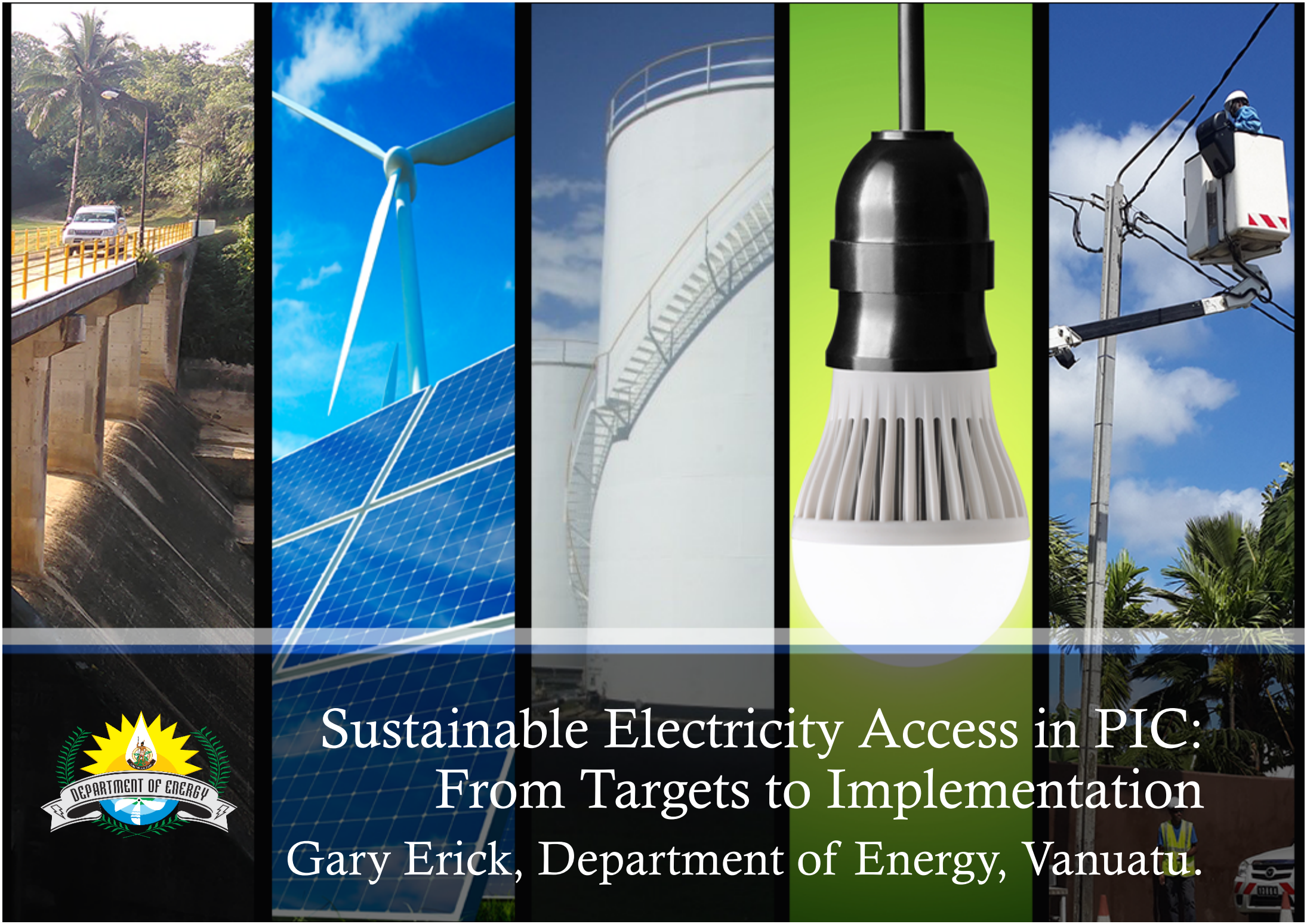
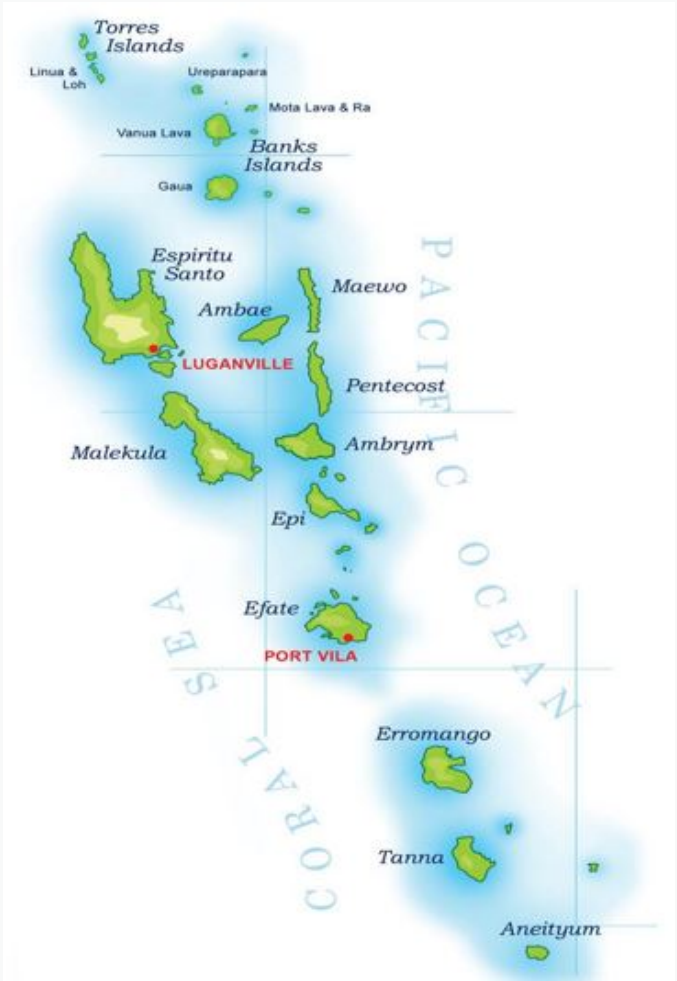


