



Concept Paper

Project Number: 47356-002
November 2017

Proposed Multitranche Financing Facility Papua New Guinea: Power Sector Development Investment Program

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 29 September 2017)

Currency Unit – kina (K)

K1.00 = \$0.31

\$1.00 = K3.20

ABBREVIATIONS

ADB	–	Asian Development Bank
PPL	–	PNG Power Limited
DPE	–	Department of Petroleum and Energy
KCH	–	Kumul Consolidated Holdings
DSC	–	design, supervision and construction
EIRR	–	economic internal rate of return
FAM	–	facility administration manual
FIRR	–	financial internal rate of return
GAP	–	Gender Action Plan
MFF	–	multitranche financing facility
MW	-	megawatt
OCR	–	ordinary capital resources
PIU	–	project implementation unit
PNG	–	Papua New Guinea

NOTE

- (i) The fiscal year (FY) of the Government of Papua New Guinea ends on 31 December.
- (ii) In this report, "\$" refers to US dollars unless otherwise stated.

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INVESTMENT PROGRAM^a AT A GLANCE

1. Basic Data		Project Number: 47356-002		
Project Name	Power Sector Development Investment Program	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	Energy sector development and institutional reform		612.00	
		Total	612.00	
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	Medium	
Environmentally sustainable growth (ESG)	Urban environmental improvement			
4. Drivers of Change	Components	Gender Equity and Mainstreaming		
Governance and capacity development (GCD)	Institutional development	Effective gender mainstreaming (EGM)	✓	
Knowledge solutions (KNS)	Organizational development			
	Application and use of new knowledge solutions in key operational areas			
	Knowledge sharing activities			
Partnerships (PAR)	Bilateral institutions (not client government)			
	Official cofinancing			
Private sector development (PSD)	Promotion of private sector investment			
5. Poverty and SDG Targeting		Location Impact		
Geographic Targeting	Yes	Rural	High	
Household Targeting	Yes	Urban	Medium	
SDG Targeting	Yes			
SDG Goals	SDG7			
6. Risk Categorization:	Complex			
7. Safeguards Categorization [Tranche 1]	Environment: B Involuntary Resettlement: B Indigenous Peoples: C			
8. Financing				
Modality and Sources	Indicative Tranches (\$million)			Amount (\$million)
	I	II	III	
ADB				612.00
Sovereign MFF-Tranche (Concessional Loan): Ordinary capital resources	20.00	10.00	10.00	40.00
Sovereign MFF-Tranche (Regular Loan): Ordinary capital resources	197.00	135.00	240.00	572.00
Cofinancing				54.00
To be determined - Grant (Full ADB Administration)	4.00	50.00	0.00	54.00
Counterpart				74.00
Government	24.00	23.00	27.00	74.00
Total	245.00	218.00	277.00	740.00
9. Country Operations Business Plan				
CPS	https://lnadbg1.adb.org/sec0083p.nsf/0/576B718A2C66719048257E18007E60D2/%24File/SecM11-15.pdf			
COBP	2018-2020			

INVESTMENT PROGRAM^a AT A GLANCE

10. Investment Program Summary

The government has requested ADB to finance the investment program to support the government's target of 70% of household's electrification by 2030. The proposed investment program is in line with ADB's Country Partnership Strategy (2016-2020) which prioritize energy as key area of support in renewable energy generation, improving transmission and distribution efficiencies and its expansion to peri-urban areas. The proposed investment program will respond to government's national development and sector strategies by promoting sustainable development in peri urban and rural areas and by increasing the grid penetration from 12% to approximately 19% by 2028 and replacing diesel generation with renewable energy sources in provincial centers. The investment program will also enhance operational efficiency of PPL and address institutional capacities, policy framework and facilitate private sector mobilization in off-grid areas.

The impact of the program will be improved socio economic conditions and aligned with PNG Vision 2050. The outcome will be a consumption to clean and reliable power supply in the investment program areas improved. This will be achieved through following outputs: (i) transmission network strengthened and expanded in three main grid areas, (ii) distribution network expanded, (iii) renewable energy for provincial grids increased, (iv) capacity of monitoring system enhanced, (v) private sector investments in rural electrification mobilized, and (vi) Institutional support and capacity of EA/IAs, program beneficiaries and stakeholders enhanced.

Impact: Improved socio economic conditions and poverty reduction through increased utilization of clean and reliable electricity

Outcome: Consumption of clean and reliable power supply in the program areas improved.

Outputs: (i)Transmission network strengthened and expanded, (ii)Distribution network expanded, (iii)Renewable energy for provincial grids increased, (iv)Capacity of monitoring system enhanced, (v)Private sector investments in rural electrification mobilized, and (vi)Institutional support and capacity of EA/IAs, program beneficiaries and other stakeholders enhanced.

Implementation Arrangements: Energy Division of the Department of Petroleum and Energy will be the executing agency.

Project Readiness: xxx

11. Milestones

Modality	Estimated Approval	Estimated Completion ^b
Multitranche financing facility	28 February 2019	31 December 2028
Tranche I	28 February 2019	31 December 2022
Tranche II	31 December 2021	31 December 2025
Tranche III	31 December 2024	31 December 2028

12. Project Data Sheet (PDS)

PDS^c <http://www.adb.org/projects/47356-002/main>

^a Multitranche Financing Facility (MFF).

^b For MFF, this refers to the end of the availability period; for tranches, this refers to the tranche closing date.

^c Safeguard documents can be viewed by clicking the Document's hyperlink in the Project Data Sheet (PDS) page.

I. THE PROJECT

A. Rationale

1. The proposed investment program will improve access to electricity in provincial and urban centers of Papua New Guinea (PNG) through expansion of transmission and distribution network, improving system efficiencies and replacement of high-cost diesel power generation with renewable energy. Transaction technical assistance (TRTA) for project preparation, design and procurement support will be required (Appendix 3).

2. **ADB's ongoing efforts.** Asian Development Bank (ADB) has been assisting the power sector in PNG since 2010 primarily through the multitranche financing facility (MFF) for the Town Electrification Investment Program (TEIP). TEIP is improving power supply in provincial centers through the replacement of high-cost diesel generation with hydropower and grid expansion.¹ In October 2017, all major contracts under TEIP Tranche 1 has been awarded.² ADB also provides the Improved Energy Access for Rural Communities Project³ to connect rural communities along the transmission lines constructed under TEIP. ADB is also assisting to improve the network reliability and increase the share of renewable energy of the Port Moresby grid through the Port Moresby Power Grid Development Project.⁴ TEIP Tranche 2 approved by ADB on July 2017 has been effective with half of the region contracts awarded.

3. **Sector issues.** Despite ongoing improvements to the power sector, only 12%⁵ of PNG's population has access to electricity, and grid penetration in rural areas is less than 4%. PNG's per capita consumption ratio of electricity is also one of the lowest in the world.⁶ The country's mountainous terrain and geographically dispersed population compounds challenges to developing rural electrification infrastructure in the country. PNG has a total of 600 megawatt (MW) installed generation capacity. PNG Power Limited (PPL), the national state-owned utility, manages generation, transmission and distribution of about 320 MW, including three main grids (Port Moresby, Ramu and Gazelle), which only serves the main urban centers, and 19 geographically isolated independent power grids servicing provincial centers. The isolated provincial center grids are powered entirely on diesel, resulting in high generation cost and creates disincentive for PPL to expand the grid further into rural areas. In addition, high network losses, high household connection charges, lack of coordination and leadership in the power sector and weak governance and financial management within PPL make it more challenging to implement government's sector road map. The remaining 280 MW is generated by the mining industry as captive power for their own consumption.

4. **Policy framework.** The Papua New Guinea Vision 2050 sets the overall direction to contribute to the social and economic well-being of nation. The PNG Development Strategic Plan 2010-2030 (DSP)⁷ identifies the government's strategic priorities of a 70% electrification rate and carbon neutrality by 2030.⁸ To achieve the strategic targets set out in DSP, the government approved the Electricity Industry Policy (EIP) in November 2011. EIP primarily focuses on (a)

¹ ADB 2010. Report and Recommendation of the President to Board of Directors: Proposed Multitranche Financing Facility to Papua New Guinea for the Town Electrification Investment Program. Manila.

² TEIP is generally in compliance with loan covenants (Back to Office Report 30 August – 5 September 2017) with cumulative contract award at \$51.4 million (95% of ADB financing) and cumulative disbursements at \$36.7 million (67% of ADB financing). Tranche 1 of TEIP encountered start up delays due to land unavailability, cost overruns and capacity constraints within PNG Power.

³ Grant of \$5 million from Government of Japan and Government of New Zealand to expand distribution grids.

⁴ ADB 2013. Report and Recommendation of the President to Board of Directors: Proposed Port Moresby Power Grid Development Project. Manila.

⁵ As per ADB and World Bank assessments, grid penetration around 7% in PNG.

⁶ Powering PNG into the Asian Century – ANZ Insight, 6 Issue August, 2015.

⁷ PNG Development Strategic Plan 2010-2030. Department of National Planning and Monitoring, Port Moresby, 2010.

⁸ PNG's "Intended Nationally Determined Contribution (INDC) Under the United Nations Framework Convention on Climate Change"

encouraging private sector participation through competition and development of a clearly defined access regime, (b) upscaling rural electrification through community service obligation, (c) enhanced technical regulations, and (d) sector coordination at national level.

5. **Road map.** In 2014, PPL developed the Fifteen Year Power Development Plan (FYDP) (2014-2028) which provides road map for priority power infrastructure development to meet future growth and to achieve the targets established under DSP and EIP. In May 2016, the government developed 15-year National Distribution Grid Expansion Plan (2017-2031) under ADB's support which covers the technical, financial and economic aspects of distribution expansion in PPL centers. The National Electrification Roll Out Plan (NEROP)⁹ has also been prepared under World Bank support and is currently awaiting government endorsement.¹⁰ NEROP summarizes that PNG's power sector requires \$1.7 billion to achieve government's target of 70% electrification by 2030. The investment program will support implementation of the FYDP and NEROP.

6. **Strategic context.** The proposed investment program will respond to the government's national development and sector strategies by promoting sustainable development in peri urban and rural areas.¹¹ It will increase the grid penetration from 12% to approximately 19% by 2028, and replace diesel generation with clean energy sources in provincial centers. The program will subsidize the high cost of connecting households to the grid, to increase electrification rate.¹² The program will enhance PPL's operational efficiency and build institutional capacity in Department of Petroleum and Energy (DPE). It will also support renewable energy policy framework and create an enabling environment for private sector to mobilize in off-grid areas. The program is in line with ADB's Country Partnership Strategy (2016-2020) which prioritizes energy as key area of support in renewable energy generation, transmission and distribution efficiencies and expansion.

7. **Incorporating lessons learned into program design.** The ongoing ADB investments in PNG's power sector indicate lack of coordination between the government, sector agencies and PPL. The investment program will address potential challenges through a corresponding technical assistance which will help establish an energy sector coordination and monitoring committee to provide overall leadership and guidance to the energy sector. The program will strengthen PPL's financial management practices and support it with enhanced network monitoring by establishing supervisory control and data acquisition system and by reducing system losses. Corresponding activities will strengthen its institutional and operational capacities. The program will also seek to ensure high readiness before the respective tranches are approved. The program has secured a grant of \$2 million from Government of Australia (GoA) for advance design and procurement support to improve project readiness and expedite implementation of Tranche 1.

8. **Justification for MFF.** The government has requested ADB to finance the investment program through an MFF. The MFF is considered the most appropriate modality because (a) its predictable financing to implement sector road map, (b) flexibility in sequencing investments, (c) it provides opportunity to review the design of implementation and apply innovation in next tranches, and (d) reduces the time and transaction costs. This will also help the government in its budget programming, sustainable engagement with the sector, institutional development and provide a platform for ongoing dialogue for sector reforms. It will also help ADB to scale up the current activities in the energy sector. All tranches will be designed to complement each other's activities: Tranche 1 will focus on physical and nonphysical investments by (i) expanding transmission and distribution network to promote economic and social activities in areas experiencing population growth and increased load, (ii) enhancing PPL's operational capacity,

⁹ World Bank supported NEROP will set up high level energy access program over 2015-2030.

¹⁰ Draft of NEROP is presented to Government for approval in 2017.

¹¹ The program is included in ADB *Country Operations Business Plan: (PNG-2018-2020)*. Manila.

¹² High household connection fee (approx \$300) is consider a barrier in promoting grid penetration in PNG. Tranche 1 will subsidize the household connection fee using grant financing of \$4million from Government of Australia.

(iii) improving sector wide coordination, and (iv) creating an enabling environment for private investments in off-grid areas. Tranche 1 will also pilot smart meters and scale up this activity in subsequent tranches. Tranche 2 will build on from Tranche 1 to ensure sustainable operations of the activities carried out under Tranche 1. Tranche 2 will focus on; (i) replacing high-cost diesel generation with clean energy in provincial centers; (ii) grid expansion to connect households, using additional generation capacity introduced in provincial centers; and (iii) capacity development. Tranche 3 will further develop the activities under previous tranches and focus on provincial connectivity by expanding the grid. The comparison matrix to justify MFF modality is in Supplementary Appendix 1.

B. Impacts, Outcome, and Outputs

9. The impact will be socio-economic conditions improved and is aligned with PNG Vision 2050. The outcome will be consumption of clean and reliable power supply in the investment program areas improved. This will be achieved through (a) transmission network strengthened and expanded, (b) distribution network expanded, (c) renewable energy for provincial grids increased, (d) capacity of monitoring system enhanced, (e) private sector investments in rural electrification mobilized, and (f) institutional support and capacity development.

C. Investment and Financing Plans

10. The investment program is estimated to cost \$740 million equivalent. The proposed 10-year MFF will be for an aggregate amount of \$666 million and will consist of three tranches. The MFF is expected to be financed from loan and grant financing by the ADB and other development partners. Tranche 1 is estimated to cost about \$245 million equivalent. The tentative financing comprises (i) a loan from ADB's Ordinary Capital Resources (OCR) of \$572 million and Concessional OCR Loan (COL) of \$40 million, (ii) ADB administered grant of \$54 million, and (iii) counterpart funding of \$74 million. ADB will endeavor to mobilize additional cofinancing for the investment program. If successful, this may be converted into cofinancing administered by ADB as permitted by MFF policy. The tentative financing plan is summarized in Table 1.

Table 1: Tentative Financing Plan

Source	Amount (\$ million)			Total	(%)
	Tranche 1	Tranche 2	Tranche 3	Amount	Share of Total
Asian Development Bank	217.0	145.0	250.0	612.0	83%
Government of Australia (grant)	4.0	0.0	0.0	4.0	0.5%
Other Development Partners	0.0	50.0	0.0	50.0	6.5%
Government	24	23	27	74	10%
Total	245	218	277	740	100%

Source: Asian Development Bank

D. Indicative Implementation Arrangements

11. DPE will be the executing agency (EA) whereas PPL will be the implementing agency (IA). A Project Management Office (PMO) will be established within the IA and supported by; (a) international experts including financial management, procurement and contract management; and (b) international design and supervision consultants (DSC). DSC will also help designing subsequent tranches. For the procurement of goods, works, consulting and non-consulting services, the ADB Procurement Regulation (2017, as amended from time to time) shall apply.

II. TECHNICAL ASSISTANCE

12. The Government of Australia will provide a technical assistance (TA) grant of \$4 million as a piggyback to Tranche 1. ADB will administer the TA. The TA will be spread over in five years and will complement output six of the investment program. DPE will be the EA and expected

outputs are (i) renewable energy policy developed, (ii) energy sector monitoring and coordination committee established, and (iii) increased capacity of DPE and private sector.

III. DUE DILIGENCE REQUIRED

13. Expected due diligence will include (i) **Sector and technical:** sector strategy and roadmap; physical and non-physical investments, technical viability and design, sequencing of priority investments, asset sustainability, and climate change considerations, (ii) **Economic and financial:** project's economic and financial viability and financial capacity of the government to provide counterpart funds and assessment of financial strength and debt burden, (iii) **Governance:** assessment of financial management, procurement, anticorruption and integrity will be carried out. It will also identify weaknesses and propose targeted capacity building measures to address them during the ensuing program; (iv) **Poverty and social:** to assess the anticipated impact of the MFF on household expenditure, identify other social benefits and risks as well as explore possible entry points for effective gender mainstreaming (EGM). The first tranche has been initially categorized as EGM and a gender action plan will be prepared; and (v) **Safeguards:** assessment for environment, involuntary resettlement, and indigenous peoples.

