

# Energy Current and Future



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# Enetise Tutumau

## Master Plan for RE&EE in Tuvalu

- 60-95% Solar
- 0-40% Wind
- 5% Biodiesel
- 30% Energy Efficiency



- Cannot achieve 100% renewable energy with **one** Renewable Energy source and need to include other potential **proven** and **matured** technology, and
- Energy Efficiency is also important to avoid additional renewable energy generation



# Current Situation

Stations	2016	2017	2018	2019	2020	2021 (3rd Quarter)
Outer islands	81%	81%	77%	63%	53%	38%
Funafuti	14%	12%	9%	11%	10%	10%
Tuvalu Overall	25%	25%	21%	20%	19%	17%

- Target of 100% RE & EE reviewed from 2020, 2025 again to 2030
  - Batteries are failing in great numbers
    - Nukulaelae, Nukufetau & Nui
  - No routine maintenance undergone
- Why batteries failed?
  - technical problem exists and not able to identify
  - dramatically increased of demand; and minimal capacity



# Way forward

- The Road Map for Funafuti to achieve 100% RE Contribution is presented in Table
- Funding for the World Bank (750kWp solar PV and 1000kW/kWh BESS) project and Stage 1 (by ADB 500kWp solar PV and 1000kW/2000kWh BESS) are assumed to be locked in
- Funding for **Stages 2 and 3** are unfunded and it is estimated would require cumulative capital of **US\$21.1m**

EXISTING							
RE % year 1	RE % 25 year avg.	Cumulative PV Capacity (kWp)	Cumulative BESS (kW/kWh)	Diesel Capacity (kW)	Operating mode	Estimated CAPEX (2019 USD)	Estimated cumulative CAPEX (2019 USD)
15%	12%	735	0	1800	minimum 2 diesel units running	N/A	N/A
WORLD BANK PROJECT							
- addition of 750 kWp solar PV and 1000 kW / 1000 kWh BESS							
- operational in 2021							
RE % year 1	RE % 25 year avg.	Cumulative PV Capacity (kWp)	Cumulative BESS (kW/kWh)	Diesel Capacity (kW)	Operating mode	Estimated CAPEX (2019 USD)	Estimated cumulative CAPEX (2019 USD)
37%	24%	1,485	1000/1000	1800	ZDO	N/A	N/A
STAGE 1 (ADB FUNDED)							
- addition of 500 kWp solar PV and 1000 kW / 2000 kWh BESS							
- operational in 2021							
RE % year 1	RE % 25 year avg.	Cumulative PV Capacity (kWp)	Cumulative BESS (kW/kWh)	Diesel Capacity (kW)	Operating mode	Estimated CAPEX (2019 USD)	Estimated cumulative CAPEX (2019 USD)
49%	33%	1,985	2000/3000	1800	ZDO	\$3.7m	\$3.7m
STAGE 2 (unfunded)							
- addition of 2,400 kWp of solar PV							
- operational in 2023							
RE % year 1	RE % 25 year avg.	Cumulative PV Capacity (kWp)	Cumulative BESS (kW/kWh)	Diesel Capacity (kW)	Operating mode	Estimated CAPEX (2019 USD)	Estimated cumulative CAPEX (2019 USD)
60%	52%	4,385	2000/3000	1800	ZDO	\$6.0m	\$9.7m
STAGE 3 (unfunded)							
- addition of 3,300 kWp of solar PV and 1000 kW / 11,000 kWh BESS							
- operational in 2025							
RE % year 1	RE % 25 year avg.	Cumulative PV Capacity (kWp)	Cumulative BESS (kW/kWh)	Diesel Capacity (kW)	Operating mode	Estimated CAPEX (2019 USD)	Estimated cumulative CAPEX (2019 USD)
~100%	86%	7,635	3000/14000	1800	negligible diesel operation	\$15.1m	\$24.8m



# Other Work

- Energy Efficiency Act
- Low Carbon Fund & Energy Efficiency Revolving Fund
- Tax exemptions on Renewable Energy & Energy Efficiency Products
- Distributions Solar Home Systems

# Challenges

- Land issue
- Technical capacity
- Funding



**Fakafetai lasi**