Project Information Document/
Integrated Safeguards Data Sheet (PID/ISDS)

Concept Stage | Date Prepared/Updated: 15-Jan-2019 | Report No: PIDISDSC25272
**BASIC INFORMATION**

### A. Basic Project Data

<table>
<thead>
<tr>
<th>Country</th>
<th>Project ID</th>
<th>Parent Project ID (if any)</th>
<th>Project Name</th>
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<tr>
<td>Papua New Guinea</td>
<td>P167820</td>
<td></td>
<td>Energy Utility Performance and Reliability Improvement Project (P167820)</td>
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<td>Nov 29, 2019</td>
<td>Energy &amp; Extractives</td>
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<tr>
<th>Financing Instrument</th>
<th>Borrower(s)</th>
<th>Implementing Agency</th>
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<tr>
<td>Investment Project Financing</td>
<td>Department of Treasury</td>
<td>PNG Power Limited (PPL)</td>
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**Proposed Development Objective(s)**

To improve the operational performance of the Borrower's national electricity utility and improve the reliability of electricity supply in the project area

### PROJECT FINANCING DATA (US$, Millions)

#### SUMMARY

<table>
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<td>of which IBRD/IDA</td>
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#### DETAILS

**World Bank Group Financing**

| International Bank for Reconstruction and Development (IBRD) | 30.00 |

**Environmental Assessment Category**

A - Full Assessment

**Concept Review Decision**

Track II-The review did authorize the preparation to continue
B. Introduction and Context

Country Context

1. Papua New Guinea (PNG) is a lower-middle income country with a per capita GDP in 2015 of US$ 2,745, and arguably one of the most culturally and geographically diverse resource rich countries in the world. Its vast and varied geography includes mountains, tropical forests, grasslands, rivers, deltas, islands, and atolls. It has a wide variety of natural resources including petroleum and mineral deposits such as gold, copper, and nickel, as well as other non-mineral renewable resources such as fisheries, forests, and agricultural products such as coffee, cocoa, and palm oil. PNG ranks 32nd in subsoil wealth per capita globally. For energy, PNG has abundant hydropower potential in excess of 15,000MW and also solar power, natural gas, geothermal and other resources. With a population of around 7.5 million and 848 languages, it is also one of the world’s most culturally diverse nations.

2. While extractive industries have been the main driver of growth, there is a distinct dichotomy in the economy with the large majority of the population living in rural communities with limited access to public services. Extractives continue to account for an increasing share of exports and output. Natural resources, in 2015, were estimated to account for 47 percent of GDP. This represents an increase over 2013 of 7 percent. The increase in the contribution of natural resources to GDP and revenue receipts is due to the production and export of liquefied natural gas (LNG) in 2014. Completion of the US$19 billion ExxonMobil LNG project has changed the structure of the economy. Mining and petroleum now comprise 24 percent of GDP almost the same as all other primary sectors combined. However, while mining and petroleum sectors were estimated to account for closer to a quarter of GDP and 75 percent of exports in 2015, these sectors only account for around 7 percent of total employment. In contrast, 87 percent Papua New Guineans live in rural communities, engaging in traditional subsistence and semi-subistence agriculture in the informal sector. Access to public services in these rural communities, including access to electricity, is extremely limited.

3. PNG has one of the fastest growing populations in the world, at approximately 3.1 percent per year, with most regions facing increasing population pressures. The current high birth and survival rates signal a wide based demographic pyramid, such that a longer term ‘youth bulge’ is set to impact education and employment opportunities over future decades. About 40 percent of PNG’s population is under 15 years of age yet entry into the formal labor market is less than 10,000 young people every year. Unable to find formal work or enter into further study, many school leavers have little choice but to join the informal economy. With economic development focused primarily on urban areas and a dearth

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1 World Bank, World Development Indicators, July 2015.
2 In May 2014, the first LNG exports were shipped from a massive project, led by ExxonMobil of the US, in the Western and Southern Highlands provinces.
of gainful employment opportunities in rural areas, young people are gravitating towards urban centers in pursuit of better jobs and higher standards of living. Opportunities are limited there too, where young people constitute a disproportionate share of the urban poor.

4. **Increasing urbanization is contributing to a range of problems threatening social cohesion, consequently undermining the potential for inclusive growth.** In Port Moresby, about 40 percent of the population lives in settlements, 80 percent of which are unplanned. The lack of well-functioning inclusive institutions in the urban centers and lack of formal access to land, has contributed to the exclusion of the informal settlements with respect to basic delivery of public services, including electrification, and economic opportunities.