IV. PROCESSING PLAN

A. Risk Categorization

14. Based on nature and loan amount, the proposed modality is categorized as "Complex"

B. Resource Requirements

15. The due diligence, detailed design and procurement support for tranche 1 will require staff inputs of 19 person months, expert inputs of 80 person months of international and 53 person months of national consultants. A TRTA of \$3.2 million will be required to finance the consultant services. TRTA will be split in two phases under one contract; (i) the Technical Assistance Special Fund (TASF6) will finance \$1.2 million to prepare investment program and conduct due diligence activities; and (ii) the Government of Australia will provide grant of \$2 million to carry out detailed engineering design and procurement support to Tranche 1.

C. Processing Schedule

16. The proposed processing schedule is presented in Table 2.

Table 2: Proposed Processing Schedule

Milestones	Expected Completion Date
Concept Paper approval	November 2017
Loan Fact Finding	August 2018
Management Review Meeting	October 2018
Loan/Grant Negotiations	December 2018
Board Consideration	February 2019
Loan/Grant Signing	March 2019

Source: Asian Development Bank

V. KEY ISSUES

17. The energy sector assessment of PNG was conducted by ADB and identified following key issues; (i) inadequate cost recovery at provincial centers; (ii) limited investments in power sector infrastructure; (iii) lack of private sector mobilization in off grid space; (iv) lack of institutional capacity; and (v) lack of financial management capacity within PPL. Sector assessment is included as Supplementary Appendix 2.

INDICATIVE DESIGN AND MONITORING FRAMEWORK FOR THE PROPOSED POWER SECTOR DEVELOPMENT INVESTMENT PROGRAM¹

Impacts of the Program is aligned with: Socio economic conditions improved (Papua New Guinea Vision 2050) ²			
Project Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome Consumption of clean and reliable power supply in the program areas improved	By 2029: a. Electricity connections increased from 12% to 19% (Baseline 12%) b. Avoided XX GHG emissions Baseline XX (to be established) c. Nationwide losses in PPL network reduced to 16% (baseline: 23% in 2017)	a-c PPL annual report on system operations	Due to prolonged global and regional economic slowdown generation projects planned by government are not completed as planned
Outputs 1. Transmission network strengthened and expanded	By 2028 1a. 1,200 km of additional 33/66/132/220 kV new transmission line installed and commissioned (Baseline 1068km in 2017) 1b. 151km of 66 kV transmission line upgraded (Baseline: 786km in 2017) 1c. 6 new units of 66/22kV and 3 new units of 220/132 kV substations constructed (Baseline:58 in 2017) 1d. 2 existing units of 132/22kV, 02 existing units of 66/22kV and 2 existing units of 33/22kV substations upgraded (Baseline: to be confirmed)	a-d Quarterly progress report of PPL	Due slowdown in country's economy, Government counterpart funding for the program not sustained

¹ Sex-disaggregated data will be collected where it is relevant.

² Papua New Guinea Vision 2050

2. Distribution network expanded	<p>2a. 1645km of additional 22kV/11kV/415V lines installed and commissioned (Baseline 2,220km in 2017)</p> <p>2b. At least 10% women headed households connected with new electricity connections (Baseline to be confirmed in 2017)</p>	a,b Quarterly Progress reports of PPL	Due slowdown in country's economy, Government counterpart funding for the program not sustained
3. Renewable energy for provincial grids increased	3a. 18 MW of renewable energy added to the grid to replace existing diesel generation in provincial centers (Baseline 7.3 MW under construction in 2017)	a. PPL annual report on system operations	Delay in land acquisition due lengthy government process
4. Capacity of PPL monitoring system enhanced	<p>4a. Supervisory control and data acquisition (SCADA) systems installed and operationalized (2017 baseline: No SCADA system)</p> <p>4b. 10,000 new smart meters installed at large load customers (Baseline: 0 in 2017)</p>	a-b PPL annual report on system operations	Political interference may lead to change in government commitments.
5. Private sector investments in rural electrification mobilized	<p>5a. At least 5 renewable energy projects identified (Baseline 0)</p> <p>5b. At least 100 entrepreneurs report improved skills (at least 30% female) on new renewable energy technologies, operational and financial management and sustainable business models</p>	a-b. Quarterly progress reports of PPL	Investment costs are higher than expected.
6. Institutional support and capacity of EA/IAs, program beneficiaries and other stakeholders enhanced.	<p>6a. Renewable Energy Policy developed (Baseline: not developed)</p> <p>6b. Energy Sector Coordination, Monitoring</p>	a-d. PPL annual report on system operations	Political interference may lead to change in government priorities and commitments.

	and Implementation Committee (ESMIC) established.		
	(2017 baseline: not established)		
	6c. At least 250 participants reported improved skills on (30% female) renewable energy solutions' maintenance, livelihood generation using electricity including ICT4 development		
	6d. 50 staff from EA/IA reported improved skills (30% women) on power network monitoring, operations and maintenance		
Key Activities with Milestones 1. Outputs 1, 2, 3 and 4: Expansion of Transmission and Distribution lines, increased renewable energy in provincial centers and enhanced monitoring 1.1 Mobilize design consultant (Q3 2018) 1.2 Procure civil works including SCADA and smart meters (Q4 2018-Q1 2025) 1.3 Make assets operational of Tranche 1 (Q1 2022) 1.4 Make assets operational of Tranche 2 (Q1 2025) 1.5 Make assets operational of Tranche 3 (Q1 2028) 2. Outputs 5 and 6: Institutional support and capacity of IAs, program beneficiaries and other stake holders enhanced and private investments mobilized 2.1 Renewable Energy Policy approved by Government and Implemented (Q4 2021) 2.2 3 x International Investor Forum organized (2019 to 2027) 2.3 ESMIC secretariat established and first meeting conducted (Q2 2019) 2.4 10 Roads shows to promote renewable energy solution in off-grid areas (Q3 2019-Q3 2024) Program Management Unit Established in Q1 2018 Preparation of Tranche 2: Q2 2021 Preparation of Tranche 3: Q2 2024			
Investment ADB: \$612 million Government: \$74 million Government of Australia: \$4million Other cofinancing partners: \$50 million Technical Assistance Technical Assistance Special Fund (6): \$1.2million for investment program preparation and due diligence of Tranche 1 Government of Australia (grant): \$2million for project design advance of Tranche 1 Government of Australia (grant): \$4million for capacity development as piggybacked to Tranche 1 ADB = Asian Development Bank, PPL = PNG Power, DPE = Department of Petroleum and Energy, PPP= Public Private Partnerships. ESMIC= Energy Sector Coordination Monitoring and Implementation Committee, SCADA=Supervisory Control and Data Acquisition Source: Asian Development Bank.			

INDICATIVE DESIGN AND MONITORING FRAMEWORK¹
Proposed Power Sector Development Investment Program (Tranche 1)

Impacts of the Project 1 is aligned with: Socio economic conditions improved (Papua New Guinea Vision 2050) ²			
Project Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome Consumption to clean and reliable power supply in the program areas improved	By 2023 a. Electricity connections increased from 12% to 14.5% Baseline 12% b. Nationwide losses in PPL network reduced to 20% (Baseline: 23% in 2017)	a. PPL annual report on system operations	Due to prolonged global and regional economic slowdown generation projects planned by government are not completed as planned
Outputs	By 2022		
1. Transmission network strengthened and expanded in Port Moresby, Ramu and Gazelle grids	1a. 183 km of 66 kV and 188 km of 132kV new additional transmission line installed and commissioned in Port Moresby and Gazelle grids (Baseline 1052km in 2017) 1b. 151km of 66kV transmission line upgraded in Ramu and Gazelle grids (Baseline 786km in 2017) 1c. 4 new units of 66/22kV substations constructed (Baseline: 58 in 2017) 1d. 2 existing units of 132/22kV, 01 existing units of 66/22kV substations upgraded (Baseline: 0)	a-d Quarterly progress report of PPL a-d PPL annual report on system operations	Due to slowdown in country's economy, counterpart funding for the project not sustained.
2. Distribution network expanded	2a. 376km of 22kV and 187km of 415V lines installed and commissioned (Baseline 2,220km in 2017) 2b. At least 10% women headed households connected with new electricity connections (Baseline to be determined)	a Quarterly progress report of PPL	
3. Capacity of PPL monitoring system enhanced	3a. Supervisory control and data acquisition (SCADA) systems installed and operationalized	a. PPL annual report on system operations	Political interference may lead to change in government

¹ Sex-disaggregated data will be collected where it is relevant.

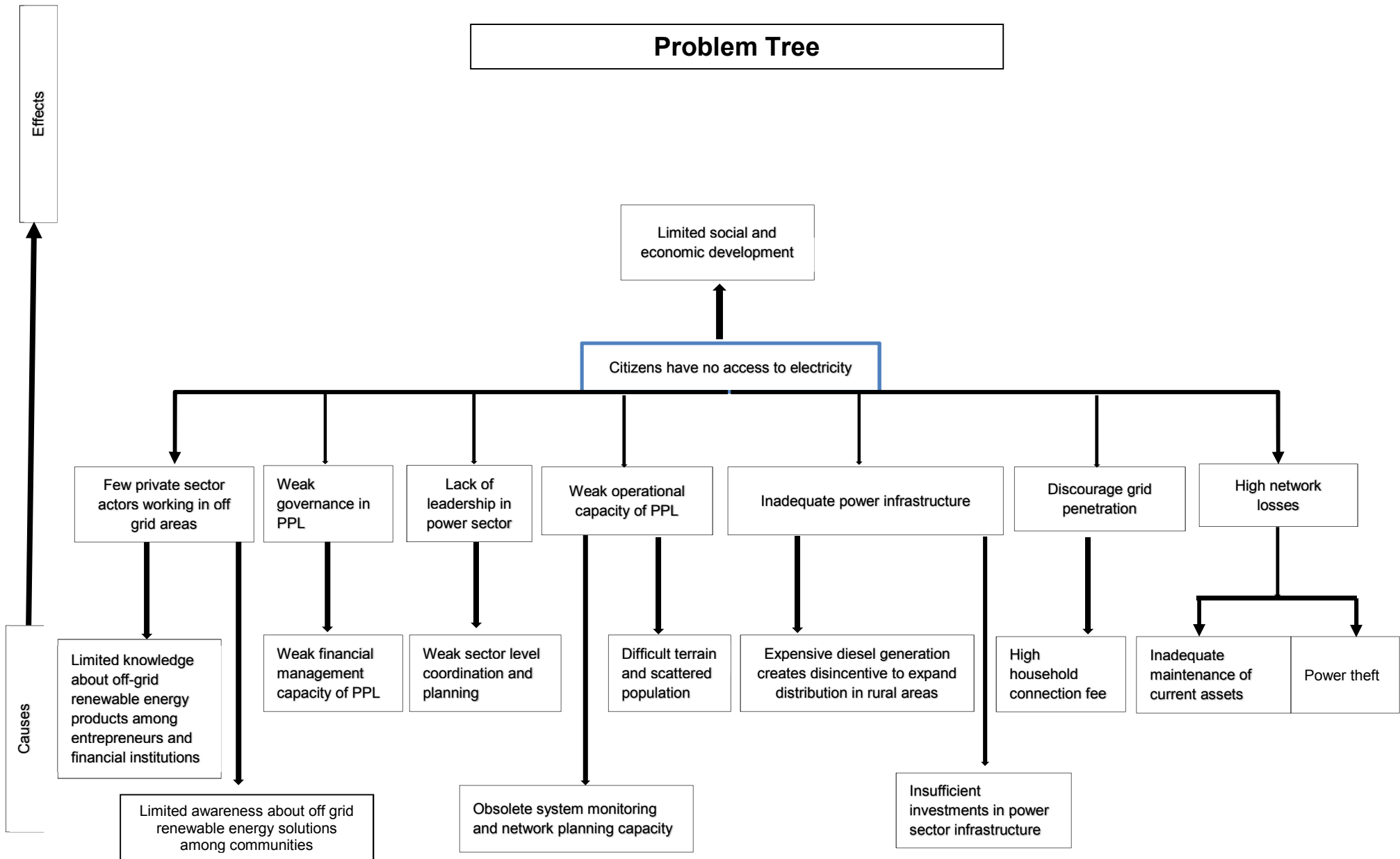
² Papua New Guinea Vision 2050

	<p>(2017 baseline: No SCADA system)</p> <p>3b. 2000 new smart meters installed at large load customers Baseline: 0 in 2017</p>		commitments and priorities
4 Private sector investments in rural electrification mobilized	<p>4a. Atleast 1 renewable energy projects identified</p> <p>4b. 25 entrepreneurs reported improved skills (at least 30% female) on new renewable energy technologies, operational and financial management and sustainable business models</p>	a Quarterly progress report of PPL	
5. Institutional support and capacity of EA/IAs, program beneficiaries and other stakeholders enhanced.	<p>5a. Renewable Energy Policy developed (Baseline: not developed)</p> <p>5b. Energy Sector Coordination, Monitoring and Implementation Committee (ESMIC) established (2017 baseline not established)</p> <p>5c. At least 50 participants reported improved skills on (30% female) renewable energy solutions' maintenance, livelihood generation using electricity</p> <p>5d. 20 staff from EA/IA reported improved skills (30% women) on power network monitoring, operations and maintenance</p>	a-d Quarterly progress report of PPL	

<p>Key Activities with Milestones</p> <p>Outputs 1, 2 and 3</p> <p>1. Expansion of Transmission and Distribution including monitoring system enhanced</p> <p>1.1 Identify and appraise subprojects (Q1-Q2 2018)</p> <p>1.2 Prepare engineering designs (Q3-Q4 2018)</p> <p>1.3. Prepare bid documents (Q4 2018)</p> <p>1.4 Contract awards (2019)</p> <p>1.5 Make assets operational (Q1 2022)</p> <p>2. Outputs 4 &5: Private sector mobilization, Institutional support and capacity of IAs, program beneficiaries and other stake holders enhanced</p> <p>2.1 Draft of Renewable Energy Policy developed (Q4 2020)</p> <p>2.2 Renewable Energy Policy approved by Government and Implemented (Q4 2021)</p> <p>2.3 2 x International Investor Forum organized (Q2 2019, Q2 2020)</p> <p>2.4 ESMIC secretariat established and structure approved (Q2 2019)</p> <p>2.5 ESMIC first meeting conducted (Q2 2019)</p> <p>2.6 3 road shows to promote renewable energy solution in off-grid areas (Q3 2019-Q3 2021)</p> <p>Program Management Office Established in Q1 2018</p> <p>Mobilize design consultants Q3 2018</p> <p>Preparation of Tranche 2: Q2 2021</p>
<p>Investment</p> <p>ADB: \$217 million</p> <p>Government of Papua New Guinea: \$24 million</p> <p>Government of Australia (grant): \$4million</p> <p>Technical Assistance</p> <p>Technical Assistance Special Fund (6): \$1.2million for investment program preparation and due diligence of Tranche 1</p> <p>Government of Australia(grant): \$2million for detailed design and procurement support of Tranche 1</p> <p>Government of Australia(grant): \$4million for capacity development as piggybacked to Tranche 1.</p>
<p>ADB = Asian Development Bank, PPL = PNG Power, DPE = Department of Petroleum and Energy, PPP= Public Private Partnerships. ESMIC= Energy Sector Coordination Monitoring and Implementation Committee, SCADA=Supervisory Control and Data Acquisition</p> <p>Source: Asian Development Bank.</p>

Olly Norojono
Director, PATE

Ma. Carmela D. Locsin
Director General, PARD



THE TRANSACTION TECHNICAL ASSISTANCE FOR PROJECT PREPARATION, DESIGN AND PROCUREMENT SUPPORT

A. Justification

1. A technical assistance for project preparation is required to (i) prepare the investment program and conduct due diligence; (ii) prepare the detailed engineering design and provide procurement support for Tranche 1 activities, and (iii) familiarize the implementing agency with ADB's procurement procedures, disbursement procedures, and safeguard requirements.

