Pacific Centre for Renewable Energy & Energy Efficiency

Entrepreneurship in Renewable Energy & Energy Efficiency

Power Sector Development Plan, Renewable Energy Targets & Initiatives in Fiji

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EFL
energising our nation

Presentation Outline

- FEA to EFL
- Vision & Mission
- Strategic Objectives
- Where are we now with our Generation Mix?
- Demand Supply Statistics
- EFL Power Infrastructure Map
- Our Operations
- Energy Efficiency & Energy Conservation
- Power Development Plan (PDP)
- Renewable Energy Development Plans upto 2016
- Funding the Power Development Plan
- Electricity Tariffs
- Economic IPP Feed-in Tariff (FIT)
- A Virtual Tour
- Discussions

Fiji Electricity Authority to Energy Fiji Limited

- FEA was established in 1966 under the Electricity Act with the basic function to provide and maintain a power supply that is financially viable, economically sound and consistent with the required standards of safety, security and quality of power supply.
- FEA was Corporatized from a Commercial Statutory Authority to a limited liability Company on Monday 16th April, 2018 and now known as Energy Fiji Limited (EFL).
- EFL is responsible for the generation, transmission and retail of electricity in the larger islands of – Viti Levu, Vanua Levu, Ovalau & Taveuni, which account for approximately 90% of the country's population.
- EFL, now is a limited liability company with 95% ownership by the Fijian Government and 5% by residential domestic account holders
- Uniform tariff rates charged for electricity used by each consumer group, determined by the Fijian Competition & Consumer Commission (FCCC) in consultation with Government
- The EFL Board of Directors consists of 6 members (3 – private sector), Public sector representation – PS MoIT, Ministry of Economy Rep & CEO

