



PAPUA NEW GUINEA

Update on OIL AND GAS SECURITY

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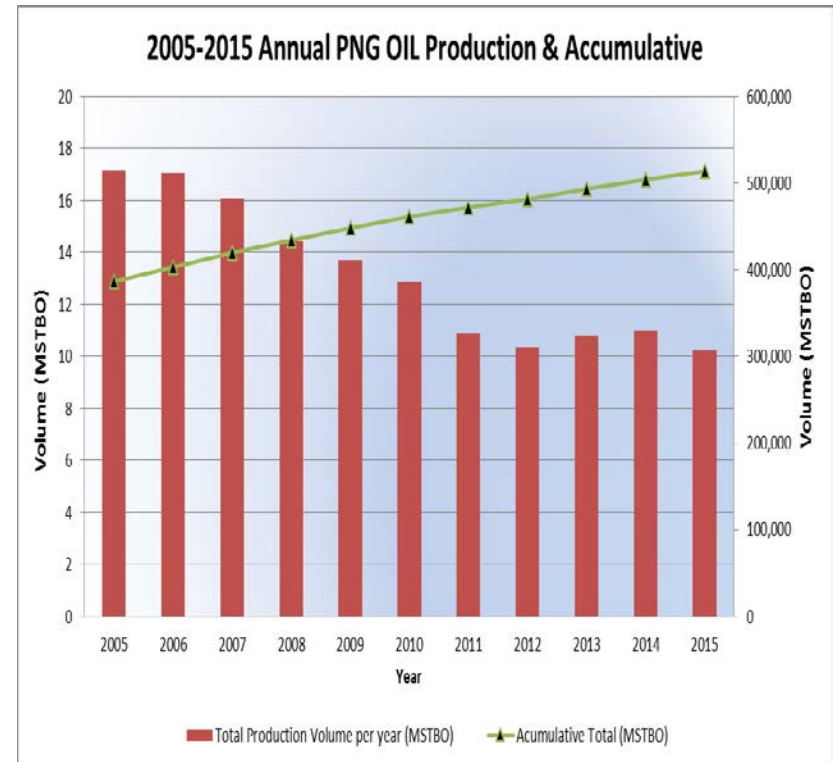
Introduction

- Papua New Guinea (PNG) is a nation made up of over 8 Million people with over 700 different languages and culture.
- The country depends heavily on the export of Non Renewable Resources, with the Mining and Petroleum sector contributing more than half the country's revenue.
- In the Petroleum Sector PNG exports mainly Crude Oil and LNG. A small quantity of petroleum products are also exported by the country's only refinery (Napanapa).
- Crude Oil production in PNG began in 1991 by Chevron until Oil Search took over in 2004 which operates the oils fields.
- LNG production and export started in 2014 by Exxon Mobil.
- PNG has only 1 commercial refinery. Napanapa Refinery built and operated by Inter Oil and recently bought by Puma Energy



Crude Oil Supply and Demand in PNG

- PNG Oil Field generally produce Sweet Crude and Condensate* (*from gas fields).
- Cumulative Crude Oil production in PNG since production began in 1991 is **52,334,265 mstbo**.
- Oil production from the maturing fields are declining from **120 000 stbo/d in 1991 to 35 000 stbo/d in 2017 (latest 2017, Oil Search)**.
- However, the PNG LNG project has added economic life extension to the maturing oil fields. (Oil fields to gas fields). Furthermore, Condensate from the PNG LNG project is added to the oil export.
- Most of the crude were exported until 2004 when the only refinery (Napanapa) in PNG was completed, thus local supply began.



- Oil/Condensate exports generates approximately USD 700 Million per year (2 billion Kina equivalent)



Crude Oil Supply and Demand in PNG

- The only Crude oil importer in PNG is the Napanapa Refinery – operated by PUMA Energy
- Two mini refineries are operated by Oil Search* for their internal operational use. (*operator of the producing oil fields in PNG)

- The Napanapa Refinery imports crude oil from Australia, Malaysia and Africa to meet refinery requirements, which supplies 70% of the local petroleum product needs.
- The remaining 30% of petroleum product need in PNG is imported and supplied by other agents (Island Mobil, Total, Niugini Oil, etc)

- PNG's Oil Reserves stands at approximately;
 - Maturing fields (Oil Search Operated) **59, 427 Mstbo (2P Reserves) 2015**
 - Considerable condensate have been discovered in most gas fields like the PNG LNG project and in most exploration licenses. That includes proposed LNG project fields;
 1. *Papua LNG (Total Operated) – Elk/Antelope; (approx. 9 tcf gas)*
 2. *P'nyang Fields (Exxon & Oil Search) (2.5 tcf gas)*
 3. *Western LNG (Repsol & Horizon) – Ketu/Elevala; Stanley Gas; etc, (approx. 4 tcf)*
 4. *Pasca Offshore Project (Twinza) – (aprox 2 tcf gas)*



