



Periodic Financing Request Report

Project Number: 41504-025
MFF Number: 0051
June 2017

Papua New Guinea: Town Electrification Investment Program, Tranche 2

Distribution of this document is restricted until it has been approved by Management. Following such approval, ADB will disclose the document to the public in accordance with ADB's Public Communications Policy 2011.

CURRENCY EQUIVALENTS

(as of 1 June 2017)

Currency Unit	–	kina (K)
K1.00	=	\$0.31
\$1.00	=	K3.18

ABBREVIATIONS

ADB	–	Asian Development Bank
EIRR	–	economic internal rate of return
FAM	–	facility administration manual
FIRR	–	financial internal rate of return
HIV/AIDS	–	human immunodeficiency virus
MFF	–	multitranches financing facility
MW	–	megawatt
PMU	–	program management unit
PNG	–	Papua New Guinea
PPL	–	PNG Power Limited
TEIP	–	Town Electrification Investment Program

WEIGHTS AND MEASURES

NOTES

In this report, "\$" refers to US dollars

Vice-President	S. Groff, Operations 2
Director General	X. Yao, Pacific Department (PARC)
Director	O. Norojono, Transport, Energy and Natural Resources Division, PARC
Team leader	W. Lee, Energy Specialist, PARC
Team members	C. Png, Principal Counsel, Office of the General Counsel N. Carandang, Social Safeguard Specialist, PARC K. Dizon, Associate Project Analyst, PARC G. Alcasabas-Bantaya, Operations Assistant, PARC J. Williams, Senior Environment Specialist, PARC
Peer Reviewer	P. Wijayatunga, Director, SAEN, SARD

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

CONTENTS

	Page
TRANCHE AT A GLANCE	
I. BACKGROUND	1
II. ASSESSMENT OF IMPLEMENTATION	2
III. PERIODIC FINANCING REQUEST	3
A. Impact and Outcome	3
B. Outputs	3
C. Investment and Financing Plans	4
D. Implementation Arrangements	5
E. Project Readiness	6
F. Advance Contracting and Retroactive Financing	6
IV. DUE DILIGENCE	6
A. Technical	6
B. Economic and Financial	7
C. Governance	7
D. Poverty, Social, and Gender Dimensions	8
E. Safeguards	8
F. Risks and Mitigating Measures	9
G. Risk Categorization	9
V. ASSURANCES AND CONDITIONS	10
VI. RECOMMENDATION	10
APPENDIXES	
1. PFR from the Government	
2. Design and Monitoring Framework for Tranche 2	
3. Loan Agreement (Ordinary Operations)	
4. Loan Agreement (Special Operations)	
5. Project Agreement	
6. Project Administration Manual for Tranche 2	
7. Updated Contribution to the ADB Results Framework	
8. Economic Analysis for Tranche 2	
9. Financial Analysis for Tranche 2	
10. Updated Summary of Poverty Reduction and Social Strategy	
11. Initial Environmental Examination	
12. Resettlement Plan	
13. Community Development Plan	
14. Updated Risk Assessment and Risk Management Plan	
SUPPLEMENTARY APPENDIXES (available on request)	
15. Financial Management Assessment	
16. Project Procurement Risk Assessment	
17. Client Feasibility Studies and Engineering Designs	

TRANCHE AT A GLANCE

1. Basic Data		Project Number: 41504-025	
Project Name	Town Electrification Investment Program - Tranche 2	Department /Division	PARD/PATE
Country Borrower	Papua New Guinea Government of Papua New Guinea	Executing Agency	Energy Division of the Department of Petroleum and Energy
2. Sector	Subsector(s)	ADB Financing (\$ million)	
✓ Energy	Electricity transmission and distribution		60.90
		Total	60.90
3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Mitigation (\$ million)	5.00
Environmentally sustainable growth (ESG)	Eco-efficiency Global and regional transboundary environmental concerns Natural resources conservation	CO ₂ reduction (tons per annum)	70,000
		Climate Change impact on the Project	Low
4. Drivers of Change	Components	Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Client relations, network, and partnership development to partnership driver of change Institutional development Organizational development	Some gender elements (SGE)	✓
Knowledge solutions (KNS)	Pilot-testing innovation and learning		
Partnerships (PAR)	Bilateral institutions (not client government) Official cofinancing		
Private sector development (PSD)	Public sector goods and services essential for private sector development		
5. Poverty and SDG Targeting		Location Impact	
Geographic Targeting	Yes	Rural	Medium
Household Targeting	No	Urban	Medium
SDG Targeting	Yes		
SDG Goals	SDG7		
6. Risk Categorization:	Low		
7. Safeguard Categorization	Environment: B Involuntary Resettlement: B Indigenous Peoples: B		
8. Financing			
Modality and Sources		Amount (\$ million)	
ADB		60.90	
Sovereign MFF-Tranche (Concessional Loan): Ordinary capital resources		5.00	
Sovereign MFF-Tranche (Regular Loan): Ordinary capital resources		55.90	
Cofinancing		0.00	
None		0.00	
Counterpart		15.70	
Government		15.70	
Total		76.60	