5. **The prevalence of extreme poverty in PNG is high, and access to services is weak.** According to the latest survey in 2010, the poverty rate is around 39 percent. Life in the rural villages where over 80 percent of the population live has changed little since independence in 1975. Less than 20 percent of households have access to electricity, three quarters of the country’s road network becomes impassable at some point during the year, 60 percent of households lack access to safe drinking water, and 80 percent lack access to improved sanitation. This in part reflects the high costs of building infrastructure and delivering services to communities spread across Papua New Guinea’s rugged inland terrain and dispersed island populations.

6. **Low capacity and weak governance may be hampering the ability of PNG’s institutions to deliver public services for its population.** PNG’s Country Policy and Institutional Assessment (CPIA) score (a measure of a country’s institutional strength) in 2016 is 3.0, which is below the average for International Development Assistance (IDA) countries (3.30). PNG, according to the World Governance Indicator (WGI), when compared to its peers across all measures of governance performs poorly at 28th percentile across the world and below 5 out of the 10 comparator countries. This is a clear indication of the poor quality of state institutions in the country and suggests limited institutional capacity in PNG to formulate and effectively implement policies for sustainable and inclusive development.

7. **Gender disparity, across a number of dimensions, is widespread.** There are gender gaps in education, health, and nutrition influenced both by gender-biased household actions and service delivery failures. Girls and women do not enjoy the same level of literacy, school participation and health care. PNG’s very high level of maternal mortality is another clear indication of significant gender disparity and inequity. Women suffer from weak voice and agency, are under-represented in the formal workforce and in political decision-making, and suffer from high rates of gender-based violence (GBV). In particular, GBV is widespread and globally there is evidence to suggest an increased risk of HIV/AIDS among victims of gender based violence. Several legal constraints on women’s employment persist. While Papua New Guinea has made strides to protect women from discrimination in the workplace, it performs in the bottom 25% of economies in the getting a job indicator. Most notably, Papua New Guinea is one of only seven economies in the world that does not legally establish any form of paid maternity leave. Finally, PNG has also been identified as one of the countries that legally restrict women from doing certain jobs solely because of their gender, with some restrictions specifically applying to the energy sector.\(^6\)

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\(^5\) Countries such as Ghana, Mongolia, Zambia, Lao PDR and Bolivia all perform better than PNG, while Mauritania, Nigeria, the Republic of Congo and Uzbekistan perform more poorly.

\(^6\) Women, Business and the Law also identifies Papua New Guinea as one of 104 economies globally that legally restrict women from doing certain jobs solely because of their gender. Specifically, sections 98 and 99 of the Employment Act of 1978 prohibit all women—including women who are
8. **Improving the accessibility, price, and reliability of electricity in PNG will remain key to achieving the Twin Goals in PNG.** Improved electrification acts as a development multiplier – reducing poverty and boosting shared prosperity by improving service delivery and reducing the cost of doing business.

### Sectoral and Institutional Context

**B.1 – General context**

9. **Institutional setup of the power sector in PNG.** The Government of PNG (GoPNG) has established two key ministries and an independent regulator to administrate the power sector. Policy formulation and approval of all major electricity investments for the power sector is managed by the Ministry of Information and Communication Technology and Energy through its Energy Division, formerly seated in the Department of Petroleum and Energy (ED-DPE). The Independent Consumer & Competition Commission (ICCC) is the principal economic regulator and consumer watchdog, including for the power sector. The Ministry of Public Enterprises and State Investment manages Kumul Consolidated Holdings Limited (KCHL) which is the delegated owner of all state-owned Entities/Enterprises (SOEs) for and on behalf of the state, including PPL. From an operational point of view, PNG Power Limited (PPL), the electricity utility, is a State-Owned Entity (SOE) and is licensed under the Electricity Industry Act to generate, transmit, distribute and sell electricity in PNG and it also has exclusive right to supply small customers (<10 MW load) within 10 km of its network throughout PNG.

