



THE NATIONAL
RESEARCH INSTITUTE
PAPUA NEW GUINEA

**Infrastructure investment , Reforming
and restructuring PNG Power Ltd is
start of solution for provision of
electricity in PNG**

Presentation by: Mr Wilson Thompson ML, Chairman, PNG NRI Council

Introduction

- PNG has an ambitious goal of reaching 70% electrification by 2030.
- Many people want to have access to electricity; especially for lights in communities within the established grids but are still not connected. For example, Goroka had a small hydro built in the 1950's.
- Power was later supplemented by Ramu Hydro in the late 1970's that expanded towards Daulo.
- By 1980 - power lines ran from Kamaliki to Kabiufa, from Goroka to Fimito (Golf Course) to Bihute Jail to Ufeto (Rothmans) to Lapeigu Forestry Station to Asaroka High School.
- 60 percent coverage and in 1995, connection of Gahavisuka Park, Kabiufa and Kotuni road took it 80 percent and Waterise and Komu in 2012 has it at 90 percent power reticulation lines covering Goroka District.
- Today, all the distribution lines are still there but only 20 percent have access to electricity. Why?

IS PNG POWER TRANSMISSION, DISTRIBUTION AND CONNECTION ABLE TO SUSTAIN PNG?

- Energy is translated into electricity to run industry, business, social services such as health and education and the household needs.
- Case of Goroka District: Certain areas have issues with electricity - either not connected or has no distribution lines. We have 90 % coverage by main lines but actual connection to electricity is a problem.
- Yonki Dam was completed with more turbines. By 1990 main transmission lines from Yonki to Goroka was upgraded. By 2012, we had connections to more villages, houses, education facilities, hospitals, businesses and industry.
- PNG has a long way to go before we can reach 70 % coverage.
- The demand for electricity in Goroka Town or District has not being addressed.
- Electricity generation, transmission and distribution have remained static whilst population, residential houses, business and industries, and education and health facilities have tripled since 2012.

UNDERSTANDING THE PAST TO MOVE INTO THE PRESENT AND THE FUTURE

- 1950's - Hydrology survey identified the potential of Ramu River and Arona Valley for water reservoir and electricity generation.
- Early 1960s - the ***Electricity Commission Act*** was passed for the regulation and control for the generation and distribution of electricity. World Bank funding was obtained for the feasibility studies and design of the Ramu Hydro Electricity Scheme.
- By 1968 - the Feasibility Study was completed and the State had identified both customary and alienated land required for the Ramu Hydro Electricity Scheme. It identified the following stages-
 1. Ramu 1 – Phase 1 - 45-megawatt capacity project from the Ramu River
 2. Ramu 1 – Phase 2 – Construction of Yonki Dam and 150-megawatt capacity
 3. Ramu 1 – Phase 3 or Toe of Dam Project
 4. Ramu 2 – power generation using water from Ramu 1 to supply or increase to 200 megawatts to supply increased demand in the Highlands and Momase
 5. Ramu 3 – power generation using Ramu 1 and 2 water to increase up to 250 megawatts and to connect to Port Moresby or Rouna system

Land Purchase and Land Use

- In 1970-71- Government purchased the land needed for the dam, reservoir with a surrounding buffer strip and for the quarries and ancillary works.
- Of the area purchased: 45% was owned by the local people and 46% by the expatriates
- The construction of Yonki Dam stalled due to a policy decision.
- Elcom was directed under the **Electricity Commission Productive Use of Land Act 1971** to keep the land utilised. Elcom ran the Oxlade Cattle Station and leased the Kwaita Coffee Plantation to the Kainantu Local Government Council.
- In 1971, the project utilized the Ramu River to pipe water to the underground turbines to generate power for Madang, Morobe, EHP, Simbu and WHP. Paunda Station in border of WHP supplemented power to Enga and SHP.
- In 1983, the NEC reaffirmed the land purchased in the Arona Valley to be used by the Commission for water storage purposes and approved increase power generation to 150-megawatt capacity by Yonki Dam project.

Importance of the Yonki Dam Project in 1986

- The building of the Yonki dam is in the second stage of the Upper Ramu Hydro Electric Project. The dam will be 60m high and will create a reservoir covering 2100 hectares.
- The project is designed as an important contribution to the country's power demands in the foreseeable future". The existing Ramu system serves Morobe, Madang and the Highlands provinces where the combined population is two million people. This is two thirds of the nation's population.
- Annual generation and peak demand requirements for the Ramu System are forecast to increase by some 350% by the year 2000.
- Existing generation capacity of the Ramu System is 45MW. The final capacity of the total Ramu System based on water from the proposed Yonki Dam will be 250MW.

