited estimates.

Table 5: Audited Balance Sheet of Tonga Power Limited, 2012–2020 (T\$)

Item	2012	2013	2014	Ψ) 2015	2016	2017	2018	2019	2020
A Current assets	Actual	Actual	Actual	Actual	Actual	Actual	Projected	Projected	Projected
Cash and cash equivalents	143,856.0	1,729,457.0	3,338,997.0	2,260,636.0	3,499,283.0	3,739,881.0	1,281,807.8	744,725.2	2,492,152.4
Trade and other receivables	4,358,209.0	6,076,550.0	5,501,499.0	5,377,785.0	6,226,077.0	6,841,725.0	9,539,242.5	9,765,242.6	9,996,705.4
Inventories	952,482.0	1,091,864.0	1,386,442.0	936,339.0	1,279,030.0	1,069,113.0	1,192,405.3	1,220,655.3	1,249,588.2
Related party receivables			191,060.0	74,542.0					
Held-to-maturity financial assets	1,000,000.0	1,029,918.0	1,557,913.0	1,392,070.0	1,423,496.0	3,316,509.0	3,000,000.0	3,000,000.0	3,000,000.0
Derivative financial instrument	-								
Current tax asset		121,708.0	175,461.0						
Total current assets	6,454,547.0	10,049,497.0	12,151,372.0	10,041,372.0	12,427,886.0	14,967,228.0	15,013,455.6	14,730,623.1	16,738,446.0
B Non-current assets									
Intangible assets	616,420.0	507,623.0	398,826.0	290,028.0	181,786.0	2,501,056.0	-		
Property, plant and equipment	58,166,820.0	59,502,567.0	79,607,016.0	111,888,504.0	114,571,844.0	117,364,377.0	140,794,988.8	227,676,193.3	248,974,608.2
Held-to-maturity financial assets			500,000.0	700,000.0	1,700,000.0	1,700,000.0			
Deferred tax assets	-		69,989.0	145,486.0	139,509.0	215,318.0			
Investment in subsidiaries		582,489.0	512,531.0	3,669,675.0	3,669,675.0	3,669,675.0	3,669,675.0	3,669,675.0	3,669,675.0
Total non-current assets	58,783,240.0	60,592,679.0	81,088,362.0	116,693,693.0	120,262,814.0	125,450,426.0	144,464,663.8	231,345,868.3	252,644,283.2
Total assets	65,237,787.0	70,642,176.0	93,239,734.0	126,735,065.0	132,690,700.0	140,417,654.0	159,478,119.5	246,076,491.4	269,382,729.2
C Current liabilities									
Bank overdraft	549,810.0	-	-						
Trade and other payables	3,901,873.0	4,293,667.0	4,583,962.0	5,528,140.0	5,913,437.0	8,340,351.0	3,581,623.9	3,712,336.9	3,776,855.9
Provision for dividend	866,721.0	779,094.0	1,000,000.0	1,900,000.0	2,800,000.0	3,300,000.0	3,000,000.0	3,000,000.0	3,000,000.0
Current Income tax liabilities	440,951.0	-	-	136,190.0	865,569.0	2,524,818.0			
Borrowings	435,400.0	337,160.0	709,842.0	1,581,164.0	1,913,699.0	2,710,353.0	4,368,000.0	7,268,000.0	4,368,000.0
Deferred income - donated assets			728,592.0	1,852,867.0	1,852,867.0	1,852,867.0			
Derivative financial instruments	139,479.0	163,095.0	44,618.0	160,296.0					
Total current liabilities	6,334,234.0	5,573,016.0	7,067,014.0	11,158,657.0	13,345,572.0	18,728,389.0	10,949,623.9	11,080,336.9	11,144,855.9
D Non-current liabilities									
Deferred income tax liabilities	4,337,202.0	5,278,982.0	6,704,066.0	7,104,288.0	8,064,207.0	7,848,244.0	7,430,308.5	7,401,391.2	7,579,255.9
Deferred income - donated assets		152,484.0	7,841,175.0	32,719,802.0	31,817,833.0	29,964,966.0	32,000,000.0	107,500,434.8	120,900,434.8
Borrowings	6,722,768.0	10,347,880.0	15,983,118.0	20,098,831.0	21,215,206.0	23,870,591.0	21,500,483.2	18,415,330.2	15,151,931.4
Total non-current liabilities	11,059,970.0	15,779,346.0	30,528,359.0	59,922,921.0	61,097,246.0	61,683,801.0	60,930,791.7	133,317,156.1	143,631,622.1
Total liabilities	17,394,204.0	21,352,362.0	37,595,373.0	71,081,578.0	74,442,818.0	80,412,190.0	71,880,415.6	144,397,493.0	154,776,478.1
E Equity									
Contributed equity	33,783,595.0	33,783,595.0	33,783,595.0	33,783,595.0	33,783,595.0	33,783,595.0	33,783,595.0	33,783,595.0	33,783,595.0
Asset revaluation reserve	8,317,362.0	7,815,204.0	12,565,800.0	12,111,612.0	11,661,353.0	11,214,520.0	11,000,000.0	10,500,000.0	10,000,000.0
Accumulated losses	5,742,626.0	7,691,014.0	9,294,966.0	9,758,280.0	12,802,934.0	15,007,348.0	42,814,108.8	57,395,403.4	70,822,656.1
Total equity	47,843,583.0	49,289,813.0	55,644,361.0	55,653,487.0	58,247,882.0	60,005,463.0	87,597,703.8	101,678,998.4	114,606,251.1
Total liabilities and equity	65,237,787.0	70,642,175.0	93,239,734.0	126,735,065.0	132,690,700.0	140,417,653.0	159,478,119.5	246,076,491.4	269,382,729.2
F Asset turnover (revenue/assets)	0.7	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.2
Quick ratio	0.9	1.6	1.5	0.8	0.8	0.7	1.3	1.2	1.4
Current ratio	1.0	1.8	1.7	0.9	0.9	0.8	1.4	1.3	1.5
Debt/total capital (%)	13.2	11.3	12.7	20.1	22.9	31.2	12.5	10.9	9.7
Rate of return on net fixed assets (9	4.1	3.4	3.1	1.7	4.6	4.5	2.6	2.0	2.0

() = negative Source: Tonga Power Limited estimates.