I. Project Context

Country Context

The population of PNG is about 6.6 million with a land area of 463,000 km², giving a population density of about 14 people/km². About 13% of the population lives in urban areas. The rural areas are sparsely populated with low access to infrastructure. PNG has substantial natural wealth, including forestry, minerals and water resources. The economy is highly dualistic. The #enclave-based# formal sector is focused mainly on the large-scale export of natural resources. The informal sector is based mainly on subsistence and semi-subsistence activities of the majority rural population. The PNG population is organized in small, fragmented social groups, speaking over 800 distinct languages. Allegiance to local, clan-based groups is frequently strong and more immediate than a national identity, a situation which poses a challenge to pursuit of a national vision.

PNG has enjoyed markedly improved economic fortunes since the mid-2000s. The global commodity price boom and stronger macroeconomic management underlie much of the reversal from the declining real incomes and macroeconomic volatility of the preceding 10 years. The global downturn of 2009 had only a mild impact on PNG's economy, which expanded by 5.5 percent, outperforming most other developing economies and its regional peers. This follows several years of 6 to 7 percent annual GDP growth. While sharply higher global commodity prices have supported incomes, the non-minerals sector has led this resurgence, benefiting from private investment in newly liberalized telecommunications and aviation sectors, for example. Improved fiscal management has done much to transform windfall gains from higher commodity prices into sustained growth, particularly through fiscal rules ensuring the savings of windfall minerals revenues.

Optimism surrounds PNG's medium-term economic outlook. A USD 15 billion LNG project implemented by a consortium of international and domestic investors led by Exxon Mobil is now beginning, with full production scheduled for 2014. The Government expects the project to expand GDP by one-quarter in 2014 and 2015 (little of the construction activity is expected to be retained in the local economy), and national income by about 8 percent. This project will more than offset the waning revenues from aging mines and oil wells possibly beginning in 2013, although there may be a short-term revenue gap, creating some financing risks just as LNG construction activity winds down. Other, smaller LNG and minerals projects are in development and increasingly likely.

But as the Government recognizes, risks to PNG’s outlook are significant, in both directions. In the short-term, after slowing to low single-digits during the global downturn, inflation has returned to the peaks experienced during the 2007 food price crisis, but now due to domestic demand pressures and capacity constraints; the official 6 percent inflation rate likely understates price growth. Inflation is likely to remain near current levels in the near term. The supply constraints causing this, particularly of skilled labor, in the construction sector and, and for land for development, are also limiting scope for higher output growth and the efficiency of government development spending.

The LNG project holds a major upside potential in terms of growth and revenue for PNG. However tax revenues will not start until several years after production starts. In the meantime, local businesses are experiencing difficulty retaining skilled staff and households are faced with rising prices. The demand for electricity on the Port Moresby grid has grown rapidly in the past year and projections show continuing high growth in demand for several years. There are other natural gas projects under discussion, but the Exxon Mobil LNG project is exclusively for export and does not include provision for domestic gas supply in Port Moresby. As a result, PNG Power cannot plan near-term generation expansion based on gas-fueled generation. Moreover, PNG has abundant hydro resources which are well dispersed all over the country.

II. Sectoral and Institutional Context
Key Electricity Sector Institutions

Key sector institutions are:

- Department of Petroleum and Energy (DPE) has responsibility for policy, strategic direction and planning in the energy sector. Under the proposed Electricity Industry Policy discussed below, DPE's responsibilities would expand to include technical regulation of the sector.
- Department of Public Enterprises (DPEnt) is responsible for policy oversight and monitoring of state-owned enterprises, including PNG Power.
- Independent Public Business Corporation (IPBC) holds the Government's ownership interest in state-owned enterprises including PNG Power and handles commercial aspects. IPBC comes under Public Enterprises.
- Independent Consumer and Competition Commission (ICCC) is responsible for economic regulation of electricity retail tariffs. The current regulatory contract for PNG Power covers the period 2002-2012. The next regulatory review is expected to get underway in 2011. The new regulatory contract will be in place at the start of 2012.
- PNG Power Limited (PPL) is the state-owned, vertically-integrated electricity utility with licenses for generation, transmission, distribution and retail covering most of the main urban centers. PPL was created in July 2002 when the electricity assets, liabilities and undertakings of the Government owned statutory corporation Elcom (formerly the Electricity Commission of PNG) were transferred to PNG Power Limited. PPL is incorporated under the Companies Act and 100% owned by the General Business Trust of which the IPBC is the trustee.
- Western Power, a wholly-owned subsidiary of PNG Sustainable Development Program Limited, has a license for electricity generation, distribution and supply activities in the Western Province. Western Power's mandate is small scale (<10MW) power supply that is unlikely to be commercially viable.