Sustainable Electricity Access in PIC: From Targets to Implementation

Gary Erick, Department of Energy, Vanuatu.

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, & raising cattle.
- Highly vulnerable to natural disasters, such as cyclones, flooding, earthquakes, landslides, tsunamis and volcanic eruptions

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Energy Sector Background

- 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

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National Energy Road Map (NERM) 2016 - 2030

- Launched in April 2014
- Updated NERM (2016-2030) June2016 - 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	Affordable energy	Secure and reliable energy	Sustainable energy	Green growth
1. Extend electricity access to all households and public institutions	1. Develop mechanisms to facilitate competitive, affordable prices for electricity, liquid fuels, and cooking fuels	1. Achieve a greater diversity of energy sources	1. Increase the use of renewable energy as a way to reduce GHG emissions; provide affordable, reliable energy access; and facilitate green growth	1. Promote green energy as a catalyst for sustainable development
2. Extend access to modern cooking fuels	2. Promote investment in least-cost electricity projects	2. Reduce the likelihood and impact on consumers of volatility in the prices of imported petroleum products	2. Promote energy efficiency across the public and private sectors	2. Consolidate and expand the use of locally produced bio-fuels
	3. Improve the supply-side energy efficiency of electricity generation	3. Facilitate the development of energy infrastructure that is resilient to natural disasters	3. Minimise the adverse environmental, social, and health and safety impacts of energy infrastructure and use	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

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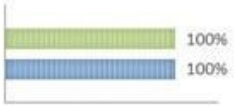
Revised Targets in the Updated NERM

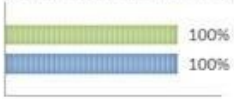
Accessible energy

Electricity access in and near concession areas
(% of households connected)

Electricity access in off-grid areas
(% of households connected)

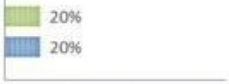


Electricity access by public institutions (on- and off-grid)
(% of institutions connected)



Affordable energy

Efficiency of diesel generation
(% reduction in g/kWh fuel use)

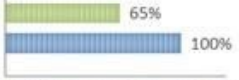


Cost of distributing petroleum products
(% reduction in cost)

Secure and reliable energy

Sustainable energy

Renewable electricity generation
(% of electricity generated from renewable sources)



Electricity sector and end-use efficiency improvement *
(% saving on BAU projection)

Transport energy efficiency improvement *
(% saving on BAU projection)

Biomass end-use efficiency improvement *
(% saving on BAU projection)

Energy infrastructure projects complying with Government and donor environmental and social safeguard requirements *
(% of projects complying)

Green growth

Electricity generation from biofuels *
(% of electricity generated from biofuels)

Rural tourism bungalows using renewable energy *
(% of bungalows using renewable sources of electricity)

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

Increasing share of RE in Power Generation

- Total Capacity: 2268 kW grid Solar PV System in Port Vila (Efate)
- 644 kW at the National Parliament Complex
- 123 kW installed at the Ministry of Climate Change
- 1 MW grid connected PV system
- 501 kW Grid Connected PV system
- 1200 kW Sarakata Hydro in Espiritu Santo

Vanuatu Rural Electrification Program

- VREP I
  - Plug & Play systems, 20,000 HHs
- VREP II
  - SHS, Micro Grids, 8400 HHs
  - 5 Mini Grids
- Challenges
  - High cost of products
  - Lack of dedicated awareness/marketing
  - Product range not meeting the current market needs
  - Safety risks of AC Pre-assembled systems
- Recommendations
  - Request for subsidy to cover appliances as well – make products more attractive
  - Recruit Communications and Marketing Consultant for VREP II
  - Approve new products – August 2018 – Product Catalogue to be updated
  - DoE to develop safety brochure to educate people of the risks of using electricity & DoE to develop Household Wiring Regulation

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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

Barriers to the Expansion of RE in Vanuatu (cont.)

I. 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.

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

- Develop a program of ongoing RE resource assessments
- 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.