



APERC Workshop at EWG54

Wellington, New Zealand, 20 November, 2017

2-2. PRLCE in Papua New Guinea

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**Asia-Pacific
Economic Cooperation**

Outline of Presentation

Background of APEC PRLCE

- Objectives of PRLCE
- PRLCE Milestones
- Review Process

Overview of PNG

- PNG in brief
- PNG key energy indicators
- Institutional arrangements

PRLCE in PNG

- Achievements (Low energy carbon energy pathways)
- Challenges
- Recommendations



Background



Objectives of PRLCE

- PRLCE is APERC's response

APEC Energy Ministers' 2010 Fukui Declaration

promote low-carbon energy policies on supply side like PREE on demand side;

promote low-emission power sources such as renewable energy, nuclear and fossil fuel with CCS; and

provide recommendations for the host economy.

Milestones

Phase 1 (2012-2013): Thailand;
the Philippines



Phase 2 (2013-2014): Indonesia; Malaysia



Phase 3 (2014-2016): Viet Nam



Phase 4 (2017): Papua New Guinea



Asia-Pacific
Economic Cooperation

**Peer Review on Low Carbon Energy
Policies in Papua New Guinea**

Draft Report for the APEC Energy Working Group

October 2017

The Peer Review reports are available at:
<http://aperc.ieej.or.jp/publications/reports/prlce.php>

Review process

- Conducted on 1-4 August 2017 with focus on hydropower resources
- **23 participants** from PNG stakeholders, **APERC Team** and **7 experts**
- **Review coverage**
 - Overarching Findings
 - Institutional Context
 - Renewable Energy Goals, Targets and Strategy
 - Regulation and Infrastructure
 - Bioenergy - Biofuels, Biomass
 - Hydropower and Ocean energy
 - Solar and PV
 - Geothermal Energy
 - Wind Energy
 - Power Supply System, Smart Grid, Private Participation
 - Greenhouse Gas Management
- The peer review team came up with **44** recommendations



Experts

Dr. Dennis Y.C. Leung	HKC
Mr. Faisal Rahadian	INA
Mr. David Rohan	NZ
Mr. Andresito Ulgado	RP
Dr. Fu-Ming Lin	CT
Dr. Nuwong Chollacoop	THA
Mr. Stephen C. Walls	US



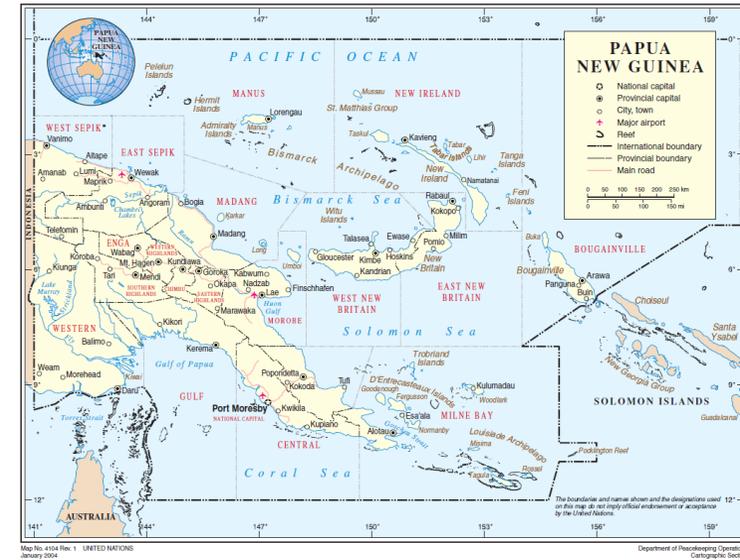
Overview of PNG

PNG in brief

Economic indicators (2015)

Area (km ²)	462 840
GDP, PPP(constant 2011 USD) (billions)	14.2
Population (millions)	7.9
Income per capita	1 787.53

Source; APEC data



Source; UN map

Fossil fuel energy sources(end 2015)

Oil reserves (million barrels)	200
Gas reserves (billion m ³)	141

Source; APEC Overview 2016

Electricity access 13%

Renewable energy sources (Potential and targets)

Hydro potential (MW)	15 000
Geothermal potential (MW)	4 000
Biomass 2050 target (MW)	90
Solar 2050 target (MW)	100
Wind (large potential)	