Vision

Energising our Nation

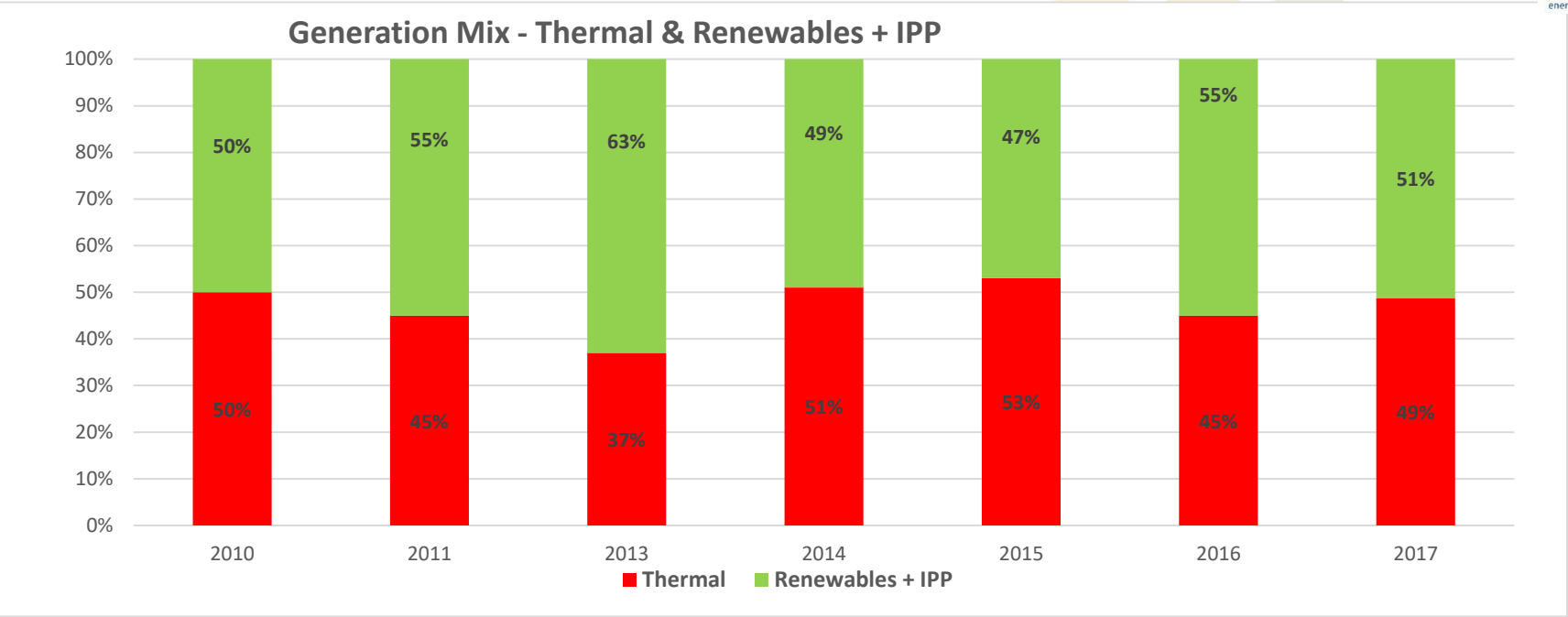
Mission

“We aim to provide clean and affordable energy solutions to Fiji with at least 90% of the energy requirements through renewable sources by 2025”

Strategic Objectives

- Improve customer focus and service
- Aim to achieve at least 10% Return on Shareholder Funds (ROSF)
- Provide 90% of energy through renewable sources by 2025
  - Fiji National Energy Policy 2013-2020 (Draft)
  - Target 100% access of basic electricity to all Fijians by 2020 - Current Access – 92%
  - Fiji's Renewable Energy to be at least 99% by 2030
- Transfer of the Regulatory functions from EFL to Government.
- Develop and implement Enabling strategies for all EFL strategic business activities
  - ICT Strategy
  - Risk Management Strategy
  - Supply Chain Strategy
  - Land Management Strategy
  - Legal Strategy
  - Environmental Strategy

Where Are We Now with our Generation Mix?



Renewable Power Stations

- Monasavu Hydro Electric Scheme – 80MW with anticipated generation of 400GWh/annum
- Nadarivatu Hydro Electric Scheme – 40MW with anticipated generation 101GWh/annum
- Butoni Wind Farm – 9.9MW with anticipated generation of 5GWh/annum
- Wainikasou Hydro Electric Scheme – 6.4MW with anticipated generation 26GWh/annum
- Nagado Hydro Electric Scheme – 2.8MW with anticipated generation of 12GWh/annum
- Wainiqeu Hydro Electric Scheme – 0.8MW with anticipated generation of 2GWh/annum
- Somosomo Hydro Electric Scheme – 0.7MW with anticipated generation of 2GWh/annum

Demand Supply Statistics

- Customer Growth – Last 7 years average growth rate is around 2.77%

Years	2010	2011	2012	2013	2014	2015	2016	2017	2018 (YTD)
Customer Numbers	150,724	155,912	159,017	162,656	167,017	171,939	174,530	182,439	188,666
Annual Growth		3.44%	1.99%	2.29%	2.68%	2.95%	1.51%	4.53%	3.41%

- 2016 Peak Demand, Installed & Available Capacity (Renewable & Thermal)

Island	Peak Demand (MW)	Installed Thermal (MW)	Available Thermal (MW)	Installed Renewable (MW)	Available Renewable (MW)	Total Available Generation Capacity (MW)
Viti Levu	170.64	145.38	121.90	146.78	130.20	252.10
Labasa	7.7	17.40	13.80	-	-	13.80
Savusavu	2.24	4.5	3.70	0.8	0.8	4.50
Ovalau	1.82	2.80	2.3	-	-	2.30
Taveuni	0.25	2.00	1.6	0.7	0.7	2.30
Total	**182.65**	**167.98**	**143.30**	**148.28**	**130.98**	**275.00**

- Fiji Sugar Corporation supplies during the crushing season only in Labasa & Lautoka
- Nabou Green Energy Limited started exporting to the grid from late July, 2017

