IRENA
International Renewable Energy Agency

IRENA and Pacific Transition to RE Future

SEMINAR 3. ENERGY TRANSITION:
A challenging perspective for the Pacific Islands and Coastal Areas
November 26-28, 2014, Nouméa, New Caledonia

‘Apisake Soakai (Pacific Coordinator)

Outline

1 **IRENA – A Global RE Agency**

2 **Key Initiatives relevant to the Pacific Transition to RE Future**

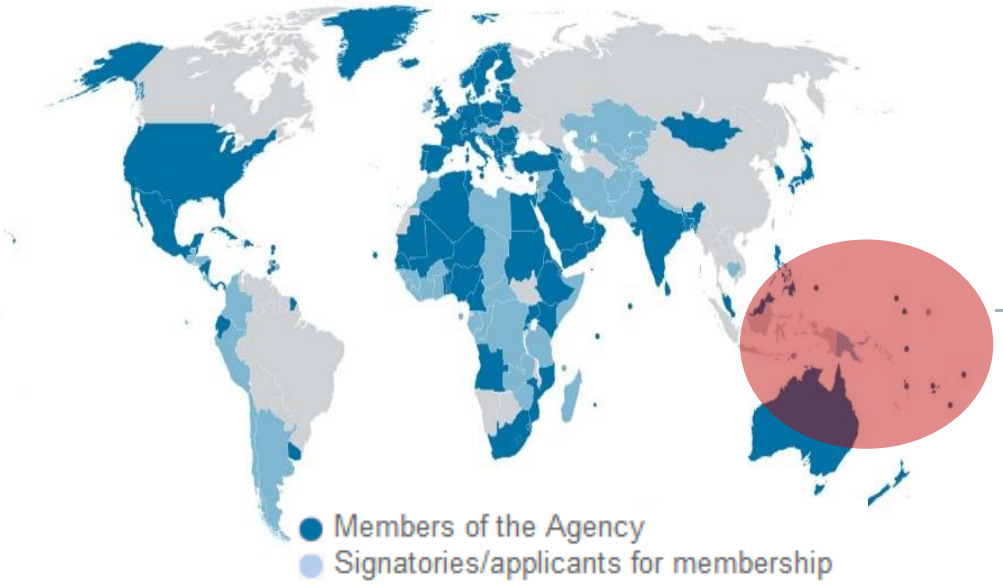
- SIDS Lighthouses
- Renewables Readiness Assessment
- RE Roadmaps for islands
- Grid Stability Assessment
- Global Renewable Energy Islands Network
- Capacity Building
- Global Atlas

IRENA: Introduction

IRENA
International Renewable Energy Agency

- Intergovernmental renewable energy agency, headquarters in **Abu Dhabi**, United Arab Emirates. Innovation and Technology Centre (IITC) in **Bonn, Germany**
- **Established**: April 2011
- **Mandate**: Biomass, Geothermal, Hydro, Ocean, Solar, Wind
- **Membership**: About 171 countries engaged; 138 Members (as of 24 November, 2014)

Mission: Accelerate deployment of renewable energy



Members

1. Fiji
2. FSM
3. Marshall Islands
4. Nauru
5. Palau
6. Samoa
7. Solomon Is
8. Tonga
9. Tuvalu
10. Vanuatu
11. Kiribati

Signatories

1. Papua New Guinea

IRENA: Programmatic Structure

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Knowledge, Policy and Finance Centre (KPFC)

- ✓ IRENA' s Central Knowledge Repository
- ✓ Renewables Policy and Finance
- ✓ Data Collection and Analysis

- **Global Atlas and Resource Assessment**
- RE Socio-economic Impacts
- Policy Adaptation to Market Conditions
- RE Target Setting
- Impact of Energy Pricing on RE Deployment
- Environmental Impact of Large Scale RETs

IRENA Innovation and Technology Centre (IITC)

