

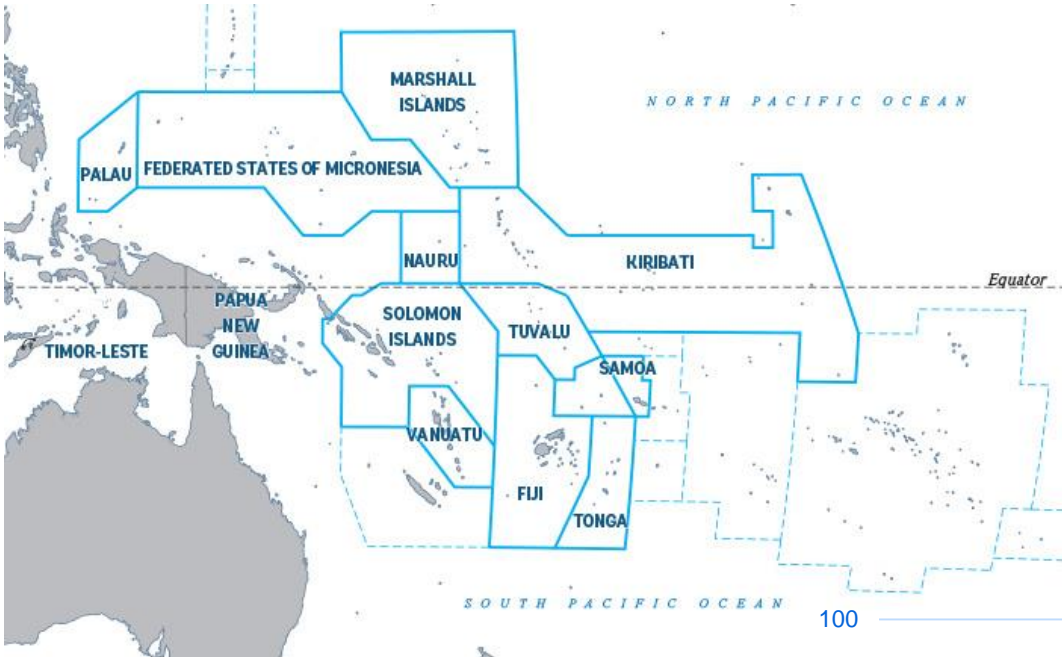
PENETRATION OF VARIABLE RENEWABLES IN THE PACIFIC ISLAND COUNTRIES – SMALL GRIDS AND OFF GRID