FIJI ISLANDS
POWER INFRASTRUCTURE

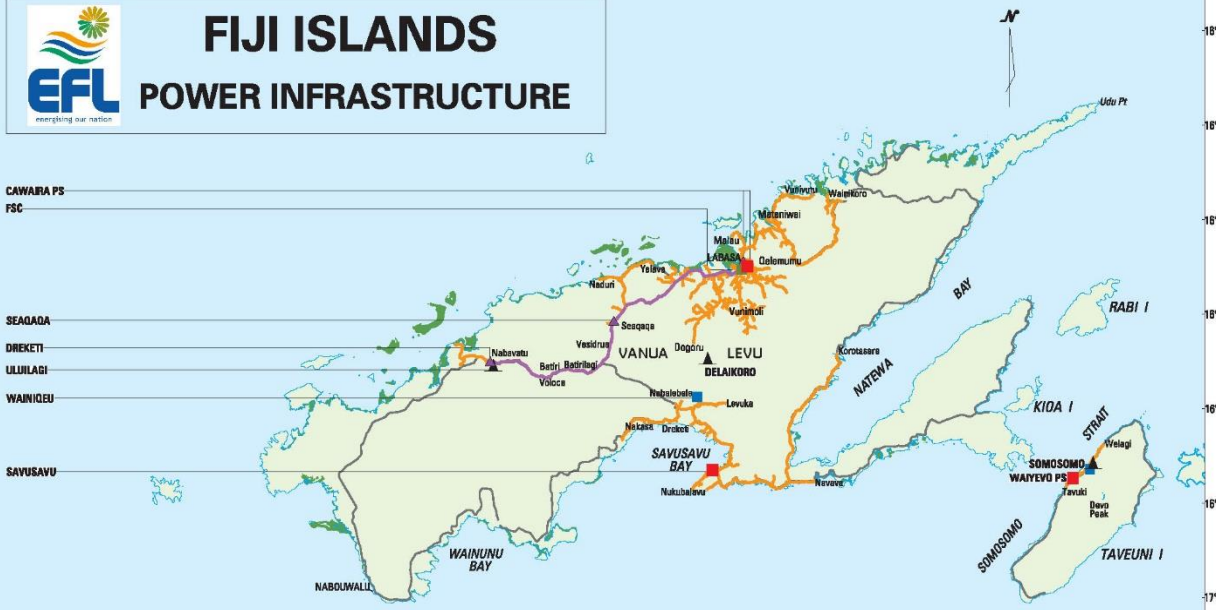
VISION
'Energising our Nation'

MISSION
'We aim to provide clean and affordable energy solutions to Fiji with at least 90% of the energy requirements through renewable sources by 2025'

Power Lines	Total (km)	Overhead (km)	Underground (km)	Poles/ Towers
Distribution - 415/240V	5090.61	4867.27	223.34	93,861
Distribution - 11kV & 8.6kV	4424.76	3831.34	593.43	
Sub-transmission - 33kV	534.86	454.61	80.25	5,062
Transmission - 132kV	147.200	147.200		383
Total (km)	10,197.43	9,300.42	897.02	99,306