- ✓ Cost & Performance
- ✓ Technology Solutions
- ✓ Technology Roadmaps

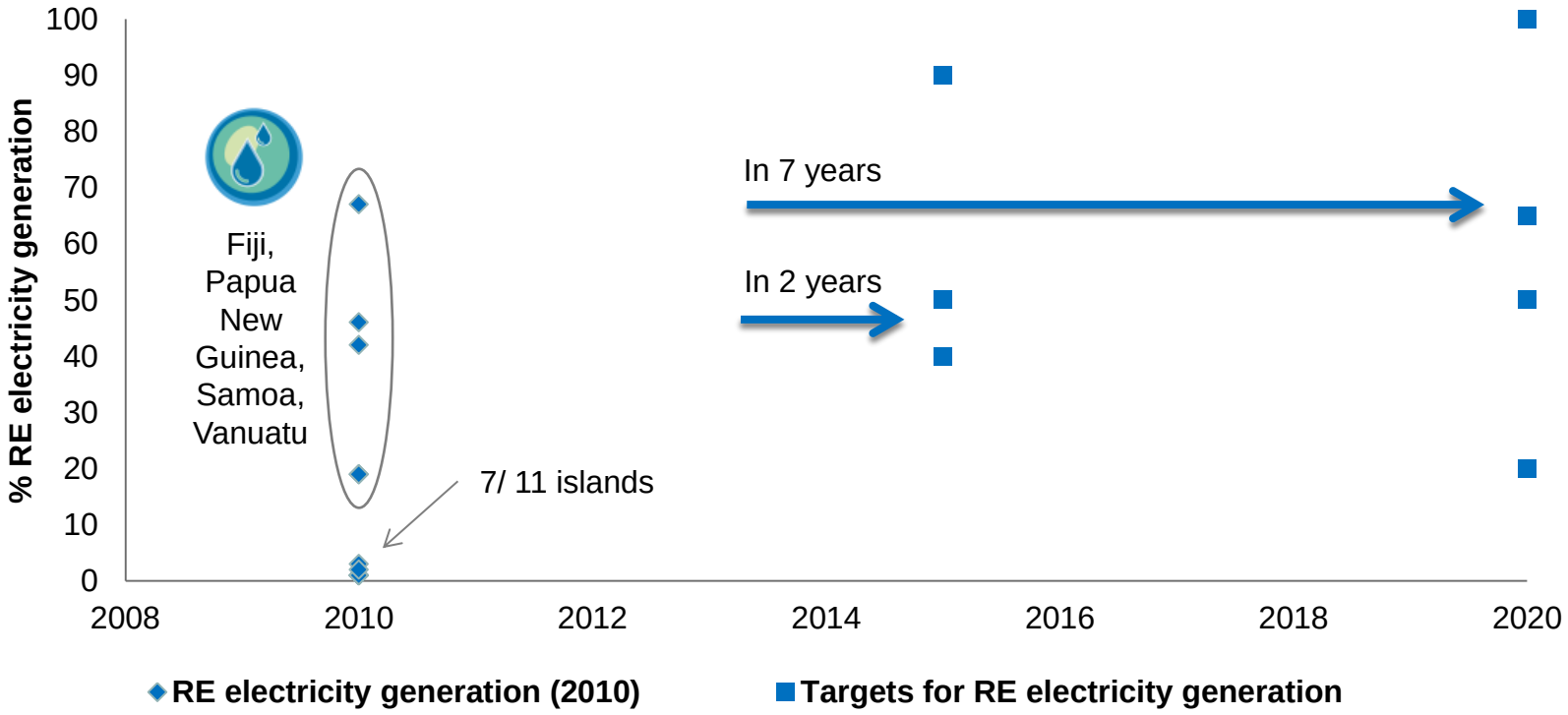
- RE Costing Analysis
- **RE Technology Roadmaps**
- Project Development Guidelines
- **Dynamic Modelling & Grid Stability Studies**
- RE Standardisation and certification

Country Support and Partnerships (CSP)

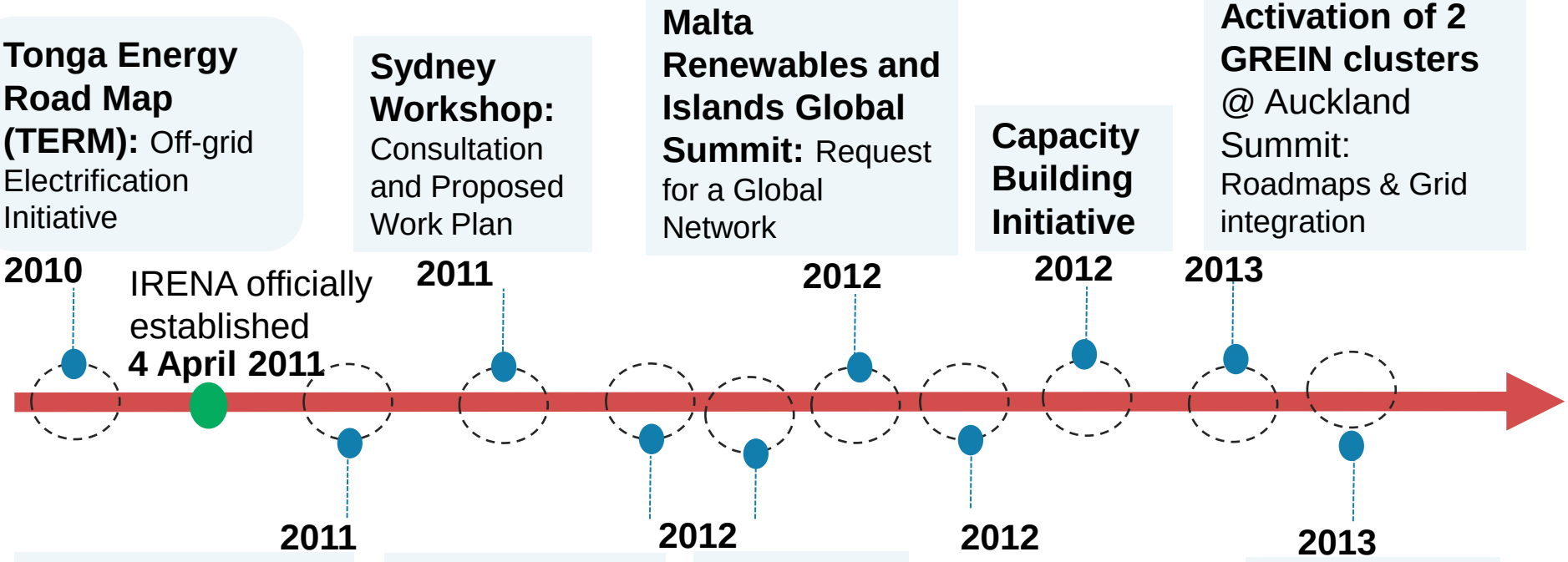
- ✓ National & Regional RE Strategies
- ✓ Renewables Readiness Assessment (RRA)
- ✓ Capacity Needs Assessment & Capacity Building

- **RRAs in up 8 countries (2013)**
- **GREIN: Global Islands Network**
- Capacity Building for Pacific Islands & ECOWAS
- Geothermal in ANDES
- Africa Clean Energy Corridor
- Online Learning Portal (IRELP)

Why the Pacific Islands?