TRANCHE AT A GLANCE

Date of Receipt by ADB of PFR: 15 November 2016	Tranche Number: 2	
9. Country Operations Business Plan		
CPS	http://www.adb.org/documents/papua-new-guinea-country-partnership-strategy-2016-2020	
COBP	https://www.adb.org/documents/papua-new-guinea-country-operations-business-plan-2017-2019	
10. Tranche Summary		
The components proposed for financing under the requested PFR are:		
<p>Component 1: Rehabilitation of two hydropower plants: (i) Yonki Toe of Dam (YTOD) hydropower plant, and (ii) Warangoi hydropower plant, which are currently operating below their full capacities. After rehabilitation, these plants will be capable of operating at their rated capacity of 28.0 MW-18 MW YTOD, and the 10 MW Warangoi plant. Moreover, the proposed rehabilitation will extend the economic life of these plants by another 20 to 25 years and ensure that they are brought to current standards.</p> <p>Component 2: Construction of Ramazon run-of-river small hydropower plant with a preliminary capacity of 3 MW. The project will include construction of a (i) concrete weir, (ii) 5 km pipeline, (iii) penstock, (iv) powerhouse, and (v) new access road from the existing road to the powerhouse and internal roads within the project area.</p> <p>Impact: Improved economic condition of the population in the targeted provincial centers. Outcome: Improved utilization of reliable, clean power to three provincial urban centers. Outputs: (i) PNG Power Ltd (PPL) rehabilitates three aging hydropower plants to bring them back to their rated capacity of 28.0 MW, (ii) PPL constructs and connects to the grid 3.0 MW of hydropower capacity, (iii) Capacity building is undertaken for implementing agency and project beneficiaries, and (iv) The Project Management Unit renders efficient project management services. Implementation Arrangements: Energy Division of the Department of Petroleum and Energy will be the executing agency. Project Readiness: Tranche 1 is under implementation. Loan closing for Tranche 1 was extended from 30 June 2014 to 1 June 2016.</p>		
11. Significant Developments in the MFF and Previous Tranches		
<p>Despite initial delays due to land acquisition, TEIP Tranche 1 is now performing well in the delivery of expected outputs. As of August 2016, (i) cumulative contract awards stood at \$34 million, or 61% of ADB financing, (ii) cumulative disbursements had reached \$21 million, or 38% of ADB financing, and (iii) the physical progress of TEIP Tranche 1 stood at 15%. Consultants for design, supervision, project management and capacity building were mobilized in October 2012. A major civil works contract is currently being negotiated for construction of the Divune Hydropower Plant (\$18.5 million). Safeguard compliance has been met and quarterly monitoring is being undertaken. The project has been performing well and there are no major issues with respect to development objectives or implementation arrangements. The project is rated as "On track" in the performance rating.</p>		
12. Milestones		
Estimated Approval	Estimated Completion^a	
30 June 2017	31 December 2019	
13. Linked Documents		
	Required Document	Disclosure Date
(i) Environment	IEE - Initial Environmental Examination	
Weblink:	https://www.adb.org/projects/documents/png-teip-t2-oct-2016-iee	04-OCT-2016

^a For Tranches, this refers to the financial closing date.