2. To ensure high readiness of proposed investment program, Government of Australia is providing a grant for detailed engineering design in advance and procurement support of the tranche 1 activities. This will significantly improve project readiness and expedite implementation which remains an issue in ongoing ADB investments in PNG.

B. Outputs and Activities

3. The major outputs and activities are summarized in Table B.1.

Table 1: Summary of Major Outputs and Activities

Outputs	Expected Delivery Dates Date	Key Activities	Expected Completion Date
1. Conduct due diligence on technical, economic, financial, environment, governance, procurement, and safeguards	March 2018– September 2018	1.1 Draft safeguard due diligence reports/plans	July 2018
		1.2 Final due diligence completed to provide basis for project justification	August 2018
		1.3 Final report submission	September 2018
2. Detailed engineering design, bidding documents and procurement support	October 2018– September 2019	2.1 Draft engineering design report and cost estimates	December 2018
		2.2 Updated safeguard documentation	December 2018
		2.3 Final design and draft bidding documents	January 2019
		Bidding -IFB posted	January 2019
		Bid Evaluation and Contract Award	April 2019– September 2019

Source: Asian Development Bank.

C. Cost Estimate and Financing

4. The TA is estimated to cost \$3.2 million equivalent of which \$1.2 million will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-6) to prepare the investment

program and conduct due diligence and \$2 million grant from Government of Australia for detailed engineering design and procurement support for tranche 1 .

5. The government will provide counterpart support in the form of counterpart staff, office supplies, secretarial assistance, provision of office space, communication facilities for consultants, and other in-kind contributions. The cost sharing plan is provided in table 2 whereas detailed cost estimates are presented in Annex 1.

Table 2: Cost Sharing Plan

Activity	TASF(6)	Government of Australia
Output 1	100%	0%
Output 2	0%	100%

Source: Asian Development Bank

D. Implementation Arrangements

6. ADB will administer the TA. DPE will be the overall executing agency (EA) of the TRTA and PPL will be the implementing agency (IA). For the consulting services, *ADB will engage consulting firms and individual consultants in accordance with ADB Procurement Policy (2017, as amended from time to time) and the associated PAIs/TA Staff Instructions*. The proposed TA processing and implementation schedule is listed in Table 3.

Table 3: Processing and Implementation Schedule

Aspects	Arrangements		
Indicative Implementation period	March 2018 to September 2019		
Executing Agency	Department of Petroleum and Energy (DPE)		
Implementing Agency	PNG Power Limited		
Consultants	Firm – single contract. To be selected and engaged by ADB		
	QCBS (90:10)	124 person months	\$3.2million
Advance contracting and retroactive financing	Nil		
Disbursement	The TA resources will be disbursed as per following ADB's Technical Assistance Disbursements Handbook (2010, as amended from time to time). Cost sharing as per table 2		

7. **Consulting services.** The technical assistance will require a total of 75 international person-months and 49 national person-months of consulting services. Assignment will be structured in two phases. A consulting firm (the Consultant) will be recruited to prepare both the phases. Activities under each phase are identified as below:

- a. Phase 1: The consultant will; (i) prepare the investment program by clearly identifying subprojects under each tranche with cost estimates; and (ii) conduct and prepare feasibility studies and project documentation suitable for investment under tranche 1.
- b. Phase 2: Preparation of detailed design of tranche 1 subprojects identified under feasibility study by; (a) conducting necessary surveys, and investigations; (b) technical appraisal of subprojects and updating preliminary designs (if deemed

necessary); (c) detailed engineering designs, (d) preparation of bidding documents; and (e) procurement support and bids evaluations.

8. The recruitment of consultants will be in accordance with ADB's Procurement Policy (2017, as amended from time to time) and the associated PAIs/TA staff instructions using the quality and cost-based selection (QCBS) method with 90:10 ratio. The contract will be time based. Consultant may propose changes in person months' inputs of individual experts to effectively deliver the required outputs under contract.

9. **Detailed engineering design.** Detailed engineering design will be exclusively financed by a grant of \$2million from government of Australia. Consultant TORs were shared with PNG Power Limited, the implementing agency who agreed with the terms and scope of work.

10. **Cofinancier requirements.** TRTA will be administered by ADB. Co-financing agreement will be prepared in coordination with OCO. reporting requirements will be followed as provided in co-financing arrangements between ADB and Government of Australia.

E. Governance

11. Due diligence will be conducted at feasibility stage to cover financial management and risk assessment, procurement capacity assessment and for anticorruption and integrity. Risk management and action plan will be generated to mitigate risks highlighted in due diligence process.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank^a	
1. Consultants	
a. Remuneration and per diem	
i. International consultants (32 person-months)	992.0
ii. National Consultants (19 person-months)	76.0
b. Out-of-pocket expenditures	57.0
2. Workshops, training, seminars, and conferences	5.0
3. Surveys	10.0
4. Contingencies	60.0
Sub Total (A)	1200.0
B. Government of Australia^b	
1. Consultants	
a. Remuneration and per diem	
i. International consultants (43 person-months)	1333.0
ii. National Consultants (30 person-months)	120.0
b. Out -of-pocket expenditure	55.8
2. Workshops, training, seminars, and conferences	8.2
3. Surveys	8.0
4. Misc, administration and support cost	400.0
5. Contingencies	75.0
Sub Total (B)	2000.0
C. Government	
1. Office accommodation	-
2. Remuneration and per diem of counterpart staff	-
3. Contingencies	-
Sub Total (C)	00.0
Total	3200.0

^a Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF6).

^b Administered by Asian development Bank. This amount also includes ADB's administration fee, audit costs, bank charges, and a provision for foreign exchange fluctuations (if any), to the extent that these items are not covered by the interest and investment income earned on this grant, or any additional grant from the Government of Australia
Source: Asian Development Bank

**TERMS OF REFERENCE
TRANSACTION TECHNICAL ASSISTANCE FOR PROJECT PREPARATION, DESIGN
AND PROCUREMENT SERVICES**

PNG: Power Sector Development Investment Program (PSDIP)

I. OBJECTIVE OF CONSULTING ASSIGNMENT

1. The assignment will be structured in two phases. A consulting firm (the Consultant) will be recruited to prepare both the phases. Activities under each phase are identified as below:
 - (ii) **Phase 1:** The consultant will; (i) prepare the overall investment program by clearly identifying investments/subprojects to potentially be included under each tranche with cost estimates; and (ii) conduct and prepare feasibility studies and project documentation suitable for investment under tranche 1.
 - (iii) **Phase 2:** The consultant will prepare detailed design of tranche 1 subprojects identified under feasibility study by; (a) conducting necessary surveys, and investigations; (b) technical appraisal of subprojects and updating preliminary designs (if deemed necessary); (c) detailed engineering designs, (d) preparation of bidding documents; and (e) supporting the procurement process and bids evaluations.
2. The consultant will also provide necessary support and inputs (where necessary) to ADB during investment program processing (including full preparation of tranche 1) for its approval by the ADB Board.
3. PPL, the implementing agency (IA) will provide the Consultant, free of charge, with relevant available data, information and documents which the Consultant may reasonably request e.g. power system data, transmission/sub-station/distribution design specifications, details of any route considered, any other planning information like land ownership and acquisition, legal requirements, permits needed and public information, among others. The Client will help in arranging and facilitate meetings with relevant institutions / authorities as required. Translation services (if required) and any type of surveys and studies which will be at Consultants expense. In performance of work, client may also have to buy or arrange aerial photography at their own expense to use in GIS mapping for projects selection.
4. The recruitment of consultants will be in accordance with ADB's Procurement Policy (2017, as amended from time to time) and the associated PAIs/TA staff instructions using the quality and cost-based selection (QCBS) method with 90:10 ratio. The contract will be time based. Consultant may propose changes in person months' inputs of individual experts to effectively deliver the required outputs under contract; however, within minimum person-month inputs indicated in the Data Sheet

II. DURATION AND TIMING OF THE SERVICES

5. It is expected that the consulting firm will be appointed and commence the phase 1 services no later than March 2018. The assignment for program preparation and tranche 1 feasibility, phase 1, is expected to be completed in 6 months. Phase 2, the detailed design and procurement support will commence immediately after completion of phase 1. Phase 2 will be undertaken over 12 months which includes detailed engineering design and procurement support.

III. SCOPE OF CONSULTING ASSIGNMENT - PHASE 1 (6-MONTH ASSIGNMENT)

6. The scope of phase 1 is about 51 person months of consulting services (32 international and 19 national person months). The consulting team is expected to execute its works in PNG. . The form proposal to be used will be full time based technical proposal. The proposal will comprise the approach to: (i) preparation of an investment program spread over in ten years in three tranches by identifying the projects/subprojects under each tranche, basis of selection of subprojects under each tranche, cost estimates and key benchmarks or milestones to achieve prior to each subsequent tranche; (ii) Tranche 1 feasibility study (all investments/subprojects included in tranche 1).¹⁷ Detailed feasibility should include:

- a. **Institutional arrangements:** Consultant will: (i) undertake the capacity assessment of the Department of Petroleum and Energy (DPE), the executing agency (EA) and PNG Power (PPL) the implementing agency (IA) to implement the program from financial, procurement and management perspective; (ii) propose measures to develop and strengthen institutional capacity of the organizations to ensure smooth project implementation and sustainability, with special attention to long-term operations and management arrangements of the facilities proposed to be developed under the program, (iii) propose an effective and workable institutional and implementation arrangement for the program, including mechanisms to enhance coordination and coherence among different organizations at the central, provincial and sector levels; and (iv) propose appropriate structuring for project management unit/office with budget estimates.

Financial analysis and financial management assessment: Consultant will: (i) undertake a financial management assessment of the DPE (EA) and PPL (IA) and based on assessment prepare financial management action plan in agreement with EA/IA. (ii) cost estimate of investment program and each tranche individually; and (iii) assess the financial viability of the overall tranche 1 and each subproject proposed under tranche 1. All activities will be conducted in accordance with ADB guidelines which can be downloaded from <https://www.adb.org/about/financial-management-resources>. ADB's Financial Management Assessment Questionnaire should be utilized for analysis.

- b. **Economic analysis:** Consultant will undertake the economic due diligence of tranche 1 and its subprojects individually using the methodology and covering the 10 key areas of economic analysis presented in *ADB Guidelines for the Economic Analysis of Projects* (2017) and can downloaded from <https://www.adb.org/documents/guidelines-economic-analysis-projects>

Studies and designs: Consultants will carry out the following:

- (i) review of past and ongoing work/studies/planning documents done by the government, private sector and development partners in the power sector.
- (ii) power system modeling for high, medium, and low-voltage grids and analysis of electrical power systems.
- (iii) develop the subproject selection criteria and select the subprojects in consultation with PPL/DPE.
- (iv) obtain topographical, geological, hydrological and other data required for design of projects;

¹⁷ As per the requirements for MFF financing modality the investments/subprojects in tranche 1, are as far as practicable, to be representative (including from a safeguards perspective) of those in subsequent tranches.

- (v) prepare the feasibility level engineering designs and arrangements for O&M of all subprojects including SCADA and smart meters. This also reflect the total number of households to be connected/energized
 - (vi) prepare a detailed implementation schedule, item-wise and total cost estimates using the ADB-standard price and physical contingencies, and detailed financing and disbursement plans, in a format agreeable to ADB.
 - (vii) Determination of technical and non-technical losses, grid reliability factor and propose the impact of investment program and tranche 1 on mitigating losses, grid reliability and revenue generation of PPL.
- c. **Environmental and social safeguards:** Due diligence of environment and social safeguards in accordance with ADB's Safeguard Policy Statement 2009 (SPS) and the country's laws and regulations. This includes, screening, scoping, assessment and mitigation planning. Assess government policies, experiences, institutions, and the legal framework for environmental assessment, involuntary resettlement and indigenous peoples to address any gaps with ADB's SPS and recommend gap filling measures. An environmental assessment and review framework (EARF) and resettlement framework (RF), and if required Indigenous People's Framework (IPF), will be required to be prepared for the overall program. Tranche 1 feasibility study will include safeguards due diligence conducted for each of the tranche 1 investments/subprojects.
- d. **Poverty, social and gender assessment:** Carry out poverty, social and gender assessment which focuses on the direct and indirect impact channels through which the poor and vulnerable groups including women will benefit from the project. Prepare SPRSS and gender action plan to be guided by the *ADB's Poverty Handbook, Analysis and Processes to Support ADB Operations* and *ADB's Gender and Energy Took Kit* to maximize poverty and social benefits to both men and women and mitigate any adverse impacts. The gender action plan will specify the gender design features, targets and activities per project output to be delivered during project implementation.
- e. **Development sector coordination and consultations:** Assess development sector participation and coordination in energy sector by looking at ;(i) development partners key strategic focus and key activities involve including future; (ii) institutional arrangements and process for development coordination;(iii) achievements and issues;(iv) how investment program seeks to build partnership in its design and implementation; and (v) recommendations.

Stakeholder and local community consultations and participatory planning exercises to be incorporated into the design of the subprojects. All proposed project design features, both hard and soft components, should be made in consultation with relevant stakeholders, including (but not limited to) the executing and implementing agencies, development partners and other relevant government agencies, and adequate consultation with local beneficiaries and NGO's when deemed appropriate.

Capacity need assessment: Conduct capacity assessment of IA/EA and ICCG (as a regulator) and develop a capacity development plan. Propose capacity need to strengthen technical and financial regulatory regime in PNG. Also, verify the need to enhance coordination and monitoring among stakeholders to justify the establishment of Energy Sector Monitoring and Coordination Committee.

- f. **Assessment of ongoing investments:** Review and assess the ongoing ADB's investments in energy sector to identify key causes of success and failures,

nonperformance, (if any) and lessons learned. Lessons learned will be incorporated in to the design of proposed investment program.

- g. **Design and monitoring framework (DMF).** Consultants will verify the activities under each output outlined in the proposed DMF of investment program and the tranche 1 and further develop outcome, outputs, assumptions, risks and key activities with clear links to performance targets and indicators, and identifying risks and assumptions. Also indicate the contribution of investment program to ADB results framework as per ADB guidelines.
 - h. **Risk assessment and management plan:** Identify potential risks in project and prepare management plan to mitigate those risks during implementation.
 - i. **Energy sector assessment:** Consultant will conduct energy sector assessment as per ADB format to identify clearly strategic context, policy framework, sector roadmap, core sector problem, issues and opportunities, government sector strategy and challenges and ADB sector experience and assistance program and how the investment program will help to government in achieving its strategic and sector road map.
 - j. **Procurement plan and risk assessment:** Consultants will conduct procurement capacity and risk assessment of EA/IA and propose contract packaging in the form of a standard ADB procurement plan template in accordance with *ADB's Procurement Guidelines* (2017, as amended from time to time) and Guide on Assessing Procurement Risks and Determining Project Procurement Classification.
 - k. **Project implementation support.** Consultants will assess and propose support required for project management and construction supervision under tranche 1 including design of Tranche 2 of investment program. Consultant will also propose support required to prepare GCF proposal for in tranche 2 for grant financing to convert existing diesel generation to renewable energy
 - l. **Technical Assistance support:** The consultant will assess and propose consulting services description for piggybacked grant technical assistance with loan of \$4million for capacity development. Consultant will also prepare its cost estimates, budgeting and implementation arrangements.
7. **Phase 1 consultant's team composition:** The team composition of International and national experts along with their estimated person-months (PM) is provided in Table below:

Table 1: Summary of Consulting Services Requirement

Positions	Person-Months Required
International	
Rural Electrification Specialist	2
Senior Electrical Engineer (Transmission and Distribution)/Team Leader	6
Electrical Engineer (Transmission and Distribution)	4
Financial Management Specialist	4
Economist	3
Social Safeguards, Poverty/Social Development and Gender Specialist	3
Environment Specialist	3
Power System Monitoring/Control Specialist	3

Procurement Specialist	2
Renewable Energy Market Development Specialist	2
Total	32
National	
Rural Electrification Expert	6
Transmission and Distribution Expert	6
Social Safeguards/Development Expert	3
Environment Specialist	2
CAD Expert	2
Total	19

Source: Asian Development Bank staff estimates

8. Senior Electrical Engineer, Transmission and Distribution (Team Leader, 6 person months, International). The Expert will have a degree in electrical engineering with 20 years of experience working in development/rehabilitation of transmission and distribution lines, substations and power systems. Team lead will take overall responsibility of supervising the team of consultants, coordinating with the Government of Papua New Guinea, relevant agencies, development partners, and ADB on development of power infrastructure in PNG. Experience of working in SinCAL software is an added advantage. The Expert will undertake the following:

- (i) Study and analyze grid and transmission and distribution network constraints through collection of data/information on domestic generation capacity, load forecast, system simulation etc.
- (ii) Carry out power system modeling for high, medium, and low-voltage grids and analysis of electrical power systems.
- (iii) Conduct site reconnaissance (route surveys) to collect data/information for feasibility study level design.
- (iv) Based on the review of existing studies and plans, identify and prioritize projects for investment program based on technical and commercial considerations, and system and generation capability and future needs. Clear selection criteria and rationale of selecting each subproject should be presented. The projects should be agreed by the Government and ADB.
- (v) Clearly identify economic corridors for high, medium and low voltage lines with substation requirements in urban, peri urban and rural areas leading up to household connections.
- (vi) Assess power demand of existing connections and proposed new connections.
- (vii) Develop power demand projections incorporating anticipated demand growth and generation sources from renewables.
- (viii) Prepare tranche 1 subprojects' feasibility level engineering design of transmission and distribution lines expansion including household connections, towers, conductors, insulators, ground wires, substations etc. in accordance with relevant technical standards.
- (ix) Prepare cost estimates with reference to international and domestic price trends for projects of similar scale and quality
- (x) As a team lead, prepare feasibility studies for the identified projects. The studies should include technical planning and design, social/environment safeguard documents, economic/financial analyses, procurement packaging, implementation arrangements and schedule, etc. The studies should include at minimum feasibility study level drawings and site maps indicating sub projects.