IRENA & Pacific Islands



Islands: lighthouses for renewable energy deployment IRENA's approach

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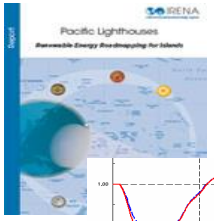
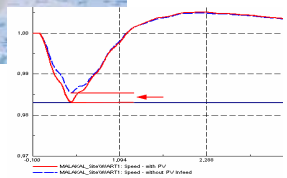
Abu Dhabi Fund for Development for innovative project financing

Islands roadmaps



Grid stability Assessments



Project navigator

Define targets, pathways and actions

Identify technical constrains and solutions

Define implementation strategies

Build Capacity

Global **R**enewable **E**nergy **I**slands **N**etwork - Interest clusters

Renewable energy publications

Renewable energy for island tourism

Renewable energy capacity building workshops

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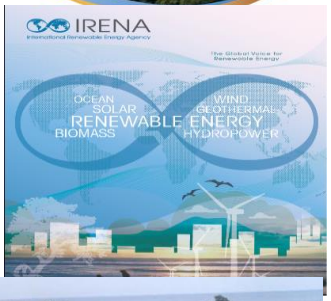
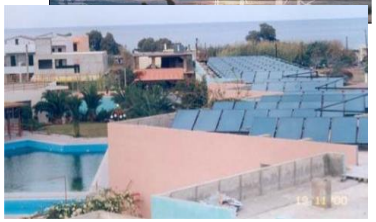
GREIN
GLOBAL RENEWABLE ENERGY ISLANDS NETWORK

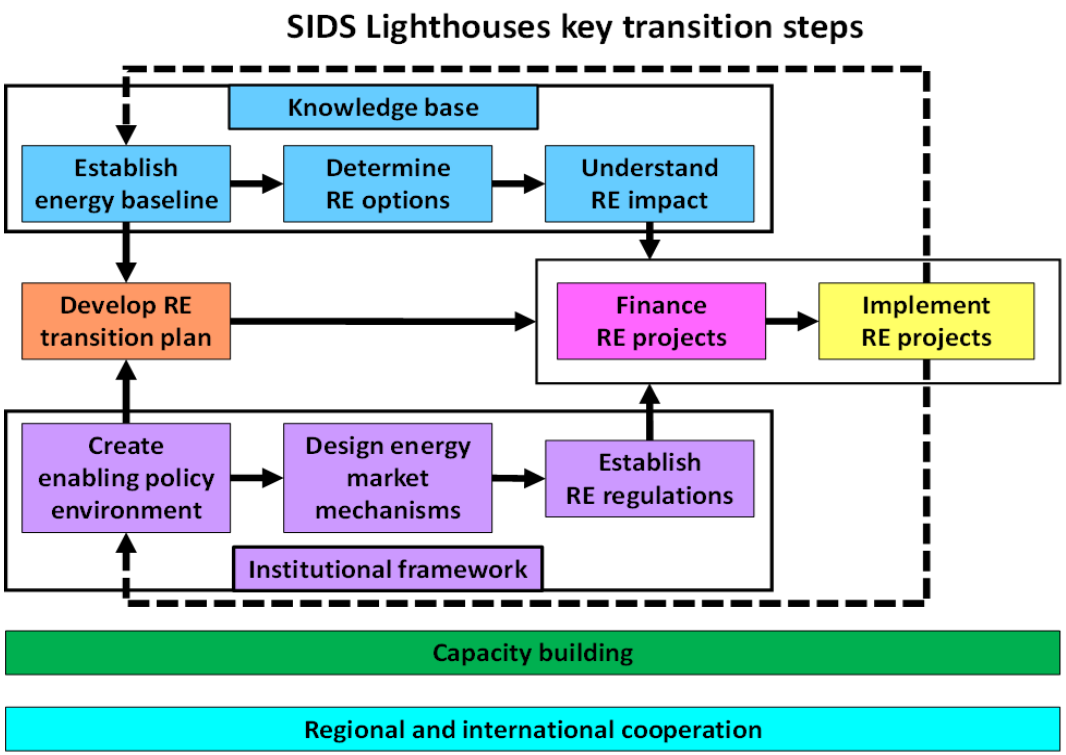




Transform island's energy systems through renewable energy

SIDS Lighthouses

- **Goal:** SIDS transition to high shares of renewable power
- **Observation:** transition is difficult to manage with many independent and often incompatible hardware projects. Priority needs/barriers are not always clear to decision makers.
- **Solution:** a country specific matrix of transition needs, ongoing and planned barrier busting activities, needs and gaps
- IRENA provides analytical, knowledge, matchmaking, fundraising support
- Implementation is left to other partners



