

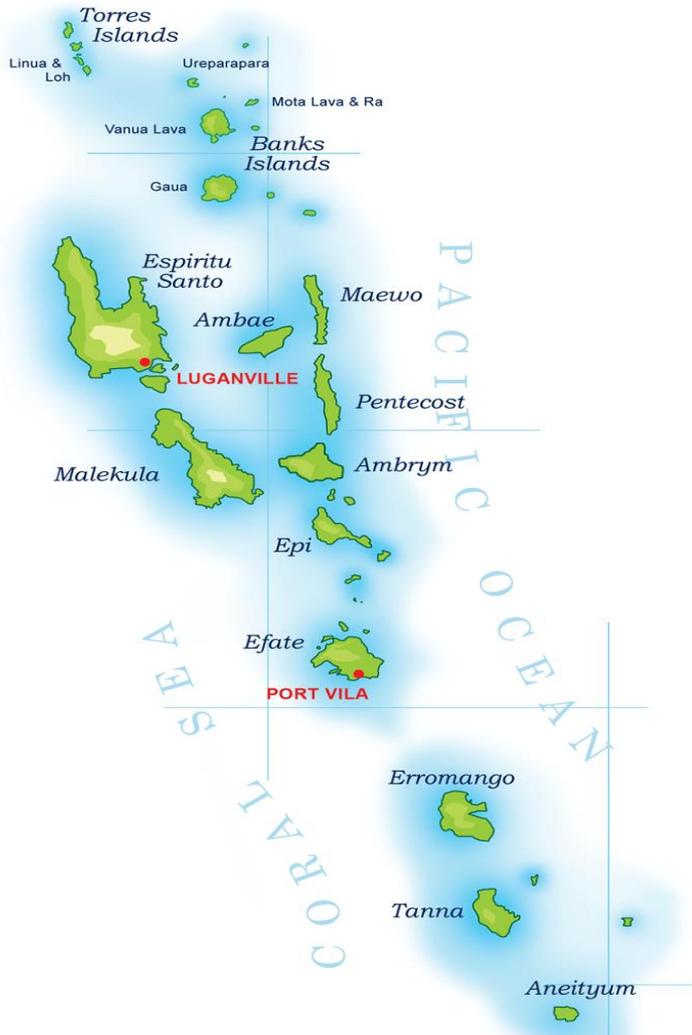


Energy Sector in Vanuatu – Current Status & Way Forward

Pacific Update Conference, Suva, 18th-19th July 2016
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Country Context



Island nation in South Pacific Ocean - more than 80 islands - 65 inhabited.

Population 284,700 (2016 est.) in more than 56,940 households

Around 28 % of the population lives on the main island of Efate - 75 percent live in rural areas

Key economic Sectors: subsistence agriculture, tourism, offshore financial services, and raising cattle.

Highly vulnerable to natural disasters, such as cyclones, flooding, earthquakes, landslides, tsunamis and volcanic eruptions

Energy Sector Background



Vanuatu Rural Electrification Project



- Characterized by low access, high relative prices
- Significant reliance on imported fuels (80%)
- Only 27 % of households have access to a permanent source of electricity.
- Key energy sector public and private institutions: Ministry of Climate Change and Natural Hazards (Department of Energy) Utilities regulatory Authority and Electricity Utility Companies (UNELCO & VUI) and Private RE Companies.
- Renewable energy sources (Solar, Geothermal, Hydro, Wind) are substantial, although not yet utilized according to its potential.
- Solar has been shown in Vanuatu and other parts of the Pacific to be a reliable and cost effective approach to basic electrification for rural areas

Access to Energy– Specific Challenges



- Characterised by small size, long distances between islands, and isolated populations
- Grid-based, publicly distributed electricity only on the main island; Limited or no supply to rural areas
- Half or more of the country's energy use - based on traditional biomass; > half of households primary energy source
- Many landowners, and often unclear land ownership including complex procedures to use land for RE projects and reticulation of electricity
- High upfront capital costs for most renewable energy projects due to remote and dispersed nature of islands.
- Unique and difficult challenges – topography, poorly developed infrastructure; fragmented energy markets; economies of scale and limited financial resources

National Energy Road Map (NERM) 2016-2030



Vanuatu National Energy Road Map
2013-2020



- Launched in April 2014
- Updated NERM (2016-2030) June 2016 - reiterates the Government's commitment to achieving the original NERM's objectives.
- **Vision:** *"To energise Vanuatu's growth and development through the provision of secure, affordable, widely accessible, high quality, clean energy services for an Educated, Healthy, and Wealthy nation."*
- The NERM 2013-2020, identified five priorities for the energy sector: access, petroleum supply, affordability, energy security, and climate change. It set out objectives, targets and actions to achieve these priorities and contribute to the NERM's overall vision.

