POWER ENGINEERING DEPARTMENT

PRESENTATION OVERVIEW

- Company Background
- Overview of Electricity Provision
- PUB Generation Mix
- Kiribati Energy Road Map
- Future & Ongoing Projects
- Improvement Plan

COMPANY BACKGROUND

- The Public Utilities Board was formed in 1977 under the Public Utilities Ordinance Cap 83. The prime function of PUB is to carry out the general business of;
- **Electricity-** supplying and distributing electricity to customers from Betio to Nabeina
- **Water-** supplying and distributing water to its customers at Betio to Buota through the water distribution system and the delivery by hired water tanker trucks.
- **Sanitation or Sewerage Disposal services-** operating and maintaining the sewerage system existing at the major villages Betio, Bairiki and Bikenibeu only. The rest of customers having Septic tanks are serviced by a Vacuum Truck.

OVERVIEW OF ELECTRICITY PROVISION

- Public Utilises Board (PUB) = State own Enterprise (SOE) – provide electricity, water and waste water on south Tarawa Rep. of Kiribati
- Provision of 240/415V electricity network to 6,500 active metered customers;
- 160Km of 11KV and LV underground network extending south and partly North Tarawa
- 63 X 11KV transformer ranging from 100KVa to 750Kva with total installed capacity of 9,550KVa
- Maximum demand is 5,045MW; Average annual energy generated – 22.75GW; Average diesel consumption – 5.81ML
- Terrif Domestic – 1-101KWh = 10c, 101-201 = 40c, 300Kwh above = 50c. Commercial = 55c/Kwh, Industry = 70c/Kwh
- Cost of Diesel Fuel fixed AUD$1.27

PUB GENERATION MIX

137Kw

118KW

764 KW

1250KW

500Kw

214KW

117Kw

400KW

3X1400Kw

Total Installed Capacity 7.7MW

KIRIBATI ENERGY ROAD MAP

The following targets have been adopted as official policy goals. The KIER analysis establishes how these goals are to be achieved.

- The goal for Tarawa is a 45% reduction in energy coming from fossil fuels for electricity generation by 2025 compared to Business As Usual (BAU)1. This goal will be met through a 23% reduction of fuel use for power generation and a 22% reduction from improvements to energy efficiency on both the supply and demand side.

- The goal for Kiritimati is a 60% reduction in energy coming from fossil fuels for electricity generation by 2025 compared to BAU. It is anticipated that 40% of this reduction will come from solar energy and biofuels while the remaining 20% will come from improvement to energy efficiency on both the supply and demand side.

- For the outer islands, it is proposed that any expansions in electricity generation be met through renewable energy and that existing diesel generation used by Island Councils (IC), government and schools must be converted to renewable energy by 2025. The goal is to have at least 60% renewable energy by 2025 in rural public infrastructures (e.g. the Tabiteuea North Hospital and ice plants) and 100% RE for rural public and private institutions

PUB GENERATION PROJECTS

COMMISSIONED

Location	System/Donor	Capacity	Commissioned Date
Bikenibeu P/S	#1 PEC	400 KW	Mar 2015
Bonriki (Water Reserve)	#2 UAE	500 KW	Sept 2015
Betio S/Complex	#3a WB	136.08 KW	Sept 2016
Betio KIT	#3b WB	116.04 KW	Sept 2016
TCH Nawerewere	#3c WB	214.96 KW	Sept 2016
Bik.KGV & EBS	#3d WB	116.64 KW	Sept 2016
PUB Network S/Tarawa	#4a HV MFAT & GoK	5.8 MVa	Dec 2017
Betio P/S	#5a HS Engine MFAT	764 KW	Apr 2018
Bet & Bik P/S SCADA & EMS System	#6 WB	Data Acquisition, monitoring & control	Aug 2018