PICs registered:
American Samoa, Fiji, FSM, Cook Is, Kiribati, Marshalls, Nauru, Palau, Samoa, Solomons, Tonga, Tuvalu, Vanuatu.
Partners: UAE, Germany, EU, NZ, Australia, Japan, UNDP, WB

Islands Lighthouses: Benefits

- Strategic and systematic approach to deployment of RE in SIDS to ensure sustainability of effort.
- Information readily available to decision-makers and development partners.
- Global overview of the SIDS' needs will allow for bundling of resources and capacities.
- Transparency of and easy access to information will facilitate cooperation and creation of partnerships.
- Dedicated resources at IRENA exist to ensure the momentum is kept after the Climate Summit and in the coming years.

RRA: Overview

Phase1 Initiation and Demonstration of Intent
(Week 1- 8)

- Formal request by Government made to IRENA is accepted, focal points in country designated
- Identify development partners interested in joining hands in the RRA and follow up actions
- Contract National Consultant. Draft the Background Paper.
- Identify national RE experts that determine up to 5 priority service-resource pairs for the country
- Identify regional and global experts and form a national RRA Expert Group (public and private sector, civil society, research institute, development partners).

***Note: Possibility** for RRA to end at this stage if there is low level of engagement or responsiveness from country*

Phase 2 Detailed country assessment and action plan
(Week 8-11)

- Conduct Expert workshop to discuss and fill up the RRA template in detail and develop a prioritized action plan
- Conduct meeting with high level decision makers that are not part of the Expert meeting
- Prepare a draft RRA report
- Plan RRA Validation Workshop

Phase 3 RRA Validation and Finalisation
(Week 11-14)

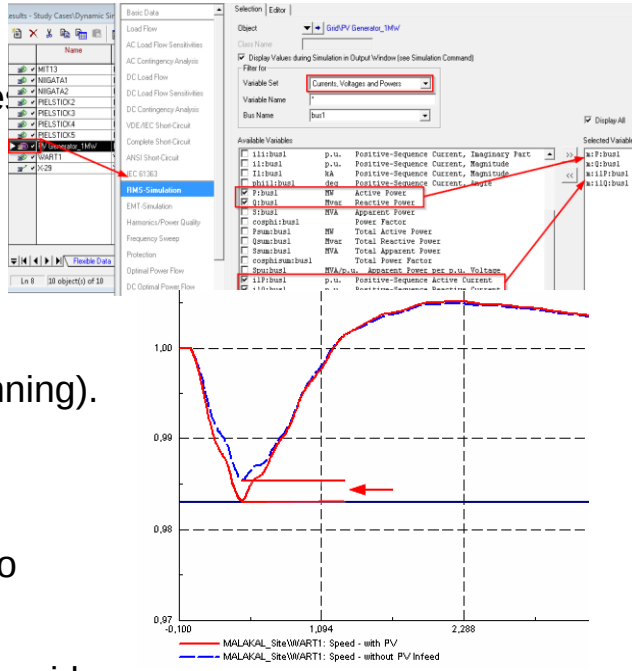
- Distribute the draft RRA report to all stakeholders- who will attend a validation workshop
- Convene all stakeholders to the RRA validation workshop
- Validate the RRA draft report
- Peer review and finalise RRA Report

Follow up
(Week 14 and onwards)

- Follow up by Governments, IRENA and Development partners (Policy, Capacity Needs Assessments, Local Content, etc.)
- Track RRA impact
- Learning and feedback for conducting a RRA

Dynamic Modelling for Grid Assessment

- *For grid operation, frequency stability and voltage control/stability are critical.*
- *Dynamic* and stationary calculations permit the simulation and analysis of the effect of renewables on the network frequency and voltages in the *second/minute scales.*
- *PowerFactory* is a grid analysis software that allows dynamic and stationary simulations. It is suitable for hybrid systems with ability to simulate key components including advanced inverters and batteries.
- Modeling and analyzing power grids through simulation studies require specific skills and experience.