10. **The current electricity network consists of several separate grids, with limited capacity and reach, and quality of service is low.** Electricity services provided by the national electricity utility PPL to its customers have at present poor quality and reliability, and average retail tariffs are very high (US$ 0.30/kWh), reflecting high costs of service delivery. PNG has about 580 megawatts (MW) of installed generation capacity, including hydropower (230 MW, or 39.7%), diesel (217 MW, or 37.4%), gas fired (82 MW, or 14.1%), and geothermal (53 MW, or 9.1%). PPL manages about 300 MW capacity and IPPs manage 280 MW. The 300 MW managed by PPL include two main grids located in Port Moresby, and in the Lae-Madang-Highlands area (the Ramu grid). In addition, 26 other smaller urban centers are serviced through 19 independent power systems. These independent provincial electricity grids are clustered around the regional population centers and isolated due to the rugged terrain of the country and long distances between centers making interconnectivity uneconomic. PPL has entered into power purchase agreements with a number of IPPs to supply PPL grids. Investment decisions have been ad-hoc and not based on long-term, least-cost planning. Because of the unreliability of the power supply, there is considerable expensive and inefficient self-generation and back-up generation capacity in the urban areas. The network suffers from frequent power cuts, disrupting people's lives and businesses. The utility has also been unable to respond to the growing loads in demand on the main power grids (the Port Moresby and Ramu grids). Large industrial users, particularly mining sites, also operate off-grid self-generation. All these point to the need for better planning in the sector and the need for investment in generation and network capacities.

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not pregnant nor nursing—from employment in heavy labor, working in underground mines and working at night in industrial undertakings.

"Industrial undertakings" is a legal term defined in section 1 of the Act to include industries such as mining, manufacturing, construction, transport, energy and water.

7 It regulates the licensing, industrial codes, tariff and service standards, and oversees the competition.

8 It was established with the power and responsibilities to plan, develop, generate, transmit, distribute and sell electricity throughout PNG.
11. **Despite having large energy resources, PNG suffers from low access to electricity, which limits opportunities for growth.** PNG is in a unique position with a significant endowment in hydropower, natural gas and geothermal resources. However, these resources are underutilized; at present the country has one of the lowest per capita consumption of electricity in the world, and it is estimated that only about 20% of the population has access to grid and off-grid electricity, concentrated around the main urban centers with very limited access in rural areas. Access to reliable and affordable electricity significantly improves people’s lives and enables economic growth. Beyond electrification, the development of mining and other energy-intensive sectors, has been constrained by the lack of reliable power supply. While achieving these goals is urgent, some of the building blocks required for such program are missing, notably the supply of sufficient, reliable and affordable power, and implementation capacity by sector institutions.

12. **The Government of PNG has set the ambitious goal of reaching 70% access to electricity by 2030 and becoming fully carbon neutral by 2050.** With Bank support, the government has embarked on an exercise to prepare a National Electrification Rollout Plan (NEROP) for the country, and concluded the geospatial modelling, to understand how best to approach electrification in an efficient and cost-effective manner. Significant financial resources will be needed to reach these targets: the total cost of achieving electrification to 70% of PNG households is likely to cost around US$1.8 billion. This work also concluded that delivering on the Government’s electrification goal will require an increase in generation capacity by about 300 MW by 2030.

B.2 – Planning

13. **Achieving the Government’s goals on access to electricity service will require implementation of systematic least cost planning to expand infrastructure in all segments of the electricity supply chain, strategically leveraging PNG’s natural resources.** Weak enforcement of sector planning over recent years and poor governance arrangements for the identification and implementation of new generation projects, combined with PPL’s operational inefficiencies, have translated into high current costs of service delivery. Identification and timely competitive implementation of optimum investments in new generation, transmission, and distribution facilities by PPL and other parties will address security of supply in the context of growing demand at the lowest cost available to the country, thereby bringing affordable electricity service within reach for more and more consumers.

14. **A recent exercise was carried out to assist PPL identify the least cost options for power generation and transmission, and in particular the potential role and opportunities of domestic gas-fired power, hydropower, and other renewable energy.** The results of the least cost options analysis show that while in the long-term hydro and other renewables generation will be key to meet the government’s access goals and future demand, gas generation can play an important role as a transition in replacing liquid fuels, lowering power costs and supporting grid expansion (see Figure 1), taking advantage of new gas field and infrastructure developments. In the short term, rehabilitation of existing hydropower to restore generation capacity is a key priority. Equally important is that identified projects are actually implemented at least cost for the country through competitive procurement processes, either directly by the utilities (PPL or others to be established), or by new entities such as Independent Power Producers (IPPs), Special-Purpose Companies (SPCs), or others. Systematic and coordinated oversight of project selection and adherence to well-prepared competitive

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9 For example, less than 250MW of hydropower potential has been harnessed against the potential for more than 15,000 mentioned above.
10 Electricity Industry Policy (EIP) of 2011, Development Strategic Plans (DSP 2010-2030) and Vision 2050
11 An increase of almost 50% of the current installed capacity of 580 MW.
bidding processes will be the essential requirement to lower supply costs and consumer tariffs, to drive sustained economic growth in industrial, commercial and residential sectors.