I. BACKGROUND

1. On 25 November 2010, the Asian Development Bank (ADB) approved the provision of loans from a multitranche financing facility (MFF) of \$120.0 million that comprised of ADB ordinary capital resources (OCR) and Special Funds resources (Asian Development Fund [ADF]) for the Town Electrification Investment Program (TEIP). The Government of Papua New Guinea (PNG) contributed \$30.0 million to help finance the total investment program cost of \$150 million. On 6 December 2010, ADB approved tranche 1 of the facility, consisting of an OCR loan of \$40.9 million and an ADF loan of SDR10.6 million (\$16.4 million equivalent) (with \$14.3 million equivalent of government counterpart contribution), for a total tranche 1 cost of \$71.6 million. On 9 December 2015, ADB approved the administration of a grant not exceeding NZ\$7.0 million (equivalent to \$4.8 million) from the Government of New Zealand as additional financing for tranche 1.¹ The overall tranche 1, including additional financing is on-going. The MFF availability period has been extended up to 30 June 2020.

2. In PNG, grid-connected power is still largely restricted to the main urban areas. By the end of 2015, approximately 12% of the overall population had access to electricity. The majority of provincial centers are supplied entirely through diesel generation, resulting in high generation costs but still with a low quality of power supply. Lack of access to affordable and reliable power is limiting economic growth in provincial centers.

3. PNG has significant underutilized indigenous renewable energy sources, particularly hydropower and solar, for which the generation costs of energy are considerably lower than that of diesel. The TEIP is assisting PNG to meet the MFF outcome of improved utilization of reliable and clean power in provincial urban centers by supporting the development of least-cost renewable energy sources to (i) improve the reliability and quality of power supply in order to stimulate economic growth; and (ii) replace diesel generation, thereby reducing power-generation costs and creating incentives to improve access rates. The TEIP also supports the extension of the distribution grid to increase access to electricity in the provinces.

4. Under tranche 2, the government seeks ADB financing for (i) refurbishment of two existing hydropower plants; and (ii) construction of the Ramazon hydropower plant, consisting of a 3 megawatt (MW) run-of-river hydropower plant.²

5. On 15 November 2016, the government submitted the periodic financing request (PFR) for tranche 2—the final tranche—under the MFF, which summarizes the analysis and due diligence completed. The proposed tranche 2 will support the objectives of the MFF by improving the use of reliable, clean power in the provincial urban and peri-urban centers. The existing project management unit (PMU) under tranche 1 will be responsible for the implementation of tranche 2. The proposed tranche 2 is included as a firm 2016 project in the ADB country operations business plan, 2017-2019.³

¹ This additional financing is within the \$120 million MFF envelope.

² Ramazon was originally included in Tranche 1 but in June 2016 the government requested to transfer it to tranche 2 due to the cancellation of the contract with the awarded contractor. PNG Power Limited (PPL), implementing agency, also requested cancellation of \$3.0 million OCR under tranche 1 to be included in the PFR from the government for tranche 2. The minor change in scope and partial loan cancellation were approved on 26 September 2016.

³ ADB. 2016. *Papua New Guinea Country Operations Business Plan 2017–2019*. Manila.

II. ASSESSMENT OF IMPLEMENTATION

6. **Tranche 1.** ADB approved tranche 1 loans of \$57.3 million equivalent on 6 December 2010, which became effective on 26 July 2012. Tranche 1 includes (i) Divune hydropower plant, consisting of 3 MW run-of-river small hydropower plant, located in Oro Province; (ii) Kimbe-Bialla Transmission line interconnection, which consists of an approximately 150-kilometer, 66-kilovolt transmission line connecting Bialla to Kimbe in West New Britain Province, accessing 1 MW of spare generation capacity from the Lake Hargy hydropower plant, and connecting about 3 MW of biomass power (methane recovery) from palm oil plantations along the alignment; and (iii) Ramazon hydropower plant. The Ramazon plant component has been transferred to tranche 2, because the previous contract was terminated. \$3.0 million from the OCR loan was cancelled from tranche 1 and included in tranche 2.⁴

7. Tranche 1 has encountered implementation delays for a variety of reasons, including land acquisition, and the detailed design and preparation of bidding documents. There are no major issues with respect to development objectives or implementation arrangements. Implementation delays are being addressed by ADB's PNG Resident Mission through the following: (i) increased support over land acquisition processes, including safeguard training programs; (ii) more frequent dialogue with senior management of PNG Power Ltd (PPL), the implementing agency, regarding the implementation progress; and (iii) closer oversight over PMU activities. The loan closing date of tranche 1 has been extended up to 30 June 2018. As of 30 May 2017, (i) cumulative contract awards for two loans under tranche 1 is at \$48.2 million, or 86.5% of ADB financing; and (ii) cumulative disbursements for two loans under tranche 1 has reached \$30.5 million, or 54.7% of ADB financing.

