# OVERVIEW OF THE PNG ENERGY SECTOR & NEROP

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# Brief Overview of Energy Sector

- Energy Sector accounts for about 14 % of the GDP. (LNG)

- The Sector includes assets related to three key energy resources

  a. Electricity
  b. Fossil Fuels
  c. Renewable Energy

# a. Electricity

- Electricity portion consists of the Generation, Transmission, Distribution and Retailing.
- PNG has two main Stand-alone Power Grids a number of small Grids that service the smaller urban centers.
- Total Installed Capacity about 580 MW
    i. Hydro – 230 MW or 39.1%
    ii. Diesel – 217 MW or 37.4%
    iii. Gas Fired – 82 MW or 14.1%
    iv. Geothermal – 53 MW or 9.1%
    v. Biomass – 7MW or 1%

- PNG Power Limited has a total installed Capacity of 300 MW.  2 Main Grids, 26 smaller Urban Centers and the remaining 280 MW Auto Producers and IPPs.
- 580 MW amounts to about 13% of Households with Access to Electriicty.
- Key Challenges
  - Increase Access
  - Improve quality of power Supply
  - Develop suitable models to increase access in the off-Grid Space

# b. Fossil Fuels

- As of 2014 oil and petroleum products accounted for 57% of the total primary energy consumed in PNG. (Transport & Electricity)
- Gas is mainly exported
- Key Challenges
    1. Decrease reliability on Fossil Fuels
    2. Domestic Market Obligation for Gas

# c. Renewable Energy

- PNG has vast potential in RE
- Estimate 15000 MW Hydro Potential, 10 000 MW Geothermal and abundant Solar, Wind and Biomass Resources
- Key Challenge is to quantify this resources so we can use the data in planning purposes.

# NATIONAL ELECTRIFICATION ROLL-OUT PLAN (NEROP)

# BACKGROUND

- The PNG Vision 2050 and (DSP 2010-2030) now replaced by StaRS and MTDP set out the Government's long term strategic directions as well as broad high level goals. In particular, the PNG Vision 2050 recognizes electricity as a critical enabler and one of the key "pillars" in the development strategies of our country's socio-economic objectives.
- In support of these development strategies, the StaRS and MTDP set the Government's target for providing access to electricity to at least 70% of PNG households by 2030.

- To facilitate this development goal, the Government, through the NEC, approved the Electricity Industry Policy (EIP) in December 2011, thereby affirming the Government's recognition of electricity as a key enabling factor in production.
- The EIP was designed to address three strategic objectives of the Government:
  - Improving access in the provision of electricity services;
  - Improving reliability of electricity supply; and
  - Ensuring that power is affordable for consumers.

- To facilitate proper planning and implementation of the EIP, the Government approved the establishment of an Electricity Management Committee (EMC) under the EIP. The EMC would be the overarching coordinating body to achieve the objectives of the EIP.
- A key function and responsibility of EMC, among others, was the development of a National Electrification Rollout Plan (NEROP). NEROP would facilitate the Government's Vision 2050 development plans as well as the targets set in StaRS and MTDP.

# NEROP

- NEC Approval of EIP in December 2011
- Government (Ministry of Treasury) signed a Financing agreement and GEF Grant Funding Agreement with World Bank 2013.
- First Workshop on NEROP 2013 with a closing Communique outlining the next step for Implementing NEROP.
- 2015 University of Columbia selected after competitive bidding.

# NEROP REPORT

- Columbia University used Geographic Information System (GIS) tools as well as satellite imagery to geo-locate PNG communities and other facilities, based on National Statistical Office (NSO) 2011 census data as well as other data, to determine the design and prepare cost estimates for least cost technologies investment plans, for rolling out electricity services to at least 70% of PNG households by 2030.
- The findings from Columbia University/ECA analyses provided estimates of grid access derived from PNG Power data as well as geospatial query, World Bank and NSO HIES data, is summarised in the following table.

# 1. Geospatial Mapping

| Results of spatial query | Grid Access (2016) | | | |
|---|---|---|---|---|
| | **Access categories** | **Population (Households)** | **Percent** | |
| Within 1km range of LV connection | **Customers**: grid access | 460,000 | 6% | 19% |
| | with PPL account | 90,000 | | |
| | **Consumers**: grid access | 460,000 | 6% | |
| | without PPL account | 90,000 | | |
| | **No grid access** (calculated | 540,000 | 7% | |
| | by difference) | 100,000 | | |
| Beyond 1km range of LV connectio | **Requires new access** (grid | 6,030,000 | 81% | |
| | or off-grid determined by geospatial model) | 1,160,000 | | |
| | **Population** | 7,630,000 | 100% | |
| | **(Households)** | 1,440,000 | | |

# 2. Financing Scenarios

- The financing plans presented by Columbia University/ECA were for each of the following three scenarios:

a) No financing constraint (≈110,000 households are connected per year to achieve the 70% target by 2030)

b) A US$50m/year cap on financing (which translates to a US$9 million contribution from the Government, ≈ 33,000 households connected per year, and 32% of households electrified by 2030.

c) Higher capital unit costs, for both grid and off-grids, assuming that PNG Power's costs of implementing grid extensions do not decrease with scale. This scenario assumes no financing constraint and that 70% of households are electrified by 2030.

# 3. Summary of Financing Plan

- The total cost of achieving electrification access to 70% of PNG households by 2030 is likely to cost around US$1.8 billion. This equates to an average annual investment cost of approximately US$130 million from 2019-2030 at ≈ US$1,400 per household connected.
- The total cost of funding NEROP in the first five years is likely to be approximately US$550 million. This funding is apportioned as follows; US$ 161 million towards grid intensification, US$322 million for grid extension and US$67 million for off-grid activities which are assumed to commence in 2022.

# Wayforward

- NEROP approved by NEC early August 2019
- Financing Round Table
- Currently Work on NEROP