Physical Environment and Socio-Economic Impact

- Since the 1983 NEC decision, Elcom initiated and funded several reports concentrating on the Socio-Economic and Physical Environment aspect of the Yonki Dam Project. The PNG Institute of Applied Social and Economic Research (IASER, now National Research Institute) completed the Social Impact Report on the Yonki Dam Project and a Draft of the Socio-Economic Development Proposal for the Arona Valley.
- Cameron McNamara (Kramer PNG Pty ltd) prepared the Physical Environment Assessment and the project's Environmental Plan. The Environmental Plan was approved by the Minister for Environment and Conservation on 5th May, 1986.
- The Environmental Plan concluded that various works and the proposed reservoir will create few problems with the physical environment and all these can be handled by appropriate care in design construction, rehabilitation and construction maintenance.
- The Yonki Dam Project will have considerable Socio-Economic Impact on the Arona Valley. Elcom has made provisions to ensure the people receive significant benefits from the project.

PEOPLE, COMPANIES AND AGREEMENTS AROUND THE PROJECT

- The colonial Gov't purchased the land needed in 1970. Construction contract awarded to Hyundai Corporation of Korea.
- Land acquired from 10 villages of Arona Valley. The customary land was sold outright to the State. All other state land was advertised as public tender for Agriculture Settlement Scheme and are now leased to cattle and agriculture leaseholders.
- According to reports, Yonki Dam Project will have considerable socio-economic impact on the Arona Valley and recommended setting up the Arona Valley Development Authority
- ELCOM directed to provide support and transfer excess land to the new Arona Valley Development Authority that would provide socio economic development programs in the Arona Valley.

continued

- Through AVDA programs, the Ramu Hydro Electricity Scheme must be protected from disturbances. In the event such happens, the grants to AVDA would be affected.
- In 1986, NEC approved for a Steering Committee to evaluate the master plan for the proposed Arona Valley Development Authority (AVDA) and to appoint the initial AVDA board and oversee formulation of the Authority
- The AVDA was established to improve the standard of living of the Arona Valley people and to create a healthy self-sufficient community for them.
- The local people were engaged or given preference for employment. The District Officers (Kiaps) liaised with the local communities including expatriates during the hydrology survey, project feasibility study and land acquisition.
- In 1950's to 1970s, different State Departments such as Lands, Public Utilities, etc, dealt with the indigenous or nationals. The District Officers (Kiaps) gave independent advice under different legislations to the customary landowners. If there were any issues, they tried to reconcile between the local people and the state agencies including seeking legal redress.

Continued

- The District Officers (Kiaps) were meticulous in engaging with various clans, undertook genealogy, and social impact studies, land investigation reports throughout the hydrology survey, project feasibility study and land acquisition stages .
- When land was acquired, land identification and demarcation such as trees and markers were placed all around the Arona Valley. Crops and land compensation were determined and paid including explaining the alienation of the land.
- State lessees were adequately compensated for improvements and relocation and settling costs including new leases.

THE OPERATIONS OF ELCOM AND AVDA , 2000 – 2020

- Under the Morauta Government, ELCOM was disbanded and PNG Power Ltd was incorporated under the Companies Act to perform the functions of generation, transmission and distribution of electricity in PNG.
- The AVDA Board composition and governance, management and operations, organisation structure, funding sources and the business plans on sustainability have continued unchanged as per the 1986 NEC Decision.
- The PNG National Government Representative from the Department of Lands & Physical Planning was to be advised and consulted by other relevant Departments.
- With the changes in Ministry and Departments such as DAL, Departments of Finance & Rural Development, Treasury and DNPM (Finance & Planning), Department of Mining & Geohazards and Petroleum & Energy (Mineral & Energy) and provincial reforms, there was breakdown in coordination.

Status of IASER (NRI) Report Implementation Scorecard

The scorecard of the NEC sanctioned benefits and the socio economic development projects set out to be delivered by ELCOM and AVDA as updated for that period 2000 to 2020 are-

- Elcom has made provisions for rural electrification of the Arona Valley – **40 percent.**
- The local people shall be encouraged to use the reservoir for recreational purposes– **awareness not done anymore as children grow up.**
- recreational facilities at points on the reservoir – **not provided.**
- a program to educate the people on safety around water – **not updated and done as children grow and people move into the area**
- A market established by Elcom once construction is complete. - **Nil**

Continued

- Gadsup Sacred Site at Obeyoka and a memorial – **Nil**
- Elcom will also be ensuring that 10% of Archaeological sites which will be lost due to the dam construction and the reservoir will be recorded and documented – **not known**
- Stimulation of and assistance with agricultural development - **Not continued.**
- AVDA to ensure the Electricity Commission work, nation's provision of power, from the reservoir and its facilities will not be interrupted – **done**
- AVDA's or its client's activities will not prohibit or hinder Elcom from utilizing the reservoir and facilities and electricity generation - **done.**

LESSONS FROM RAMU HYDRO SCHEME AND ENERGY SUFFICIENCY

- We have many sources of energy but we seem to be energy deficient or not harnessing it properly.
- Is the Government committed to review the operations and management and structure of PNG Power Ltd with the aim of providing electricity to 70 percent of PNG by 2030?
- PNG Power Ltd has progressed from ELCOM but considering the Ramu Hydro Scheme Feasibility Study and the establishment of ELCOM and AVDA, there has never been a comprehensive review undertaken for the Ramu Hydro Electricity Scheme and the energy needs.
- Since 1983, PNG has undergone political, social, economic, fiscal and technological developments. Since the Project was undertaken by Electricity Commission including the establishment of AVDA, there has been changes in the socio economic environment including changes in legislation and policies.
- I have heard about Asian Development Bank reports on reforming the State Owned Enterprises but is this looking at what has happened and the status to date.