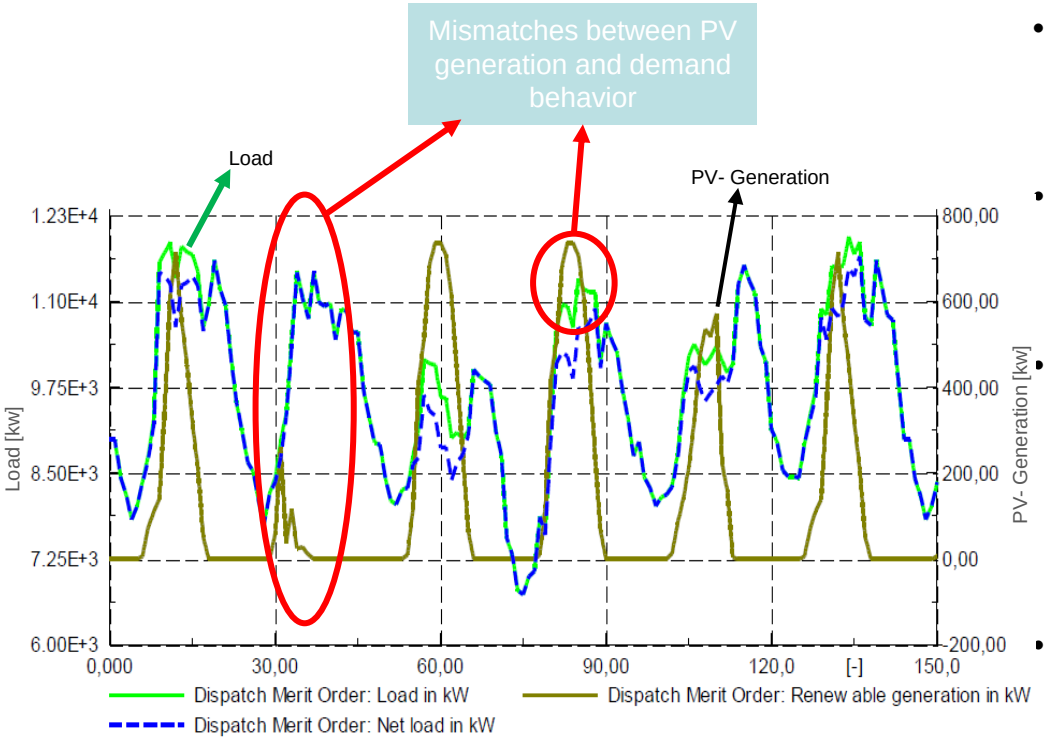


Source: *PowerFactory*

Aims of IRENA grid assessments:

- Provide islands with better understanding of the levels of variable RE integration without affecting the security of power supply (energy planning).
- Develop capacity in islands to conduct grid stability assessments/ grid studies.
- Develop a comprehensive methodology for grid stability assessment to analize impact of RE integration.
- Provide technological options for RE integration with stable and secure grid operation.

