

Divune Hydropower plant



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

Natural Disasters



PNG's drought disaster impacting on Port Moresby's power supply

By: Girish Sawlani



Posted Tue 8 Sep 2015, 4:04pm Updated Tue 8 Sep 2015, 4:20pm

PNG

PNG drought having increasing impact on capital

News and Press Release • Source: ABC • Posted: 11 Nov 1997 • Originally published: 11 Nov 1997

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:



LATEST NEWS

Landowners Shutdown Sirinumu Dam In Port Moresby

01:55 PM - PNG Power Ltd Advises Port Moresby Residents That Koiari Landowners Shutdown Sirinumu Dam As Of Lunch Time Today.

September 1, 2017

No power from PNG Power

January 9, 2013 • webmaster • National, Normal

Article Views : 230

Source:
The National, Thursday 10th January, 2013

EMERGENCY power cuts were carried out in Lae, Madang and the Highlands region on Tuesday because of flooding at the Ramu Hydro Power Station and faults on the transmission lines to Madang. Normal power supply to Madang from Ramu was cut off at 5pm on Monday as a result of a transmission line fault and PNG Power personnel patrolled the transmission lines to identify and repair the fault. Heavy flooding at the Ramu power station on Monday night affected the generators, resulting in the supply to Lae and the highlands region being cut off. Townships in the highlands region, Lae and Madang were without power, with power coming from diesel generators. The company said the Ramu generators were restored with normal power supply back in Lae 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

TOTAL POWER OUTAGE IN MT HAGEN AND JIWAKA DUE TO VANDALISM

📅 06 Nov 2019

- Vandalism
- Landowner issues
- Fuel shortage/ high Fuel prices

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New threat to LNG project from disgruntled landholders



Hides LOs shut gates to power plant, camp site

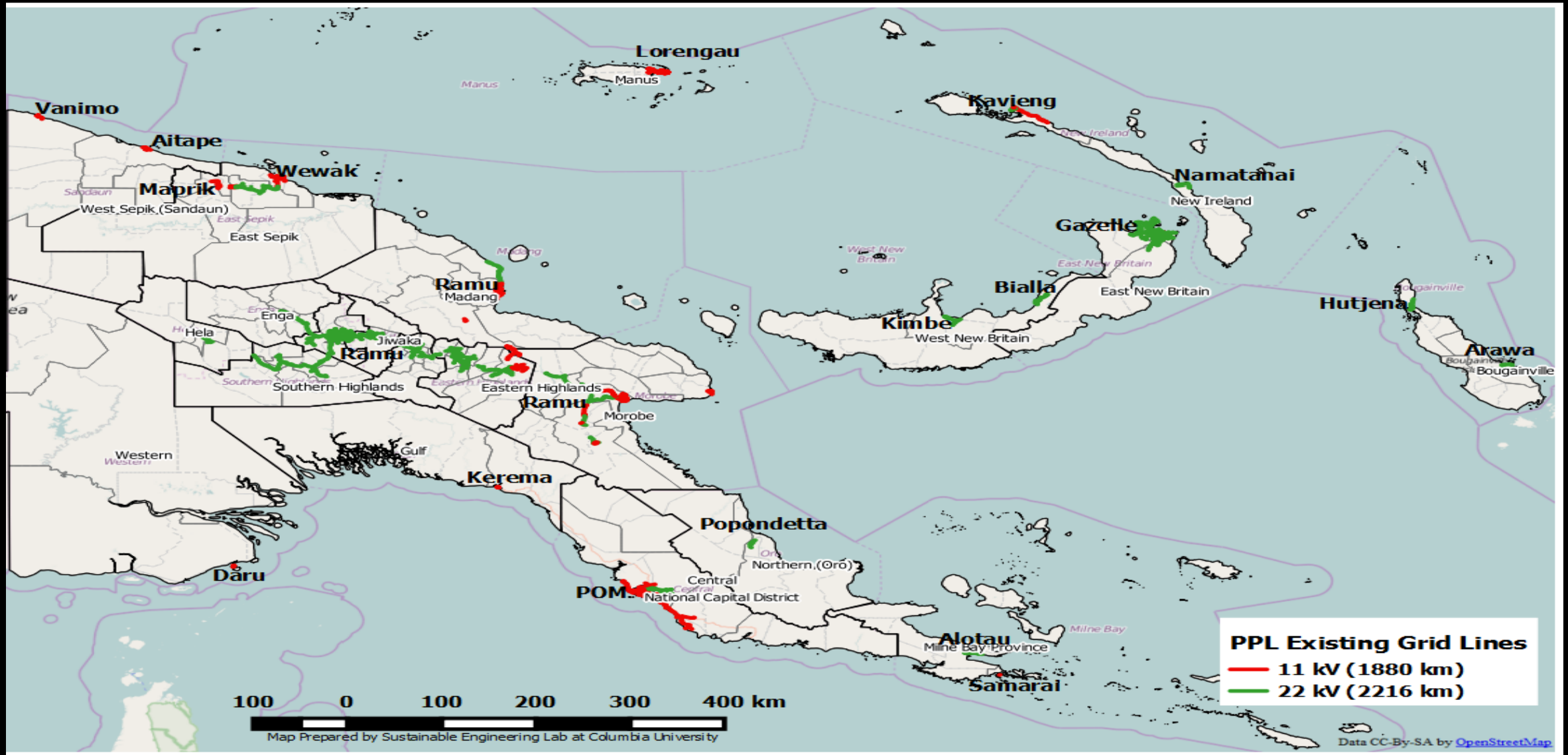
Post Courier | April 12, 2017

TOP STORIES

Power Outages In City Caused By Fuel Shortage, Says Minister Muthuvel

The Ongoing Power Blackouts In Port Moresby And Other Urban Centres Are Due To A Shortage Of Fuel, Particularly Diesel From Fuel Supplier Puma Energy.

Current Grid Electricity Infrastructure



NEROP Plan is expensive(\$3.2B) and probably less resilient

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

Results of spatial query	Current Grid Access (2016)			Program for 100% Electricity Access (Grid & Off-Grid) by 2030					
	Access Categories	Population	Percent	Recommended Type of Access and Investments	Population	Per-cent	Capex per HH	Total Capex (M)	
		(Households)			(Households)				
Within range of LV connection: <1 km	Customers: grid access with PPL account	460,000	6%	EasyPay meters for existing customers	460,000	4%	\$260	\$22	
		90,000			90,000				
	Consumers: grid access w/o PPL account	460,000	6%	Improved connections + EasyPay meters for consumers	460,000	4%	\$450	\$39	
		90,000			90,000				
	No grid access (calculated by difference)	540,000	7%	Grid Intensification (LV line + connection)	1,680,000	14%	\$990	\$272	
		100,000			280,000				
Beyond range of LV connection: >1km	Requires new access (grid or off-grid determined by geospatial model)	6,030,000	81%	Grid extension (MV, LV, connection)	6,790,000	55%	\$1,680	\$2,200	
		1,160,000			1,320,000				
				Off-grid / Mini-Grid	2,950,000	24%	\$1,160	\$660	
		570,000							
Population		7,630,000	100%	Population		12,330,000	100%	\$1,370	\$3,200
(Households)		1,440,000		(Households)		2,330,000			

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



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)