FINANCIAL ANALYSIS

A. Introduction

1. The financial analysis of the Renewable Energy Sector Project was carried out in accordance with the guidelines of the Asian Development Bank (ADB), Financial Management and Analysis of Projects.[1] All financial costs and benefits are expressed in 2014 prices. Cost streams used for calculating the financial internal rate of return (FIRR) are capital investment, and operation and maintenance, costs. The analysis quantifies costs and benefits for the subprojects on Mangaia, Mauke, and Mitiaro. The financial costs include (i) the initial costs of the hardware and electrical works needed for the installation and integration of the solar photovoltaic plant in the respective island's electrical grid; and (ii) annual and periodic operation and maintenance (O&M) expenditures, including replacement of parts. Taxes and duties on capital and operational expenditure for the core subprojects in the outer islands are exempted by the government. The financial benefits include avoided system losses due to transmission line rehabilitation and (ii) reduction in diesel fuel consumption resulting from displacement by solar photovoltaic generation.

B. Weighted Average Cost of Capital

2. A financial appraisal of each subproject was undertaken using with- and without-project scenarios over a 25-year operational period, with the residual value at the end of this period assumed as zero. The tariff will increase in line with inflation. Financial flows were discounted over time using the weighted average cost of capital (WACC), which was calculated based on the after-tax real interest rate. The WACC is computed at 5.02% (Table 1).

Table 1: Computation of Weighted Average Cost of Capital

	Item	Financing Component			
		ADB OCR Loan	EU Grant	Government	Total
A.	Weightage (%)	46.09	29.90	24.01	100.0
B.	Nominal cost (%)	5.65	10.0	10.0	-
C.	Tax rate (%)	0.0	0.0	-	-
D.	Tax-adjusted nominal cost (%) [C x (1-D)]	5.65	10.00	10.00	-
E.	Inflation rate (%)	3.00	2.30	3.00	-
F.	Real cost [(1+ E) / (1+F) -1] (%)	2.57	7.53	6.80	-
G.	Weighted component of WACC [G x B] (%)	1.21	2.21	1.60	5.02

ADB = Asian Development Bank, EU = European Union, OCR = ordinary capital resources, WACC = weighted average cost of capital.
Source: Asian Development Bank estimates.

3. The annual domestic inflation rate is 3.0% for 2014.[2] Given that the ADB loan is denominated in domestic currency units, the domestic inflation rate applies to the real cost of this debt. The foreign inflation rate is the manufacturers unit value (MUV) index, which is generally accepted as a proxy for the price of developing country imports of manufacturers in

[1] ADB. 2005. *Financial Management and Analysis of Projects.* Manila.
[2] ADB. 2013. *Pacific Economic Monitor.* Manila.

US dollar terms. The international inflation rate according to the MUV index is expected to be 2.3%.[3]

4. Since grant funds provided to the project also have an opportunity cost, the proposed grant has been treated similarly to equity, such that the cost of grant is assumed to be the cost of equity. The cost of equity has been assumed to be 10%, which is derived from the New Zealand 10-year bond rate, and adjusted upward to reflect a 25-year term.

C. Financial Analysis

5. The FIRR is the discount rate at which the financial net present value (FNPV) of each subproject's net cash flow becomes zero. If the FIRR is equal to or greater than the WACC, a subproject is considered financially viable. The FIRR was determined from the incremental cash flow, which is the difference between the net cash flow under a with-project scenario and the net cash flow under a without-project scenario over the 25-year operational period.

6. Revenue under both scenarios is derived from the sale of power. Net generation for each subproject is assumed to be equal under both scenarios. Under the with-project scenario, a tariff for energy generated from the solar photovoltaic system is estimated based on the levelized cost of electricity derived for each subproject, and a nominal amount for diesel generation to account for days where solar generation is insufficient to meet energy demand.[4] Under the without-project scenario, energy is assumed to be billed at the prevailing tariff, with no tariff rise over the subproject's life cycle.

7. The with-project scenario includes capital expenditure in the first 3 years. In terms of recurrent expenditure, it assumes that existing O&M costs of the existing diesel generation plant decline by 40% compared with the without-project scenario. It also assumes a nominal O&M cost for the photovoltaic power plant, plus replacement costs for batteries (every 15 years) and inverters (every 10 years). O&M costs are assumed to remain constant in real terms. The financial costs include physical contingencies, but do not consider price contingencies.

8. Sensitivity analysis of the FIRR and FNPV was conducted under the following scenarios: (i) construction delay of one year; (ii) increase in transmission losses by 3% after refurbishment; (iii) reduction in solar generation by 10%; (iv) increase in O&M costs by 10%; and (v) reduction in diesel cost by 10%. The FIRR and FNPV results under the base case, and defined scenarios for the sensitivity analysis, are shown in Table 2. Under all scenarios, the FIRR for all the subprojects exceeds the WACC, and the FNPV is positive. The analysis shows that all subprojects are most sensitive when the current diesel cost decreases by 10%.