ONGOING

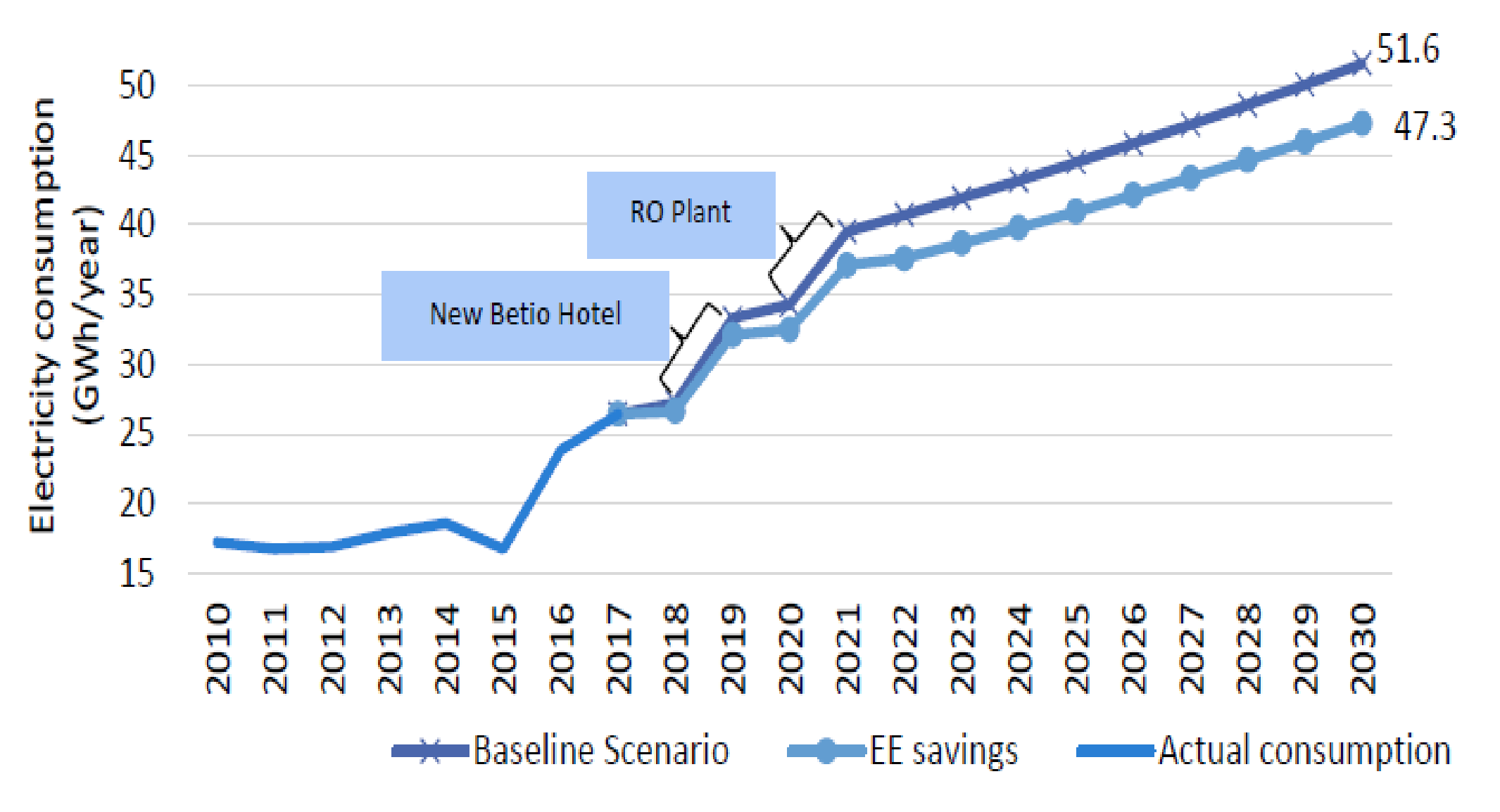
- HV Phase 2 95% of project cycle has been complete and by the end of August 2018 refurbishment of 26 HV substation will be completed.
- Engagement of Technical Adviser has been extended for another 12 month to building the capacity of Power generation diesel mechanics in Plant Overhaul ,maintenance and trouble shooting and other mechanical repairing.
- Additional 120KWp will be installed at KGV & KIT the work will commence by September and the commissioning at the end of October 2018
- Procuring of 1.2MW high speed engine has landed on the Island and commissioning will be schedule by Nov 2018
- Installation of HV cable on the causeway will be schedule by end of October and completed by Feb 2019
- Integrated training framework with JICA on Hybrid Power Generation

IMPROVEMENT PLAN

GENERATION

- Continue to improve health & safety which has been realised over the past years, this range through the company facilities and provision of required personnel protective equipment for all field staff.
- Engine Overhaul maintenance and refurbishment work on DG stators.
- DG's Fuel consumption rate measurement on quarterly basis.
- Installing Hydrogen unit as Pilot system to monitor and measure fuel consumption rate for future way forward in annual fuel saving.
- Continue Preventative maintenance program on Solar PV system, Plants and equipment's
- Reduce the number of outage compared to last year.
- Procurement of spares from overseas to reduce down time of Plant and equipment.
- Reaching out to other SEO & ministry for standby generators servicing and maintenance program .

ELECTRICITY DEMAND FORECAST FOR SOUTH TARAWA



IMPROVEMENT PLAN

DISTRIBUTION

- Support the community & stakeholder upgrading of distribution boxes and replenishing of damaged LV cables.
- Continue to use permit-to-work system for switching of High Voltage substation. All HV switches are fully locked preventing un-authorized access to switching unless permitted under the lead of Electrical Engineer.
- Reduce number of outage on the Low Voltage side network thus increase system reliability.
- Installation of Fibre optic cable between Bikenibeu and Betio Power station ensure more reliability of SCADA & EMS system in the future.
- Procuring of DIgSilent Power Factory software and train one personnel for load flow modelling for PUB network.
- Energising Temaiku area that prudent to flood during high tide.
- Network Operation security Policy.
- Reducing network losses.

DEVELOPMENT PLAN

SUPPLY

- generators
  - Two new 2MW medium speed
  - Two new 1.5MW high speed
  - Hydrogen fuel saver
- Energy Efficiency
  - Aim for efficiency above 4kWh/l
  - Install variable speed drives to reduce station auxiliary consumption
- Energy Storage
  - Use of high energy density storage
  - Install variable speed drives to reduce station auxiliary consumption

DEMAND SIDE

- Prepayment meter
  - Helps customer deduce demand
- Energy Efficiency
  - Energy efficiency improvement through building upgrades
  - Energy efficient appliances (LEDs, etc)

DISTRIBUTION

- Voltage regulator to be upgraded beyond 3,000 kVA
- Upgrading of Network cables
  - HV
  - LV

RENEWABLE ENERGY GENERATION

- 1 MW of OTEC pilot system schedule for 2020 by Korean Government
- 3.7MW of solar PV and 1.7 MW (2.3 MWh) of energy storage.
- 2.5MW of solar PV and 2.5MW of solar smoothing Energy Storage

THANK YOU