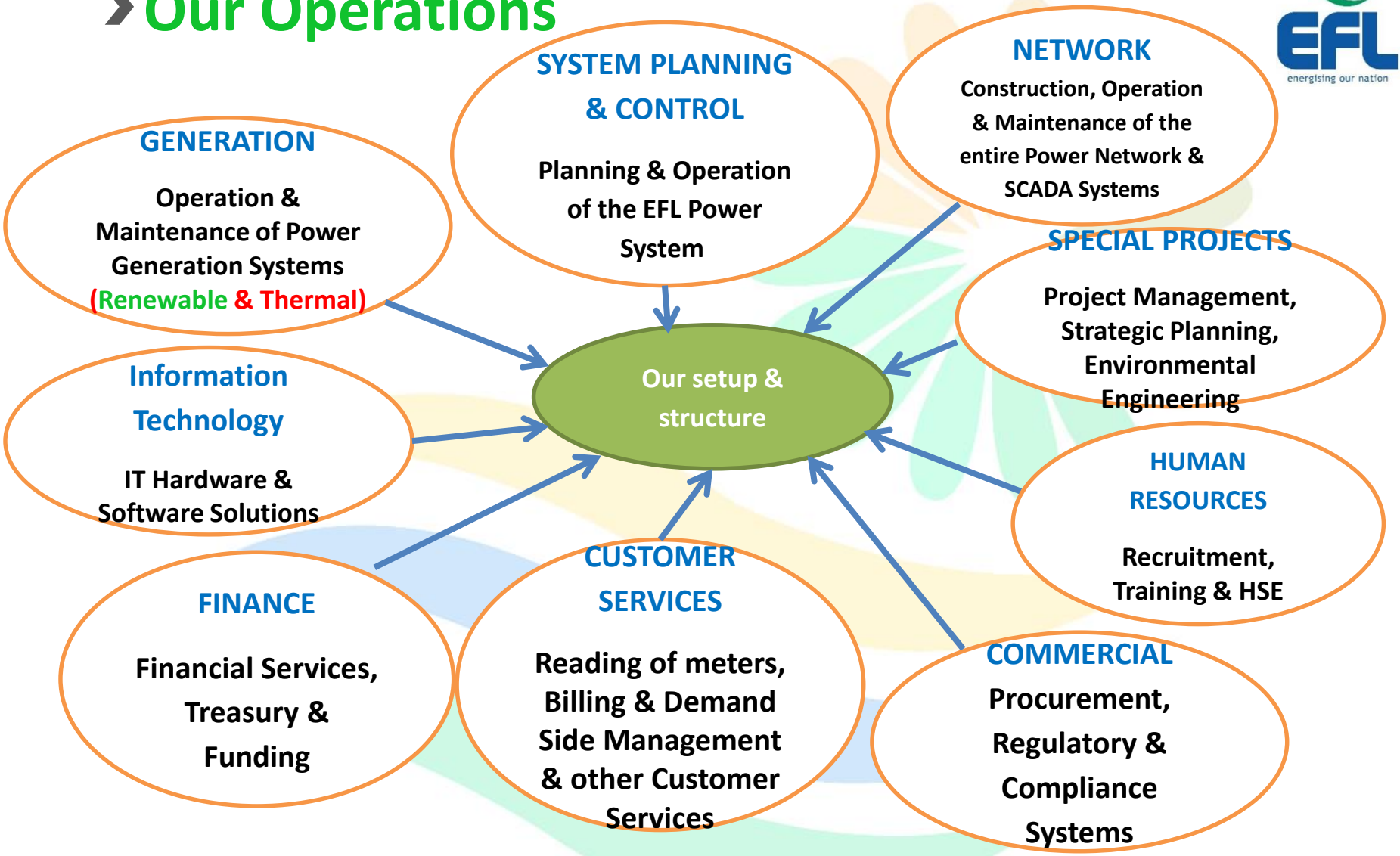
EFL POWER SYSTEM LEGEND

- 132kV Line
- Proposed 132kV Line
- 33kV Line
- Proposed 33kV Line
- 11kV Line Coverage
- Proposed 11kV Line
- 8.6kV Line Coverage
- Diesel Power Station
- Hydro Power Station
- 132kV Substation
- 33kV Substation
- Butoni Wind Farm
- Biomass/ IPP Power Station
- FEA Repeater Station



SCALE 1 : 950 000

Our Operations



The above operations are supported by Legal, Lands, Risk & Audit Departments and Executive Projects & Public Relations

Energy Efficiency & Energy Conservation

- Energy Efficiency must go hand-in-hand with Renewable Energy Development
- Implementation of the minimum energy performance standards and labelling in Fiji
- Minimum Energy Performance Standards and Labeling Program (MEPSL) is a regulatory program that only allows the importation of energy efficient appliances into the country.
- As of 1st of January 2012 it is now mandatory for All Household Freezers and Refrigerators being imported into Fiji to comply with MEPSL
  - FS/AS/NZS 4474.1: Energy Consumption & Performance
  - FS/AS/NZS 4474.2: Energy Labeling and Minimum Energy Performance Standard Requirements
- Additional electricity demand is current met with non-renewable energy, high fuel bill and environmental degradation
- Need to ensure that only standard, energy efficient items are brought into the country
- *"Improvements in energy efficiency show the greatest potential of any single strategy to abate global GHG emissions from the energy sector"* (IEA 2012)
- **Energy Conservation – Let's make it our business**

Power Development Plan (PDP)