Figure 1: Indicative least cost power generation for 2018-2030

15. A particular opportunity to underpin power sector development is to harness mining loads which are primarily served by captive generation. Their requirement for reliable long-term supply and ability to pay could help to underwrite new investment in generation, transmission and distribution assets in a variety of grid-based or off-grid solutions. Incorporating projections of mining loads from existing and planned mines is an important aspect of planning, while recognizing that some of these loads are uncertain. There are ongoing discussions with specific mining companies who could become off-takers for gas-to-power projects (or other) and thereby enable generation investments that could benefit the country as a whole, and electrification goals in particular.

B.3 – PPL performance

16. To achieve the sustainable development of the power sector in PNG (including Government’s goal on access), it will be necessary to ensure that PPL is able to efficiently provide good quality services to all its customers in a sustainable manner. To complement systematic least cost planning and implementation of new investments to expand sector infrastructure, it is necessary to adopt specific actions aimed at improving the operational and financial performance of PPL. Given the geography and settlement patterns of PNG’s population, it is estimated that grid electrification is the least-cost option for providing access to approximately 75% of the nation’s future population; while off-grid systems are recommended for the other 25%12. PPL’s operational and financial viability are key to enable private investments in new generation projects under the IPP scheme, as the company will be the off-taker in power purchase agreements with those investors. Even in cases where major clients (such as mines) can act as the main guarantor of the PPA, PPL will still likely be responsible for transmission investments.

12 NEROP concluded that currently, about 12-13% of households in PNG are connected to the grid. An additional 6% could be easily connected, as they are within 1 km of existing transformers, representing the lowest hanging fruit for expanding grid-access in the country. Others are more distant, but grid-connection would still represent the best technical option for up to 75% of the country’s population.
17. **Improvements needed to PPL’s financial and operational performance.** Currently, PPL is in financial distress. Its costs are high, starting with the costs of generation, losses are high and collection rate is low, resulting in a very poor financial situation. Effectiveness in billing and collection are issues under the company’s control and must be addressed as a matter of urgency.

18. **Reliability of electricity supply is low and is affected by several factors.** Under the current circumstances, PPL is financially unable to carry out any of the investments required to improve the operating condition of the existing plants and networks and build new infrastructure to meet increasing demand, therefore compromising reliability of existing service and the ability to connect new consumers. Poor planning and long-term underinvestment has created several constraints. Current available generation capacity is insufficient to supply demand with adequate level of reliability. Overloaded network infrastructure in poor operating condition derive in high losses and bad quality of electricity supply to customers. Issues of reliability of supply in the Ramu grid are of particular concern, given that several large customers (including mines) providing a significant share of PPL’s revenues are connected to this system.

19. **A high level assessment of the utility was recently conducted to identify the main areas to be addressed to improve utility performance, through implementation of a Performance Improvement Plan (PIP).** The high-level assessment of current operational and financial performance of the national electricity utility PPL highlights significant challenges currently faced by the company, but also identifies the main topics to be addressed and concrete actions under PPL’s control to be implemented to improve its performance. Several proposed actions can be implemented in the short to medium term (less than 3 years), which are expected to have significant positive impact on the company’s performance. For the short term, it is important to focus on improving PPL financial and operational performance, specifically through areas such as the implementation of a Revenue Protection Program (RPP), and implementation of priority investments to improve reliability of existing transmission and distribution network. Strong support is needed for PPL and specific actions have been proposed through the implementation of a Performance Improvement Plan (PIP).

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13 Although uncollected bills are not a permanent financial loss, it is clear that poor collection rates affect the financial situation of the utility. Current collection rate of bills issued by PPL to Government agencies, representing 14% of the company’s sales, is very low. Amounts of unpaid receivables from those agencies, which are handled by PPL as non disconnectable points of supply, reached (US$18.7 million) in 2017. The increasing trend of this parameter started in 2016, and is growing at a rate above K10 million per month. This issue should be addressed at the broader Government level as a matter of urgency.
20. **Several partners are already active in the sector.** Beyond the Bank, several partners are supporting PPL, namely the Asian Development Bank (ADB), JICA, the Australian Government and New Zealand Government, in the areas of grid reinforcement and extension, and financing of connections to households.\(^{14}\) IFC is also supporting the private sector in rolling out modular solar homes systems in the central province and exploring grid connected commercial and industrial rooftop solar systems, as well as working with PPL on solutions for provision of affordable and reliable generation in isolated centers.