- (xi) Prepare, in collaboration with relevant team members, the capacity development plan based on the capacity needs assessment.
- (xii) Lead the preparation of inception, interim, draft, final and other reports as requested by the Government and ADB.
- (xiii) All feasibility studies will be summarized into one single report and also presented in the format of a Periodic Financing Request for tranche 1.
- (xiv) Deliver presentations at requested meetings with or on behalf of ADB regarding progress of Projects preparation.
- (xv) Coordinate the activities of team and lead discussions and consultations with stakeholders
- (xvi) Team leader will work with ADB after the submission of final report to provide inputs (where necessary) and coordinate with ADB project team lead during investment program processing.

9. Electrical Engineer, Transmission and Distribution (4 person months, international)

The Expert will have a degree in electrical engineering with at least 15 years of experience working in development/rehabilitation of transmission and distribution lines and rural electrification. Work experience working on SinCAL will be an added advantage. The Expert will work closely with team lead undertake the following:

- (i) Study and analyze grid distribution network constraints through collection of data/information on domestic generation capacity, load forecast, system simulation etc.
- (ii) Carry out power system modeling for high, medium, and low-voltage grids and analysis of electrical power systems.
- (iii) Conduct site reconnaissance (route surveys) to collect data/information for feasibility study level design.
- (iv) Based on the review of existing studies and plans, identify and prioritize projects for transmission and distribution expansion and household connections based on technical and commercial considerations, and system and generation capability and future needs. This will identify economic corridors for grid expansion in urban, peri urban and rural areas including the household connections.
- (v) Clear selection criteria and rationale should be prepared and presented for route selection/prioritization. The projects should be agreed by the Government, EA, IA and ADB.
- (vi) Assess options for extension of the grid to serve additional customers within financially viable distance to existing grid.
- (vii) Assess power demand of existing connections and proposed new connections.
- (viii) Develop power demand projections incorporating anticipated demand growth.
- (ix) Monitor electricity demand and develop load curves
- (x) Prepare tranche 1 subprojects' feasibility level engineering design and technical specification of distribution lines expansion including household connections, towers, conductors, insulators, ground wires, substations etc. in accordance with relevant technical standards.
- (xi) Prepare cost estimates with reference to international and domestic price trends for projects of similar scale and quality;
- (xii) Prepare, in collaboration with relevant team members, the capacity development plan based on the capacity needs assessment.
- (xiii) Coordinate the activities of team and lead discussions and consultations with stakeholders

10. Rural Electrification Specialist (2 person months, International): The specialist should hold a degree in engineering or equivalent with a proven experience in scoping off-grid renewable energy applications and promoting rural electrification in developing countries. The ideal candidate should have at least 10 years of overall work experience in international development, with a track record of successfully implementing off-grid and on-grid renewable energy projects in developing countries in Asia or Pacific. Any direct experience in rural electrification with private sector development will be considered an advantage. Specific tasks of the specialist will include but not limited to:

- (i) Review PPL household connection policy including connection charges. Identify barriers in grid penetration at rural level propose measures to increase electricity access in rural areas of PNG, including provision of subsidy to household connection fee through grant financing.
- (ii) Conduct survey and verify the affordability of households in rural areas to pay for power connection fee
- (iii) With the help of team members, conduct initial shortlisting of potential candidates in provincial center's current diesel generation sites for assessing options of converting them into suitable hydro/solar power
- (iv) Work closely with the team leader and provide inputs in the expansion of distribution grid and households connections by considering current and future growth (demand and supply side).
- (v) Assess options for extension of the distribution of grid to serve additional customers within financially viable distance to existing grid.

11. Financial Management Specialist (4 person months, International): The expert will have a degree in accounting, finance, or a related field, and will have a recognized professional accountancy qualification. The expert should have at least 15 years' experience, including in financial due diligence (FDD). The expert will conduct FDD in accordance with ADB's requirements¹⁸. Relevant guidance is available at <http://www.adb.org/projects/operations/financial-management-resources>. The FDD will include:

- (i) Conducting a financial management assessment of the executing and implementing agencies, including (a) assessing whether previous financial management assessments have been conducted by ADB or other agencies and, if so, reviewing the results and ascertaining whether these can be used as input, (b) assessing capacity for planning and budgeting, management and financial accounting, reporting, auditing, internal controls, and information systems (c) reviewing proposed disbursement and funds-flow arrangements, and (d) concluding on the financial management risk rating and identifying and confirming measures for addressing identified deficiencies;
- (ii) The FDD needs to cover (a) weaknesses in PPL's FM capacity as evidenced by Disclaimers of Audit opinion for the enterprise for 4 years up to 2015, and Disclaimers / Qualified audit opinion for all ongoing project financial reports; (b) assess PPL's financial position, its financial sustainability, capacity to borrow; (c) project level financial viability; (d) funds flow, accounting and audit arrangements; and (e) financial covenant design.

¹⁸ ADB. 2014. Financial Management, Cost Estimates, Financial Analysis, and Financial Performance Indicators. *Operations Manual*. OMG2/BP. Manila

- (iii) Prepare financing plan, costing model, project and subprojects financial evaluations (FIRR).
- (iv) supporting the preparation and agreement of cost estimates and a financing plan, which are based on verifiable data and are sufficient to support project implementation;
- (v) preparing financial projections and conducting financial analyses of the executing and implementing agencies, and incremental recurrent costs, to determine financial sustainability, and reviewing proposed cost-recovery and tariff policies, including affordability;
- (vi) conducting financial evaluations (financial cost-benefit analyses) including sensitivity analyses of project components that have a cost-recovery objective;
- (vii) where significant risks are identified to project financial sustainability or viability, proposing relevant financial performance indicators to be incorporated in financial covenants; and
- (viii) assessing and reaching agreement on financial reporting, auditing and public disclosure arrangements for the project, and, as appropriate, identifying and agreeing arrangements for receiving financial statements from executing and/or implementing agencies.
- (ix) Expert will provide working sheets of cost tables and financial evaluations
- (x) Expert will support ADB after the submission of final report to provide inputs (where necessary) during investment program processing for ADB Board approval.

12. **Economist, (3 person months, International):** The expert will have a degree in economics or a related field, and should have at least 15 years' experience, including in economic due diligence. Undertake the economic due diligence using the methodology and covering the 10 key areas of economic analysis presented in *ADB Guidelines for the Economic Analysis of Projects* (2017).¹⁹ The analysis will mainly address:

- (i) Macroeconomic context for the project by reviewing recent economic performance including key sources of growth and their trends, to identify sector needs for improving growth potential etc
- (ii) Assess the sector context by assessing the overall sector growth and performance, including probable causes of underperformance and low productivity. Analyze area-specific constraints and market and public related institution performance.
- (iii) Provide a rationale for public sector intervention. Describe the market failure that needs to be addressed to establish the rationale for government intervention.
- (iv) Conduct demand analysis that establishes the existing and future consumer demand for goods and services to be produced by a program and provides a basis for estimating the project's economic benefits
- (v) Estimating economic benefits and costs associated with the proposed project requires establishing the with project and without project scenarios and comparing the two.
- (vi) The ENPV and the EIRR should be calculated for all program and subprojects of tranche 1 in which benefits can be valued. The general criterion for accepting a project is achieving a positive ENPV discounted at the minimum required EIRR, or achieving the minimum required EIRR. ADB's newly adopted minimum required EIRR is 9%.
- (vii) Identify key risks to the project and undertake sensitivity analysis on the risk factor basis for various scenarios

¹⁹ . Available from <https://www.adb.org/documents/guidelines-economic-analysis-projects>.

- (viii) Expert will support ADB after the submission of final report to provide inputs (where necessary) during investment program processing for ADB Board approval.

13. Social Development and Gender Specialist (3 person months, International): The Social Development and Gender Specialist will be a graduate with a degree in sociology, applied social science or other related fields. The Specialist will have (i) substantial and recent experience in social, poverty and gender impact assessment, participatory planning and social safeguards due diligence; (ii) international experience working in social development and/or safeguards and policy issues in several developing countries; and (iii) experience working in Pacific countries. The following will be considered an advantage: (i) experience in PNG; (ii) experience with renewable energy projects and (iii) experience in preparing social and gender assessments and social safeguards due diligence in compliance with the ADB requirements.

- (i) Review the scope and activities of the proposed Multi-tranche Financing Facility (MFF) and conduct due diligence on its potential impacts on land acquisition/involuntary resettlement (IR) and indigenous peoples (IP). The findings should be able to provide recommendations on the subproject selection or programming of activities per tranche taking into account the resources and time it will require to possess identified site/s or implement safeguards requirements where applicable. Subprojects where survey and compensation of affected assets and acquired land could be completed expediently will be prioritized under Tranche 1. This includes sites with minor impacts and without any existing legacy or outstanding land issues. In liaison with the Department of Lands, and Physical Planning, detailed program of actions will also be provided on how to expedite the completion of necessary safeguards requirements in each tranche particularly Tranche 1.
- (ii) Conduct surveys, (including cadastral survey where possible), interviews and focus-group discussions to collect data for assessment of social impacts and preparation of safeguard planning and management documents and provide the basis for the project's consultation and participation plan;
- (iii) In coordination with relevant government agencies, undertake adequate consultations with affected persons and other stakeholders, including NGOs/CSOs and assist in disclosing relevant information including the draft safeguard documents in accordance with the country's laws and ADB's SPS and Public Communications Policy 2011. Minutes of meetings and consultations duly signed or acknowledged by the attendees should be prepared;
- (iv) Prepare a Resettlement Framework and Indigenous Peoples Framework which will (a) reflect fully the policy objectives and relevant policy principles and safeguard requirements governing preparation and implementation of succeeding tranches under the MFF; (b) explain the general anticipated impacts of the succeeding tranches to be financed under the MFF; (c) specify the requirements that will be followed for subproject screening and categorization, assessment, and planning, including arrangements for information disclosure, meaningful consultation with measures to involve vulnerable groups including women, grievance redress mechanism, and where applicable, safeguard criteria that are to be used in selecting tranche or subprojects and/or components under the tranche; (d) describe implementation procedures, including budgets, institutional arrangements, and capacity development requirements; (e) specify monitoring and reporting requirements; and (f) specify the responsibilities and authorities of the

borrower/client, ADB, and relevant government agencies in relation to the preparation, submission, review, and clearance of subproject safeguard documents, and monitoring and supervision of safeguard plan implementation. The content of the Resettlement Framework and Indigenous Peoples Framework should follow prescribed content and outline of these documents according to ADB SPS²⁰

- (v) Under the proposed Tranche 1, establish the land ownership, use and access rights for all proposed infrastructure. Formal records of land tenure or written advice from the relevant land authority confirming Government ownership must be obtained where government land is to be used or existing land lease agreement if applicable. A due diligence report must be prepared for government land or existing government lease.
- (vi) If any private land is required to be acquired, restriction on land use or access will take place, assets on private land will be affected, or an easement created for any land-based infrastructure, a land acquisition and resettlement action plan (LARP) is to be prepared in accordance with the pertinent government laws and ADB Safeguard Policy Statement 2009 (SPS). The content of the LARP should follow prescribed content and outline of the Resettlement Plan according to ADB SPS.
- (vii) Identify the land with PPL and Government of PNG for small scale generation projects to replace diesel generation with renewable energy mainly solar and hydro in provincial centers and include in the LALRP to initiate the process of its acquisition.
- (viii) Prepare an Indigenous Peoples Plan (IPP) under Tranche 1 if required. The IPP will set out the measures whereby the borrower/client will ensure (i) that affected Indigenous Peoples receive culturally appropriate social and economic benefits; and (ii) that when potential adverse impacts on Indigenous Peoples are identified, these will be avoided to the maximum extent possible. Where this avoidance is proven to be impossible, based on meaningful consultation with indigenous communities, the IPP will outline measures to minimize, mitigate, and compensate for the adverse impacts. The content of the IPP should follow prescribed content and outline of the IPP according to ADB SPS.
- (ix) Assess potential poverty and social impacts of the proposed MFF and prepare a brief social and poverty report as the basis of Summary Poverty Reduction and Social Strategy (SPRSS);
- (x) Conduct a gender analysis focusing on gender differentiated access to energy services and current and potential use of energy services (e.g. entrepreneurship), control of energy sources and technologies, women's and men's energy needs and preferences, and opportunities for and constraints on women's participation. Based on the gender analysis, recommend gender features for the program [as part of the social and poverty report, (item ix)] and specifically for Tranche 1, develop a gender action plan (GAP) that mirrors the design and monitoring framework with gender targets and indicators based on sound baseline data, timelines, assigned responsibilities, estimated cost and implementation arrangements.
- (xi) Identify government agencies, nongovernment organizations and women's groups which can be utilized in project preparation and project implementation and assess their potential and capacity to be involved in the project.