Table 2: Sensitivity Test on Financial Internal Rate of Return (%)
and Financial Net Present Value (NZ$ million)

	Aggregate		**Mangaia**		**Mauke**		**Mitiaro**	
	FIRR	FNPV	FIRR	FNPV	FIRR	FNPV	FIRR	FNPV
Base scenario	7.2	1.53	6.0	0.29	8.6	0.92	7.1	0.33
Construction delay of 1 year	6.1	0.88	5.1	0.03	7.4	0.67	6.1	0.19
Increase in line	7.1	1.52	5.9	0.28	8.6	0.91	7.1	0.32

[3] World Bank. 2013. *Manufactures Unit Value Index.* Washington, DC.
[4] The levelized cost of electricity for Mangaia, Mauke, and Mitiaro is NZ$0.46, NZ$0.58, and NZ$0.46.

	Aggregate		Mangaia		Mauke		Mitiaro	
	FIRR	FNPV	FIRR	FNPV	FIRR	FNPV	FIRR	FNPV
losses by 10% after refurbishment								
Reduction in solar generation by 10%	7.2	1.52	6.0	0.28	8.6	0.91	7.2	0.32
Increase in O&M cost by 10%	7.1	1.51	5.9	0.27	8.6	0.91	7.1	0.32
Reduction in diesel cost by 10%	5.7	0.48	4.5	(0.17)	7.3	0.58	5.5	0.07

( ) = negative, FIRR = financial internal rate of return, FNPV = financial net present value, O&M = operation and maintenance.

Source: Asian Development Bank estimates.

D. Financial Management Assessment

9. The project's executing agency is the Ministry of Finance and Economic Management (MFEM), which is the central agency in the Government of the Cook Islands responsible for advising on financial and economic issues. It is divided into four divisions: (i) revenue management, (ii) development coordination, (iii) treasury, and (iv) statistics. The development coordination division is governed by the Cook Islands Official Development Assistance Policy (September 2011), which strengthens governance and management of aid effectiveness, strengthens partnerships in the coordination and delivery of development assistance, and ensures accountability of development assistance. The government has implemented previous ADB assistance successfully, recently through the Avatiu Port Development Project and the ongoing Economic Recovery Support Program.

10. The economic contraction in fiscal year (FY) 2009, and the change in government in the November 2010 elections, provided strong impetus for the improvement of public financial management (PFM) systems. The government has stepped up its commitment to fiscal responsibility. A public expenditure and financial accountability assessment independently analyzed the strengths and weaknesses in PFM performance, and guided the development of the PFM road map for FY2012–FY2015.[5]These actions provide a comprehensive framework for PFM improvements. The government continues to meet the principles of responsible fiscal management set out in the MFEM Act to promote sound PFM through the budget process. These initiatives are monitored through ADB's Economic Recovery Support Program (Subprogram 2).[6] The government is proactive in remaining below the ceilings for the ratios of net debt to gross domestic product (35%), and debt servicing to revenue (5%). In this regard, the financial risk of lending to the government is assessed as moderate.

11. The project has two implementing agencies—the Renewable Energy Development Division (REDD) and Te Aponga Uira (TAU). REDD will be responsible for the supervision of the project management consultants, and day-to-day implementation of the subprojects on the outer islands,[7] while TAU will be responsible for day-to-day implementation of the subproject in Rarotonga. REDD reports directly to the Office of the Prime Minister, which has sound financial management procedures. REDD is responsible for the implementation of the Cook Islands Renewable Energy Chart Implementation Plan in coordination with TAU, the Island

[5] Ministry of Finance and Economic Management. 2011. *Public Financial Management Performance Report and Performance Indicators.* Rarotonga.

[6] ADB. 2012. *Report and Recommendation to the President for a Proposed Policy-Based Loan for Subprogram 2, Cook Islands: Economic Recovery Support Program.* Manila.

[7] The outer islands include Aitutaki, Atiu, Mangaia, Mauke, and Mitiaro.

Administration Council (IAC) of each outer island, development partners, MFEM's Aid Management Division, and the Renewable Energy Committee, which is chaired by the Prime Minister.

12. During project implementation, REDD will be supported by the project owner's engineer includes a financial specialist. The specialist's terms of reference include (i) assisting the project management unit in preparing project audit reports, and corporate audit reports as required by ADB; (ii) conduct tariff analysis to ensure financial sustainability of core and noncore subprojects, and make recommendations; (iii) review project audit reports to ensure financial soundness of all subprojects; and (iv) develop capacity in financial analysis and management within REDD and TAU. Given the institutional support, the overall financial management risk for REDD is assessed as moderate.