- EFL reviews its 10 year Power Development Plan (PDP) every 2 years.
- The ten (10) year power development plan contains the load forecasting and power generation planning scenarios up to 2026 for Viti Levu, Vanua Levu, Ovalau and Taveuni Power Systems with associated network assets to be augmented/developed and the investment plan required to implement this 10 year Power Development Plan.
- It is estimated that the total funding to execute the 10 year Power Development Plan will require an investment of in excess of FJ$2.4B.
- F$1.6B will be required for the development of power generation projects and around $0.8B investment will be required in the transmission & distribution power network sector.
- EFL expects the private sector to invest in the Power Generation Sector as Independent Power Producers (IPP).
- Discussions with prospective IPPs to develop various Renewable Energy technologies. i.e. Biomass/Waste to Energy Projects, Solar Projects & Hydro Projects are ongoing.

Renewable Energy Development Projects up to

Operational Renewable Energy Plants

- Biomass
  - TWIL supplies up to 5MW – 6MW which equates to 12-15M units/annum
  - FSC supplies energy to the EFL grid during the crushing seasons from their Lautoka & Labasa Sugar Mills
  - Nabou Green Energy Limited has a 10MW plant and started feeding into the EFL grid since July, 2017
- Solar – surplus energy from solar roof-top installations are fed into the EFL grid at an agreed upon price between EFL & the individual customers – (Loose supply)

EFL has its plans to develop the following renewable energy schemes:

- Biomass – Waste to Energy Plant in Central Viti Levu
- Solar – 4 x 5MW in partnership with the Private Sector (Nadi to Rakiraki corridor)
- Hydro – Upper Wailoa/Qaliwana Diversion Project & the Lower Ba Project
  - Presently EIB has provided grant aid to carry out full feasibility studies for this two projects

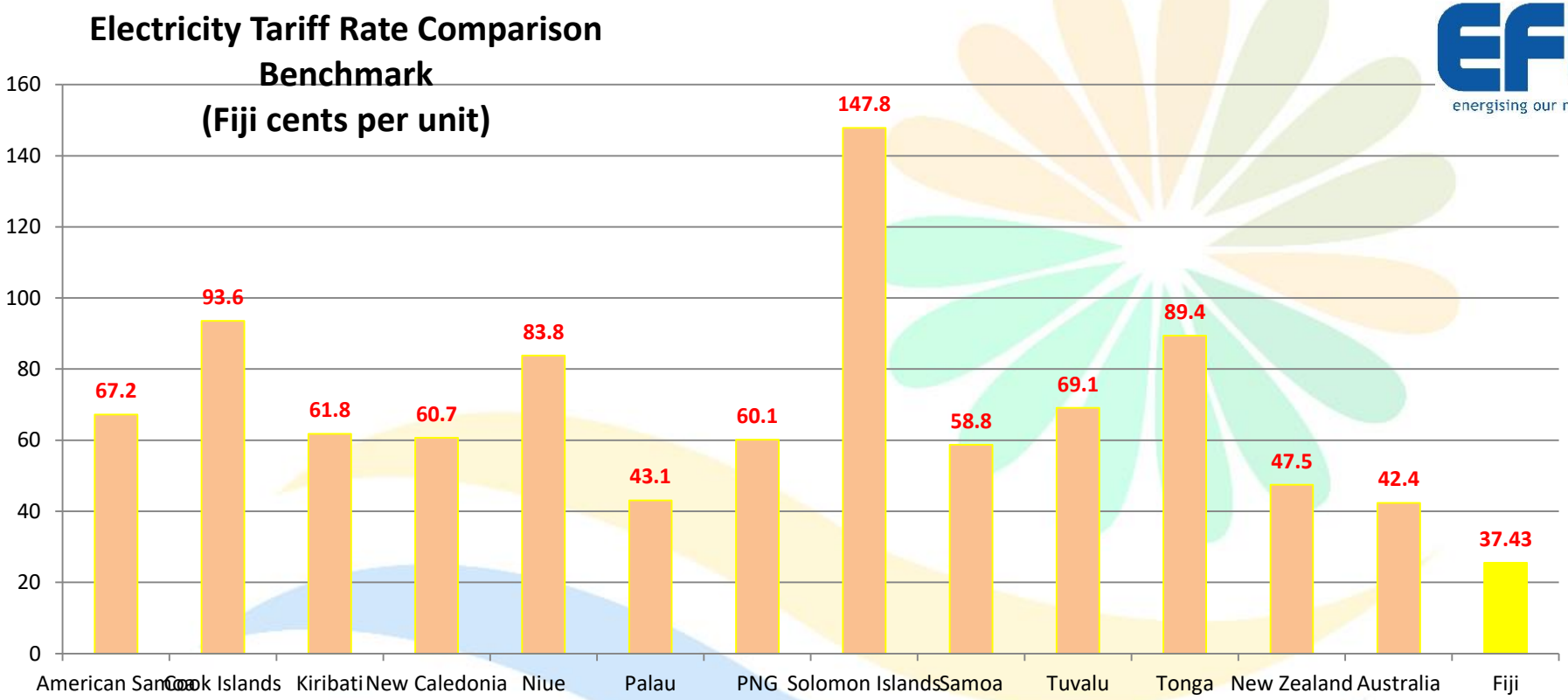
Private Sector Participation - Independent Power Producer (IPP)