**Relationship to CPF**

21. **Improved access, price, and reliability of electricity remains central to the Government’s development planning.** The Government of PNG has set the ambitious goal of reaching 70% access by 2030 and becoming fully carbon neutral by 2050 (National Strategy for Responsible Sustainable Development (StaRS) and Medium-Term Development Plan (MTDP2, 2016-2017). The Government’s forthcoming Medium-Term Development Plan III (2018-2022) ‘Securing our future through inclusive sustainable economic growth’, is a five-year plan focused on building PNG’s economic foundation through inclusive growth. While human and social development outcomes are included in the overall framework, the MTDPIII presents a pivot in PNG’s development planning towards increasing economic growth and increasing government revenue; improving the business and investment landscape; and economic diversification. MTDPIII sees a renewed emphasis upon increasing the number of SMEs to boost the participation of Papua New Guineans in the formal economy, land tenure land reform aimed at spurring investment, and improved decentralized service delivery.

22. **The project is consistent with the latest CPS.** A Performance and Learning Review (PLR) for the Country Partnership Strategy (CPS) for the period 2013-2016 was conducted which extended the implementation period of the CPS to 2018. The proposed project is consistent with the context and strategy identified in the CPS to increase access to

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\(^{14}\) ADB is providing support through the Town Electrification Investment project (TEIP) and the Port Moresby Grid reinforcement project; JICA is supporting the development of a transmission line master plan for the Ramu Grid and identified the need to reinforce the existing 132 kV between Ramu Hydropower station and the Taraka substation to enhance power supply reliability and stability of the Ramu grid; New Zealand is supporting the government and partnering with the ADB under the TEIP program by subsidizing the cost of household connections in certain areas and is also supporting the extension of distribution lines on the Port Moresby Grid in the central province, targeted at increasing energy access.
inclusive infrastructure. The project complements the ongoing IDA-funded Energy Sector Development Project (ESDP), which aims to put in place some of the building blocks to increase access and renewable energy contribution.

23. **The proposed project is consistent with the challenges that have been identified in the Systematic Country Diagnostic (SCD).** The Systematic Country Diagnostic (SCD) for PNG (Report No. 127800-PG) has identified the lack of access to affordable and reliable power supply as limiting economic growth in urban areas and contributing to poverty in rural areas. Low levels of access to electricity limits the ability of children to study and access school and health services, and exacerbates personal security problems. More generally, it also hinders economic activities, for example, refrigeration of fish, pumped irrigation, processing of produce, and development of the tourism industry. The development of new copper and gold mines has been constrained to some extent by the lack of reliable and cost-effective power, and the same may be true for other industry that could have been developed in remote areas. The SCD equally establishes that the country will need to significantly increase generation capacity, at affordable rates, and the importance of developing a proactively implementing a least cost power development plan through competitive processes. Finally, the SCD also establishes that PPL operational and financial performance are a matter of concern and need to be improved in order to deliver on the ambitious electrification targets and enable further private investment in generation.

24. **The project is also consistent with the Country Partnership Framework (CPF) currently in preparation.** The draft CPF indicates that in the energy sector the WBG will support the government’s ambitious goal of reaching 70 percent electricity access by 2030 and becoming fully carbon neutral by 2050 specifically through technical assistance and transaction support for the development and implementation of a Least Cost Power Development Plan, aimed at lowering the cost of generation in the country and improving the operational performance and reliability of electricity supply of PNG Power Limited (PPL). The draft CPF establishes that when considering PNG’s rich energy resources, it is expected that lowering the cost of generation in the medium to long term will be achieved through hydro and other renewables resources, but gas generation can help in the transition to liquid fuels, lowering power costs and supporting grid expansion. Ultimately, lowering the cost of supply and building PPL into an efficient utility and a credible off-taker will not only establish a sound vehicle for implementation of electrification projects, but also enable attracting private investments to the sector.