Priorities and Key Objectives of the Updated NERM

Accessible energy

1. Extend electricity access to all households and public institutions
2. Extend access to modern cooking fuels

Affordable energy

1. Develop mechanisms to facilitate competitive, affordable prices for electricity, liquid fuels, and cooking fuels
2. Promote investment in least-cost electricity projects
3. Improve the supply-side energy efficiency of electricity generation

Secure and reliable energy

1. Achieve a greater diversity of energy sources
2. Reduce the likelihood and impact on consumers of volatility in the prices of imported petroleum products
3. Facilitate the development of energy infrastructure that is resilient to natural disasters

Sustainable energy

1. Increase the use of renewable energy as a way to reduce GHG emissions; provide affordable, reliable energy access; and facilitate green growth
2. Promote energy efficiency across the public and private sectors
3. Minimise the adverse environmental, social, and health and safety impacts of energy infrastructure and use

Green growth

1. Promote green energy as a catalyst for sustainable development
2. Consolidate and expand the use of locally produced bio-fuels
3. Promote the use of renewable energy sources in Vanuatu's main economic sectors
4. Promote the appropriate use of renewable energy and energy efficiency technologies in the water sector
5. Improve energy-related business and technical skills among rural island people

Revised Targets in the Updated NERM



Renewable Energy Deployment in both Grid & Off Grid areas

- ❖ *Promoting and Increasing share of RE in Power Generation.*
 - *NERM ambitious target to achieve 65% by 2020*
 - *Btw 2012-2015 share of RE increase from 19%-29%*

Devils Point Wind Farm

- 3.6MW grid connected wind farm in Port Vila (Efate)
- 13 X 275kW VERGNET Wind Turbine installed
- Manage and Operated by the Utility (UNELCO)



Increasing share of RE in Power Generation (cont.)

- Total Capacity: 767 grid Solar PV System in Port Vila (Efate)
- 644kW at the National Parliament Complex
- 123kW installed at the Ministry of Climate Change
- displace 896 tons of CO₂ emissions
- save 324,000 litres of diesel fuel worth US\$378,000 per year (at 2015 prices).
- The project also provides the added benefit of shaded parking for up to 112 cars.
- PPA arrangement with the Utility (UNELCO)

Masdar (UAE) Funded Grid Connected PV System



644kW PV system @ Parliament

Increasing share of RE in Power Generation (cont.)



123kW PV System @ Ministry of Climate Change

Increasing share of RE in Power Generation (cont.)

Undine Bay (North Efate) 501kW Grid Connected PV System

- Supply electricity to 300 Rural
HH in North Efate



Increasing share of RE in Power Generation (cont.)



**1.2 MW Sarakata Hydro in Espiritu Santo
(accounts for 70-80% of Generation)**

RE CAPACITY WITHIN THE GRID/CONCESSION AREA TO DATE

LOCATION	GEN. TYPE	CAPACITY in kW	SINCE
Efate	Wind	3575	2010
Efate	Solar	1338	2011
Santo	Hydro	1200	1995
Santo	Solar	40	2007
Malekula	Solar	20	2012
Tanna	Solar	20	2012

- UNELCO' Energy Mix handles diesel oil, wind power, copra oil (biofuel) and PV solar.
- Today, renewable energies represent 20 % of the total power generation.



Ongoing and Proposed Actions to Increase Rural Energy Access in Off-Grid Areas

Investment or action	Priority	Status
Rural Biofuel Project (Ambae, Vanua Lava)	Immediate	underway
Solar & biogas community RE project	Immediate	being designed
Vanuatu Rural Electricity Project (VREP) Phase 1 plug & play solar PV for off-grid households & public facilities	Immediate	Underway from 2014
Talise Hydro Project, Maewo (Phase 2—installing distribution lines)	Immediate	Underway
Whitesands solar PV micro-grid, Tanna	Highest	proposed
National Green Energy Fund to support investments in renewables-based electricity access & energy efficiency, especially in rural areas	Highest	In draft
Vanuatu Rural Electricity Project (VREP) Phase 2 (solar home systems; mini PV grids)	Highest	proposed
Reform import duties, tariffs and VAT to encourage imports of renewable energy equipment (solar PV, wind, biomass) and spare parts.	Highest	proposed
Develop an electrification plan for renewable energy in remote islands (this study)	Immediate	completed
Commission a national study on biomass resource and use in Vanuatu, and develop a national biomass strategy (with Departments of Forestry and Agriculture)	Highest	proposed
Explore mini-grid RE systems in communities with potential to develop agriculture, fisheries, and/or tourism businesses	Highest	proposed
Encourage systematic implementation of standalone RE systems within communities with strong governance, track record of maintaining infrastructure, and well-established community plans linked to provincial and national plans; not prioritising implementation of standalone RE energy projects in communities likely to have problems maintaining systems in the future	Highest	proposed

Barriers to the Expansion of RE in Vanuatu

Within Concession Area

- i. The process to ensure the use of Land for RE projects and electrical reticulation due to unclear ownership.
- ii. Existing regulatory frameworks does not provide for IPPs to have PPAs with concession holders
- iii. High upfront capital for most RE projects
- iv. Nearly exhausting max. RE penetration allowance into the grid: need stability studies and new investment and/or upgrade on current generating station