Financing, policy and governance challenges & opportunities



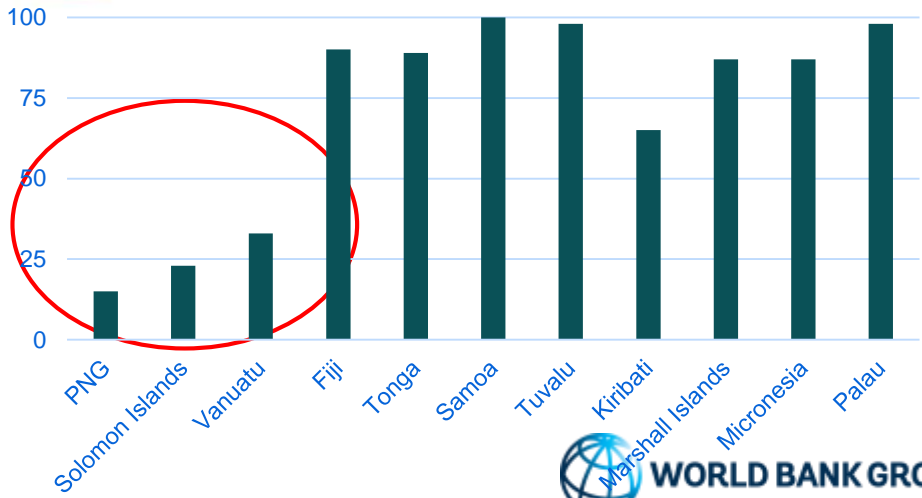
Kamleshwar Khelawan
December, 2018

World Bank Group (WBG) Pacific energy operations



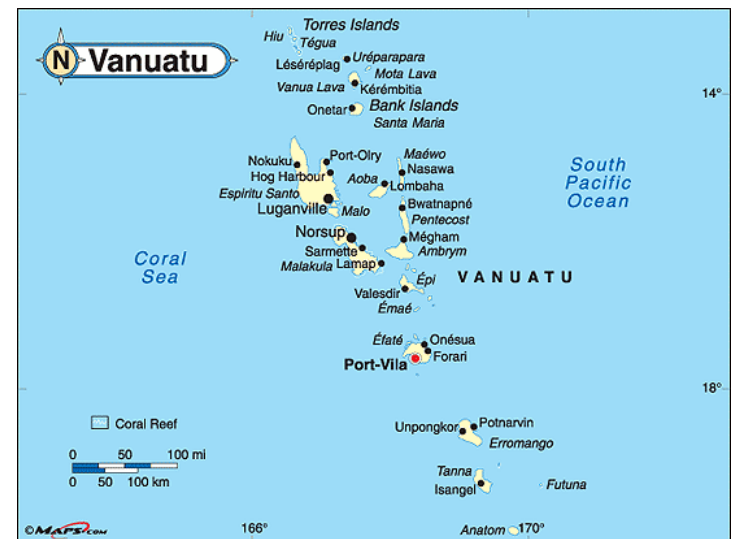
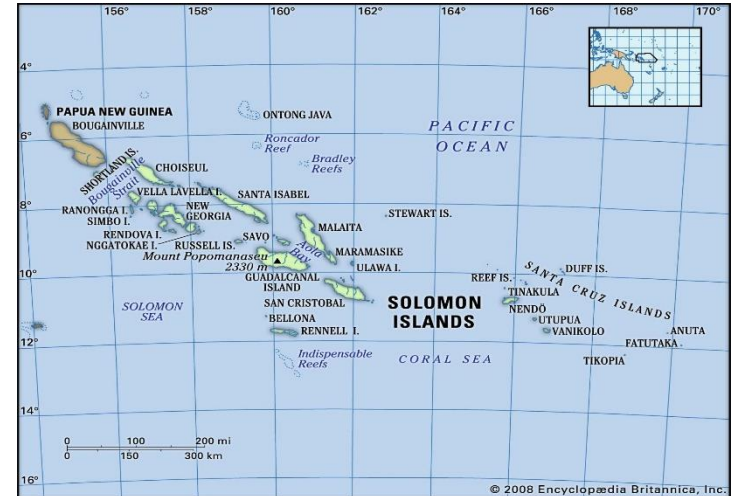
- WBG - entities
 - Technical assistance
 - Grants, soft loans, commercial loans, guarantees and dispute resolution
- 13 countries, 10M people, 8 with populations less than 200K
- > 75% lack access to electricity

Energy access rates %



Energy sector challenges

- Demand - Island grids, relatively small demand - integration issues
- Resources - limited indigenous
- Off grid - dispersed communities, limited technical expertise, remote from main centers, markets thin (size and number), limited economies of scale
- Weak supply chains, small private sector
- Policy, planning and legal and regulatory frameworks (governance).
- Institutions and capacity
- Finance - for borrowers (loans) and Investors/suppliers (working capital/loans/equity)
- Community land ownership



Renewable energy solutions

- Grid connected – utility operated
- Mini/micro grids - utility models for larger population centers, purchase options for smaller single user applications
- Solar Home Systems (SHS) for dispersed communities
- “Plug and Play” systems for the very remote isolated homes and businesses



