MINISTRY OF
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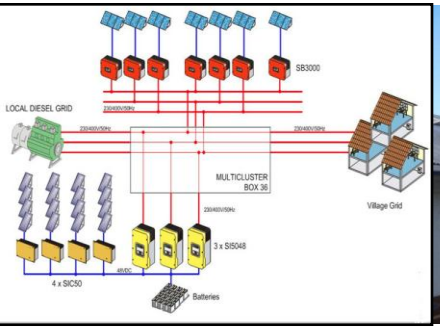
New Zealand Aid Programme - Energy in the Pacific






IRENA Workshop

Joseph Mayhew – Development Manager Energy
26-28 October 2011

NEW ZEALAND
MINISTRY OF FOREIGN AFFAIRS & TRADE
Aid Programme

Summary

- Energy in the Pacific
- Case studies
    - Cook Islands
    - Tokelau
    - Tuvalu
- Priorities for next year
    - Actions derived from multi-party statement
        - Energy roadmaps
        - Standards and labelling
        - Private sector investment

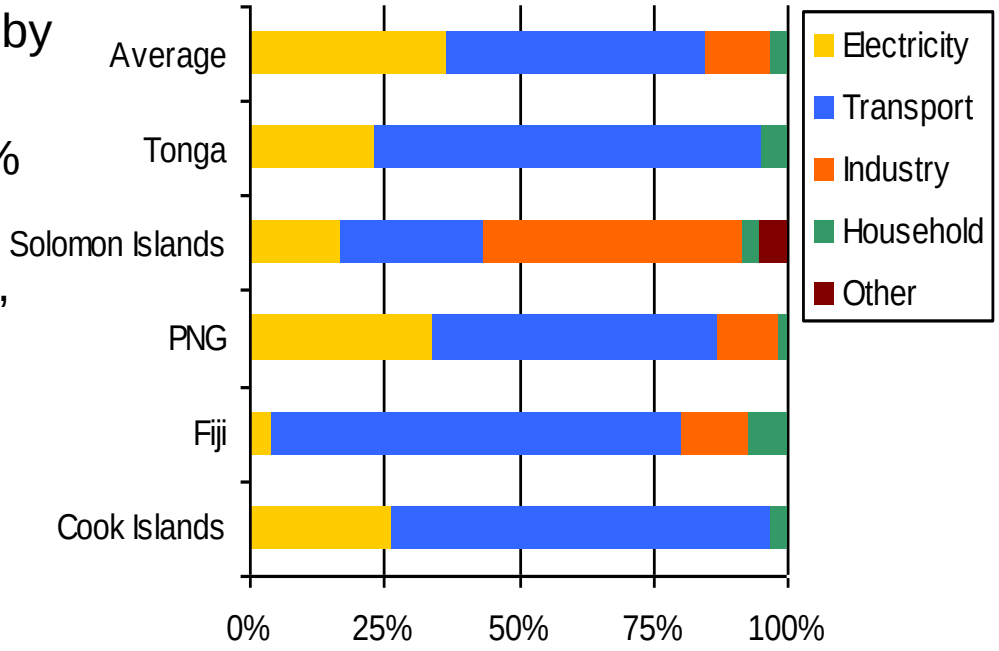

Renewable energy rationale and drivers

- If the main driver is sustainable economic development…
  - PICs extremely reliant on imported petroleum, and vulnerable to international price fluctuations.
  - Remote from markets means the fuel costs are high, meaning high costs of delivered energy services
  - As oil prices go up, GDP often goes down
  - Energy underpins socio-economic development (agriculture, fisheries, production and industry, health, education, information and communication, tourism, etc).
- …through reducing reliance on imported petroleum, then…



…Shouldn't there be more of a focus on transport energy too?

- Up to date data is difficult to come by
- Overall, transport is the most significant use of petroleum (+-48% across region)
    - Includes shipping, aviation, road transport
- Electricity generation (37% across region)
- Industry and households



Source: *Pacific Regional Energy Assessments,* World Bank and ADB, 2002.