Principles of Power Systems
Renewable energy characteristics

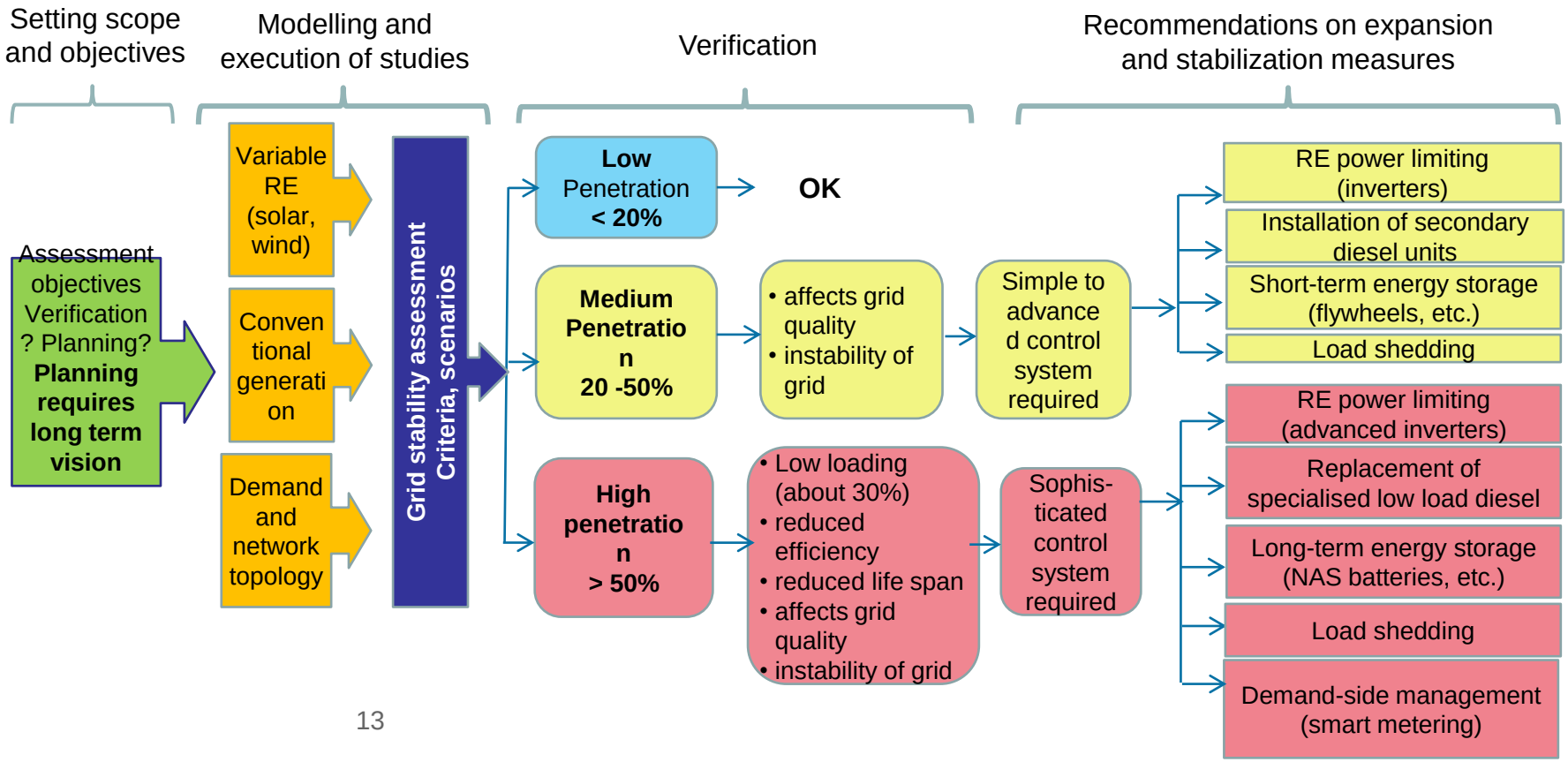


Scaled load and PV generation, study case Palau

PV and Wind behave different than convectional generation

- Variable input of primary energy depended on weather conditions → additional variability for active power balance
- No inertia characteristics as known from conventional generation → system becomes more sensitive to load/generation variations
- Ride through voltage and frequency deviations depended on type of technology → affect frequency stability, transient and voltage stability i.e robustness against large disturbances
- Reactive power/Voltage control capability dependent on type of technology
- New location of generation resources may require reinforcements and reconfigurations to avoid overloading and unexpected action of protection devises

Stability Assessment for Isolated Grids
Stability assessment flow and stabilization strategies



GREIN:
Global Renewable Energy Islands Network

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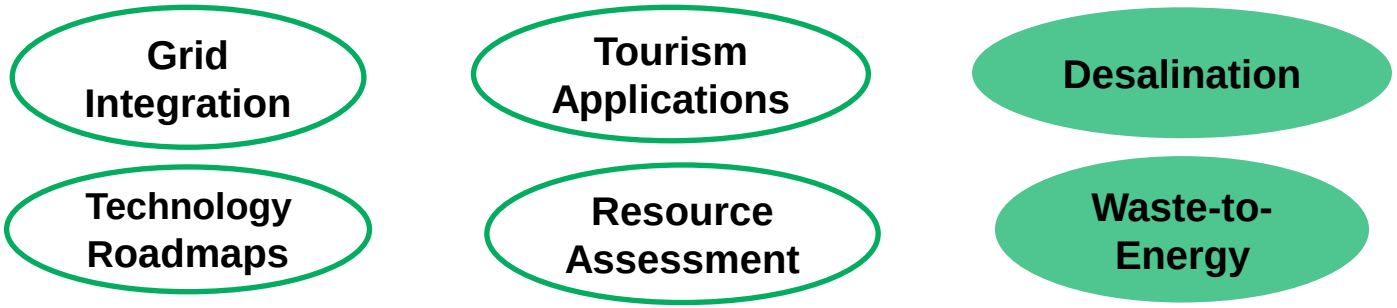
- September 2012 Malta communiqué, ministers and others called on IRENA to establish a Global Renewable Islands Network (GREIN) as a platform for pooling knowledge, sharing best practices and seeking innovative solutions
- 6 thematic clusters on topics of interest demanded by majority of islands
- Launch at IRENA Assembly in January 2013 and Activation of roadmaps and grid integration clusters at Pacific Energy Summit, Auckland, March 2013
- Clusters on Tourism and Resource Assessment launched in 2014
- Last two will be launched in 2015



Capacity Building

A Regional Initiative for Pacific Islands

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- **Timeline: December 2012 – May 2014**
- **Funded by:**
  - The Government of Germany
  - The Government of United Arab Emirates
  - IRENA
- **Partners:**
  - Pacific Power Association (PPA)
  - Secretariat of the Pacific Community (SPC)
  - Secretariat of the Pacific Regional Environment Programme (SPREP)
  - South-East Asia and Pacific Regional Secretariat of the Renewable Energy and Energy Efficiency Partnership (REEEP-SEAP)
  - Sustainable Energy Industry Association of the Pacific Islands (SEIAPI)
  - University of the South Pacific (USP)