Power Supply in PNG

There is no national power grid in PNG, due in part to the country's very rugged, mountainous terrain, high population dispersion, low income level, capital constraints, and the development priorities of GoPNG. Instead, Papua New Guinea has three separate main power grids owned and operated by PPL:
- Port Moresby;
- Ramu Valley serving Lae, Madang, and the Highlands;
- Gazelle Peninsula (Rabaul) serving New Britain.

These three islanded networks are mixed hydro-thermal power systems. PPL also operates 16 other small systems, all of which are thermal based with the exception of three that have mini hydro schemes supplemented by diesel power. This includes a 24MW diesel unit Independent Power Producer (IPP) supplying the Port Moresby grid under a power purchase agreement with PPL.

PNG Power's power systems were predominantly built in the late 1960s and early 1970s, prior to PNG's independence in 1974. Since that time, there has been relatively little expansion of the geographic coverage of the existing PNG Power networks due to the inadequacy of resources to expand beyond the urban centers, but the loads on the networks have grown.

There is at least 280MW of additional capacity outside these grids belonging to other entities. Most of this is privately-owned and operated for dedicated power supply to certain mining operations. Many of these are diesel systems, but a privately-owned 58MW hydropower system provides power to the Ok Tedi mine (OKTL), and the Lihir Gold mine is largely powered by privately-owned geothermal power. Gas turbine power plants in the Highlands are fuelled by natural gas from the Hides gas field. In some cases, privately-owned generators inject power to the PPL systems under power purchase arrangements with PPL. Western Power owns and operates some isolated grids in Western Province.

Beyond the grids operated by PPL, Western Power and major mines, power is supplied via:
- mini-grids in provincial and district administration centres under the oversight of the provincial governments (formerly called #C-centres#);
- stand-alone diesel generators for clinics, churches and schools; and
- household generators (diesel, solar).

It is estimated that about 10% of PNG's population has access to electricity.

PNG Power Ltd. (PPL)

PPL currently supplies around 89,000 customers with 700,000 MWh/yr of electricity. Sales revenue for 2008 was K439m. Net profit before tax declined in 2008 to K25 million largely because of higher fuel and maintenance costs, but PPL remains profitable. During 2007-2008 capital expenditure has increased to K101m in 2007 and K114m in 2008, up from a low level of K18m in 2004, which has been funded primarily by borrowings and a K65m equity infusion. Gearing is currently moderate at 25.75 debt/equity.

The performance of PNG's power sector improved in the period 2002-2010, following the deterioration in services in the 1990s that arose from that decade's political and economic instability and uncertainty in PNG. PPL was near bankrupt in 2002, with its generation and network assets run down, and reliability poor. Between 2002 and 2010, the changes in the power sector's policy and regulatory framework, together with significant efforts on the part of PPL, helped to place the sector on a much better footing.

However, PNG's power sector faces a number of serious ongoing challenges, including:
- Little or no generation reserve margin at all, resulting in poor reliability of the power systems in the event of generator outages;
- Generator maintenance scheduling is challenging, given lack of spare capacity. Because of this, routine maintenance is done on an ad-hoc, opportunistic, basis. Hydro generators are the last to be serviced, given the opportunity cost of taking them out of service and operating diesel and the load shedding that would take place;
- Significant derating of existing hydro generation capacity due to inadequate servicing of the hydro generators over time. PPL is currently implementing a rehabilitation program for its hydro generators to restore capacity;
- Relatively high electrical losses, which in 2008 were estimated to be around 18% on average, with some areas such as the Highlands significantly higher. PPL is currently developing a program to reduce losses;
- A growing dependence on diesel generation, in the absence of access to natural gas and development of further hydropower;
- Unpaid electricity bills, particularly those of some government departments.

A national uniform tariff is used (which charges the same price for customers within a specific group, regardless of location). The cross-subsidies that arise from this are viewed as necessary to maintain affordability of electricity access in high cost areas. Power prices are expected to rise to fund new power sector infrastructure (including power purchase commitments under-pinning new private sector development. The current...
III. Project Development Objectives

Project Development objective:

The proposed Project development objectives (PDO) are to (i) strengthen policy development and strategic framework for renewable energy and rural electrification; and (ii) to attract investors for sustainable development of new hydropower generation to supply the Port Moresby electricity grid.