²⁰ ADB. 2009. Safeguard Policy Statement, Manila.
<http://www.adb.org/Documents/Policies/Safeguard-Policy-Statement-June2009.pdf>

- (xii) Assess consultant scope for gender specialist services to implement the GAP or project gender features under Tranche 1, including for any NGOs or women's groups to be recruited for implementation.
- (xiii) Conduct stakeholder analysis and prepare a consultation and participation strategy for the project to ensure continuing stakeholder engagement during project implementation;
- (xiv) Ascertain the capacity of the executing agency/implementing agency in complying with ADB's safeguards requirements such as implementing gender and/or social development measures and, if required, LARP, and recommend capacity building measures.
- (xv) The expert will liaise and coordinate with the environmental safeguards consultant to ensure that the requirements for consultations, socio-economic baseline and social impacts assessment are integrated into the environmental assessment as required
- (xvi) Draft SPRSS (together with brief social and poverty report), GAP consultation and participation strategy and all safeguards documents (RF, IPF, RP/DDR and IPP if required) for ADB and government comments and review
- (xvii) Final version of SPRSS, GAP consultation and participation strategy and all safeguards documents

14. Environmental Specialist (3 person-months, International): The international environmental specialist will have a degree in environmental science, planning or engineering or other related field and at least 10 years' experience in environmental assessment and management plan preparation. The following is required: (i) experience in preparation and/or implementation of Asian Development Bank and/or World Bank projects; and (ii) experience in the Pacific. Experience in PNG will be considered an advantage. . The specialist will contribute to the preparation of the screening, assessments and analyses that will be part of the feasibility study and support the package of documentation to go to ADB's Board for consideration. This includes feasibility studies undertaken for each tranche 1 investment by undertaking the environmental safeguards due diligence and prepare the framework for the overall program. In compliance with the requirements of country safeguards system (CSS) and safeguard requirement 1: environment of the Safeguard Policy Statement 2009 (SPS), the specific tasks include:

- (i) A preliminary screening indicates that tranche 1 investments are likely to be category B for environment, this will be confirmed during the PPTA. The project will likely create low-medium impacts through expanding distribution network, installation of transmission line, and building renewable energy in provincial centers and associated civil works. Preparation of a work plan as part of the inception report. The work plan will identify tasks and timeframe for completion of tasks for both the international and national specialist's inputs to the project preparation.
- (ii) Prepare the environmental assessment and review framework (EARF) for the overall investment program to undertake environmental due diligence in compliance with the CSS and SPS. The table of contents of the EARF is to be agreed with ADB;
- (iii) Conduct screening for each tranche 1 investment to confirm the level of due diligence required, submit the screening forms and Rapid Environmental Assessment (REA) checklists to ADB for concurrence;
- (iv) If any investment/component is likely to create significant adverse impacts (category A), a terms of reference (TOR) will be prepared for the ensuing

environmental impact assessment (EIA) and be agreed with ADB and Conservation and Environmental Protection Authority (CEPA). As conduct of EIA has implications for timeframes (given 120-day disclosure requirements), the overall timing and resource requirements will be discussed with ADB;

- (v) For category B investments/components undertake an environmental assessment, including establishing the baseline conditions for relevant environmental parameters. Depending on the scope of works (and therefore impacts) and geographic location of investments/components, one environmental assessment covering all tranche 1 investments can be considered. This will be agreed with ADB once the tranche 1 investments are defined;
- (vi) Ensure that there is coordination and information sharing with other PPTA team members in respect of identification of the key environmental considerations to be considered in the design of physical investments/components;
- (vii) As a component of the due diligence, undertake an audit of existing facilities and operations and identify corrective actions to bring facilities and/or operations into compliance with SPS principles. The audit can be included as a section of the environmental assessment report;
- (viii) Ensure the environmental management plan(s) (EMP) prepared as part of the environmental assessment follow requirements of the CSS (including guidelines issued by the CEPA²¹) and SPS.
- (ix) Estimate the impact on climate change under investment program and estimated GHG emission avoided.

15. Procurement Specialist (2 person months, International): The expert should preferably have at least 10 years or more experience in MDB/ADB procurement systems. The expert will perform:

- (i) Procurement capacity assessment of EA/IA
- (ii) Project Procurement Risk Assessment (Guide on Assessing Procurement Risks and Determining Project Procurement Classification)
- (iii) Consultants will assess the IA/EA's procurement capacity and perform an assessment for both international and national markets for the energy sector for anticipated NCB/ICBs; and define sensible procurement packaging based on the market assessment.
- (iv) Draft Procurement Plan for tranche 1;
- (v) Conduct at least 01 Training the EA and IA on ADB procurement procedures and guidelines

16. Power System Monitoring/Control Specialist (3 person months, international): The consultant should have master's degree in engineering or information technology or equivalent together with minimum 7 years of experience in i) SCADA/communication system, ii) advanced metering infrastructure (AMI) /reading (AMR), smart metering solution for the development and implementation of their architecture and technology or both. The expert will perform:

- (i) Assess PPL's existing system of i) monitoring and communication system and propose system design for interfacing with transmission/distribution line and substations, ii) metering system and assess system design for interfacing with demand-side customers.

²¹ DEC Publication 2013 – Guideline for Preparation of Environmental Management Plan.

- (ii) Review existing monitoring and data collection system, metering system and PPL plans for upgrade.
- (iii) Conduct feasibility on SCADA and smart meters for customers to reduce power theft including its roll out plan.
- (iv) SCADA feasibility will customize and identify the utility need, but not limited to, real-time equipment need, metering data and alarming, historical data trending and storage, remote operation capability, system security, communications, Implementation and commissioning support and control center.
- (v) Smart meter feasibility will Identify potential for demand and supply side management, loss reduction/theft control analysis, communication and monitoring, data collection and analysis, implementation and its roll out plan spread over in three tranches.
- (vi) Determination of technical and non-technical losses, grid reliability factor and propose the impact of investment program and tranche 1 on these factors
- (vii) Identify any potential barriers, risks and measures to mitigate
- (viii) Conduct training need analysis and propose potential capacity development requires in PPL to implement and sustain such operations

17. Renewable Energy Market Development Specialist (2 person months, International):

The ideal candidate will have at least 10 years of overall work experience in international development, with a track record of successfully implementing off-grid and on-grid renewable energy programs in developing countries in Asia. Particularly, the specialist will have experience in conducting needs assessment, developing technical standards, processes and developing business plans for financial institutions that finance off-grid and on-grid renewable energy deployment in Asia and the Pacific. The expert will also have extensive experience in developing and implementing off-grid and on-grid renewable energy programs financed by multilateral development agencies such as ADB, World Bank and bilateral agencies. Any direct experience in renewable energy and private sector development in the Pacific Islands will be considered an advantage. Familiarity with renewable energy and financial sectors in PNG will also be an added advantage. Specific tasks of the specialist will include but not limited to:

- (i) Identify the renewable energy technologies and products that are ideal and necessary for increasing access to clean and affordable energy in PNG. The specialist will also be responsible for identifying a technology and product vendors and suppliers in PNG that can meet international standards and specifications, and develop an profile of such suppliers, their supply chains and distribution networks in PNG – essentially, reviewing the existing value chain of renewable energy technologies and products in PNG, and recommend strategies and plans to further develop this value chain, so that people living in off-grid and rural areas of PNG can get access to high quality renewable energy products and technologies.
- (ii) specialist will review and explore the possibility of developing the green finance programs in PNG
- (iii) the specialist will be also be responsible for ascertaining renewable energy for off-grid applications focused human resource and skill development requirements in market,
- (iv) liaising with, and hold discussions with the proposed program's EA – Department of Petroleum and Energy (DPE), Government of Papua New Guinea, private entities, micro lending banks and other stakeholders – to understand the present conditions of renewable energy finance in the country especially in rural areas, and develop a list of requirements and activities need to perform to develop this market and increase the reach of private sector to rural and off grid areas.

- (v) To develop an understanding of the value chain of renewable energy technologies and products in PNG, suggest a plan to strengthen and develop the capacity of this value chain and reducing financial risk, so that people in rural and off-grid areas of PNG can access high quality renewable energy products, technologies and services.

18. **National Consultants:** The national consultants should be national of PNG and assist the work of their international counterparts through field surveys and data collection, arranging meetings with relevant government agencies and development partners, and follow-up works as needed. All national experts must possess Bachelor level degree and a minimum of 5 years of relevant experience.

19. **Transmission and Distribution Expert, 6 person months, national:** The expert should have a bachelor degree or equivalent with at least 7 years of work experience in the power sector transmission and distribution network of PNG. Engineering degree will be an extra advantage. The expert will:

- (i) Coordinate the activities of team to support team leader in day to day operations, site visits, meetings and liaison with other departments and provincial governments.
- (ii) Participate and take lead in data collections, site reconnaissance (route surveys) to collect data/information for feasibility study level design.
- (iii) Provide inputs to team lead on the review of existing studies and plans, identify and prioritize projects for investment program based on technical and commercial considerations, and system and generation capability and future needs. This will identify economic corridors for grid expansion in urban, peri urban and rural areas including the household connections.
- (iv) Prepare, in collaboration with relevant team members, the capacity development plan based on the capacity needs assessment.
- (v) Arrange team presentations with or on behalf of ADB regarding progress of the project preparation.
- (vi) Undertake other related tasks to assist the consulting team to meet ADB objectives.

20. **Rural Electrification Expert, 6 person months, national:** The expert should have a bachelor degree or equivalent with at least 5 years of work experience in the rural electrification in PNG. Engineering degree with experience working in rural areas will be an added advantage. The expert will:

- (i) Coordinate and provide full support to international experts on transmission and distribution, rural electrification and renewable energy market development specialist in day to day operations, site visits, meetings and liaison with other departments and provincial governments.
- (ii) Participate and take lead in data collections, site reconnaissance, surveys to collect data/information for the potential household's connection under program and grid lines expansion
- (iii) Based on the capacity needs assessment, prepare in collaboration with team members, the capacity development plan for communities and private sector to increase electricity penetration in off-grid areas
- (iv) Provide inputs in the expansion of distribution grid and households connections by considering current and future growth (demand and supply side).
- (v) With the help of team, identify the potential sites to replace existing diesel generation in provincial centers with solar/hydro.

- (vi) Work with team to identify policy incentives and regulatory framework for renewable energy in PNG and assessing their effectiveness; assessing the effectiveness of policy incentives for private sector development in the renewable energy sector, such as long-term tax and tariff incentives, incentives for local banks and financial institutions, development of human capital in the sector through formal and informal education and others as appropriate;
- (vii) Undertake other related tasks to assist the consulting team to meet ADB objectives.

21. **Social Development Expert, 3 person months, national:** The expert will be a graduate with at least 5 years' recent experience in social, poverty and gender impact assessment, and social safeguards due diligence. Experience in preparing social assessments and social safeguards due diligence in compliance with the ADB requirements is considered as an advantage. The expert will:

- (i) Coordinate and provide full support to international expert in day to day operations, site visits, meetings and liaison with communities, other relevant departments and provincial governments.
- (ii) Participate in site surveys, interviews and focus-group discussions to collect data for assessment of social impacts and preparation of safeguard planning and management documents and provide the basis for the project's consultation and participation plan;
- (iii) In coordination with team and relevant government agencies, undertake adequate consultations with affected persons and other stakeholders, including NGOs/CSOs and assist in disclosing relevant information including the draft safeguard documents in accordance with the country's laws and ADB's SPS and Public Communications Policy 2011. Prepare minutes of meetings and consultations duly signed or acknowledged by the attendees should be prepared;
- (iv) Under the proposed Tranche 1, work with team to establish the land ownership, use and access rights for all proposed infrastructure. If any private land is required to be acquired, restriction on land use or access will take place, assets on private land will be affected, or an easement created for any land-based infrastructure, a land acquisition and resettlement action plan (LARP) is to be prepared in accordance with the pertinent government laws and ADB Safeguard Policy Statement 2009 (SPS). The content of the LARP should follow prescribed content and outline of the Resettlement Plan according to ADB SPS.
- (v) Coordinate and provide inputs to international Social Development and Gender Specialist in preparing the social safeguard and related documents (RF, IPF, RP/DDR and IPP if required) as per ADB Safeguard Policy Statement 2009 (SPS).
- (vi) Assist the international Social Development and Gender Specialist in undertaking poverty, social and gender assessment including the preparation of the SPRSS and gender action plan for Tranche 1.
- (vii) The Social Safeguards expert will liaise and coordinate with the environmental expert team to ensure that the requirements for consultations, socio-economic baseline and social impacts assessment are integrated into the environmental assessment as required.
- (viii) Undertake other related tasks to assist the consulting team to meet ADB objectives.

22. **Environment Expert (2 person months, national):** The national specialist will have a degree in environmental science, planning or engineering or other related field and at least 5 years' experience in environmental assessment and management plan preparation. Experience

with international development and/or the PNG environmental assessment system will be an advantage. The national expert will help the team and international expert on to:

- (i) Coordinate and day to day operations, site visits, meetings and liaison with communities, other relevant departments and provincial governments.
- (ii) Participate in site surveys, interviews and focus-group discussions to collect data for environment assessment
- (iii) Provide inputs and support to prepare the environmental assessment and review framework (EARF) for the overall investment program to undertake environmental due diligence in compliance with the CSS and SPS.
- (iv) Conduct screening for each tranche 1 investment to confirm the level of due diligence required, submit the screening forms and Rapid Environmental Assessment (REA) checklists to ADB for concurrence;
- (v) For category B investments/components undertake an environmental assessment, including establishing the baseline conditions for relevant environmental parameters. Depending on the scope of works (and therefore impacts) and geographic location of investments/components, one environmental assessment covering all tranche 1 investments can be considered. This will be agreed with ADB once the tranche 1 investments are defined;
- (vi) Ensure that there is coordination and information sharing with other team members in respect of identification of the key environmental considerations to be considered in the design of physical investments/components;
- (vii) As a component of the due diligence, undertake an audit of existing facilities and operations and identify corrective actions to bring facilities and/or operations into compliance with SPS principles. The audit can be included as a section of the environmental assessment report;
- (viii) Ensure the environmental management plan(s) (EMP) prepared as part of the environmental assessment follow requirements of the CSS (including guidelines issued by the CEPA) and SPS.
- (ix) Undertake other related tasks to assist the consulting team to meet ADB objectives.

23. Computer Aided Design(CAD) expert, 2 person months, national: The expert should have at least 5 years of work experience in CAD work with power sector on transmission or distribution network.

- (i) Review and adjust current drawings and conduct changes/redevelop if required based on understanding with PPL.
- (ii) Design and draft CAD (computer-aided design) drawings in accordance with project schedules and deliverables.
- (iii) Work closely with the team lead, transmission and distribution experts to make sure that the design is precise and acceptable to team lead.

VI. SCOPE OF CONSULTING ASSIGNMENT - PHASE 2

Detailed Engineering Design and Procurement Support - Tranche 1 (12-Month Assignment)

24. The scope of phase 2 is about 73 person months of consulting services (43 international and 30 national person months). The consulting team is expected to execute its works in Papua New Guinea. The form proposal to be used will be full time based technical proposal. Services will be required to prepare detailed engineering designs, specifications, bidding documents and provide procurement support for the physical components of the Tranche 1. Services will also include updating of environmental and social safeguard assessments and documentation.

- a. **Detailed Design:** The international Senior Electrical Engineer (Transmission & Distribution) will be the team lead (TL) for this phase. The team lead in cooperation with PPL and other experts will prepare the detailed engineering design of the subprojects under the tranche 1, including drawings, technical specifications, bills of quantities, detailed cost estimates, implementation schedules, and evaluation and qualification criteria to be applied to potential bidders. The TL will provide all necessary information and documents to the procurement specialist so that the latter can prepare a bidding document for subprojects using ADB standard bidding document template and supervise the procurement process.
- b. **Cost estimation:** The consultant will prepare detailed estimates of the cost of all subprojects under Tranche 1 in the form of the bill of quantities (BOQ) of the relevant bidding document to facilitate bid comparison and evaluation. Working sheets will be provided
- c. **Procurement:** The International procurement specialist will prepare documents following ADB's procedures in accordance with ADB Procurement Policy for Goods, Works, Non-consulting and Consulting Services (2017, as amended from time to time). ADB Procurement Regulations for Goods, Works, Non-consulting and Consulting Services (2017, as amended from time to time) and ADB Standard Bidding Document (2014, Procurement of Goods and Works). Procurement specialist will also assist the PPL during the bidding process including issuance of invitation to bid, pre-bid conference, bid openings, bid evaluations and contract award.
- d. **Social and Environment Safeguards:** The consultant will review and update the, social safeguard documentation and consultation and communications plan prepared during the feasibility studies to accurately reflect the final design and impact of construction both on and off the site. The documents will be reviewed and updated in accordance with local regulations and the ADB's SPS. The detailed design is required, as far as practicable, to reflect the recommendations and proposals for mitigation of impacts made in the environmental assessments and the environmental management plans (EMPs). The environmental assessments and EMPs will be updated to reflect the final design. The updated EMPs will be included in the Employer's requirements of the bidding documents. The Due Diligence Report will be updated and any Resettlement Plan (if required) will be prepared based on the cadastral survey, further consultations, and other findings arising from the detailed design.

- e. **Capacity Development:** Based on capacity need assessment conducted during feasibility, training and capacity development program will be prepared for tranche 1. This training program will address the needs of all stake holders including, private sector, communities and related government agencies.