Source : PNG Background Information

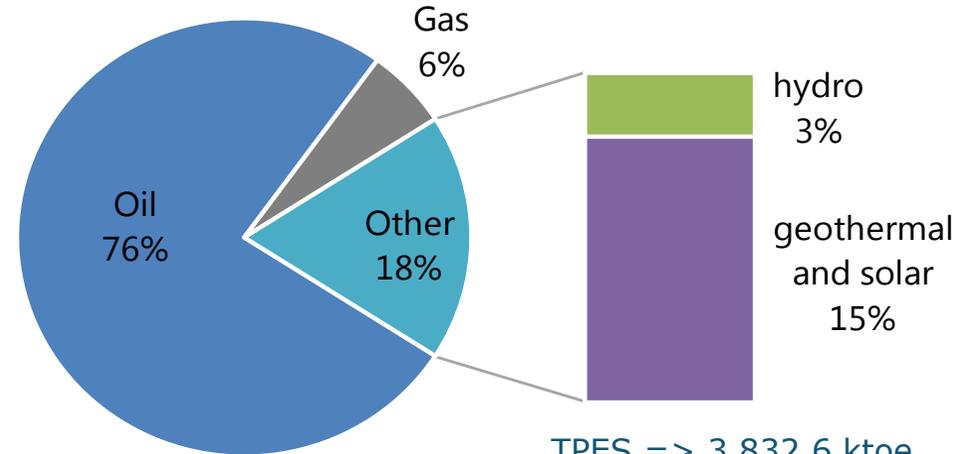
PNG key energy indicators (2015)

Per capita

TPES	0.48 toe/capita
Electricity consumption	491 kWh/capita
— other sector	131 kWh/capita
CO2 emissions	0.27 t-C/capita

