



The Business of
Marine Energy

Oceania Room | Te Papa Tongarewa | Wellington

Energising the Pacific

Energising the Pacific through the New Zealand Aid Programme

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Overview

- Introduction to the New Zealand Aid Programme
- The role of marine energy in the Pacific
- New Zealand Aid Programme's energy programmes
- International Partnership for Energy Development In Island Nations (EDIN)



The New Zealand Aid Programme

- The Government's international aid and development programme; managed by the Ministry of Foreign Affairs and Trade (IDG – International Development Group)

- The strategic objective and mandate is:

Sustainable development in developing countries, in order to reduce poverty and contribute to a more secure, equitable and prosperous world.

- Within this there is
 - a core focus on **sustainable economic development**
 - an increasing core focus in the **Pacific**.



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Focus on the Pacific



- Six main priority sectors (Education, tourism, fisheries, agriculture, horticulture, and renewable energy)
- Absolute priority given to renewable energy initiatives
- In Pacific, renewable energy a significant building block to sustainable economic development

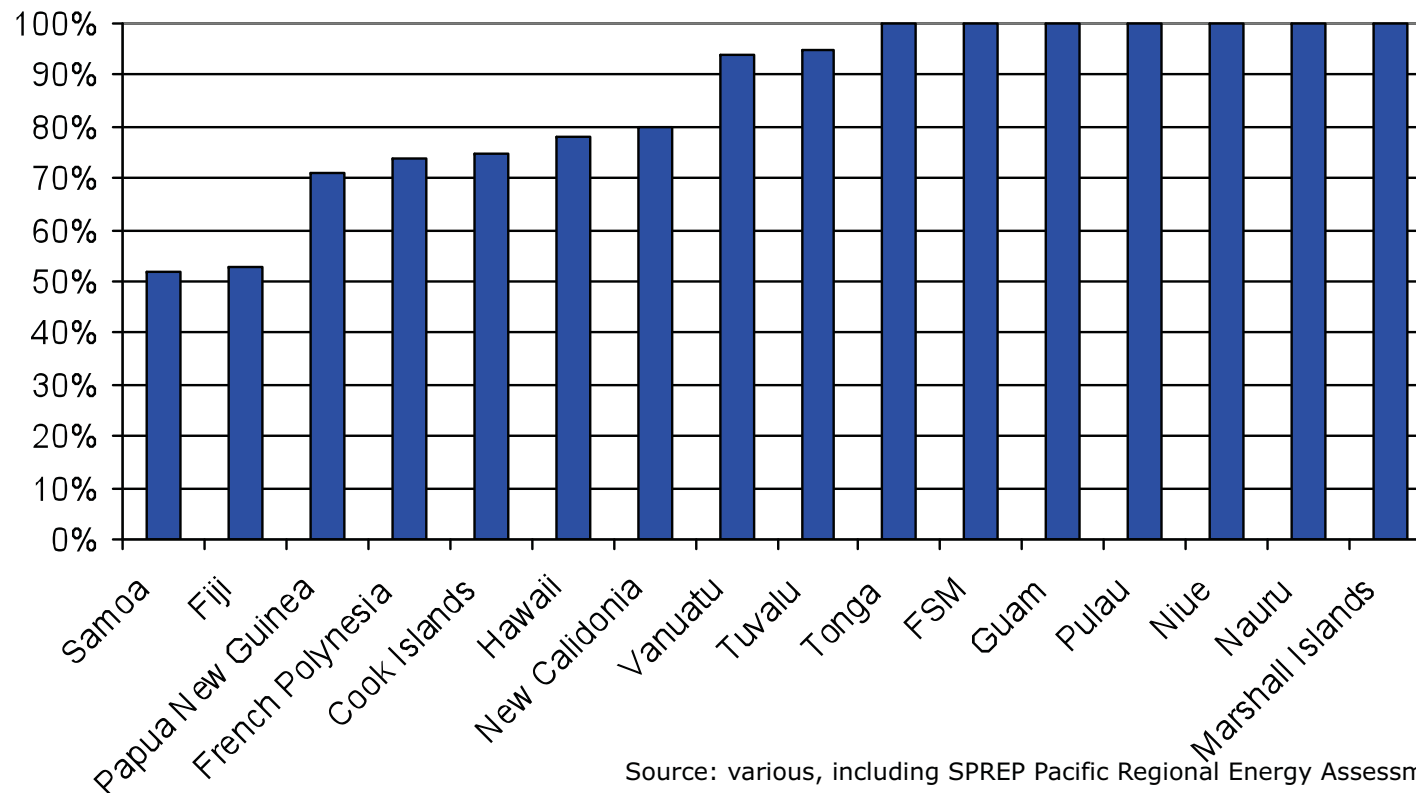


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Energy in the Pacific – background and context