Capacity Building

Objectives

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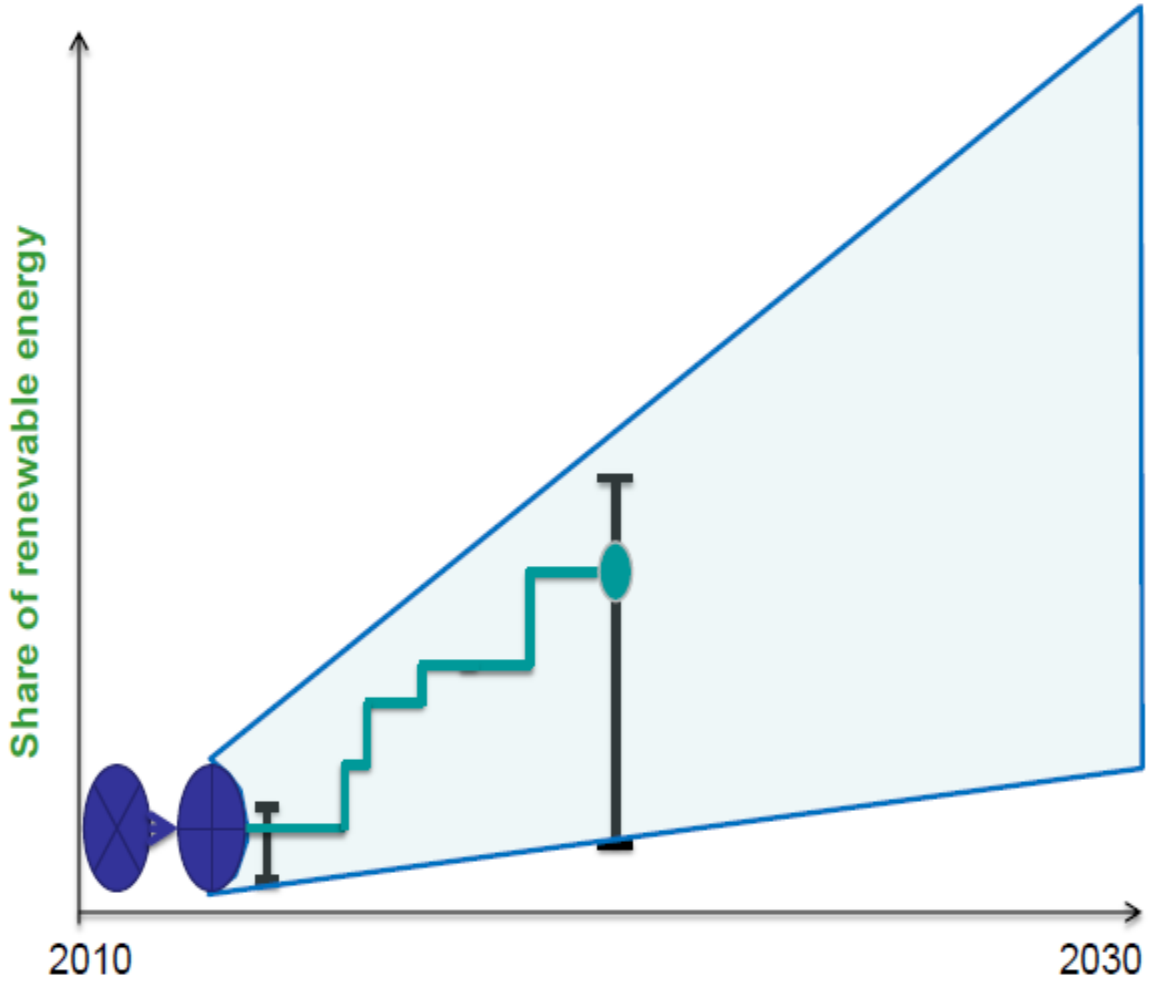
- **Support building varying capacity needs at the following levels:**
  - RE policy makers
  - Power utilities (through Pacific Power Association)
  - Local financial institutions (Local development banks)
  - Vocational training institutes
  - Private sector, when feasible (installers, technicians, entrepreneurs, etc.)
- **Contribute to the transition from donor support to sustainable markets**

- **Targeted support**
- **Demand-driven**
- **Long-term sustainability**
- **Islands' sizes & economies**

RE Road mapping

- Island roadmaps in the Pacific: Tonga Energy Roadmap (TERM), Nauru Energy Roadmap (NERM). Now starting the Kiribati Integrated Energy Roadmap (KIER)
- Global Level – REMAP 2030 Doubling share of renewables
- Sector level – manufacturing, industry, cities, grids and storage enabling technologies
- Roadmap development and application process (Expression of Interest through GREIN)

Methodology for RE Roadmaps
IRENA Approach



Renewable Readiness Assessment: Assessing the current situation

Scenarios and Strategies: Identifying Potential Futures

Grid Stability Planning Studies

Roadmaps: Prioritising Action Items

IRENA island roadmaps

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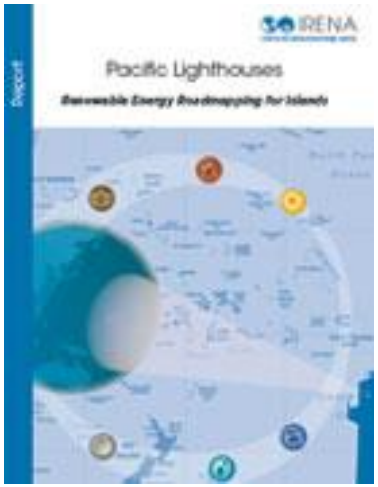
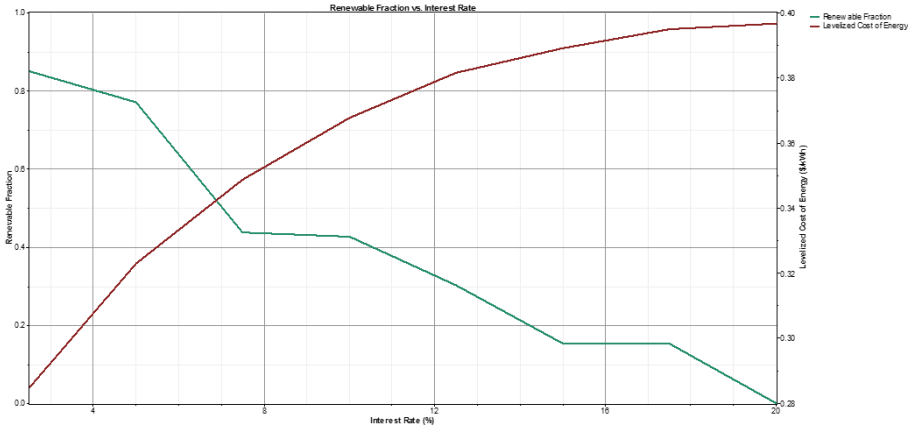