Source; APEC data

Primary energy mix

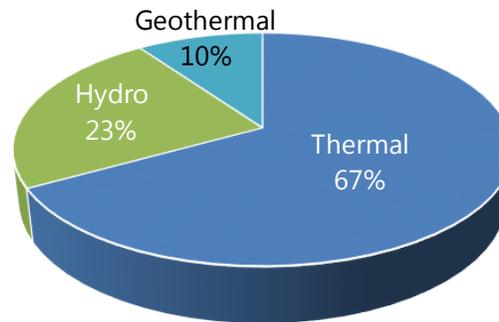


3 Island grids (Ramu, Port Moresby, Gazelle)



Source; PNG presentation

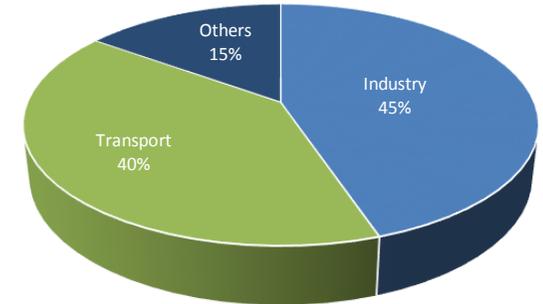
Power generation mix



Total power generation => 4 324 GWh

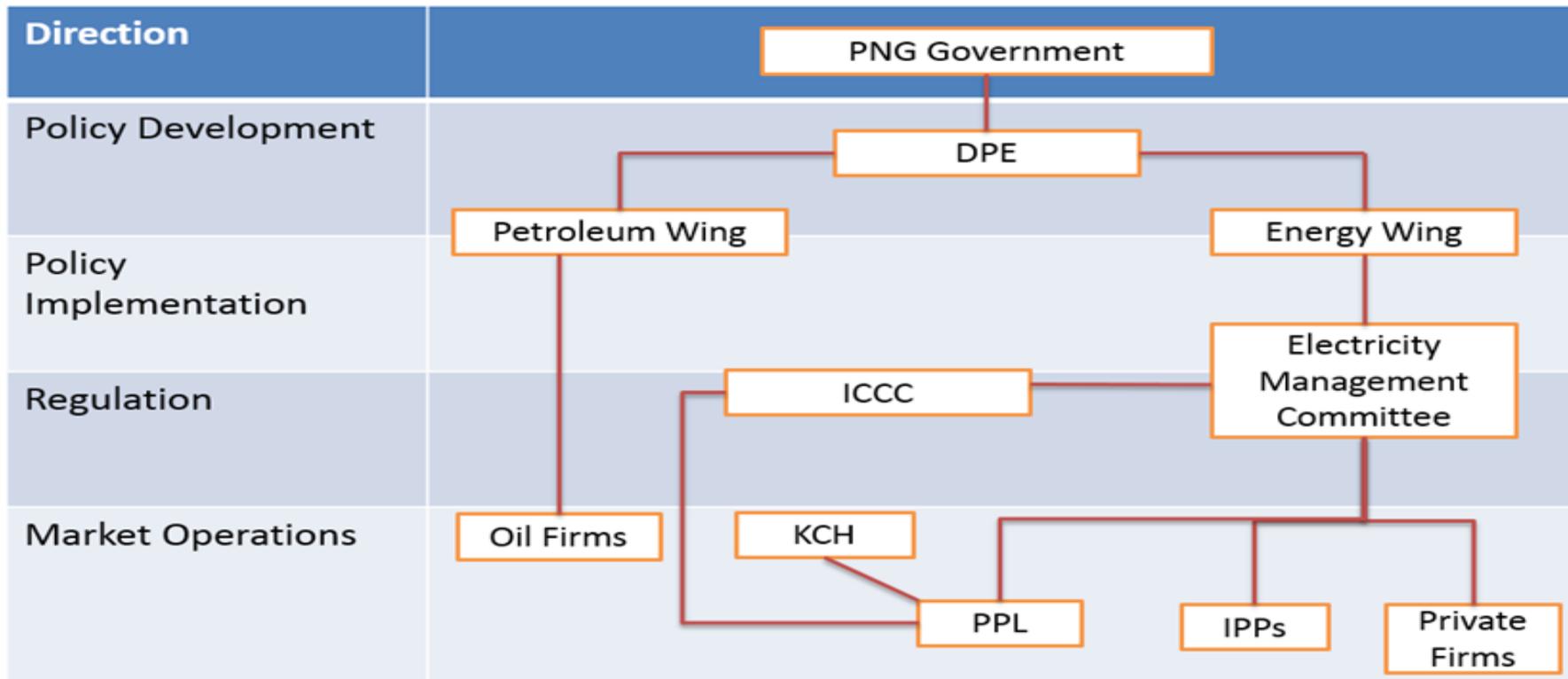
Source; APEC data

Final energy consumption



TFEC => 1 587 ktoe

PNG's institutional arrangement



ICCC = Independent Consumer and Competition Commission
 IPP = Independent Power Producer
 KCH = Kumul Consolidated Holdings
 PPL = PNG Power Limited

Energy Wing of the Department of Petroleum & Energy (DPE) is in charge of planning and implementing all other energy policies including renewable energy (RE) policies

Source: PNG presentation during PRLCE



PRLCE in PNG

Achievements (Low carbon energy pathways)

Energy policies related to low carbonization

Biofuel Policy

Geothermal Commercialization

Renewable Energy Policy

Renewable and Sustainable Growth Strategy

Nationally Determined Contribution (NDC)

- 100% renewable energy by 2050

Economic development

- National Strategy for Responsible Sustainable Development (StaRS)
- SDG7
- Low carbon energy projects for Green Climate Fund

Building-up from the absence of any policies from early years, several policies, especially on low carbon energy, have been formulated which are either for implementation and or in the process of obtaining cabinet's approval

PRLCE in PNG Recommendations



Tailored towards achieving RE targets of 100% by 2050

Overarching Findings

Institutional Context

Renewable Energy Goals, Targets and Strategy

Regulation and Infrastructure

Bioenergy - Biofuels, Biomass

Hydropower and Ocean energy

Solar and PV

Geothermal Energy

Wind Energy

Power Supply System, Smart Grid, Private Participation

Greenhouse Gas Management





Recommendations to meet PNG's challenges



Overarching Findings

Maintaining political will to expedite energy development

- Recommendation 1: Conduct survey
- Recommendation 3: Tariff review

Lack of trained personnel in the sector

- Recommendation 4: Capacity buildings
- Recommendation 5: Training

Public attitude and perception

- Recommendation 6: Education and public communications
- Recommendation 7: Awareness raising



Institutional Context



Manpower shortage and lack of official mandate

- **Recommendation 9:** The PNG Government should allocate enough budget for RE and other energy policies including personnel expenditure.
- **Recommendation 10:** Many government officials are designated as “acting” officers. This situation should be made known to higher officials (maybe at the ministerial level) and rectified in order to give clear mandate to the relevant officials.