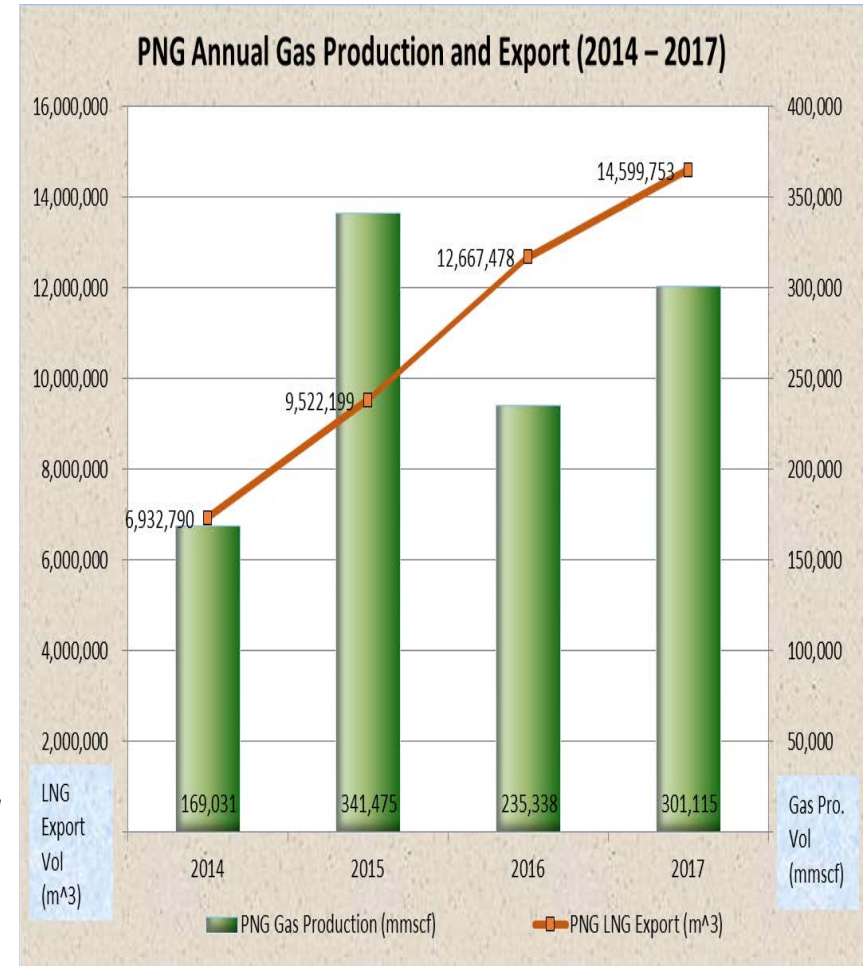
Refinery Capacity and Oil productions in PNG

- The Napanapa Refinery has a full capacity of 36,000 bpd
- Refinery blends sweet crude from Kutubu (PNG) with imported crude oil from Australia, Malaysia and Africa to meet refinery requirements,
- 65 % of the Petroleum products from the refinery is supplied to meet 70% of the local petroleum product needs. The remaining 35% is exported to Asian markets.
- The remaining 30% of petroleum product need in PNG is imported and distributed by other agents (Island Mobil, Total, Niugini Oil, etc)
- The refinery has a capacity to store 750,000 barrels of crude and approximately 1.1 million barrels of refined products.



Gas Supply and Demand in PNG

- Since its inception in 2014, LNG is the single largest export commodity in PNG.
- LNG exports generate approximately 10 billion kina per year (USD 3 billion equivalent).
- PNG LNG shipped mostly to buyers in Japan, China and Taiwan.
- Current PNG gas reserve stands at approximately 30 tcf. (*this is from both producing and exploration fields, thus some have not been certified by third party*)





Gas Supply and Demand in PNG

- Cumulative Gas Production in PNG since LNG operations began in 2014 to end 2017 is **1,046,959 mmscf** of which **43,722,220 m³ of LNG exported.**
- However, Gas has been produced in Hides and supplied to Pogera Gold Mine for Power generation since 1991. On average, **425.66 mmscf/month** to produce **2 MW/month.**
- GoPNG and Exxon Mobil are currently discussion options to supply gas for domestic power generation in PNG.
- Import of LPG (liquid petroleum gas) is steadily **increasing at 5% rate.** It is only consumed by **3% of the population**