Lessons from Ramu Hydro continued

How have we fared under the Ramu Hydro Scheme?

1. Ramu 1 – Phase 1 - 45-megawatt capacity **1970-71**
2. Ramu 1 – Phase 2 –Yonki Dam, 150-megawatt capacity **1986-1991**
3. Ramu 1 – Phase 3 or Toe of Dam Project **2000 to ???**
4. Ramu 2 – increase to 200 megawatts **2010 to ????**
5. Ramu 3 –increase up to 250 megawatts **when**

Lessons from Ramu Hydro continued

- We started with electricity for Goroka Town and then Goroka District between 1950 and 1971 and then Ramu Hydro Scheme from 1971 to 1991 commissioning of the Yonki Dam. There is need for Review of the energy needs of PNG and also PNG Power Ltd.
- In 1993, we saw vehicles driving over the Yonki Dam and new high transmission power lines on the Ramu Grid and the same grasses of Arona and Markham today. We cannot blame PNG Power because I have not seen any new things except changes in the size and population of Goroka and Lae.
- While the Ramu Grid remains the same or had minor changes, we have Ramu Nickel Mine, Kainantu Mine, Porgera Mine, Hidden Valley Mine, oil palm mills in Ramu and Marham, stock feed processing and meat factory at Rumion and new Divine Word University and University of Goroka etc.
- Has PNG Power Ltd be made an evolving entity in pace with the country's economic, social, technological and political changes, and able to focus on its core business of generation, transmission and distribution of electricity?
- **The Ramu 1 to 3 Plan shows we are still held back by 20 years. So our generation is still down whilst demand has not been met.**

DIFFERENT ENERGY SOURCES AND SAME TRANSMISSION AND SAME TARRIFF ACROSS PNG

- Let us look at feeding diesel, gas and air or wind into the electricity system. We may be addressing generation aspect but is it going to feed into the existing transmission and distribution system? My answer is simple No.
- We are having shortage or poor transmission or shortage in the system. We need massive investment in electricity infrastructure right around PNG.
- Should the electricity users of diesel power station in Lae and Tari and Rai Coast be paying the same price of say 0.80 toea per kilowatt?
- What is the price of diesel, gas or hydro power per kilowatt in Western, Manus, Sandaun and Jiwaka and should they all be selling at 0.80 toea per kilowatt?

Continued

- PNG Power Ltd can be liquidated tomorrow but if we cannot answer the three questions, we are far from providing solution for PNG .
- We need to bring in needed capital, technology and expertise to boost generation capacity and also to support rehabilitation of deteriorating transmission and distribution network.
- The country can have rich endowment in hydro, geothermal, solar, wind and biomass but without addressing existing infrastructure, we can only talk about great potential in the sustainable and least-cost power generation.
- Businesses and industries that can generate own power by diesel or solar or wind must be allowed so that it reduces the load on the existing grids.

Continued

- The Government must support and direct and ensure PNG Power Limited must reform itself on its productivity and efficiency whilst massive public investment is required in generation, transmission and distribution networks and then review into different sources of energy and the tariff across provinces and energy sources.
- The review of energy source and tariff will also address the generation and supply of power by independent power producers.

SUMMARY

- The Government has seen the need for reform by adopting the National Energy Policy and enacted the **National Energy Act** and established the National Energy Authority and engaged on the PNG Electrification Partnership with different countries.
- We can create NEA or rebrand PPL or come up with another policy on connecting the remaining 30 percent to electricity but without massive investment in the infrastructure, we can be assured of the institutional and regulatory environment but not having power in our homes and hospitals etc.
- An option could be for PPL to move to Ramu, Warangoi and Rouna Grid and open up or lease all its generators and facilities in provinces and districts and enable private Industry players to introduce different energy sources as they see fit so that it opens up the country.

Summary Continued

- Independent power producers should be allowed to bid for a province each while PPL can focus on transmission only and then allow other operators to work on distribution in each Town or geographical region in a province. PPL can invest in transmission lines and maintenance whilst generation and distribution is left to the private sector.
- PNG has an Electrification Partnership (PEP) with Australia, New Zealand, United States and Japan to support PNG realise its goal of reaching 70% electrification by 2030.
- All these would depend on the commitment of the government to reform PPL to obtain source needed capital, technology and expertise to address electricity first and then other outcomes can be achieved.

Reference

- NEC Submission, 1986, 1990
- IASER Reports