Government agencies are fragmented and tend to lack good coordination/ Insufficient consultation and communications with stakeholders

- **Recommendation 11:** Communications across government agencies should be improved to ensure that each agency is aware of what another agency is doing
- **Recommendation 12:** DPE should foster closer contact with all RE stakeholders
- **Recommendation 13:** More consultation with private companies during the development of market policies, and more public engagement prior to rolling out public infrastructure plans.



Renewable Energy Goals, Targets and Strategy

PNG has not communicated any targets for improving the reliability of electricity service or reducing costs to ratepayers.

Less than 15% of the population has access to electricity, and a similarly low percentage of the population lives in urban areas.

- **Recommendation 14:** PNG should focus attention and resources on a near-term action plan to develop the lowest cost renewable resource available near load centres.
- **Recommendation 15:** PNG should engage with rural communities to develop a remote, off-grid power system as part of delivering other public services, such as health, mobile banking, agricultural marketing, or remote education.
- **Recommendation 16:** PNG should prioritise new renewable energy and energy-efficient technologies as part of its energy development strategy.



Regulation and Infrastructure

Some issues, such as biodiesel standards and community benefits from hosting energy infrastructure, have not been fully addressed.

- **Recommendation 17:** PNG should rely on internationally-recognised standards when establishing new regulations covering the performance of technology.
- **Recommendation 18:** PNG should consider establishing performance standards for electricity providers, such as benchmarks for reliability and line losses, to complement economic regulation.

Concerns with the reliability and quality of electric service and the condition of the electricity grid.

- **Recommendation 19:** PNG should analyse latent demand for electricity so that capital-intensive energy infrastructure investments can be optimised to meet customer needs in non-electrified areas.



Bioenergy - Biofuels, Biomass

Lack of specific targets/mechanisms for biofuel usage in transportation sector.

Lack of technical standards/guidelines for biofuel promotion

- **Recommendation 21:** Take best practices from other APEC economies regarding biofuel implementation.



Hydropower and Ocean energy



Absence of policy on hydropower and ocean energy development (micro, mini, large, ocean) i.e., incentives, guidelines, etc.

- **Recommendation 22:** Enact a law that provides policy direction and incentives on developing hydropower and ocean resources.



Solar and PV

Difficulties in land acquisition for large-scale solar farms.

- **Recommendation 24:** Design stand-alone solar lighting system pilot projects for rural villages and develop a sustainable financial model.



Geothermal Energy

Absence of policy on geothermal energy development i.e., incentives, guidelines, etc.

- **Recommendation 25:** Enact a law that provides policy direction and incentives on developing geothermal energy resources



Wind Energy

Uncertain return on investment of wind power projects

- **Recommendation 26:** Early planning of wind turbines installation.
- **Recommendation 27:** Offering of incentives to private investors

Land accessibility and environmental issues

- **Recommendation 28:** Construction of off-grid wind turbines
- **Recommendation 30:** Encourage communication with various stakeholders



Power Supply System, Smart Grid, Private Participation

The future generation portfolio (more renewables) will require different skills and capabilities from the current predominantly diesel-based system.

- **Recommendation 32:** The investment focus should move from individual 'least-cost generation projects' to a 'least-cost generation portfolio' approach.

Understanding the full implications of increasing electricity access/renewable electricity targets.

- **Recommendation 33:** Better understand the drivers of electricity demand.

Affordability of electricity

- **Recommendation 35:** Better understand the affordability versus cost, and consumers' willingness to pay (particularly for rural electrification)



Greenhouse Gas Management

Aggressive targets of GHG reduction

- **Recommendation 38:** Greening road transport
- **Recommendation 39:** Turning waste into energy
- **Recommendation 40:** Provide more incentives for energy efficiency (EE) and renewable energy (RE) initiatives
- **Recommendation 42:** Encourage more sectors and NGOs to participate in market driven CDM projects to mitigate GHG emissions.
- **Recommendation 44:** Develop and implement building energy codes for new buildings



Thank you for your kind attention

<http://aperc.ieej.or.jp/>