25. **The proposed project supports the two corporate goals of helping to end extreme poverty and increasing shared prosperity for the poorest population.** The project aims to establish the building blocks for electrification through lowering the cost of supply and transforming PPL into a capable agent for electrification. The lack of access to affordable and reliable power supply is limiting economic growth in urban areas, constraining growth in smaller urban centers and contributing to poverty in rural areas. It hinders economic activities, access to school and health services, and exacerbating already severe personal security problems. Low levels of access to an adequate supply of electricity limit the ability of children to study, add to the burden of household work, and severely constrain economic activity. Ultimately the project will also contribute to global efforts to mitigate climate change by promoting the use of renewable energy and, ultimately, the use of electricity in rural areas, thereby displacing the current use of mainly kerosene for lighting.

26. **The proposed project is consistent with the principles of Maximizing Finance for Development (MFD).** The proposed activities enable private investments in two ways: (i) through providing technical assistance for identifying and selecting private sector companies that would be brought in to implement generation projects consistent with the least
cost power development plan (under Component 1), (ii) through contributing to build PPL into an efficient utility and a credible off-taker, therefore facilitating private sector generation projects (through Components 2 and 3).

C. Proposed Development Objective(s)

To improve the operational performance of the Borrower’s national electricity utility and improve the reliability of electricity supply in the project area.

Key Results (From PCN)

Progress will be measured against the following results indicators:

- Electricity losses per year in the project area
- Average interruption frequency per year in the project area
- Cash-recovery index

The intermediate indicators and other project indicators will be developed during project preparation.

D. Concept Description

The proposed IBRD Loan, with an estimated financing of US$30 million, will include the following components:

27. Component 1 — Technical assistance on least cost power development plan development and implementation (US$3 million). This component will provide technical assistance (TA) to support any supplementary planning studies as may be needed to the Least Cost Power Development Plan. It will also provide support for implementation of the plan through technical assistance as may be needed to: (i) conduct an assessment and any feasibility studies as needed for rehabilitation options for existing hydropower facilities and fuel switch from fuel oil to gas; (ii) provide support for preparation of projects which have been identified in the LCPDP – namely gas-to-power projects (most likely in the Southern Highlands) and renewable energy projects. Such support could include project level screening, feasibility, safeguard studies and the financing of transaction advisors to support the competitive selection of developers to implement selected projects.15

28. Component 2 — Implementation of key components of PPL’s Performance Improvement Plan (US$9 million). This component would include support for key components of the PPL’s Performance Improvement Plan (PIP). An indicative PIP has been proposed and has received broad support by PPL management. It is expected that PPL will adopt a more detailed PIP focusing on the next 3-year period, and focusing on improving efficiency, transparency and accountability in key operations areas (electricity supply, commercial functions, management of corporate resources) in a sustainable manner, with specific emphasis on better service quality and loss reduction. PPL is already implementing some elements of the PIP on its own – notably the component linked to organizational restructuring and establishment of skilled management team and workforce, and various actions under the remaining PIP areas.

15 This support could include for example complementary TA to what is already being provided on the Naoro Brown project, or support for development of other projects such as solar or wind projects.
29. This component will provide support for the following key components of the PIP, which are believed to be the key tools and most impactful investments to enable PPL management to improve the company’s operational and financial performance notably through

- **Incorporation of management tools.** Incorporation of management information systems (MIS) will enable more efficient, transparent and accountable the development of processes and activities in all business areas: operation and maintenance (O&M) of assets for electricity supply and attention of customers’ claims; commercial functions; and management of corporate resources. Incorporation of the MIS must be complemented with the improvement and update of their respective databases (customers, assets, etc.) supported by a geographic information system (GIS).

- **Protecting and increasing revenues.** The project will support implementation of a revenue protection program (RPP) for sustainable reduction of non-technical losses in supply (unmetered consumption) through systematic remote recording and monitoring of consumption of large users through the installation of Automatic Meter Reading (AMR) systems. In PNG less than 7% of customers (consuming above 800kWh/month) account for 77% of physical sales in 2013). The program will initially target these customers.

30. **Component 3 — Urgent rehabilitation/upgrade of PPL infrastructure (US$15 million).** This component would support execution of urgent investments in rehabilitation/upgrade of facilities for electricity supply (generation, transmission, distribution) and metering needed to improve service quality to acceptable levels. An assessment of the most urgent investments is currently ongoing.

31. **Component 4 — Project management support (US$3 million).** This component will support project management related issues through the recruitment of FM, procurement and social and environmental safeguards experts as the need may be, preparation of project safeguards studies, financing of audit, office equipment and incremental operating costs. Significant support for project implementation will be provided through this component, namely for the provision of technical advisory services to PPL for project design, implementation and supervision. It will include the setup of a strong project management office within PPL to assist in implementation of rehabilitation and network upgrade works going forward.