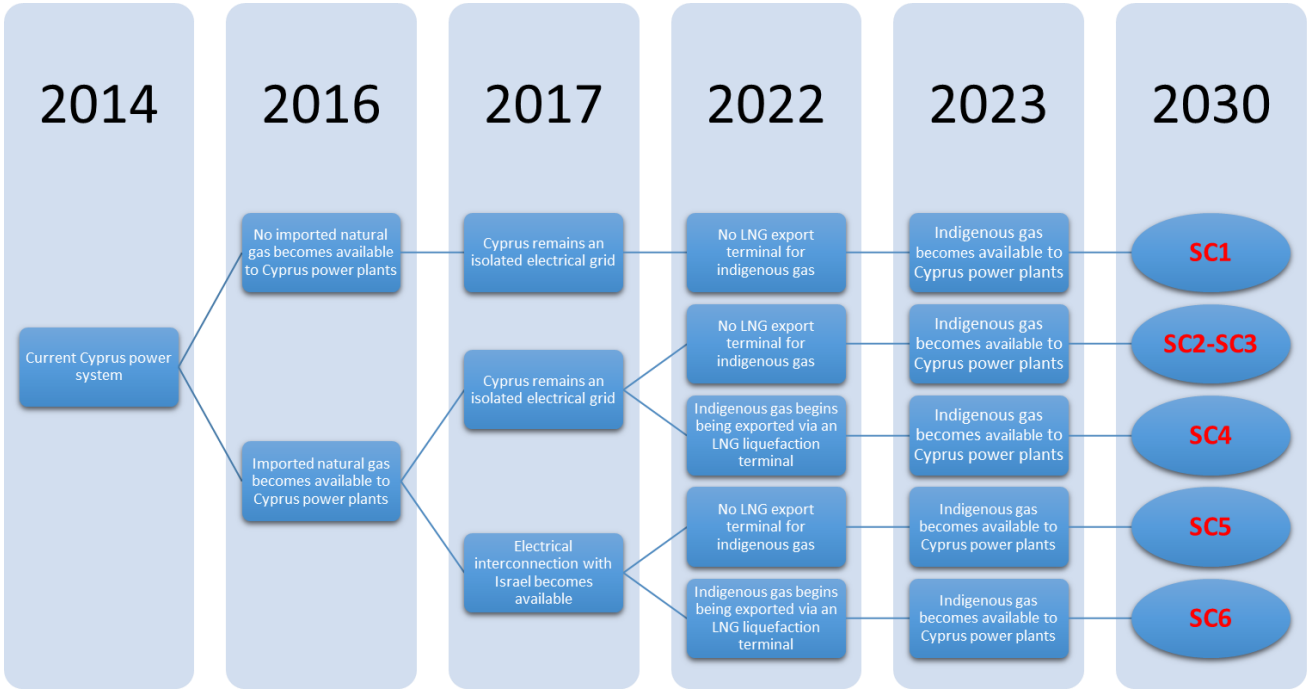
A Pwiyeiy bwio – light up my land

Nauru Energy Road Map 2014 – 2020

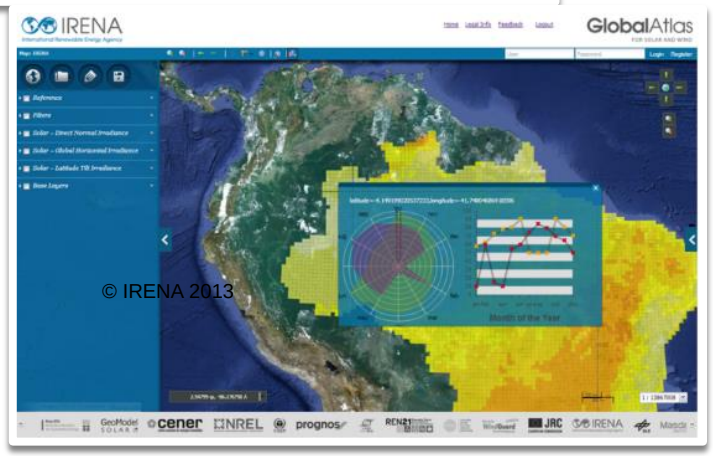
An Implementation Plan for Energy Sector Development

Second Draft

7th January 2014



Global Renewable Energy Atlas



- Largest initiative to **assess renewable energy potential** on a global scale
- Compiles data on **high-resolution maps**
- **39 countries contributing data** (as of May 2013)
- Initially includes **solar and wind** data, in the future will also include data on bioenergy, geothermal and other renewable energy sources
- Will incorporate **cost data** and available **infrastructure**

Global Renewable Energy Atlas

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Albania, Australia, Belgium, Denmark, Egypt, Ethiopia, France, Gambia, Germany, Grenada, Honduras, India, Iraq, Israel, Kuwait, Lithuania, Mali, Mexico, Mongolia, Nicaragua, Niger, Nigeria, Norway, Peru, Qatar, Saudi Arabia, Senegal, Seychelles, South Africa, Spain, Swaziland, Switzerland, Tunisia, UAE, Uganda, UK, Uruguay, USA, Yemen.

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Renewables are increasingly competitive, but more needs to be done to fulfill their potential…

IRENA is part of the solution in the Pacific region

http://www.irena.org

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