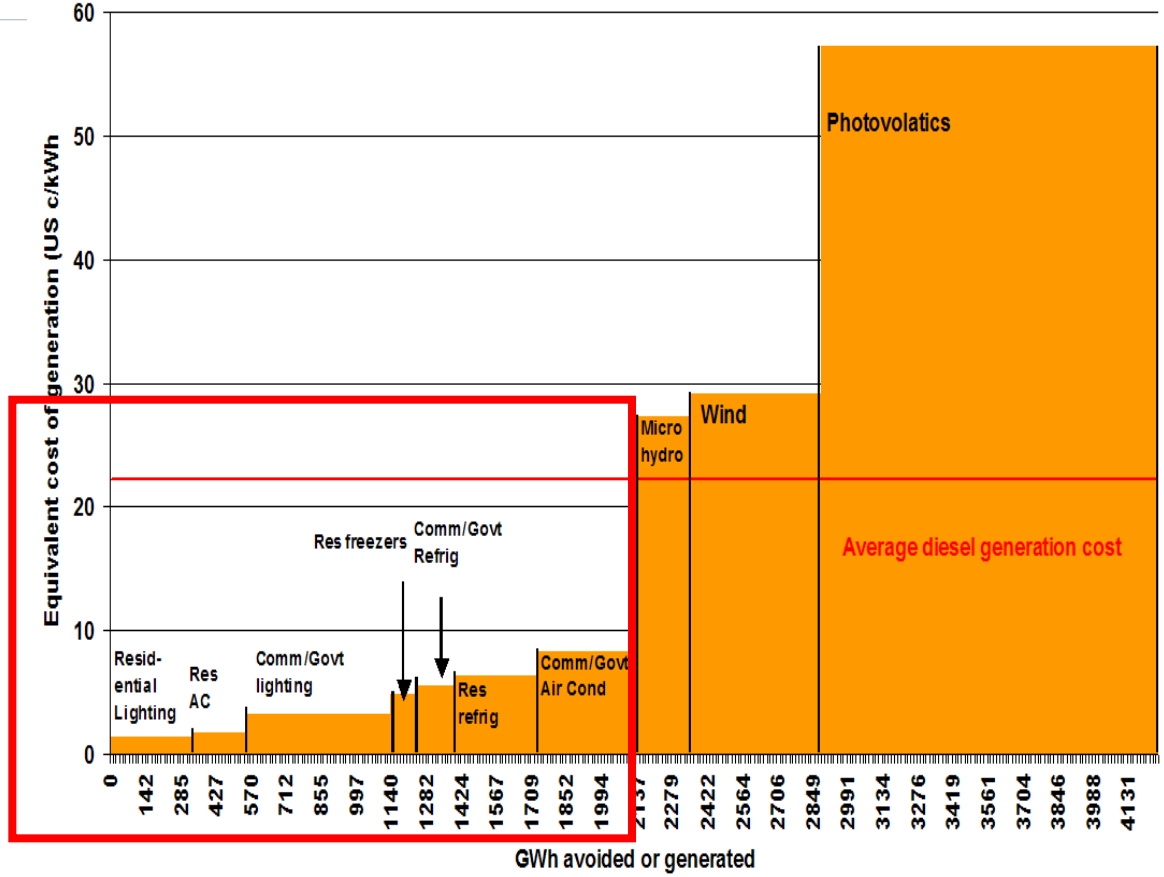
Energy in the Pacific: transport energy

- Transport is largest user
  - Up to 75% of petroleum use in some PICs
- Fewer options to reduce petroleum for transport
  - Shipping and aviation significant users
  - Roads in poor condition; larger, less-efficient vehicles used
  - Vehicles poorly maintained
  - Restrictions on inefficient vehicles is one option
  - Improved and well maintained roads essential
  - Facilities for walking / bicycles / mopeds
  - Biofuels and blends, such as biodiesel from coconut oil
  - Eventual switch to hybrid/electric vehicles – long term for PICs.
- Electricity sector provides easier opportunities to use renewable energy and reduce diesel dependency, but at risk of playing around the edges?