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

14. An assessment of TAU's financial management was conducted in accordance with ADB's guidelines on the financial management and analysis of projects (footnote 1). TAU has a sound accounting system following New Zealand's generally accepted accounting procedures. TAU has six qualified and experienced staff in its finance department. There have been no major accountability issues in the past 3 years.

15. According to the company's audited consolidated financial statements 2010–2013, total asset value increased at an annual average growth rate of 7% from NZ$34.73 million to NZ$44.75 million, and total owner's equity increased at an annual average growth rate of 8% from NZ$32.01 million to NZ$42.04 million. During the same time, gross revenue increased from NZ$18.24 million to NZ$21.18 million. TAU's financial performance has been solid from 2010 to 2013; with no abnormal incident occurring over that period. In 2013, its operating ratio was around 92%, the return on net fixed assets was 3.7%, the current ratio was 9.66, and the debt to equity ratio was 1%. Onlending from MFEM to TAU for the noncore subproject on Rarotonga is estimated at NZ$2.45 million and will bring the debt–equity ratio to less than 10%. Therefore, the financial risk of onlending to TAU as a state-owned entity is assessed as moderate. Projections of TAU's financial performance, based on audited financial statements from 2010 to 2013, are in Table 3.

16. Power assets in the outer islands are maintained by the IACs, which are governed by the Island Government Act 2013. The Island Government Act provides clear processes for IAC financial management. The national government provides annual budget allocations to the IACs based on approved plans that are to be reported and monitored to ensure accountability. While an estimate of the tariff was used for the purposes of demonstrating financial viability of core subprojects, the IACs will need to ensure that a suitable tariff is introduced upon completion of the project. To ensure sufficient cost recovery, the project provides a covenant that electricity tariffs are to be adjusted to maintain the project's financial sustainability.

Table 3: Summary of Financial Projections for Te Aponga Uira

Projected Income and Expenses	**2010** Actual	**2011** Actual	**2012** Actual	**2013** Actual	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
					Projected							
Key Indicators (NZ$ million)												
Operating revenues	18.24	18.39	21.38	21.18	18.03	18.97	19.20	18.50	18.65	18.70	18.71	18.71
Net operating income	2.72	2.88	4.71	2.25	3.69	3.60	3.58	2.80	2.92	2.96	2.96	2.95
Net income (loss)	2.22	2.32	3.85	1.64	3.15	2.97	2.91	2.11	2.23	2.27	2.27	2.27
Current assets	11.69	14.85	19.05	21.05	11.82	14.40	15.02	15.21	15.29	15.33	15.34	15.35
Net fixed assets	22.99	20.99	20.31	23.58	21.80	21.89	21.91	21.92	25.42	24.74	24.42	24.25
Accounts receivables	1.98	2.52	3.11	2.41	2.22	2.37	2.41	2.42	2.42	2.42	2.43	2.43
Current liabilities	1.64	1.57	2.19	2.18	1.56	5.24	4.61	4.54	4.61	4.71	4.83	4.95
Long-term debt	0.45	0.31	-	-	0.44	3.81	3.11	3.01	3.07	3.17	3.29	3.40
Equity	32.01	33.38	36.70	42.14	31.00	30.20	31.51	31.80	35.32	34.57	34.15	33.87
Net internal cash generation	1.16	0.26	2.05	0.64	2.40	0.67	0.60	0.33	1.08	0.89	0.78	0.71
Financial Ratios												
Operating ratio[a]	0.85	0.84	0.78	0.89	0.80	0.81	0.81	0.85	0.84	0.84	0.84	0.84
Return on net fixed assets[b]	0.12	0.14	0.23	0.10	0.17	0.16	0.16	0.13	0.11	0.12	0.12	0.12
Current ratio[c]	7.11	9.48	8.72	9.66	7.57	8.28	8.43	8.48	8.50	8.50	8.51	8.51
Debt–equity ratio[d]	0.01	0.01	-	-	0.01	0.13	0.10	0.09	0.09	0.09	0.10	0.10
Debt service ratio[e]	6.48	1.33	4.57	4.66	10.93	2.89	2.59	1.41	4.63	3.79	3.32	3.02

[a] Total operating expenses as a percentage of total revenues
[b] Net operating income as a percentage of net fixed assets
[c] Current assets to current liabilities
[d] Ratio of long-term debt to equity
[e] Ratio of internal cash generation to debt service requirement
Sources: Te Aponga Uira's audited financial statements, and Asian Development Bank estimates.