The Global Environment Facility (GEF) objective is to support the development of a framework, information exchange and consensus-building to launch a national effort on development of renewable energy-based mini-grids and rural electrification.

IV. Project Description

Component Name
Strengthening the enabling environment toward low carbon growth path and increasing access to electricity
Technical Assistance for Preparation and Planning for Port Moresby Hydropower Supply

V. Financing (in USD Million)

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<th>For Loans/Credits/Others</th>
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<td>Financing Gap</td>
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<td>Total</td>
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VI. Implementation
Institutional and Implementation Arrangements

The proposed Project would involve two implementing agencies: (i) the Energy Division at the Department of Petroleum and Energy (ED-DPE) and (ii) PNG Power Ltd. (PPL).

The Energy Division has a small staff and in the past has remained relatively low-profile in the Department, as the major focus in the past few years of DPE - and to some extent the GoPNG - has been the LNG project. Now that the key LNG Project agreements are in place, GoPNG and DPE are re-focusing on the energy sector. Once the Electricity Industry Policy is approved, significant strengthening of the Energy Division is planned. An example of this renewed focus is the excellent collaboration between the Department of National Planning and Monitoring and DPE, with support from the World Bank and other development partners, in the preparation of the workshop: #Sharing The Benefits of New Hydropower in PNG: Environmental, Social and Financing Aspects of Medium and Large Hydropower# which was hosted by GoPNG in Port Moresby, in September 2010.

None of the current staff at the Energy Division have been involved in WB-supported projects. Capacity for undertaking WB procurement and financial management will need to be developed further during implementation of the proposed project. A DPE PMU has been set up, headed by a senior staff member in the Energy Division. In addition to on-going capacity-building efforts, the proposed project directly supports strengthening implementation capacity through financing of:
# Assistant PMU Manager, who would be a full-time local consultant to handle the day-to-day aspects of project implementation including contract management;
# Renewable and Rural Energy Advisor, who would be part time and would provide the technical expertise for definition of the Terms of Reference for the major consultancies, assist in technical evaluation of bids, assist in guiding consultants and reviewing draft reports.
# TA for specialist support for GoPNG role in Naoro Brown and other hydropower projects expected to be developed in the medium term;
# Training as needed in procurement, financial management and technical areas.

PNG Power Limited has strong technical staff, although lacking experience in WB procurement and financial management procedures as PNG Power has not undertaken a WB-supported project in over a decade. Capacity for undertaking WB procurement and financial management will need to be developed further during implementation of the proposed Project. A PMU has been set up at PNG Power, with existing staff from the utility headed by the PMU manager (a senior staff member), a financial management specialist and an environmental specialist. Initially the team members would not be required full-time for the PMU activities. As implementation proceeds, the requirements on the PMU would increase. The need for additional PNG Power staff time and / or specialist consultant support for the PMU will be determined as implementation proceeds.

Component 2 of the proposed Project includes funding to strengthen project management and hire technical specialists as required, for example in communications and safeguards aspects.

With respect to implementation of Component 2.1: Preparation of the Naoro Brown hydropower project for Port Moresby, PNG Power is well-placed in terms of power sector expertise to manage the process for preparing the Naoro Brown hydropower project, including the process of selecting the Developer. However it is recognized that ultimately the key decisions will be made by GoPNG. An intra-governmental #Naoro Brown Project Oversight Committee# including Department of National Planning and Monitoring, Treasury, Department of Petroleum and Energy, Department of Public Enterprises, Department of Environment and Conservation, Department of Water Resources and other key government stakeholders, would be established to provide oversight of the process. As and when the PPP Center in Treasury is established, designated staff could join the oversight committee. PNG Power will report to the Oversight Committee on a regular basis so that the Committee is well-informed regarding the progress and issues as decision points are reached. Component 1 of the proposed Project includes funding for Technical Assistance related to GoPNG#s role in the Naoro Brown hydropower project so that specialist input can be brought in as and when DPE and / or the Oversight Committee requires it.

With respect to the safeguards aspect of the proposed project and Component 2.1 in particular, a clear plan of responsibilities and support required to fully address the safeguards aspects associated with the project has been prepared. A draft of this Environment and Social Management Framework (ESMF) will be made publicly-available for consultations and disclosure prior to [the end of] appraisal.

VII. Safeguard Policies (including public consultation)

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