25. The scope of consulting services in phase 2 is provided below.

Table 2: Summary of Consulting Services Requirement

Positions	Person-Months Required
International	
Rural Electrification Specialist	2
Renewable Energy Specialist	3
Senior Electrical Engineer (Transmission and Distribution)/Team Leader	12
Electrical Engineer (Transmission and Distribution)	7
CAD Specialist	3
Social Development and Gender Specialist	3
Environment Safeguards Specialist	2
Power System Monitoring/Control Specialist	3
Procurement Specialist	8
Total	43
National	
Rural Electrification Expert	6
Transmission and Distribution Expert	10
Social Development Expert	3
Environment Expert	2
CAD Expert	6
Power System Engineer	3
Total	30

26. **Senior Electrical Engineer, Transmission and Distribution (Team Leader, 12 person months, International):** The Expert will have a degree in electrical engineering with 20 years of experience working in development/rehabilitation of transmission and distribution network, substations and power systems. Team lead will take overall responsibility of supervising the team of consultants, preparation of bid documents and complete procurement process, coordinating with the Government of Papua New Guinea, relevant agencies, development partners, and ADB on development of power infrastructure in PNG. Experience of working in SinCAL software is an added advantage. The Expert will undertake the following:

- (i) Together with PPL carry out a survey of the proposed substations, transmission and distribution lines shortlisted for tranche 1;
- (ii) Prepare engineering design for transmission and distribution lines and substation including line route, drawings, towers, conductors, insulators, bill of quantities, grounding system, insulation level coordination, cost estimation, and etc;
- (iii) Prepare technical specifications, implementation schedule, and evaluation and qualification criteria to be applied to the potential bidders;
- (iv) Consult and coordinate with PPL during preparation of engineering design and necessary documents for bidding package;

- (v) Provide all technical information and necessary documents for procurement packages to the Procurement Specialist in a timely manner to run procurements.
- (vi) Participate as a member in bid evaluation process for physical investments
- (vii) Overall responsible for all the deliverables under phase 2

27. Electrical Engineer, Transmission and Distribution (7 person months, international)

The Expert will have a degree in electrical engineering with at least 15 years of experience working in development/rehabilitation of transmission and distribution lines and rural electrification. Work experience working on SinCAL will be an added advantage. The Expert will help the team lead to undertake the following:

- (i) conduct survey of the proposed substations, transmission and distribution lines under tranche 1;
- (ii) prepare detailed engineering design for transmission and distribution lines and substation including line route, drawings, towers, conductors, insulators, bill of quantities, grounding system, insulation level coordination, cost estimation, and etc.;
- (iii) prepare technical specifications, implementation schedule, and evaluation and qualification criteria to be applied to the potential bidders;
- (iv) provide all technical information and necessary documents for procurement packages to the Procurement Specialist in a timely manner to run procurements.
- (v) prepare cost estimates with reference to international and domestic price trends for projects of similar scale and quality;
- (vi) coordinate the activities of team and lead discussions and consultations with stakeholders

28. Rural Electrification Specialist (2 person months, International): The specialist should hold a degree in engineering or equivalent with a proven experience in scoping and promoting rural electrification and off-grid renewable energy applications in developing countries. The ideal candidate should have at least 10 years of overall work experience in international development, with a track record of successfully implementing off-grid and on-grid renewable energy projects in developing countries in Asia or Pacific. Any direct experience in rural electrification with private sector development will be considered an advantage. Based on feasibility study conducted under phase1, specialist will perform following tasks:

- (i) confirm the affordability of households in rural areas to pay for power connection fee based on survey conducted during feasibility and suggest level of subsidy²² required to promote rural electrification.
- (ii) based on identified beneficiaries, target areas, selection criteria for households and women participation identified in this subsidy program, design the implementation/roll out plan with appropriate delivery model to increase grid penetration for household
- (iii) prepare fund flow arrangements for household subsidy
- (iv) work closely with the team leader and provide inputs in the engineering design of expansion of distribution grid from clean energy in rural areas and number of household's connections by considering grid expansion and future growth.
- (v) initial screening and shortlisting of existing diesel generation sites in provincial centers for conversion into renewable sources in Tranche 2 of investment program.

²² Government of Australia will be providing grant to promote electrification in rural areas by providing grant subsidy to household connections.

Initial screening may include supply and demand analyses in brownfield and greenfield identified sites for small scale generation to identify development and expansion needs, contracting approaches including private sector participation, and transmission and distribution system, auxiliary and support facilities required and conduct cost estimation.

29. Renewable Energy Specialist (International, 3 person months): The international renewable energy specialist will have experience working with governments and communities in the design and implementation of small scale renewable energy generation projects including solar (1MW-5MW), preferably in the Pacific. The ideal candidate should have at least 10 years of overall work experience in international development, with a track record of successfully implementing off-grid and on-grid renewable energy. Any direct experience in rural electrification with private sector participation will be considered an advantage. Specific tasks of the specialist will include but not limited to:

- (i) initial screening and shortlisting of existing diesel generation sites in provincial centers for conversion into renewable sources in Tranche 2 of investment program. Initial screening may include supply and demand analyses in brownfield and greenfield identified sites for small scale generation to identify development and expansion needs, contracting approaches including private sector participation, and transmission and distribution system, auxiliary and support facilities required and conduct cost estimation.
- (ii) Priority projects will be bundled and assessed for project financing (donor or private sector).
- (iii) based on renewable energy technologies identified during feasibility to promote off grid electrification, prepare a plan and trainings that are ideal and necessary for increasing access to clean and affordable energy in PNG rural areas to further develop this value chain, so that people living in off-grid and rural areas of PNG can get access to high quality renewable energy products, technologies and services.
- (iv) designing and planning renewable energy related training and capacity building programs for entrepreneurs, MFIs and other potential partner organizations
- (v) In coordination with Social Safeguard Specialist, PPL and provincial governments, identify suitable land for solar/hydro projects in provincial center

30. Procurement Specialist (international, 8 person-months). The expert should preferably have at least 10 years or more experience in MDB/ADB procurement systems. The expert will perform:

- (i) prepare Master Bidding Documents for works, plant and goods
- (ii) coordinate the activities with team leader to produce quality bidding documents for all packages under Tranche 1 in accordance with ADB Standard Bidding Documents (2014, Procurement of Goods and Works);
- (iii) assist PPL in running procurement process as per procurement plan
- (iv) assist PPL in an issuance of invitation of bids, pre-bid conference, bid openings, bid evaluations and contract award.
- (v) Training and capacity building of Project Management Office Staff on ADB's procurement process.

31. Social Development and Gender Specialist (International, 3 months): The Expert will be a graduate with a degree in sociology, applied social science or other related fields. The

Specialist will have (i) substantial and recent experience in social, poverty and gender impact assessment, participatory planning and social safeguards due diligence; (ii) international experience working in social development and/or safeguards and policy issues in several developing countries; and (iii) experience working in Pacific countries. The following will be considered an advantage: (i) experience in PNG; (ii) experience with renewable energy projects and (iii) experience in preparing social and gender assessments and social safeguards due diligence in compliance with the ADB requirements. Based on the work completed during Phase 1, the Specialist will undertake the following tasks:

- (i) coordinate with design engineers to avoid and minimize involuntary resettlement impacts during the detailed design and assist in ensuring adequate consultation with stakeholders;
- (ii) based on detailed engineering design, carry out surveys and other assessments required to verify the identified project involuntary resettlement impacts. In particular, census of all affected persons and inventory/detailed measurement survey of losses will be undertaken. All the losses on properties, income and any other kinds of losses due to the proposed tranche will be identified as the basis of preparing compensation. Identify a cut-off date in consultation with the government, and only APs listed before the cut-off date will be eligible for compensation. The cadastral survey will be undertaken if still necessary to complete mapping out all the boundaries of the land to be used/acquired including confirmation of the right of way and alignment for the transmission and distribution lines.
- (iii) in coordination with Renewable Energy Specialist, PPL and provincial governments, identify land with minimal issues for solar/hydro projects in provincial centers
- (iv) Review the process of compensation and valuation in consultation with the Office of the Valuer General and ensure that rates are based on existing market price as per ADB guidelines. If not, conduct a replacement cost survey and government rates will be adjusted, as necessary, based on the findings of the replacement cost survey. Reference will be made on how other ADB funded projects in PNG has dealt with complying with ADB requirements on compensation.
- (v) update the Resettlement Plan and reconfirm involuntary resettlement impacts following the completion of all assessments and surveys. The consultant will ensure that the updated RP (i) adequately addresses all involuntary resettlement issues pertaining to the project; (ii) describes specific mitigation measures that will be undertaken to address the issues and ensure that affected persons are not disadvantaged by the project; and (iii) update the compensation budget as required.
- (vi) assist the government to disclose updated Resettlement Plan to affected communities in a form and language they can understand and in an easily accessible place before submission to ADB for approval.
- (vii) assist the government in establishing the grievance redress mechanism prior to starting compensation payment and inform the affected persons of its purpose and functions.
- (viii) assist the government during compensation and/or putting in place livelihood restoration program if required. Prepare a resettlement completion report after all the compensation has been paid for no-objection by ADB prior to any civil works.

32. Environmental Safeguards Specialists, International (2 person-months): The international environmental specialist will have a degree in environmental science, planning or engineering or other related field and at least ten-years' experience in environmental assessment and management plan preparation. The following is required: (i) experience in preparation and/or

implementation of Asian Development Bank and/or World Bank projects; and (ii) experience in the Pacific. Experience in PNG will be considered an advantage. Based on the work completed during the feasibility study and in compliance with the requirements of the CSS and safeguard requirement 1: environment of the SPS, the specific tasks include:

- (i) Coordinate with the engineers to ensure that any recommendations for design modifications (including any special design features or mitigation measures) included in the environmental assessments are reflected in the detailed designs;
- (ii) Based on the final detailed design, update the environmental assessments and EMPs included in the environmental assessments. Ensure the updated EMP(s) follow requirements of the CSS (including guidelines issued by the Conservation and Environmental Protection Authority [CEPA] ²³) and SPS;
- (iii) Support PPL make applications for environmental permit from the CEPA for the investments that are prescribed activities. The updated environmental assessments will form part of the application submission;
- (iv) Ensure the updated EMPs and any conditions on environmental permit(s) issued by CEPA, as well as any other safeguard provisions, are incorporated into the tender/bid documents and ensuing contract(s);
- (v) Provide, as required, support and/or advice to the tender/bid evaluation in respect of bidder compliance with environmental management requirements; and
- (vi) Provide support to the team leader as required, in respect of environmental safeguard matters.

33. Computer Aided Design (CAD) Specialist (3 person months, International): The expert should have at least 10 years of work experience in CAD work with power sector on transmission or distribution network;

- (i) Review and adjust current drawings and conduct changes/redevelop if required based on understanding with PPL.
- (ii) Design and draft CAD (computer-aided design) drawings in accordance with project schedules and deliverables.
- (iii) Work closely with the team lead, procurement specialist, transmission and distribution experts to make sure that the design is precise and acceptable to team lead.
- (iv) Provide all technical information/drawings and necessary documents for procurement packages to the Procurement Specialist in a timely manner to run procurements
- (v) Accountable for the storage and maintenance of the CAD drawing library
- (vi) Hand over all the drawings to PPL in soft and hard copy to PPL at the time of completion of assignment.

34. Power System Monitoring/Control Specialist (3 person months, international): The expert should have master's degree in engineering or information technology or equivalent together with minimum 10 years of experience in SCADA/communication system and 7 years in advanced metering infrastructure (AMI) /reading (AMR), smart metering solution for the development and implementation of their architecture and technology both. Based on feasibility results, expert will perform:

²³ DEC Publication 2013 – Guideline for Preparation of Environmental Management Plan.

- (i) Make necessary inputs and advice to the project team and to PPL on i) design of transmission/distribution line and substation communication matters and ii) demand-side metering matters, that include international standard communication protocol.
- (ii) Prepare the detailed engineering design and implementation plan including, technical design , drawings, communication plan, cost estimates, BOQ, O &M, future expansion etc
- (iii) Prepare procurement inputs (bill of quantities, cost estimates such as CAPEX and OPEX, specifications, implementation schedule, drawings, diagrams, etc.). Especially from technical aspect,
 - a. confirm that the Smart Metering System will have the following key feature, such as, TOU capacity, customer relation management, third party vending service, remote disconnection and load shedding, remote communications, remote meter reading and scheduling, etc. The system can interface with wider smart meters, and also can meet the future advance metering requirements.
 - b. confirm that the SCADA System will have the following key feature, such as, monitoring and control for T/D, record, display, maintenance, security function, etc. The system can interface with wider substation and distribution automatic-recloser/ -sectionalizer devices through RTUs, and also meet the expansion for energy management system(EMS), etc.
- (iv) Assist PPL in procurement review (bid evaluation) regarding i) SCADA system and ii) Smart Metering system.
- (v) provide all technical information and necessary documents for procurement packages to the Procurement Specialist in a timely manner to run procurements. prepare technical specifications, implementation schedule, and evaluation and qualification criteria to be applied to the potential bidders

35. **National Consultants:** The national consultants should be national of PNG and assist the work of their international counterparts through field surveys and data collection, arranging meetings with relevant government agencies and development partners, and follow-up works as needed. All national experts must possess Bachelor level degree and a minimum of 5 years of relevant experience.

36. **Transmission and Distribution Expert, 10 person months, national:** The expert should have a bachelor degree or equivalent with at least 7 years of work experience in the power sector transmission and distribution network of PNG. Engineering degree will be an extra advantage. The expert will:

- (i) Coordinate the activities of team to support team leader in day to day operations, site visits, meetings and liaison with other departments and provincial governments.
- (ii) Participate and take lead in data collections, site reconnaissance (route surveys) to collect data/information for design.
- (iii) Provide inputs to team lead on the review of existing studies and plans and to carry out detail design of tranche 1 subprojects
- (iv) Provide inputs in the expansion of distribution grid and households connections by considering current and future growth (demand and supply side).
- (v) Arrange team presentations with or on behalf of ADB regarding progress of the project preparation.

- (vi) Undertake other related tasks to assist the consulting team to meet ADB objectives.

37. **Rural Electrification Expert, 2 person months, national:** The expert should have a bachelor degree or equivalent with at least 5 years of work experience in the transmission, distribution and rural electrification in PNG. Engineering degree with experience working in rural areas will be an added advantage. The expert will:

- (i) Coordinate and provide full support to international experts on transmission and distribution and rural electrification in day to day operations, site visits, meetings and liaison with other departments and provincial governments.
- (ii) Participate and take lead in data collections, site reconnaissance, surveys to collect data/information for the potential household's connection under program and grid lines expansion
- (iii) Based on the capacity needs assessment, prepare in collaboration with team members, the capacity development plan for communities and private sector to increase electricity penetration in off-grid areas
- (iv) With the help of team, identify the potential sites to replace existing diesel generation in provincial centers with solar/hydro.
- (v) Undertake other related tasks to assist the consulting team to meet ADB objectives.

38. **Social Development Expert, 3 person months, national:** The expert will be a graduate with at least 5 years' recent experience in social, poverty and gender impact assessment, and social safeguards due diligence. Experience in preparing social assessments and social safeguards due diligence in compliance with the ADB requirements is considered as an advantage. The expert will:

- (i) Coordinate and provide full support to international expert in day to day operations, site visits, meetings and liaison with communities, other relevant departments and provincial governments.
- (ii) Participate in site surveys, interviews and focus-group discussions to collect data for assessment of social impacts and preparation of safeguard planning and management documents and provide the basis for the project's consultation and participation plan;
- (iii) In coordination with team and relevant government agencies, undertake adequate consultations with affected persons and other stakeholders, including NGOs/CSOs and assist in disclosing relevant information including the draft safeguard documents in accordance with the country's laws and ADB's SPS and Public Communications Policy 2011. Prepare minutes of meetings and consultations duly signed or acknowledged by the attendees should be prepared;
- (iv) Under the proposed Tranche 1, work with team to establish the land ownership, use and access rights for all proposed infrastructure. If any private land is required to be acquired, restriction on land use or access will take place, assets on private land will be affected, or an easement created for any land-based infrastructure, a land acquisition and resettlement action plan (LARP) is to be prepared in accordance with the pertinent government laws and ADB Safeguard Policy Statement 2009 (SPS). The content of the LARP should follow prescribed content and outline of the Resettlement Plan according to ADB SPS.
- (v) Coordinate and provide inputs to international Social Development and Gender Specialist in preparing the social safeguard and related documents (RF, IPF, RP/DDR and IPP if required) as per ADB Safeguard Policy Statement 2009 (SPS).

