Tying Electricity Access and Resilience in Papua New Guinea

Pacific Energy Resilience Series of Workshops, 1/12/2020: Planning and investing in more resilient energy systems
Context

• Abundant energy resources but more than 85 % either have no electricity or have an insufficient supply

• Electricity-deficient population are sparsely distributed in rural rugged terrain

• Grid extension is the political favorite for electrification, and centralized Large Hydro and Diesel-thermal the cornerstone of grid generation. Gas slowly becoming a political favourite.

• PNG prone to natural and human disasters/interventions that often affect electricity supply.

• Goals: 70 % Electrification by 2030 and 100% Renewables by 2050

• Energy Sector is underdeveloped: Limited Planning
PNG’s drought disaster impacting on Port Moresby’s power supply

By Girish Sawant

PNG drought having increasing impact on capital

Source: ABC

PNG drought having increasing impact on capital

The drought in Papua New Guinea is having an increasing impact on the capital, Port Moresby. Sean Dorney reports that from next Monday, severe power rationing will be introduced to try to save water in the dam that feeds the city’s hydro-electric system.

No power from PNG Power

Source: The National

EMERGENCY power cuts were carried out in Lee, Madang and the Highlands region on Tuesday because of flooding at the Ramu Hydropower Power Station and faults on the transmission lines to Madang.

Power supply to Madang from Ramu was cut off for the rest of the week as a result of a transmission line fault and PNG Power personnel have been patrolling the transmission lines to identify and repair the fault.

Meanwhile, the fault at the Ramu power station on Monday night affected the generators, resulting in the supply to Lee and the Highlands region being cut off.

The company said the Ramu generators were restored with normal power supply back in Lee and the Highlands region just after lunch on Tuesday.

“Load shedding continues in Madang, with supply coming from the town’s diesel generators while company personnel address the line fault,” PNG Power said.
Human Interventions

- Vandalism
- Landowner issues
- Fuel shortage/high Fuel prices
Current Grid Electricity Infrastructure

Source: NEROP
NEROP Plan is expensive ($3.2B) and probably less resilient.

Imagine supplying every unelectrified households with a Sun King 400 system ($500), this would cost about $0.58B.

### Table 9: System results and costs for 100% electricity access (grid and off-grid) by 2030

<table>
<thead>
<tr>
<th>Results of spatial query</th>
<th>Current Grid Access (2016)</th>
<th>Program for 100% Electricity Access (Grid &amp; Off-Grid) by 2030</th>
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<tbody>
<tr>
<td></td>
<td>Population (Households)</td>
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<td></td>
<td>Access Categories</td>
<td>Recommended Type of Access and Investments</td>
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<td></td>
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<td>EasyPay meters for existing customers</td>
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<td>Improved connections + EasyPay meters for consumers</td>
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<td>Grid Intensification (LV line + connection)</td>
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<td>Grid extension (MV, LV, connection)</td>
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<td>Off-grid / Mini-Grid</td>
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<td>Population (Households)</td>
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</table>

Source: NEROP
Electricity Access + Resilience

Planning and Investment plays a key role!

Opportunities
- Broader energy mix.
  - Renewables
- Looking beyond grid extension.
- Builds resilient communities
- PNG Electrification Partnership (PEP)
- Emphasized in National Energy Policy

Barriers
- Land conflicts
- Weak institutions
- Limited Technical Capacity
- Limited Finance
Questions to Explore Resilience

- How can the technical capacity for renewable technologies be developed within government agencies?
- How can planning in general be improved?
  - How can traditional knowledge and resilience practices be integrated within planning?
- Can RE-powered mini-grids solve energy access issues for remote communities?
- Could standalones systems play a more significant role in electrifying PNG while also addressing energy resilience of remote communities? (compared to grid and minigrid)