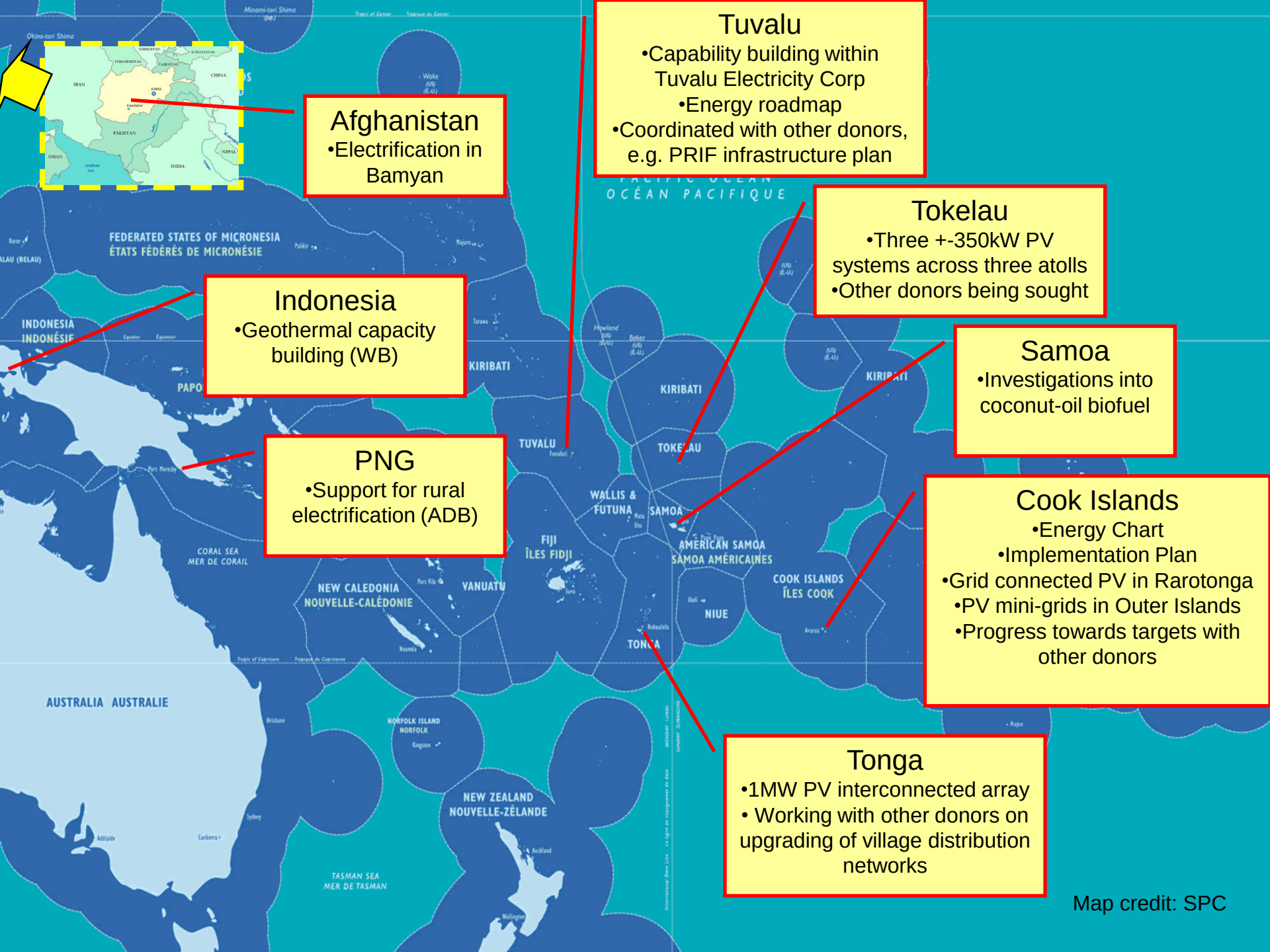

Energy in the Pacific: energy efficiency and conservation

- Energy efficiency and renewable energy go hand in hand
    - negawatts and megawatts
- Efficiency measures are often cheaper than new generation and amongst the first things invested in - more ‘bang for your buck’.
- If you don’t do energy efficiency and conservation, further electricity supply likely to be required - and this will often be from fossil-fuels
- Demand side interventions – e.g. shifting loads, or shedding loads, to reduce peaks (most often met by diesel generation) -
    - Make it easier meet demand loads
    - Higher % of renewable energy may be possible