- (vi) Assist the international Social Development and Gender Specialist in undertaking poverty, social and gender assessment including the preparation of the SPRSS and gender action plan for Tranche 1.
- (vii) The Social Safeguards expert will liaise and coordinate with the environmental expert team to ensure that the requirements for consultations, socio-economic baseline and social impacts assessment are integrated into the environmental assessment as required.
- (viii) Undertake other related tasks to assist the consulting team to meet ADB objectives.

39. **Environment Safeguard Expert (2 person months, national):** The national specialist will have a degree in environmental science, planning or engineering or other related field and at least 5 years' experience in environmental assessment and management plan preparation. Experience with international development and/or the PNG environmental assessment system will be an advantage. The national expert will help the team and international expert on to:

- (i) Coordinate and day to day operations, site visits, meetings and liaison with communities, other relevant departments and provincial governments.
- (ii) Participate in site surveys, interviews and focus-group discussions to collect data for environment assessment
- (iii) Provide inputs and support to prepare the environmental assessment and review framework (EARF) for the overall investment program to undertake environmental due diligence in compliance with the CSS and SPS.
- (iv) Ensure the environmental management plan(s) (EMP) prepared as part of the environmental assessment follow requirements of the CSS (including guidelines issued by the CEPA) and SPS.
- (v) Undertake other related tasks to assist the consulting team to meet ADB objectives.

40. **Computer Aided Design (CAD) expert, 6 person months, national:** The expert should have at least 5 years of work experience in CAD work with power sector on transmission or distribution network is desired.

- (i) Review and adjust current drawings and conduct changes/redevelop if required based on understanding with PPL.
- (ii) Design and draft CAD (computer-aided design) drawings in accordance with project schedules and deliverables.
- (iii) Work closely with the team lead, transmission and distribution experts to make sure that the design is precise and acceptable to team lead.
- (iv) Accountable for the maintenance of the CAD drawing library.

46. **Power system engineer (3 person-months, national).** The national specialist will have a degree in electrical, power system or other related field and at least 5 years' related experience working in PNG power sector. The national expert will help the international expert on Power Systems on:

- (i) coordinate the activities of team to support team leader in day to day operations, site visits, meetings and liaison with other departments and provincial governments.
- (ii) participate and take lead in data collections, site reconnaissance (route surveys) to collect data/information for design.
- (iii) Assist project team and to PPL on i) design of transmission/distribution line and substation communication matters and ii) demand-side metering matters

- (iv) provide inputs on detailed engineering design and implementation plan including, technical design, drawings, communication plan, cost estimates, BOQ, O &M, future expansion etc
- (v) provide inputs to Power System Specialist on the review of existing studies and plans and to carry out detail design of tranche 1 subprojects
- (vi) undertake other related tasks to assist the consulting team to meet ADB objectives.

VII. REPORTS AND DELIVERABLES.

47. Reports and Deliverables - Phase 1:

- Inception report: Within 21 calendar days of commencement of the services, the consultant will provide an Inception Report confirming or otherwise amending the detailed methodology described in its technical proposal.
- Draft feasibility report: Within 4 months of contract award (include safeguard reports)
- Final feasibility report: Within 6 months of contract award
- Safeguard reports: Within 4 months of contract award
- Draft and final report will include maps of project sites indicating all subprojects under investment program and tranche 1 separately. A power point presentation is required to deliver at minimum 3 stages to stakeholders in Port Moresby at inception stage, fact finding mission and at report submission. All documents and reports would be made available on print and electronic format to client and ADB in editable format. Consultant's key experts will participate in fact finding mission scheduled in July 2018.
- Loan processing support: The consultant will provide prompt support and inputs to ADB team leader during loan processing for the approval of investment program from ADB Board.

48. Reports and Deliverables - Phase 2:

- Draft engineering design report and cost estimate: Within 3 calendar months of submission of final feasibility report, the consultant will provide a draft design report with Master Bid Documents for works and goods.
- Final report, cost estimate and bidding documents: Within 4 calendar months of submission of final feasibility report. The final design report includes draft bidding documents (including provisions covering safeguards requirements and the updated EMP).
- Safeguards documentation: Updated environmental and social safeguards reports shall be provided within 4 calendar months of commencement. This will include: (i) the IEE, reflecting detailed design and final construction options, updated EMP; (ii) based on the cadastral survey results (including identifications of issues or disputes) updated due diligence report (DDR); (iii) strategy for implementing the gender actions; and (iv) updated consultation and communications plan
- Bid evaluation report (BER): Subject to there being no need to seek clarifications from bidders, a draft bid evaluation report will be provided with 21 days of receipt of the bids by the consultant. Otherwise, it is expected that bid clarifications will be dealt with expeditiously.
- Loan processing support: The consultant will provide prompt support and inputs to ADB team leader during loan processing for the approval of investment program from ADB Board.

INITIAL POVERTY AND SOCIAL ANALYSIS

Country:	PNG	Project Title:	PNG: Power Sector Development Investment Program
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Lending/Financing Modality:	Multitranche Financing Facility	Department/ Division:	PARD/PATE
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I. POVERTY IMPACT AND SOCIAL DIMENSIONS

A. Links to the National Poverty Reduction Strategy and Country Partnership Strategy

The program will support the goal of the PNG Development Strategic Plan (PNGDSP) 2010-2030 in creating a long-term investment for power sector and particularly achieving the Government of PNG's 70% electrification target by 2030. The program's expected outcome of having an improved access to clean and reliable power is also in line with delivering the key pillars of the GoPNG Vision 2050, particularly related to (i) human capital development and empowerment; (ii) wealth creation; (iii) institutional development and service delivery; (iv) environmental sustainability and climate change; and (v) community development.

The program supports the Asian Development Bank (ADB)'s Country Partnership Strategy for PNG (2016-2020)²⁴ which aims to support the government to (i) invest in generation expansion and improved transmission and distribution efficiencies on the main power grids; (ii) support investments through PNG Power Limited (PPL) in expansion and rehabilitation of provincial grids, particularly for conversion to least-cost renewable energy systems; (iii) increase access to electricity through expansion of the existing power grids to peri-urban areas and promote innovative models for off-grid power delivery; and (iv) promote private sector delivery of energy sector infrastructure financing.

B. Poverty Targeting

☒ General Intervention ☐ Individual or Household (TI-H) ☐ Geographic (TI-G) ☐ Non-Income MDGs (TI-M1, M2, etc.)

The program is designed to deliver an improved access to clean and reliable power supply and will not have direct poverty reduction focus. However, the program is expected to increase energy access and expand distribution network which will help improve socio-economic conditions of the beneficiaries which may include the poor segment of the society.

C. Poverty and Social Analysis

Key issues and potential beneficiaries. PNG remains confronted with key socio-economic challenges despite increasing national wealth in the past. The country ranks 156 out of 187 countries on Human Development Index. 39.9% of the population in the country are living below the poverty line, prevalence of stunting among children remains high at 49.5% and progress on key health indicators such as maternal mortality rate and communicable diseases remains below the average for middle income countries and is very vulnerable due to lack of access to reliable health facilities particularly in rural areas where 85% of the population live. Agriculture, whether for subsistence and cash is the still the main source of employment of the population with very little employment generated by industry. The 2000 census reported that 2.4 million people were employed out of the total 5.2 million population and out of those employed 10 percent were in the formal wage economy while 67 percent were engaged in subsistence or semi-subsistence employment. This trend continues where the population increase in the country has not been matched by increase in formal employment. The lack of access to electricity exacerbates these socio-economic challenges particularly in the provinces where potential for socio-economic growth is being limited due to lack of reliable and affordable energy supply. The country has approximately only 12% of population with access to electricity and even lower percentage in rural areas with estimated 4% of the population connected to the grid. Only major urban and industrial centers are connected to the transmission grid with the rest of the country mostly underserved.

2. Impact channels and expected systemic changes. The program design particularly of shifting from the use of diesel to more renewable energy at provincial centers, expansion of transmission and distribution network and private sector participation in small to medium-sized renewable energy projects will bring positive impact on affordability of electricity supply which would benefit small businesses and households including low-income families. This is expected to increase income generating activities at the community level and economically empower women who would be able to participate. The program is also expected to provide income opportunities for unskilled labor during construction and maintenance.

²⁴ ADB. 2010. *Country Partnership Strategy: Papua New Guinea, 2016–2020*. Manila.

3. Focus of (and resources allocated in) the PPTA or due diligence. Assessment will be undertaken on social, gender and poverty issues related to the potential benefits and impacts of the project. Design features to be considered during the project preparation will ensure social inclusiveness including how the poor households, women and other vulnerable groups will be given opportunities to benefit from the program.

4. Specific analysis for policy-based lending. N/A

Improving the reliability and increasing access to electricity is expected to address lack of economic opportunities particularly in those unserved areas and will encourage small businesses and household entrepreneurship. It will also help facilitate industries to grow in urban and peri-urban areas and generate employment in the country. Access to social services such community health posts and educational institutions are likely to improve with reliable electricity supply which would also benefit the poor. The program will increase the PPL customer base which includes additional schools and health centers to help deliver this benefit.

II. GENDER AND DEVELOPMENT

What are the key gender issues in the sector/subsector that are likely to be relevant to this project or program? PNG ranks 140 out of 154 countries in the 2015 UNDP Gender Inequality Index placing them at the bottom among the countries in Asia and the Pacific. WHO estimated maternal mortality rate at 230 in 2010.²⁵ The current progress is at risk with declining supervised births in health facilities from 44% in 2012 to 37% in 2013 with huge disparities between urban and rural population. Women also remains at risk from gender-based violence and HIV infection. Improvement in access to health facilities is associated to reliable access to electricity including regular services and storing medicines at community health posts. Women often give birth to poorly lit health posts. Women have lower workforce participation compared to men where men are almost twice as likely as women to have formal wage job in the formal sector – both in urban and rural areas. Women entrepreneurship is an opportunity which can be explored through having a reliable and affordable electricity supply. Women also continue to play the traditional role of housekeeper or economically active women having responsibilities for home and family plus economic activities. Lack of electricity supply makes their home responsibilities even more health hazardous, strenuous and time-consuming such as from collecting fire woods, cooking in smoky kitchen, and collecting drinking water and creeks and streams.

2. Does the proposed project or program have the potential to make a contribution to the promotion of gender equity and/or empowerment of women by providing women's access to and use of opportunities, services, resources, assets, and participation in decision making?

☒ Yes ☐ No Please explain. There is a potential for women to benefit from the project through trainings on renewable energy technologies, operational and financial management and sustainable business models; trainings on livelihood generation which will include women targets; priorities given to women-headed households to be connected to reliable electricity supply; and their active participation and involvement during project preparation and implementation either through employment during construction or providing inputs to the design. A gender action plan will be prepared for Tranche 1.

3. Could the proposed project have an adverse impact on women and/or girls or widen gender inequality?

☒ Yes ☐ No Please explain

4. Indicate the intended gender mainstreaming category:

☐ GEN (gender equity) ☒ EGM (effective gender mainstreaming)
☐ SGE (some gender elements) ☐ NGE (no gender elements)

III. PARTICIPATION AND EMPOWERMENT

1. Who are the main stakeholders of the project, including beneficiaries and negatively affected people? Identify how they will participate in the project design.

The main stakeholders of the program include government agencies, energy customers and potential users in urban centers and sites for distribution expansion including businesses, entrepreneurs and households.

2. How can the project contribute (in a systemic way) to engaging and empowering stakeholders and beneficiaries, particularly, the poor, vulnerable and excluded groups? What issues in the project design require participation of the poor and excluded?

Stakeholder analysis will be undertaken to identify important stakeholders and their concerns, roles and influence in the project. Public meetings and focus group discussions will be utilized to communicate and consult with stakeholders, particularly potential electricity users and vulnerable groups, to get their views and suggestions on the proposed program and how its benefits to them could be maximized.

²⁵ ADB. 2013. Basic 2013 Statistics. Manila

3. What are the key, active, and relevant civil society organizations in the project area? What is the level of civil society organization participation in the project design?

☒ Information generation and sharing (H) ☒ Consultation (M) ☐ Collaboration ☐ Partnership

4. Are there issues during project design for which participation of the poor and excluded is important? What are they and how shall they be addressed? ☒ Yes ☐ No

Surrounding communities including vulnerable groups will be consulted to identify any adverse social impacts which should be mitigated by the project during project implementation and operation.

2. SOCIAL SAFEGUARDS

A. Involuntary Resettlement Category ☐ A ☒ B ☐ C ☐ FI

1. Does the project have the potential to involve involuntary land acquisition resulting in physical and economic displacement? ☒ Yes ☐ No Tranche 1 is proposed as Category B. The project will utilize existing facilities and government-owned/leased land as much as possible. However, it is likely that some assets will be affected and/or additional land acquisition will be required for expanding distribution network, installation of transmission line, and building renewable energy in provincial centers and other associated civil works. This will be confirmed by the PPTA.

2. What action plan is required to address involuntary resettlement as part of the PPTA or due diligence process?

☒ Resettlement plan ☒ Resettlement framework ☐ Social impact matrix
☐ Environmental and social management system arrangement ☐ None

B. Indigenous Peoples Category ☐ A ☐ B ☒ C ☐ FI

Tranche 1 is proposed as Category C. It is not anticipated to adversely impact Indigenous Peoples defined as distinct and vulnerable as per ADB SPS. Overwhelming majority of the population are tribal peoples belonging to Melanesian group which comprised almost the entire population. A social impact assessment will be undertaken during PPTA to further confirm.

1. Does the proposed project have the potential to directly or indirectly affect the dignity, human rights, livelihood systems, or culture of indigenous peoples? ☐ Yes ☒ No

2. Does it affect the territories or natural and cultural resources indigenous peoples own, use, occupy, or claim, as their ancestral domain? ☐ Yes ☒ No

3. Will the project require broad community support of affected indigenous communities? ☐ Yes ☒ No

4. What action plan is required to address risks to indigenous peoples as part of the PPTA or due diligence process? An indigenous peoples planning framework will be prepared as a requirement of an MFF.

☐ Indigenous peoples plan ☒ Indigenous peoples planning framework ☐ Social Impact matrix
☐ Environmental and social management system arrangement ☐ None

3. OTHER SOCIAL ISSUES AND RISKS

1. What other social issues and risks should be considered in the project design?

☐ Creating decent jobs and employment ☒ Adhering to core labor standards (L) ☐ Labor retrenchment
☒ Spread of communicable diseases, including HIV/AIDS (L) ☐ Increase in human trafficking ☐ Affordability
☐ Increase in unplanned migration ☐ Increase in vulnerability to natural disasters ☐ Creating political instability
☐ Creating internal social conflicts ☐ Others, please specify _____

2. How are these additional social issues and risks going to be addressed in the project design? The implementing agency will ensure that the contractor to be engaged will adhere to core labor standards and take the appropriate measures to prevent the spread of communicable diseases and HIV/AIDs through trainings among the workers and surrounding communities.

VI. PPTA OR DUE DILIGENCE RESOURCE REQUIREMENT

1. Do the terms of reference for the PPTA (or other due diligence) contain key information needed to be gathered during PPTA or due diligence process to better analyze (i) poverty and social impact; (ii) gender impact, (iii) participation dimensions; (iv) social safeguards; and (v) other social risks. Are the relevant specialists identified?

☒ Yes ☐ No

2. What resources (e.g., consultants, survey budget, and workshop) are allocated for conducting poverty, social and/or gender analysis, and participation plan during the PPTA or due diligence? A Social Development Specialist will be required for 3 person-months.