- 3 Hydros in Central Viti Levu with total capacity of 32MW and anticipated total energy output of 120M units/annum

Funding the Power Development Plan (PDP)

- EFL needs to ensure economic viability to fund the implementation of the PDP
- Successful implementation of the PDP requires appropriate Tariff Structure
- Private Sector Participation in the Power Generation Sector depends on the Feed-in Tariff that EFL is prepared to pay them, in order to ensure a win-win situation for both parties
- We are keen to include cost effective, sustainable, & resilient renewable energy solutions.

Electricity Tariffs



Fiji has the lowest electricity tariff rate in the South Pacific including Australia & New Zealand.

Current average electricity tariff rate of 37.4 c/u (VEP) is not adequate to fund the total investment of $2.4B required for the 10 year Power Development Plan

Electricity tariff was reviewed upwards in early 2011 and thereafter decreased by 5% from January, 2013. An appropriate tariff rate will contribute towards the financial sustainability and implementation of the PDP.

Economic IPP Feed-in Tariff (FIT)

- Generation cost/unit + TDR cost/unit < 37.4 cents/unit
- For EFL to generate profits TDR – 12.7 cents/unit presently, therefore levelised cost of generation should be < 37.4 – 12.7 = 24.7 cents/unit
- This means the affordable IPP feed-in needs to be below 24.7 cents/unit for EFL to generate some profit

** Transmission, Distribution and Retail (TDR)*

IPP Feed-in Tariff

- FEA was offering 23 cents/ unit to prospective IPPs when the average retail tariff was 39.4 cents/unit in 2011
- Thereafter, on 26th May 2014, FCCC determined the Feed-in Tariff payable by EFL to prospective IPPs should be 33.08 cents/unit VEP – unsustainable at an average retail tariff of 37.4 cents/unit VEP
- However, now the feed-in tariff is deregulated and EFL can negotiate the FIT with prospective IPPs depending on the renewable technology

A Virtual Tour

- Strategic Sites
  - Generation
  - Network
  - Communications

Wanisavulevu Weir – Monasavu Hydroelectric Scheme

Wanikasou – Monasavu Hydroelectric Scheme

Monasavu Lake

Wailoa Power Station - 4 X 20MW Pelton Turbine (1983)