Photo: Courtesy PUB, Kiribati



Photos: Courtesy DoE, Vanuatu and Fiji

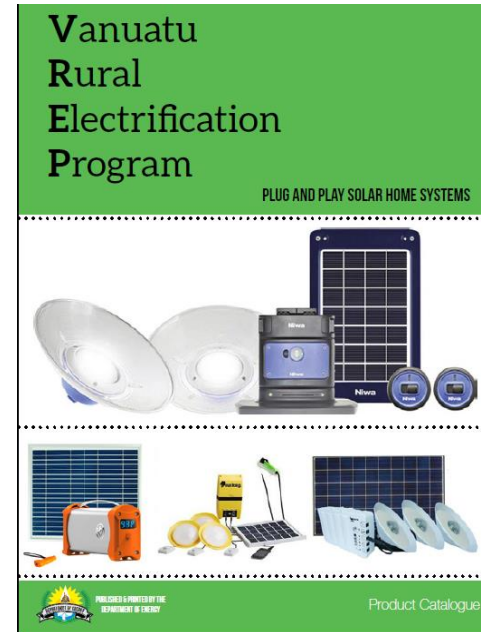
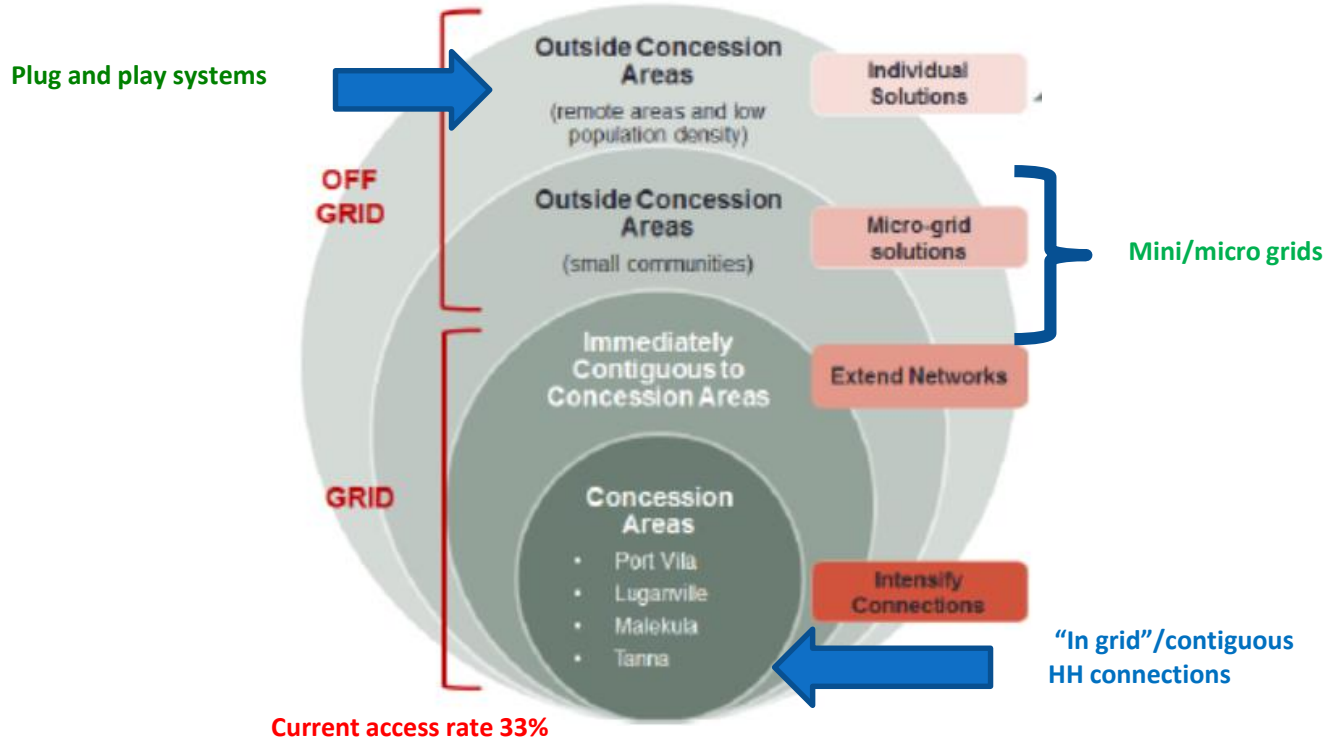
Kiribati grid connected solar photovoltaic project

- Objective: Reduce reliance on diesel and fuel costs and support a transition to renewables
- 730 kW of grant financed solar PVs installations at four sites – owned by the Government
- Fuel savings \$300K per annum, GHG reductions of 1,000 tons p.a.
- SCADA and Energy Management System
- 3 – year operations and maintenance and capacity building program
- One of 3 projects adding 1.6MW to grid (30 – 50 % of demand)
- New challenges – upscaling solar with storage and energy management systems