8. **Tranche 1 - Additional Financing.** ADB approved the administration of a grant not exceeding NZ\$7.0 million (equivalent to \$4.8 million) from the Government of New Zealand for the additional financing of tranche 1. It was approved on 9 December 2015 and became effective on 15 April 2016. It includes extension of the three distribution grids, and rehabilitation of the Lake Hargy hydropower plant. The distribution grid extension will connect additional 2,500 households in three provinces: (i) West New Britain (1,200 households), (ii) Northern Province (700 households), and (iii) Autonomous Region of Bougainville (600 households). The additional financing will therefore expand the social and economic benefit of tranche 1 and scale up the project benefits to additional beneficiaries in new geographical areas. As of 30 May 2017, (i) cumulative contract award is at \$3.7 million, or 94.0% of the grant administered by ADB; and (ii) cumulative disbursement has reached \$3.53 million.

9. **Compliance with Undertakings and Covenants.** The requirements of the Financing Framework Agreement (FFA), and loan and grant agreements of tranche 1 are being complied with, including: (i) the energy sector roadmap and policy framework; (ii) design and monitoring framework targets; (iii) implementation framework; (iv) selection criteria and approval process for subsequent tranches; (v) environmental and social safeguard requirements; and (vi) undertakings, as well as the covenants of the loan agreements. Out of the 53 loan covenants, seven grant covenants and 14 project covenants, 55 are being complied with to date, 12 are not yet due, seven have been complied with. Overall, compliance with loan and grant covenants is *satisfactory*. Out of the 27 FFA covenants, 12 are being complied with to date, 6 are not yet due, and 9 have been complied with. Compliance with FFA covenants is also *satisfactory*.

⁴ The minor changes in scope and partial loan cancellation were approved on 26 September 2016.

10. **Road map and policy framework.** The government policies and programs that underpin the road map continue to be relevant, and key policies have also been updated. For instance, the government's policy for the electricity sector is detailed in the Electricity Industry Policy (EIP), 2011.⁵ EIP was approved by cabinet in 2011 followed by the formulation of an electricity trust fund. The proposed development of the power sector in each province is detailed in PPL's Fifteen-Year Power Development Plan (FYDPD).⁶ The FYDPD lists the status of current infrastructure and proposed investments over a 15-year time frame.⁷ The FYDPD provides a road map of priority provincial hydropower development to reduce reliance on diesel generation and improve service delivery. Tranche 2 supports further implementation of the road map and policy framework.

11. The proposed tranche is in line with the objectives of ADB's 2009 Energy Policy 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.⁸ It is included in ADB's country operations business plan for PNG for 2017–2019,⁹ which makes energy a priority area of support.

III. PERIODIC FINANCING REQUEST

A. Impact and Outcome

12. The impact of tranche 2 is the improved economic condition of the population in the targeted provincial centers. The outcome of tranche 2 is improved utilization of reliable, clean power in provincial urban centers.

B. Outputs

13. The outputs of tranche 2 will include (i) refurbishment of two existing hydropower plants, (ii) construction of the Ramazon hydropower plant, (iii) continuous capacity building for the implementing agency, and (iv) efficient project management services of the PMU. Details are as follow:

- (i) Rehabilitation of two hydropower plants: (a) Yonki Toe of Dam (YTOD) hydropower plant, and (b) Warangoi hydropower plant, which are currently operating below their full capacities. After rehabilitation, these plants will be capable of operating at their rated capacity of 28.0 MW—the 18 MW YTOD, and the 10 MW Warangoi plant. Moreover, the proposed rehabilitation will extend the economic life of these plants by another 20 to 25 years and ensure that they are brought to current standards.
- (ii) Construction of Ramazon run-of-river small hydropower plant with a preliminary capacity of 3 MW. The project will include construction of (a) a concrete weir, (b) a 5km pipeline, (c) penstock, (d) powerhouse, and (e) a new access road from the existing road to the powerhouse and internal roads within the project area.