Wainique Mini Hydro Station – Savusavu (1992)
2 X 400KW Frances Turbine


Nagado
Power Station
TAKE 5
and stay alive
fea
NAGADO HYDRO POWER STATION


Butoni Wind Farm 2007
36 X 275KW

Nadarivatu Weir


NADARIVATU POWER STATION – 2012
2 X 20MW TURBINES


Naibili Weir, Taveuni

Somosomo Mini Hydro Power Station
2 X 350KW Pelton Turbine

Kinoya 35MW Heavy Fuel Oil Power Station

Network

Vuda 132kV/33kV Zone Substation

Network

Knolly Street 33kV/11kV Zone Substation

Network

Nadarivatu Switchyard

Communications

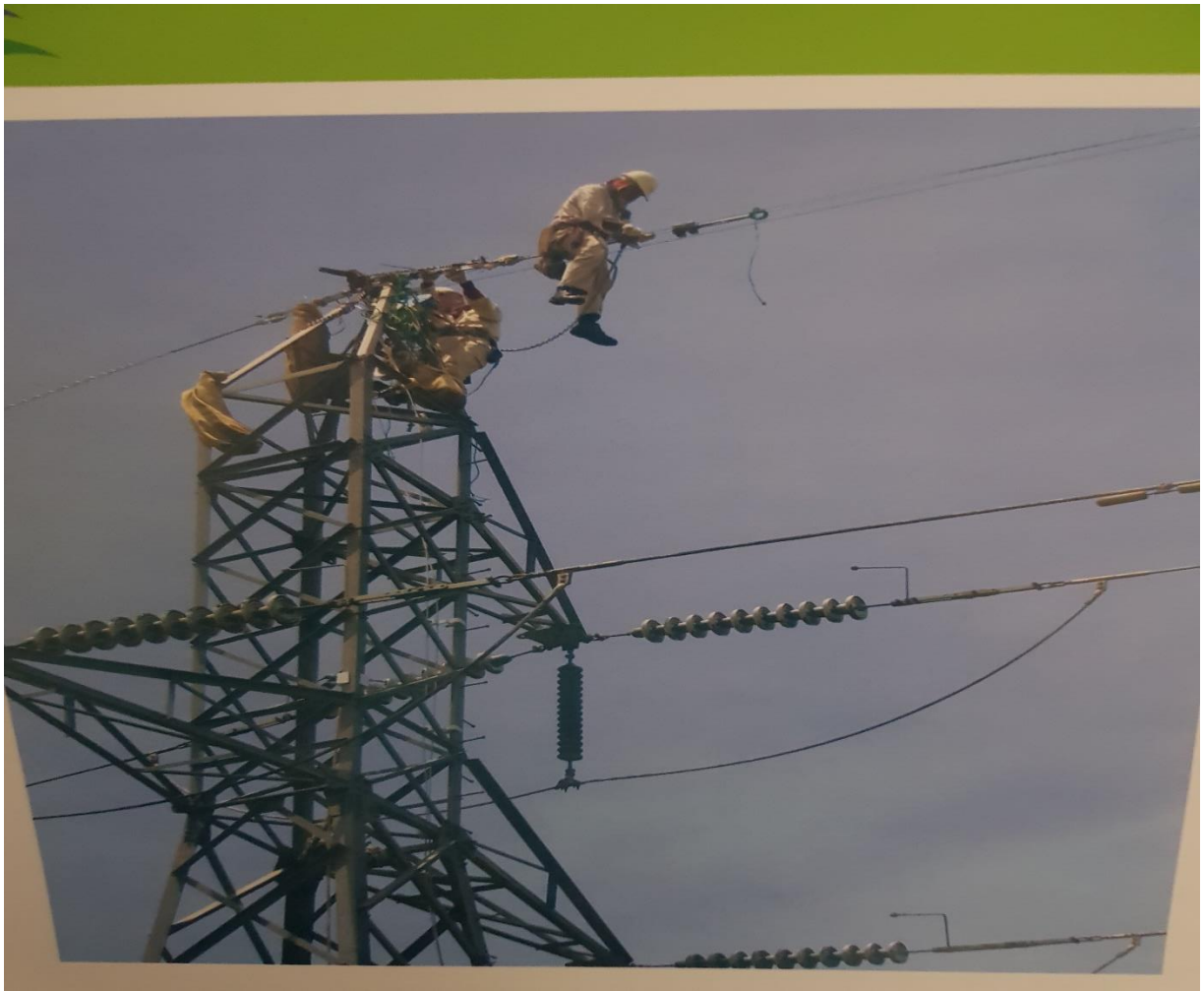
- EFL power systems are remotely supervised, controlled and metered using SCADA (Supervisory Control and Data Acquisition)

Communications

- The signals from the various Power Station, Substations and Switching Stations get to our national Control Centre via these Repeater Stations

Communications

- EFL installed 18-pair optic fibres on its transmission towers from Vuda to Cunningham via Wailoa, which form EFL's backbone communication link for the power system network. EFL has a back to back arrangement with Telecom Fiji for a lease of a pair of dark fibre.



Discussions

Thank You

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