32. It will support hiring of an Owner’s Engineer whom will be responsible to work closely with PPL on preparing the final designs, procurement and supervision of any works, preparation of the environmental and social impact assessments and associated impact management plans, and monitoring of compliance and reporting. Specific support will also be provided for safeguard capacity building, including community engagement and consultations, to strengthen the capacity of PPL and other stakeholders in the management of environmental and social assessment and mitigation of impacts associated with distribution and substation projects. Specific support will also be provided through this component to address and measure the gender dimensions of the project.

**SAFEGUARDS**
A. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

The TA component (Component 1) is likely to carry substantial to high risks. Part of the funds will be used to continue the preparation of the Naoro Brown hydropower project (which started under the PNG Energy Sector Development Project – P101578), which may include transaction advisory services related to taking the project to market and achieving financial close, initial assistance to set up a project office, etc. Safeguard instruments for the Naoro Brown HPP are currently being prepared and are due to be completed during Q1 2019. The exact location and scope of other potential investments to be supported under Component 1 is not known, however is expected to include assessment and any feasibility studies as needed for rehabilitation options for existing hydropower facilities and fuel switch from fuel oil to gas, as well as support for preparation of projects including gas-to-power projects (most likely in the Southern Highlands) and renewable energy projects. This work could involve complexities in terms of land, changes to upstream and downstream impacts and potentially associated (linked) projects. It is possible that advisory work will cover investments which may have potential to create significant adverse impacts that are sensitive, diverse, or unprecedented and which may affect an area broader than the sites or facilities subject to physical works. It is proposed that the project be a Category A project under OP4.01.

The key risk mitigation measure for the TA Component will be addressed through the integration of E&S issues and risks into relevant activities during implementation. The ToRs for the feasibility studies will be submitted for clearance by the Bank, during project implementation. A sample TOR will be prepared by appraisal that can be adjusted to specific activities identified during implementation. It is noted that such investments would not be funded under this project. Preliminary safeguard documentation will be prepared for the selected project(s) under Component 1, be it hydropower plant rehabilitation, a gas-to-power or renewable energy project. Identification of the types of assessments for such project(s) will be decided once the project is selected.

Component 3 (Minor upgrades) will be defined once an assessment of the most urgent investments is complete. These are anticipated to carry moderate to substantial risks however land related impacts are expected to be very minor as works will be in existing corridors.

B. Borrower’s Institutional Capacity for Safeguard Policies

The implementing agency, PNG Power Limited, has extremely low capacity for management of environmental and social risks. A current recipient executed TF is proving difficult to implement as PPL is unable to form a functional project management unit (including safeguards specialists until recently). Components 2 and 4 will provide support to PPL for reform, improvement and capacity development. In this context the project would bring much needed support to PPL to establish some functional systems and sustainable capacity to manage E&S risks.

C. Environmental and Social Safeguards Specialists on the Team

Ross James Butler, Social Specialist
Nathalie Suzanna Noella Staelens, Environmental Specialist

D. Policies that might apply

<table>
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<th>Safeguard Policies</th>
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<td>Environmental Assessment OP/BP 4.01</td>
<td>Yes</td>
<td>The studies under component 1, the works under component 3 and the support to PPL for reform, improvement and capacity development will entail a</td>
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</table>
number of environmental and social considerations which will require proactive management. In addition to TA for the rehabilitation of hydro plants and/or the construction of a gas to power plant, Component 1 is likely to include additional support to the Naoro Brown Hydro Power (NBHP) project for which a preliminary ESIA is being funded under P101578. Given the nature of these potential future investments, and particularly NBHPP, they are likely to have the potential to create significant adverse environmental impacts that are sensitive, diverse, or unprecedented and which may affect an area broader than the sites or facilities subject to physical works. Accordingly, it is proposed that this project be a Category A project under OP4.01. The key risk mitigation measure for the TA Component will be addressed through the integration of E&S issues and risks into relevant activities. The ToRs for the feasibility studies will be submitted for clearance by the Bank. The preparation of a selected project (likely to be a gas to power plant in the Southern Highlands) will trigger a requirement for environmental and social assessment, which will be identified as part of the feasibility work outlined above. It is noted that such investments would not be funded under this project.

Component 2 may include the implementation of better technical, financial and operational management systems, which will need to be screened for E&S risks once identified.