⁵ Government of PNG. 2012. *Electricity Industry Policy*. Port Moresby. It supports (i) competition and contestability in the electricity industry, (ii) upscaling of rural electrification through community service obligations, and (iii) enhanced technical regulation.

⁶ Government of PNG. 2009. *PNG Power National and Provincial Ten-Year Power Development Plan, 2009–2018*. Port Moresby.

⁷ Most of PPL's current development projects are in line with the FYDPD. However, many of PPL's identified projects under the FYDPD are not implemented as anticipated or are being carried out slowly because of PPL's financial constraints.

⁸ ADB. 2009. *Energy Policy*. Manila.

⁹ ADB. 2016. *Country Operations Business Plan: Tonga, 2017–2019*. Manila.

C. Investment and Financing Plans

14. Tranche 2 is estimated to cost \$76.60 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM) for this tranche.¹⁰

Table 1: Tranche Investment Plan
(\$ million)

Item	Amount ^a
A. Base Cost^b	
1. New Small Hydropower Plant Construction	22.12
2. 2 Hydropower Plants Refurbishment	36.25
3. Capacity Development	0.30
4. Project Management	4.44
Subtotal (A)	63.11
B. Contingencies^c	9.63
C. Financing Charges During Implementation^d	3.86
Total (A+B+C)	76.60

^a Includes taxes and duties of \$5.74 million to be financed from the government resources through exemption.

^b In mid-2017 prices.

^c Physical contingencies computed at 10.0% of base cost. Price contingencies computed at 0.5% on foreign exchange costs and 5.0% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

^d Includes interest and commitment charges. Interest during construction for ADB loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5%. Commitment charges for an ADB loan are 0.15% per year to be charged on the undisbursed loan amount (for LIBOR-based loans only).

Source: Asian Development Bank and PNG Power Ltd estimates.

15. The government has requested a regular loan of \$55.9 million from ADB's OCR and a concessional loan in various currencies equivalent to SDR3.662 million from ADB's OCR (\$5.0 million equivalent) to help finance tranche 2.¹¹ The government will provide \$15.7 million to finance contingencies and all taxes and duties through exemption. The regular OCR loan will have a 25-year term, including a grace period of 5 years, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year (the interest and other charges during construction as applicable to be capitalized in the loan), and such other terms and conditions set forth in the draft loan and project agreements. Based on the above loan terms and the repayment option, the average loan maturity is 15.25 years and the maturity premium payable to ADB is 0.10% per annum. The concessional OCR loan will have a 25-year term, including a grace period of 5 years, an interest rate of 2.0% per annum during the grace period and thereafter (the interest during construction as applicable to be capitalized in the loan), and such other terms and conditions set forth in the draft loan and project agreements. The financing plan is in Table 2.

¹⁰ Project Administration Manual (accessible from the list of linked documents in Appendix 5).

¹¹ References to ADF loans under the MFF are replaced by concessional OCR loans further to the designation of all ADF loans as concessional OCR loans effective 1 January 2017. ADB. 2015. *Enhancing ADB's Financial Capacity for Reducing Poverty in Asia and the Pacific*. Manila.

Table 2: Financing Plan
(\$ million)

Source	Amount	Share of Total (%)
Asian Development Bank	60.90	79.50
Ordinary capital resources (regular loan)	55.90	72.98
Ordinary capital resources (concessional loan)	5.00	6.52
Government of PNG	15.70	20.50
Total	76.60	100.00

PNG = Papua New Guinea

Source: Asian Development Bank and PPL estimates.

D. Implementation Arrangements

16. The executing agency will be Department of Petroleum and Energy (EDDPE) through the Energy Division. The implementing agency will be PPL. The existing PMU for tranche 1 will continuously be responsible for implementing tranche 2 with the procurement assistance from the same project management consultant under tranche 1. A new project supervision consultant (firm) will be recruited and will assist PPL during construction. The existing project steering committee for tranche 1 will exercise oversight for tranche 2. Tranche 2 will be implemented in accordance with the PAM. Tranche 2 will be implemented within the TEIP implementation period. The implementation arrangements are summarized in Table 3.