COMPARISON OF FINANCING MODALITY

Issues	Comparison		Remarks
	Multi-tranche Financing Facility	Other Financing Modalities	
1. Sustainability in reform agenda	The MFF provides basis to ADB to continue dialogue with the government on provision of subsequent financial resources based on specific conditions and undertakings are met.	No subsequent tranches in project	The MFF modality is preferred. The three tranches planned are based on sequenced activities, disbursement progress, and covenants other specific requirements being met.
2. Predicable financing to support sector road map	The MFF allows both the client and ADB to establish a long-term partnership in achieving its sector road map. Tranche wise approach will help to plan and prioritize investments on a long-term basis to ensure commitment and continuity in implementation. Under proposed MFF, each of the tranche will be designed to complement each other activities to ensure sustainable operations of the activities carried out under previous tranche.	The possible size of a project loan is significantly less than the investments required in sector.	MFF modality is preferred
3. Long term engagement with sector to develop institutional capacity and coordination among stakeholders.	The MFF will not only allows ADB to provide sustainable policy support and institutional capacity development but also provide sufficient time to implement and monitor for its sustainable operations. MFF also provides a platform for ongoing dialogue and support for sector reforms and support for sustainable operations of activities completed under TA on institutional capacity building.	Potential support provided by a project loan is limited to the size and term of the loan. The non-physical interventions under a stand-alone project may not allow for the capacity building efforts to be fully institutionalized especially in PNG where the current capacity of institutions is already very low	The MFF modality is preferred. The long-term implementation period of the MFF supports needed institutional strengthening and capacity building

4. Operational flexibility, operational cost and financial charges	The MFF allows for more opportunity to review and adjust the design of implementation arrangements in next tranches. Additionally, innovations may be applied to subsequent tranches. The MFF modality reduces the time and monetary transactions costs more than a stand-alone project,	Other instruments do not offer the same degree of flexibility as the MFF.	The MFF modality is preferred. Flexibility is needed for long term sector interventions and development, especially in the coordination of other development partner programs, which may also be long term in nature, such as that of the Government of Australia.
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ADB = Asian Development Bank, COBP = country operations business plan, CPS = country partnership strategy, PPL = PNG Power, GoPNG = Government of Papua New Guinea, MFF = multi-tranche financing facility, Source: Asian Development Bank.

PNG: ENERGY SECTOR ASSESSMENT

I.SECTOR CONTEXT AND STRATEGIC ISSUES

A. Sector Context

1. Papua New Guinea (PNG) is a vast country with a population of over 8 million people. It is estimated that less than 12% of the total population has electricity access. Electricity access in rural areas is estimated to be under 4%. The mining industry, which is one of the main drivers of PNG's economy, largely depends on captive power stations for their operations. Lack of funding for upgrading and rehabilitation and even for routine maintenance is leading to a further deterioration in services, while the anticipated rise in demand due to economic growth and an increasing population will further stress the system if large-scale investments are not made to develop the electricity system.

2. Electricity generation capacity in PNG is about 300 megawatts (MW) managed by PNG Power Limited (PPL), the only utility in country. Hydropower accounts for about half of the electricity generated and diesel for a third, with the rest generated from gas and geothermal energy plants, which are principally used in the mines. Private sector mines have installed an additional 250–280 MW of capacity for their operations. The following grid systems are operated by PPL:

12. Port Moresby System, which serves the capital city and other parts of the Central Province, is supplied from the 68 MW Rouna hydropower station, 50 MW thermal power stations and 94 MW Gas based power.
13. Ramu system, which serves the economic and industrial load centers in the Momase Region and the Highlands, and is supplied through the 75 MW Ramu hydropower station, a 12 MW hydropower station in the Western Highlands Province, and 10 MW hydropower based Independent Power Provider (IPP).
14. Gazelle Peninsula system, which is supplied through a 10 MW hydropower station and about 9 MW of diesel based power plants.
15. Provincial Grids. Parts of the country not covered by the main utility grid are powered by mini-grids (19 in total), which are predominantly powered by diesel.

3. **Growth Forecast.** A recent IFC draft study indicates that the demand in Port Moresby grid is expected to grow at a rate of 4.5% and forecasted to be 220MW in 2030. Ramu Grid growth is forecasted at 4% which will increase from 80MW to 310MW in 2030. The Gazelle grid expected to grow at 2.5% which may end up from 10MW in 2017 to about 15 MW in 2030. This all summarizes as total peak load by 2030 would be approx. 550-600MW. However, demand growth in PNG is highly uncertain and depends on (i) economic growth, which is difficult to predict as demand is directly proportional to economic activity in country, (ii) future grid extensions, considering a large percentage of the population is still without electricity, and (iii) large mines load especially in Ramu Grid, both existing and under consideration that may connect to the grid in the future, e.g. a single mine connecting to PPL's grid could potentially double load on the system.

B. Energy Sector Institutions

4. The key institutions that govern the operations of the power sector include:

- (i) **Department of Petroleum and Energy (DPE):** DPE is responsible for energy sector policy and planning. It also heads the Electricity Management Committee (EMC).
- (ii) **Kumul Consolidated Holdings (KCH):** KCH is a holding company with ownership in state-owned enterprises, including PPL. It also takes the lead in developing the large generation assets such as the proposed Ramu 2 (150MW) Hydropower Plant.
- (iii) **Independent Consumer and Competition Commission (ICCC):** ICCC is the sector regulator for electricity tariffs and issuing of generation and distribution licenses.
- (iv) **PNG Power Limited.** PPL is the only state-owned, vertically integrated electricity utility that provides generation, transmission, distribution, and retail services

C. Development Partner Activities

5. ADB currently has the largest energy portfolio. WB is continuing efforts to expand their portfolio in the sector. NZ has a number of smaller grant projects and JICA is focusing support to the Ramu grid. A summary of current and planned development partner assistance in the sector is presented below:

Project	Outline	Status
Asian Development Bank		
1. Town Electrification Investment Program Tranche 1	2 hydropower plants, one transmission interconnection	Implementation ongoing
2. Port Moresby Grid Development Project	Upgrades to the POM grid and rehab. of Rouna Hydropower cascade	Implementation ongoing
3. Town Electrification Investment Program Tranche 2	Upgrade of hydropower assets	Waiting for NEC approval
4. Solar Power Independent Power Provider (IPP) for Provincial Grids	Private Sector Development Initiative (PSDI) led	Design underway
5. National Distribution Grid Development Plan	Implementation plan showing prioritization of physical assets.	Completed 2016
6. Power Sector Development Program	Proposed \$800 million programmatic approach proposed (see below/MOU)	2017 PPTA, 2018 project
World Bank		
1. Nauro Brown Hydropower, Port Moresby Grid – 80MW	Technical support for safeguards and geotechnical assessments	Support ongoing
2. National Electrification Roll Out Plan (NEROP)	National plan for achieving the 70% access target by 2030	Draft Report with NEC for consideration
3. Proposed investment in distribution and PPL reform	Proposed \$150 million investment	Treasury reportedly declined the proposal
4. National Power Sector Development Plan	Proposed sector plan to support DPE	Proposed. Partial funding Australia
New Zealand		
1. Zak Valley Hydropower	1MW hydropower plant to be connected back to main grid	Tendering ongoing
2. Port Moresby Grid extensions	Distribution extensions to 2,500 households	Construction ongoing
3. East Sepik mini-grid trials	Trial for private sector mini-grid model	Design ongoing
4. Energy Access project	Proposed NZ\$50 million 5 year investment for energy access	Design ongoing

Japan International Cooperation Agency (JICA)		
1. Ramu Grid Master Development Plan		Completed
2. Ramu Grid Transmission Investment	Investment to strengthen Ramu grid transmission grid.	Proposed - under discussion

D. Alternative Delivery Models

6. The majority of ADB's sector support is currently through PPL. An analysis of alternative delivery models to PPL was undertaken and is presented below:

Entity	Comment
Mining Companies	Some mining companies supply power to adjacent communities as part of a community engagement approach. Limited scope for partnership with ADB.
Telecommunication companies	Companies such as Digicel have renewable energy generation assets for supply of communication towers. In some instances they provide excess electricity to surrounding communities. Limited scope for partnership with ADB.
Oilsearch	Oilsearch is active in power generation and is interested in grid expansion. Oilsearch are both a prospective client for PSOD and a potential delivery partner for ADB projects.
Rural Communities	In some instances, communities in PNG have formed small cooperatives to operate and maintain small power generation facilities. Limited scope for partnership with ADB.
Provincial Governments	Provincial Governments have significant interest and funding available to develop power generation assets. However, they lack capacity. There are significant opportunities to support PPP's to catalyze provincial Governments investments.
Church groups	In some cases Church based organizations operate small generation facilities and provide spare power to neighboring communities. Limited scope for partnership with ADB.
Rural Energy Company	The Electricity Industry Policy envisages an organization to support off-grid electrification. There is a opportunity for a Government owned rural energy company to upscale rural electrification and a viable partner for ADB.
Private Sector	There are significant opportunities to encourage private sector to investment in generation assets connected to the main grid, however interest by the private sector in investment in off-grid solutions is uncertain. There are significant opportunities for ADB to support private sector.

E. Core Sector Issues

7. The following core issues are observed in power sector performance in PNG:

(i) **Lack of clear sector planning documents.**

a. Within PPL's regulatory boundary. PPL's 15 year Power Development Plan, provides investment priorities to supply projected increases in demand on PPL grids. In addition, there are a number of smaller specific grid development plans. However, there is political interference in selection of new generation assets which can override least-cost planning decisions.

b. Outside PPL's regulatory boundary – off-grid. The draft National Electrification Roll-out Plan (NEROP) provides investment targets and proposed modalities for areas outside PPL's regulatory boundaries, in particular to meet the 70% access target by 2030. The National Grid Development Plan details priority extensions.

c. Outside PPL's regulatory boundary – on-grid. There is a lack of centralized planning document which specifies least cost prioritization of large scale investments in generation, transmission and distribution outside PPL's regulatory boundary. Numerous planning documents have been prepared, however in the absence of a strong centralized agency and coordination, they have not been followed.

(ii) **Financing gap – renewable energy:** Due to large scale investment required, the Government is unable to finance the structural conversion to renewable energy generation using sovereign debt. The Government is therefore promoting private sector investment in large scale power generation, however there are significant barriers.

(iii) **Financing gap – energy access:** There are 3 levels for improving energy access: (i) transmission/distribution expansion; (ii) mini-grids; and (iii) household solar solutions. The Government is proposing sovereign financing for the transmission/distribution expansion through PPL and private sector financing for the mini-grid and household solutions to fill the financing gap.

(iv) **Lack of institutional capacity within DPE:** There is a lack of organizational, financial and technical capacity within DPE, resulting in reduced ability to implement and oversee energy policies and provide leadership in the sector.

(v) **Governance issues within PPL.** PPL has recently suffered from several changes of management and a resultant loss of technical and managerial capacity. There has been ongoing political influence in: (i) appointment of PPL management and board; and (ii) tariff adjustments.

(vi) **Lack of Government subsidy for non-financially viable investments.** PPL is a corporatized power utility and is required to only undertake financially viable investments according to its regulatory contract. High cost centers (e.g. diesel based provincial grids) are intentionally cross-subsidized by the low cost centers (hydropower and gas generation based main grids) through the national uniform tariff. This is common practice in the Pacific and elsewhere and ADB has previously supported this approach. However, this provides a disincentive for PPL to extend the grid in high cost centers where they are unable to charge cost of delivery (i.e. PPL loses money for every new customer they connect). This is usually managed by allocation of community service obligation (CSO) funding by the Government for new extensions. This can be financed by: (i) a direct subsidy for a specific infrastructure development (financed off budget); or (ii) targets can be put into the regulatory contract (financed by the tariff). Government has been reluctant to allocate CSO to PPL for these purposes or to include asset investment targets into the regulatory contract.

II. SECTOR STRATEGY

A. Current Sector Strategy

8. The current sector strategy, as outlined in the CSP, includes the following:
- (i) **Port Moresby Grid.** Support investments on the main grids to underpin economic development in growing urban centers. This is currently being implemented through: (i) Port Moresby Power Grid Development Project (\$83 million), and (ii) Rouna Hydropower cascade management plan.
 - (ii) **Provincial Grids.** Support renewable energy investments in the provincial grids to reduce cost of generation. This is currently being implemented through the Town Electrification Investment Program (\$150 million multitranche financing facility).
 - (iii) **Rural electrification.** Increase energy access through grid extensions associated with investment projects. This is being implemented through grant allocations to existing projects and standalone grant projects.
 - (iv) **Private sector.** Extend support through PSDI for improved business laws, improved efficiencies for PPL, and support for PPP's.

B. Proposed Sector Strategy

9. In order to maintain ADB's lead in the energy sector, the following shift in sector strategy is proposed:

- (i) Move from a project based portfolio to a programmatic approach to provide a 10-year vision to Government for the energy sector.
- (ii) Increase support for private sector and Public Private Partnership (PPP) investments.
- (iii) Expand support into off-grid electrification.
- (iv) Scale up of public financing for transmission and distribution expansion.
- (v) Scale up support for institutional capacity building.

C. Proposed Power Sector Development Program

10. Following guidance from key Government agencies, a 10 year Multi-tranche Finance Facility (MFF) is proposed with loan and grant financing by the Asian Development Bank (ADB), Green Climate Fund and other development partners. The key implementing agencies will be DPE, PPL and private sector. The outputs will include:

- (i) **Output 1: Increased Private Sector Investment.** Output 1 will:
 - a) mobilize private sector investment in rural electrification by development of a renewable energy financing company which will support DPE in promoting off-grid and mini-grid solutions,


- b) provide transaction services for medium to large scale investments (where required), and
 - c) identify and facilitate small/medium projects, including provincial Government level Public Private Partnerships (PPPs).
- (ii) **Output 2:** Expansion of transmission networks. Output 2 will include support for transmission lines extensions to (i) connect large loads to existing grids, (ii) interconnect provincial centers, and (iii) connect high density rural populations located along economic growth corridors.
 - (iii) **Output 3:** Expansion of distribution network. Output 3 will include construction of distribution lines from existing grids and newly constructed transmission lines to peri-urban and rural communities. The expanded distribution network will support economic growth and improved livelihoods.
 - (iv) **Output 4:** Increased renewable energy for provincial grids. Output 4 will include conversion of diesel generation to renewable energy to reduce cost of generation in provincial centers, and increase capacity to supply the increased load from expanded transmission and distribution networks.
 - (v) **Output 5:** Institutional support for implementing agencies. Output 5 will consist of capacity development support for DPE and PPL.

D. Addressing Sector Issues

11. The above revised strategy and programmatic approach addresses the identified sector issues in the following ways:

Risk/Issue	Approach
1. Lack of clear sector implantation planning documents.	The program will provide financing to implement documents such as NEROP and the National Distribution Expansion Plan in a clear and transparent manner.
2. Financing gap – renewable energy.	The program will support private sector investment in medium to large scale power generation.
3. Financing gap – energy access.	The program will support (i) upscaling of sovereign financing for transmission and distribution expansion, (ii) support for DPE through the Renewable Energy Financing Company to upscale private sector investment in mini-grids, household solar solutions etc.
4. Lack of institutional capacity within DPE.	The program will provide institutional support to DPE.
5. Governance issues within PPL.	The program will engage with KCH and PPL to assess options for institutional strengthening.
6. Lack of Government subsidy for non-financially viable activities.	The program will assist with sovereign financing for non-financially viable activities through PPL.

PROJECT PROCUREMENT CLASSIFICATION
Power Sector Development Investment Program

Characteristic	Assessor's Rating:
Is the procurement environment risk for this project assessed to be <i>high</i> based on the country and sector and/or agency risk assessments?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are multiple (typically more than three) and/or diverse executing agencies and/or implementing agencies envisaged during project implementation? Do they lack prior experience in implementation under an ADB-financed project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
Are multiple contract packages and/or complex and high-value contracts (compared with recent externally financed projects in the developing member country [DMC]) expected?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
Does the project plan to use innovative contracts (public-private partnership, performance-based, design and build, operation and maintenance, etc.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
Are contracts distributed in more than three geographical locations?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Are there significant ongoing contractual and/or procurement issues under ADB (or other externally) financed projects? Has misprocurement been declared in the DMC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown (No misprocurement and procurement issues in PPL)
Does the DMC have prolonged procurement lead times, experience implementation delays, or otherwise consistently fail to meet procurement time frames?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Do executing and/or implementing agencies lack capacity to manage new and ongoing procurement? Have executing and/or implementing agencies requested ADB for procurement support under previous projects?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown
Regional department's overall recommendation (Hussain Haider)	
Overall project categorization recommended	<input type="checkbox"/> Category A <input checked="" type="checkbox"/> Category B
Procurement of civil works contractors, goods and recruitment of consultants for construction supervision will be conducted by the PPL. They are familiar with ADB Procurement Guidelines and Guidelines on the Use of Consultants. PPL is already implementing two ADB-funded projects including one MFF and have experience and capacity to manage ADB procurement.	
OSFMD's recommendation (Eric Gagnon, Principal Procurement Specialist, OSFMD)	
 18.07.2017	