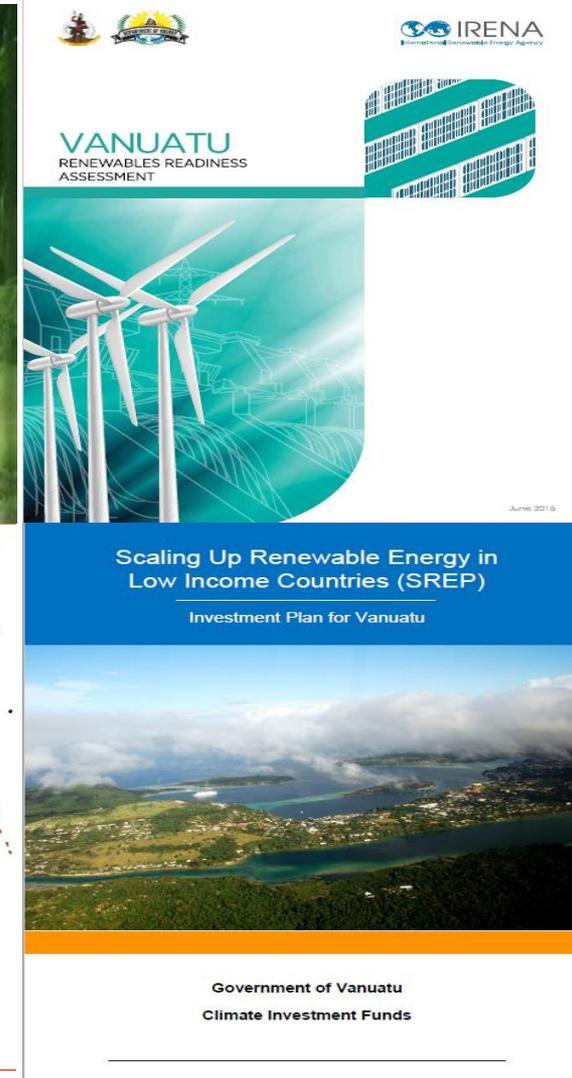
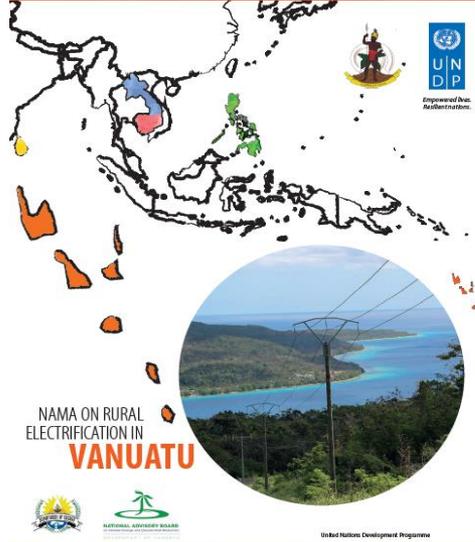
Off-Grid

- i. Equipment maintenance and fee collection for very remote locations
- ii. Limited working capital for local suppliers of individual SHS to maintain adequate inventories
- iii. Limited local capacity for undertaking installation and maintenance, and
- iv. The process to ensure the use of Land for RE projects and electrical reticulation due to unclear ownership

- specific challenges for stand-alone power systems on isolated islands include: developing suitable financing, long term management, O&M plus designing tariff structures that are sustainable and supported by local communities and other stakeholders. Load growth forecast allowance is also a key design challenge for optimising the economics of isolated RE-based power systems.

Policies for Off-Grid Electrification

- 1. Nationally appropriate Mitigation Action (NAMA).**
 - 2 intervention: RE Micro Grids & Grid Extensions
- 2. Intended Nationally Determined Contributions (INDC).**
 - Mitigation contribution too achieve the outcomes and targets of the NERM and Second National Communication.
- 3. Scaling up Renewable Energy (SREP) Investment plan**
 - Two investment priorities
 - i. Individual SHS & Micro and Mini Grid
 - ii. Run of river Hydro Power Gen. (Malekula & Santo)
- 4. Renewable Readiness Assessment (RRA)**
- 5. Vanuatu RE Master Plan**



REPUBLIC OF VANUATU

INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC)

Key Actions & Way Forward - Electrification of Remote Off-Grid Households

- Develop a program of ongoing RE resource assessments
- Assess EU biofuel program in remote islands
- Institutional development - Pursue DoE staffing and resources sufficient for overseeing remote island RE
- Develop & Implement national RE program - Prepare detailed assessment of electrification needs and priorities of various island; Prepare design specifications (solar and other) and budgets
- Monitoring & Evaluation - Annual M&E reporting action plan

Support Needed

- Implementation of many of the energy sector priorities will be heavily dependent on resources (technical & financial) being made available by external development partners, to supplement limited domestic funds.
- Vanuatu intends to place considerable emphasis on working with its development partners, regional agencies, for the financial and technical resources needed to implement its energy sector priorities, including the improvement of access and facilitation to international climate finance.
- Institutional capacity building and training for all stakeholders including DoE needed for efficient and effective tracking progress on the implementation of energy sector priorities and goals.