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	July 2017–December 2019		
Estimated closing date	30 June 2020		
Management			
(i) Oversight body	Town Electrification Investment Program Steering Committee Chair: Department of National Planning and Monitoring Members: (i) Department of Petroleum and Energy, (ii) Treasury, (iii) Department of Environment Conservation, and (iv) PNG Power Ltd		
(ii) Executing agency	Department of Petroleum and Energy		
(iii) Implementing agency	PNG Power Ltd		
(iv) Project management unit	PNG Power Ltd, 13 staff and 1 consultant		
Procurement	International Competitive Bidding (ICB)	3 contracts	About \$53.06 million
Consulting services	1 consulting firm 1 individual consultant	55 person-months 12 person-months	About \$ 2.25 million About \$0.25 million
Advance contracting and retroactive financing	Advance contracting will be undertaken for the Ramazon subproject using ICB and the project supervision consultant package. Retroactive financing is requested for expenditures in connection with Works (New Hydropower Plant Construction) and Consulting Services not exceeding 20% of the loan incurred under advance contracting prior to loan effectiveness but not earlier than 12 months before the date of signing of the related loan agreement.		
Disbursement	The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2015, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank; PNG = Papua New Guinea; ICB = International Competitive Bidding.

Source: Asian Development Bank.

17. All procurement will be undertaken in accordance with ADB's *Procurement Guidelines* (2015, as amended from time to time),¹² and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time).¹³ The PAM prepared for tranche 2 includes (i) contract award and disbursement projection s-curve, (ii) procurement plan, (iii) terms of reference for the additional consulting inputs from the consultant, and (iv) allocation and financing tables.

E. Project Readiness

18. Project readiness is high. The PMU has demonstrated capacity and experience with the ADB procurement process. Both Ramazon subproject turnkey package and project supervision consultant packages are "contract award-ready" as ADB has already provided its no-objection for PPL to award the contracts to the recommended bidders. Both contracts are expected to be awarded after tranche 2 becomes effective. The due diligence reports for other subprojects under tranche 2 show compliance with government and ADB requirements. The bidding documents for the other two subprojects are expected to be advertised by the third quarter of 2017. These subprojects will not involve any land acquisition.

F. Advance Contracting and Retroactive Financing

19. In the PFR, the government has requested advance contracting and retroactive financing for expenditures in connection with Works (New Hydropower Plant Construction) and Consulting Services, not exceeding 20% of the loan incurred under advance contracting prior to loan effectiveness but not earlier than 12 months before the date of signing of the related loan agreements. The government and PPL have been informed that advance contracting and retroactive financing do not commit ADB to finance tranche 2.

IV. DUE DILIGENCE

20. Following the FFA, these criteria were used to identify the subprojects under tranche 2: (i) technical justification, (ii) financial and economic viability, and (iii) minimal environmental and social impacts. These subprojects were tested for financial and economic viability, and assessed for environmental or social impact.

A. Technical

21. The proposed projects have been assessed to be technically viable. For the hydropower design, all available stream flow data was collated to assess water resource availability. Where flow data was limited, correlated projections were made. The equipment design options have been carefully analyzed. The design will incorporate adequate climate-proofing measures to lessen the potential negative impacts of extreme weather events throughout the project life cycle. Standard equipment of known design has been selected to (i) increase availability of parts, and (ii) standardize equipment.

22. The YTOD hydropower plant rehabilitation subproject will include (i) construction of a surge chamber—a 9.7-m-diameter and 54-m-high steel tower at the top of the penstock along with a branch pipe connection to the tower, (ii) redesign and modifications of the generator cooling system, (iii) replacement of one damaged butterfly valve, and (iv) replacement or reinforcement

¹² Available at: <http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf>.

¹³ Available at: <http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf>.

of 62 m long penstock section consisting of three damaged sections and the sections adjoining them.

23. The Warangoi hydropower plant rehabilitation subproject will include (i) river training works at the intake, (ii) refurbishment of intake structure and the hydro-mechanical components, and (iii) refurbishment and replacement of equipment in the power plant and switchyard.

24. The Ramazon run-of-river small hydropower plant with a preliminary capacity of 3 MW will include construction of (i) concrete gravity diversion weir across the Ramazon river and intake structure, (ii) 3 km-long penstock to the powerhouse, (iii) surface powerhouse containing two horizontal-shaft Francis Turbines generators and a small outdoor switchyard, (iv) new access road from the existing road to the powerhouse and internal roads within the project area, and (v) two houses for operators.