PNG has a long list of needs in terms of investments including transformers, switchgear, protection system upgrades and SCADA systems etc which could be funded under Component 3. A decision on the actual investments will be taken during implementation.

An ESMF will be developed for the activities under Components 1, 2 and 3 of the project. It will be submitted to RSS for clearance before appraisal and disclosed as per the requirements for Category A projects. For Component 1, the ESMF will provide guidance on addressing E&S risks in all TA activities by providing a template TOR for TA activities, including requirements for review of E&S risks and preparation of preliminary safeguard instruments for individual
activities. For the Naoro Brown HPP, the ESMF will explicitly set out how environment and social requirements will be integrated into the next steps for the preparation of the project, namely to include for the review, update and clearance of the ESIA based on the final design, and for the inclusion of the necessary requirements into the procurement documents for the project.
For Component 2 and 3, the ESMF will outline the types of activities and investments, identify E&S screening and scoping criteria, define necessary safeguard instruments to be prepared, consultation and GRM requirements and other critical aspects, including capacity building requirements for the PMU. The ESMF will also include codes of practice for activities that are routine maintenance and repair works that are unlikely to have significant impacts, as well as a RPF to cover any events where sub-projects will have IR impacts covered by OP 4.12.

<table>
<thead>
<tr>
<th>Performance Standards for Private Sector Activities OP/BP 4.03</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Habitats OP/BP 4.04</td>
<td>Yes</td>
</tr>
<tr>
<td>Forests OP/BP 4.36</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Any investments that flow on from the TA component of the Project (be it hydropower asset upgrades, gas to power plants, or renewable energy projects), are likely to be undertaken in areas characterized by natural habitats (Southern Highlands, existing hydropower dam sites). Hence, OP/BP 4.04 applies to these potential future investments. The work undertaken under Component 1 will be guided by a ToR including the ToRs for the feasibility studies to be cleared by the Bank. This ToR will require integration of natural habitat considerations into project outputs.
It is envisaged that all upgrades and repairs to the existing power generation and transmission infrastructure under Component 3 will be within the confines of existing facilities and transmission line corridors. It is unlikely that the upgrade / repairs will involve major civil works which would trigger a requirement for land for laydown areas, material sourcing, extensive construction camps, etc. The works are more likely to be electro-mechanical in nature. Therefore, the policy is not deemed applicable to these works.

It is not anticipated that any project activities under Component 3 would impact upon forests as they will be confined to existing power generation and
transmission infrastructure. Similarly, the policy is unlikely to be applicable to investments assessed under Component 1 as these consist of rehabilitation of existing hydropower projects of an electro-mechanical nature, development of gas-to-power facilities within the boundaries of existing gas field infrastructure, etc. However, it will be a requirement for all TORs for feasibility studies to cover an assessment of potential impacts to forest areas. However, the policy does apply to the Naoro Brown Hydropower Project and impacts are being assessed in the ESIA/ESMP which is being prepared for the project.

Pest Management OP 4.09 No The Project will not involve the use of pesticides and hence this policy does not apply.

Physical Cultural Resources OP/BP 4.11 Yes It is not anticipated that any project activities under Component 3 would impact upon PCR assets. However, the policy does apply to the Naoro Brown Hydropower Project and impacts are being assessed in the ESIA/ESMP which is being prepared for the project. Similarly, the policy may be triggered for other investments assessed under Component 1 and it will be a requirement for all TORs for feasibility studies to cover an assessment of potential impacts to PCRs.

Indigenous Peoples OP/BP 4.10 Yes The studies under component 1 and the works under component 3 will have indigenous communities in the project area. Because it is anticipated that the overwhelming majority of people in the project areas will be indigenous people, elements of an indigenous peoples plan (IPP) will be integrated into the ESMF. The ESMF will also include a social assessment and a separate section to describe how OP4.10 requirements will be met. These elements would require free prior and informed consultation leading to broad community support and any additional measures needed to address particular issues or risks concerning IPs in sub-project activities. Similarly, studies into the rehabilitation of hydro plants could involve complexities in terms of land, changes to upstream and downstream impacts and potentially associated (linked) project which will need to be managed. Given the very high probability of indigenous peoples living in the project areas, the TORs to be cleared by Bank will require that the elements of an indigenous peoples plan (IPP) be
**E. Safeguard Preparation Plan**

**Tentative target date for preparing the Appraisal Stage PID/ISDS**

**Mar 29, 2019**

Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing should be specified in the Appraisal Stage PID/ISDS

**TBC**
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