Energy in the Pacific: energy cost curve



Source: *Energy Efficiency and Demand-Side Management,* Australian Dept of Climate Change and Energy Efficiency, 2011

Map credit: SPC

Case Study: Cook Islands

- Cook Islands Govt has set ambitious renewable electricity targets – 50% RE by 2015 and 100% by 2020
- Numerous reports, studies, and research over last 20 years but still +-100% reliant on diesel
- Activities
  - Supporting the Cook Islands Renewable Energy Chart (CIREC) and the Implementation Plan – help coordinate and plan investments / donors
  - Working with PIAC to increase RE capability in utility
  - Installing +-150kW of grid-connected PV in Rarotonga
  - Design and implement PV mini-grids on Mitiaro, and a number of other Outer Islands, coordinated with PEC
  - Other projects will be identified through Implementation Plan




Long term outcomes

Economic development benefits through significant and sustainable reduction in diesel consumption and increased energy security through reduced reliance on imported diesel.

Medium term outcomes

Improved capability to plan, design, implement, and sustainably maintain and operate RE. Progress made towards CIGov renewable electricity targets.

Short term outcomes

Improved energy sector planning; strategic direction; leadership within CIGov

Increased capability in TAU to design, plan, and implement; clear direction, investment pathway

Diesel savings realised; 'template' for other islands; design and implementation capability increased

Outer Island RE design and implement capability

Outputs

CIREC and Imp Plan finalised

Energy policy/ strategy support to OPM

TAU RE expertise provided

PV installation in Rarotonga installed

Mangaia system upgraded and repaired

Mitiaro system designed and installed

Case Study: Tokelau

- Three very remote atolls; no air access or wharfs/jetties
- 12km^2 total land area; 1,466 persons evenly spread between the three atolls
- Logistical challenges are significant
- Good example of partner-led process
    - Many studies, reports, assessments, and design work
    - Government of Tokelau lead on procurement
- For each atoll, PV, battery, inverter/changer integrated into existing diesel, using the 3-phase solar cluster concept
- Almost 1MW of PV across three atolls; approximately 90% RE fraction
- Stand-alone clusters grouped together to provide sufficient supply for each atoll
- NZ providing $7mil as an advance on Tokelau's budget support
- To be constructed in 2012

Case study: Tokelau

- Key issues:
  - System design principles: simple, robust, manual operation (not automated), redundancy and fault tolerance, proven components in Pacific environment, low maintenance, spare parts in region, long battery life, and so on.
  - Training, support, and building internal capability and capacity in Tokelau vital
    - Training of at least one week on each atoll will be provided
    - SMA training will be provided
  - Need to ensure that long-term solutions in place for maintenance, operation of systems

Renewable energy projects: Tuvalu

- NZ help establish a Renewable Energy and Energy Efficiency Unit (REEEU) within Tuvalu Electricity Corporation (TEC)
    - $500,000 to date
    - Focus is on building capability and capacity within Tuvalu
    - Master Energy Plan that will likely identify subsequent renewable energy investments
- Next steps
    - Systematic energy sector and investment planning
    - Co-ordinated with the Tuvalu Infrastructure Plan

Key priorities for New Zealand 11/12

- Progress existing energy projects; tangible outcomes and diesel reduction
- NZ is chair of the Pacific Island Forum till September 2012
- A multi-party statement on energy was developed and consulted on:
    - Statement itself not used in PIF
    - Want to make progress, given importance of RE at PIF