B. Economic and Financial

25. The economic internal rates of return (EIRRs) for the tranche 2 components are 23.5% (YTOD), 21.5% (Warangoi), and 14.0% (Ramazon). The EIRRs of the tranche 2 components exceed the EIRR threshold of 12% and are therefore considered economically viable. The project is considered to be economically feasible under any sensitivity cases.¹⁴

26. The financial internal rates of return (FIRRs) for the tranche 2 components are 20.9% (YTOD), 17.5% (Warangoi), and 12.6% (Ramazon). The FIRRs of the tranche 2 components exceed the corresponding weighted average cost of capital of 1.8% and are therefore considered financially feasible. The project is considered to be financially viable under any sensitivity cases.¹⁵

C. Governance

27. The financial management assessment for PPL was updated,¹⁶ including a review of the accounting and reporting system, internal and external auditing, fund disbursement, and information system. Overall risk (inherent and control) is substantial in terms of PPL as a whole since (i) there are internal control deficiencies in its accounts payable, stores, and accounts receivable systems, (ii) its general ledger reconciliation procedures are ineffective, and (iii) there are a significant number of unreconciled items. Therefore, PPL has received a qualified audit report from its external auditors for many years which reflect these concerns. The financial management action plan has been prepared as shown in the PAM.

28. The following specific issues were identified during the procurement capacity assessment conducted during the preparation of tranche 2: (i) procurement methods (e.g., not maintaining detailed minutes of discussions, and overreliance on selective tendering practices), (ii) lack of a formal non-judicial mechanism in dealing with complaints; and (iii) lack of comprehensive procurement training to manage international contracts. During tranche 1, these issues were addressed by (i) ensuring ADB procurement guidelines are followed for ADB-financed projects, (ii) establishment of a complaints redress mechanism, and (iii) ADB-supported procurement training undertaken for PPL staff.

¹⁴ Economic Analysis (accessible from the list of linked documents in Appendix 7).

¹⁵ Financial Analysis (accessible from the list of linked documents in Appendix 8).

¹⁶ In accordance with ADB. 2005. *Financial Management and Analysis of Projects*. Manila; and ADB. 2009. *Financial Due Diligence A Methodology Note*. Manila.

29. ADB's *Anticorruption Policy* (1998, as amended to date) was explained to and discussed with the government, EDDPE and PPL. The specific policy requirements and supplementary measures are described in the PAM.

D. Poverty, Social, and Gender Dimensions

30. Tranche 2 will improve the power supply in the project provinces and is expected to stimulate economic growth and employment. Particular poverty and social benefits in the project areas include: (i) improved access to reliable and affordable power supply to households (including low-income families), businesses, schools, and health centers; (ii) employment for local men and women during construction; and (iii) provision of minimum labor standards in civil work contracts, and roll-out of HIV/AIDS prevention programs in construction camps and communities.

31. Tranche 2 includes some gender elements. Women's views will be taken into account during community consultations and women will be employed where possible during civil works construction. Awareness activities will be implemented on HIV/AIDS where women's participation will also be encouraged.

E. Safeguards

32. Tranche 2 has been classified as category B for environment, involuntary resettlement, and indigenous peoples. All safeguard documents have been disclosed on ADB's website.¹⁷

33. **Environment.** The main potential environmental impacts of the project will be experienced during the construction phase and include dust from access tracks, localized erosion and sedimentation issues from earthworks, waste management and disposal from hydropower plant upgrades, and vegetation trimming along distribution corridors. Following detailed design, the environmental management plan (EMP) will be updated and integrated into the bidding documents. The impacts of the project are anticipated to be minor and site-specific, and can be managed and/or mitigated through the site-specific EMP to be prepared and then implemented by the contractor. PMU's environment officer with support from PPL's environment management unit and the design and supervision consultant team will continue in tranche 2. The safeguards unit staff and PPL's environment officer recently participated in advanced environmental safeguards training focusing on EMP aspects delivered by ADB.