Photos: PUB, Kiribati

Vanuatu: National Energy Road Map



Photos: Courtesy DoE, Vanuatu
Diagram: Vanuatu National Energy Road Map

Vanuatu rural electrification project

- Objective: Provide access to electricity to rural consumers
- The Republic of Vanuatu has 82 islands (65 inhabited)
- National household count: approximately **55,000**:
 - 13,750 urban, 41,250 rural areas

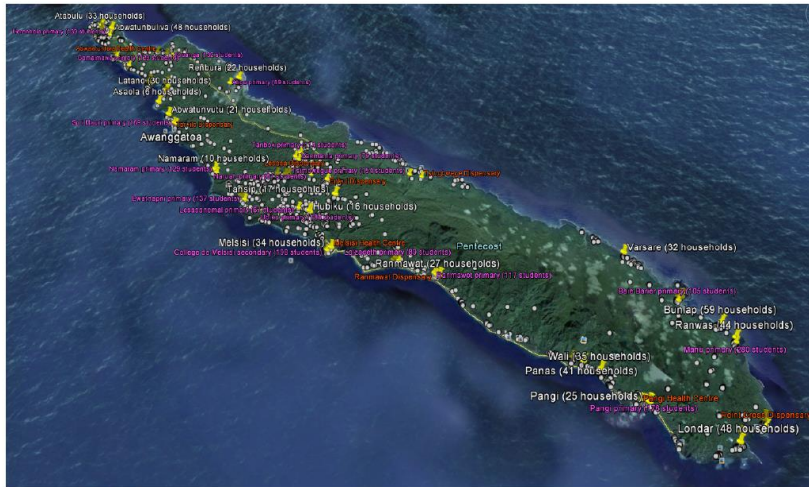


Vanua Lava Island
 Total villages = 30 villages (3110 population / 587 households)
 Largest village = 128 households (591 population)



- Average household monthly income:
 - Urban: USD 970, Rural: USD 792
- Subsidized “plug and play” solar systems
- Subsidized Solar Home Systems
- Micro grids for single user installations
- Mini grids – private utility models

Vanuatu rural electrification project - results



Pentecost Island
 Total Villages = 278 (18809 population / 4035 households)
 Largest Village = 69 households (297 population)

Source: Google maps, World Bank and DoE, Vanuatu

Fiji/regional sustainable energy financing project

- Objective: Encourage commercial banks to lend to individuals and businesses for renewable energy and energy efficiency investments
- A Risk Sharing Facility (US\$5.2M). Guarantees 50% of the loan issued
- US\$22M in loans (over US\$40M total investment) with NPL of 1%
- 4.7MW of renewable energy benefiting over 100,000 people



- Encourage innovation* – demand driven, instead of supply-side, public sector led investments
- Achieve sustainability by stimulating demand and promoting development of supply chains and financial products

Photos: Courtesy DoE, Fiji

	Current Actions	3 year	10 year
PIC Utilities	<ul style="list-style-type: none"> • Performance improvements • Plans and roadmaps 	<ul style="list-style-type: none"> • Improvements & investments • Supply diversification 	<ul style="list-style-type: none"> • Support Government targets for RE penetration and NDCs
Consultants	<ul style="list-style-type: none"> • Analysis and planning support • Technology standards 	<ul style="list-style-type: none"> • Implementation support 	<ul style="list-style-type: none"> • Post implementation reviews
PIC Govt	<ul style="list-style-type: none"> • Policy & plans, legal & regulatory enablers, RE targets and NDCs 	<ul style="list-style-type: none"> • Monitoring and compliance • Institutions & capacity 	<ul style="list-style-type: none"> • Manage the energy transition to meet global commitments
Research	<ul style="list-style-type: none"> • Technology solutions • Distributed energy management and optimization 	<ul style="list-style-type: none"> • Demonstrate/commercialize new technologies • Manage distributed generation within/into a network 	<ul style="list-style-type: none"> • Support new business models (“democratisation of power” “convergence - energy, finance, ICT”)
Donors/finance	<ul style="list-style-type: none"> • Policy, governance and capacity building support • R&D support • New business, delivery & operating models 	<ul style="list-style-type: none"> • Mobilize MDB finance • Mobilize private sector participation & finance • Implementation support 	<ul style="list-style-type: none"> • Support long term policy, technology and institutional development • Post implementation reviews



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