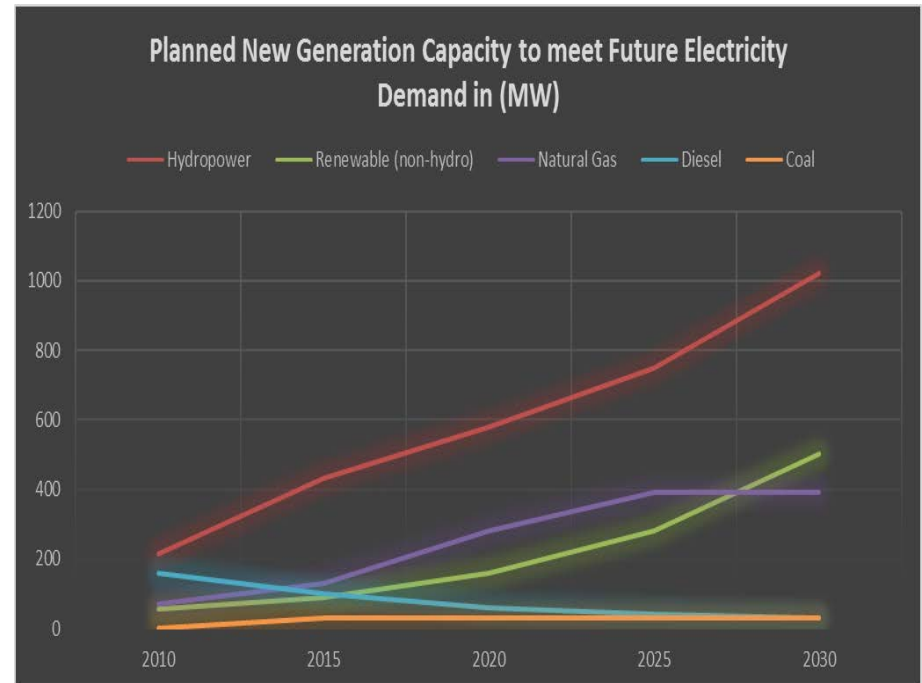
Year	PNG Gas Production (mmscf)	PNG LNG Export (m ³)
2014	169,031	6,932,790
2015	341,475	9,522,199
2016	235,338	12,667,478
2017	301,115	14,599,753
Total	1,046,959	43,722,220

- LPG is imported from Australia by Origin Gas.



Natural Gas Production and Consumption in PNG

- PNG LNG project is primarily for export and there is no domestic offtake of gas.
- Gas to electricity is an attractive and environmentally clean option to meet future domestic demands.
- However, there are no clear government policy for the gas sector, which will impede the use of gas for power generation.
- A framework for development of gas-based power generation is also planned and is negotiated by GoPNG with companies.
- LPG (Liquid Petroleum Gas) is the only gas imported. The refinery also produces and supplies to domestic market.



Source: Government of Papua New Guinea, Department of National Planning and Monitoring. 2010. Papua New Guinea Development Strategic Plan, 2010–2030. Port Moresby.

- Gas will be a major play in power generation in PNG in the near future as per GoPNG plan



Natural Gas Production and Export

- PNG primarily exports LNG gas. Approximately 6.6 million tones per year.
- Gas is extracted, conditioned and piped 700km from the highlands to the LNG processing & loading point near Port Moresby.

- 4 major customer;
 - 1. Chinese Petroleum Corporation of Taiwan (1.2 Mtpa)
 - 2. Osaka Gas Company (1.5 Mtpa)
 - 3. Tokyo Electric Power Company of Japan (1.8 Mtpa)
 - 4. Unipecc Asia Company (2 Mtpa) (a subsidiary of Sinopec)



Oil and Gas Security Policy

Oil & Gas Supply Security Policy

- The country wishes to build from oil production and develop gas, but while the country has an oil and gas act, it has no gas or petroleum policy at present. Contracts are negotiated and regulatory conditions are mandated through contracts (Gas Agreements/MOA) rather than through a transparent policy. The existing liquefied natural gas (LNG) project is exporting all its output and is not available for domestic market obligations in the country.
- The country still lacks a comprehensive energy sector policy. A draft policy has been prepared and is under consideration, and the Department of Petroleum & Energy (DPE) expects that the policy will be finalized and adopted.
- The country wishes to develop gas based power generation but lacks policy.
- Thus, there are no indicators in place to gauge security of supply.
- PNG does not have strategic oil stock holding facilities for emergency oil and gas supply disruptions except existing companies storage facilities.



Oil and Gas Security Policy Gaps

Policy Issues and Gaps that need to be addressed

- There is no clear policy for the gas / energy sector, which will impede the use of gas for power generation and/or local domestic market obligations.
- There are constraints in the formulation of the draft policy.
 - Lack of capacity
 - Lack of capacity in terms of human and physical resources
 - Management Support and Commitment
 - Lacking management support and attention towards formulation of key policies
 - Training & Capacity Building
- Institutional capacity is also a constraint. The DPE has inadequate trained staff to undertake all its intended functions and plans.



Oil and Gas Supply Demand

Conclusion:

- Papua New Guinea's (PNG) economy is highly driven by the extractive industry.
- Oil and Gas are the major players and are largely exported.
- Demand in electricity will see a demand in Gas to Electricity projects going into the future. (GoPNG Vision 2050).
- No clear policy directive for the energy sector in terms of Gas. Government Policy constraints are a combinations of;
 - Lack of capacity
 - Government & Management Support and Commitment
 - Training & Capacity Building
 - Institutional capacity



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