34. **Involuntary resettlement.** Tranche 2 is category B for involuntary resettlement due to the Ramazon hydropower plant carried over from Tranche 1 to Tranche 2. The due diligence confirmed that the refurbishment and improvement of the other two existing hydropower plants will not involve any land acquisition and involuntary resettlement impacts. The Ramazon hydropower plant will be built on customary-owned lands where the government has established a lease agreement with 2,197 affected landowners in accordance with the requirements of the ADB SPS. None will be physically and economically displaced and impacts are related to loss of crops and trees. The implementation of its updated Resettlement Plan (RP) to compensate for the losses is ongoing under tranche 1 and will continue in tranche 2. The RP has been disclosed on the ADB website with no further updates required. Consultations were undertaken with all the key stakeholders and will continue during project implementation. PPL and PMU will be responsible for implementing safeguards activities including monitoring and reporting. There are two safeguards officers within PPL to manage the safeguards activities and they are all engaged in capacity building exercises offered by ADB and other development partners.

¹⁷ These are the initial environmental examination, resettlement plan, and community development plan.

35. **Indigenous peoples.** Tranche 2 is category B for indigenous peoples because of the Ramazon hydropower plant. The impacts to the affected persons are not considered as significant and will be mainly positive. Under tranche 1, a Community Development Plan has been prepared for the Ramazon hydropower plant, in line with the Resettlement Framework to avoid potential vulnerability or adverse impacts to the host tribes since it is a new hydropower plant to be built in the project area. The other existing hydropower plants are not expected to have adverse impacts on, or target any, distinct or vulnerable ethnic or tribal group. An indigenous people's plan is therefore not required but nevertheless all the activities will be implemented in a culturally appropriate and participatory manner.

F. Risks and Mitigating Measures

36. There are a number of risks associated with the project and mitigating measures have been incorporated into the project design. Major risks and mitigating measures are summarized in Table 4 and described in detail in the updated risk assessment and risk management plan.¹⁸

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Small hydropower plants are customized equipment, which can lead to long delivery times. Therefore, implementation could be delayed, leading to cost overruns.	Defect liability period will be specified in the bidding documents; advance procurement action will be taken.
Implementation is delayed due to landowner disputes.	The selected subprojects will not involve land acquisition and are not expected to have physical and economic displacement and involuntary land acquisition, except the Ramazon hydropower plant site, where the lease agreement has already been signed. Site-specific resettlement plans have been prepared to identify and address land ownership issues.
Project implementation is delayed due to inadequate staffing in the PMU.	PPL has committed to adequate human resources at the PMU (13 staff and 1 consultant). This will be reviewed during regular review missions.
Low number of bidders leading to insufficient competition.	Based on lessons learnt from tranche 1, the PMU will provide more detailed project information on the bidding documents, especially to the participating bidders during the pre-bid meetings
High turnover of senior officers at PPL	Discuss at a project steering committee comprised of multi- agency stakeholders in PNG.
Uncompetitive electricity tariff level	The new covenant has been included in the loan agreement.
Overall risk (inherent and control) is substantial in terms of PPL	The financial-management action plan has been prepared as shown in the PAM.

PMU = project management unit; PPL = PNG Power Limited; SHP = small hydropower plant.
Source: Asian Development Bank.

G. Risk Categorization

37. Tranche 2 is categorized as low risk because: (i) the proposed financing amount does not exceed \$200 million; (ii) ADB has a sound record of recent experience with energy sector projects

¹⁸ Risk Assessment and Risk Management Plan (Appendix 11).

in PNG;¹⁹ (iii) there is reasonable implementing agency capacity in terms of externally financed project administration; and (iv) safeguards are Category B for environment, involuntary resettlement, and indigenous peoples.

V. ASSURANCES

38. The government and PPL 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 loan documents. The government and PPL have agreed with ADB on certain covenants for the project, which are set forth in the loan agreements and project agreement.

VI. RECOMMENDATION

39. On the basis of the approval by ADB's Board of Directors for the provision of loans under the multitranche financing facility in an aggregate principal amount not exceeding the equivalent of \$120,000,000 to the Independent State of Papua New Guinea for the Town Electrification Investment Program, it is recommended that the President approve the proposed tranche as described in paragraph 15 and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements for the proposed tranche.

¹⁹ (i) ADB. 1984. *Project Completion Report: Upper Warangoi Hydropower Project in Papua New Guinea*. Manila; (ii) ADB. 1989. *Project Completion Report: Provincial Mini-Hydropower Project in Papua New Guinea*. Manila; and (iii) ADB. 1996. *Project Completion Report: Ramu Grid Reinforcement Project in Papua New Guinea*. Manila