Work areas identified in the multi-party statement on energy

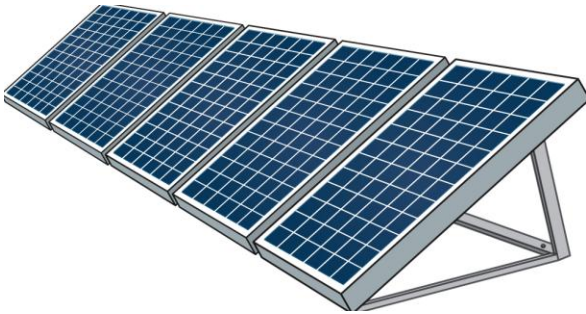
- **Work together …**
  - …through the PRIF to develop **energy roadmaps**, or similar strategic energy sector planning documents, for all PICs
  - …through the PRIF to coordinate the implementation and financing of the activities required to effectively implement existing and new energy road maps
  - …to expand the existing **appliance energy efficiency standards and labelling programme** to all parts of the Pacific region, to help realise significant energy savings
  - …to facilitate **greater private sector participation** in the Pacific energy sector by systematically reducing barriers to uptake of distributed generation


Energy roadmaps

- Roadmaps need strong support from the government
- Is lighter better? – a quick, cheap, and less demanding process may be suitable in some circumstances
- A 2 stage process
  - High level strategy/framework that sets scene, addresses policy or regulatory needs, sets targets, proposes the general direction, considers RE options (high level)
    - This gains political and community commitment
  - An Implementation/action Plan that maps out a schedule and sequence of works, based on agreed principles, to progress towards targets.
    - Can be used to seek support for design and implementation of elements identified


Energy roadmaps – next steps

- What further work is required?
- What is the logical sequence for roadmap development
- New Zealand is keen to support and work with partners
- Pacific Infrastructure Advisory Centre (PIAC)



Standards and labelling (S&L)

- A regional activity
- Identified as key area in multi-party statement
    - Significant economic potential in Pacific that needs to be tapped to help achieve targets
    - Australasian scheme provides some basis
    - New Zealand very supportive and keen to work with partners in this area


Encouraging Private Sector Investment

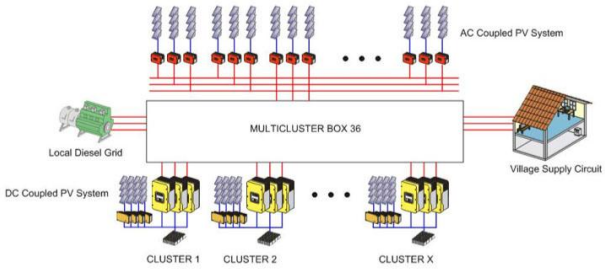
Removing barriers to IPPs - a regional approach

- Economic, financial, regulatory, technical, and governance ‘barriers’ cause difficulties or constrain development
- Some may be addressed regionally:
    - Connection of generation equipment
        - Technical, safety standards, rules, requirements for ‘grid’ connection
    - Negotiating a fair price / off-take agreement
        - Developers need long-term certainty
        - Model or template power purchase agreements (PPAs), regulation and policy support
- New Zealand interested in working with partners and regional organisations to progress this
    - Project needs to be scoped up and defined as first step
        - What are the issues, opportunities, costs, benefits, etc


System design and component standards – a regional opportunity?

A regional or standardised approach

- Successes may provide common lessons and design principles
- PV mini-grids for numerous atolls and small islands in region
- Is there value in taking a regional approach?
  - Common system design principles:
    - Proven and reliable
    - Simple (manual, less automation)
    - Robust, with built-in redundancy
    - Complementarities of spare parts and mainter
    - Allow innovation, different brands, but focus on basic and common principles.
  - Common tender or procurement to assist interacting with market and evaluation of proposals
  - Common product classes and technical Standards, where it makes sense
    - Photovoltaic modules, inverters, balance of system components, etc




- The end
- Thank you
- Any questions?