% electricity generated from diesel



Source: various, including SPREP Pacific Regional Energy Assessments 2004

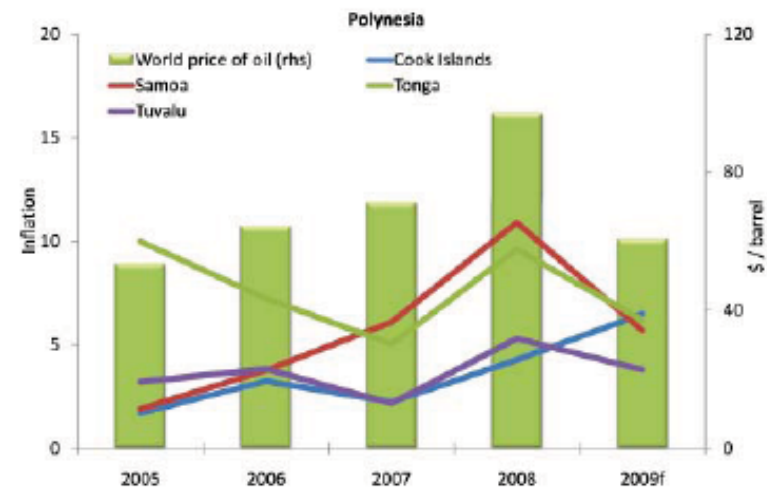


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Costs to economies

- PICs use total of approx 40,000 barrels of oil per day
- Prices peaked at NZ\$146 in 2008, total daily cost of approx NZ\$5.8 million
- Increases in oil prices
 - Upward pressure on inflation, and lowers economic activity
 - Loss of real income for fuel consumers

Figure 4: Inflation in PDMCs and the World Price of Oil (continued)



PDMC = Pacific developing member country.

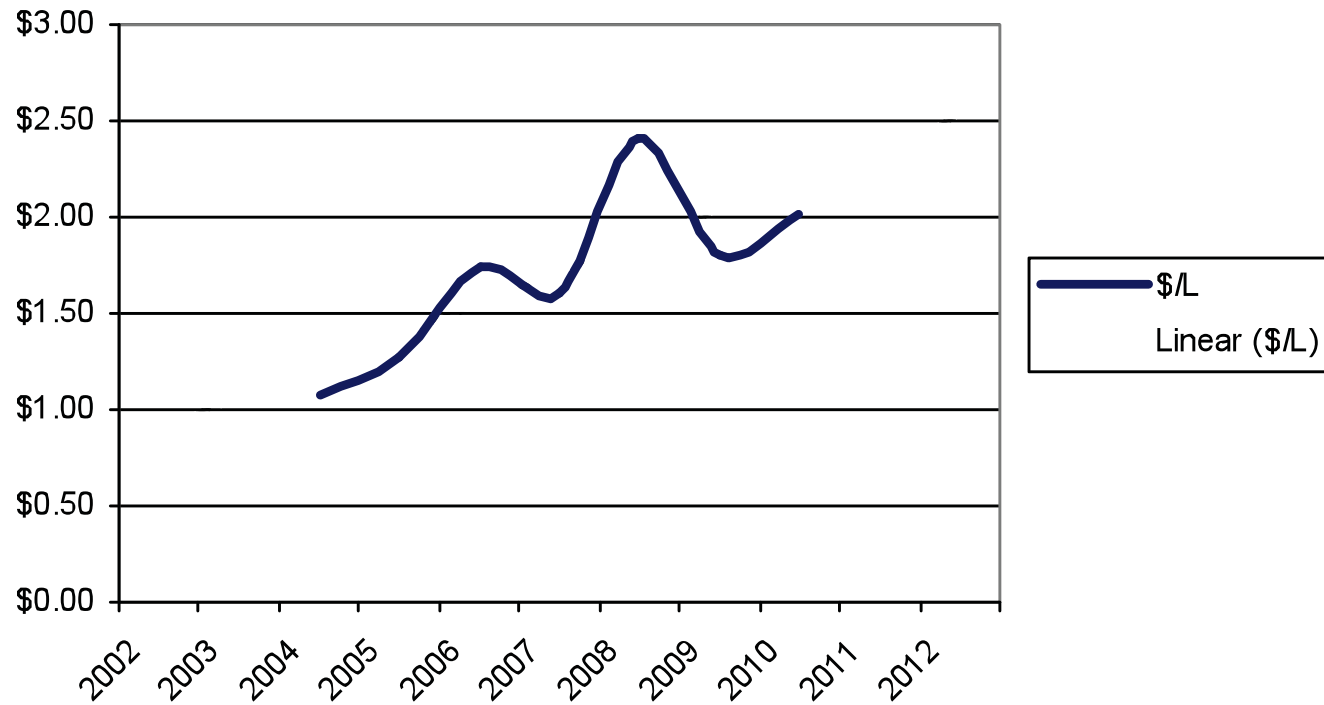
Note: The world price of oil is an average of UK Brent, Dubai, and West Texas Intermediate crude oil prices, in \$ per barrel; inflation is the annual percentage change in the consumer price index of each country.

Source: Asian Development Outlook, various years; and World Economic Outlook.



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Diesel price trends in Tuvalu in NZ\$

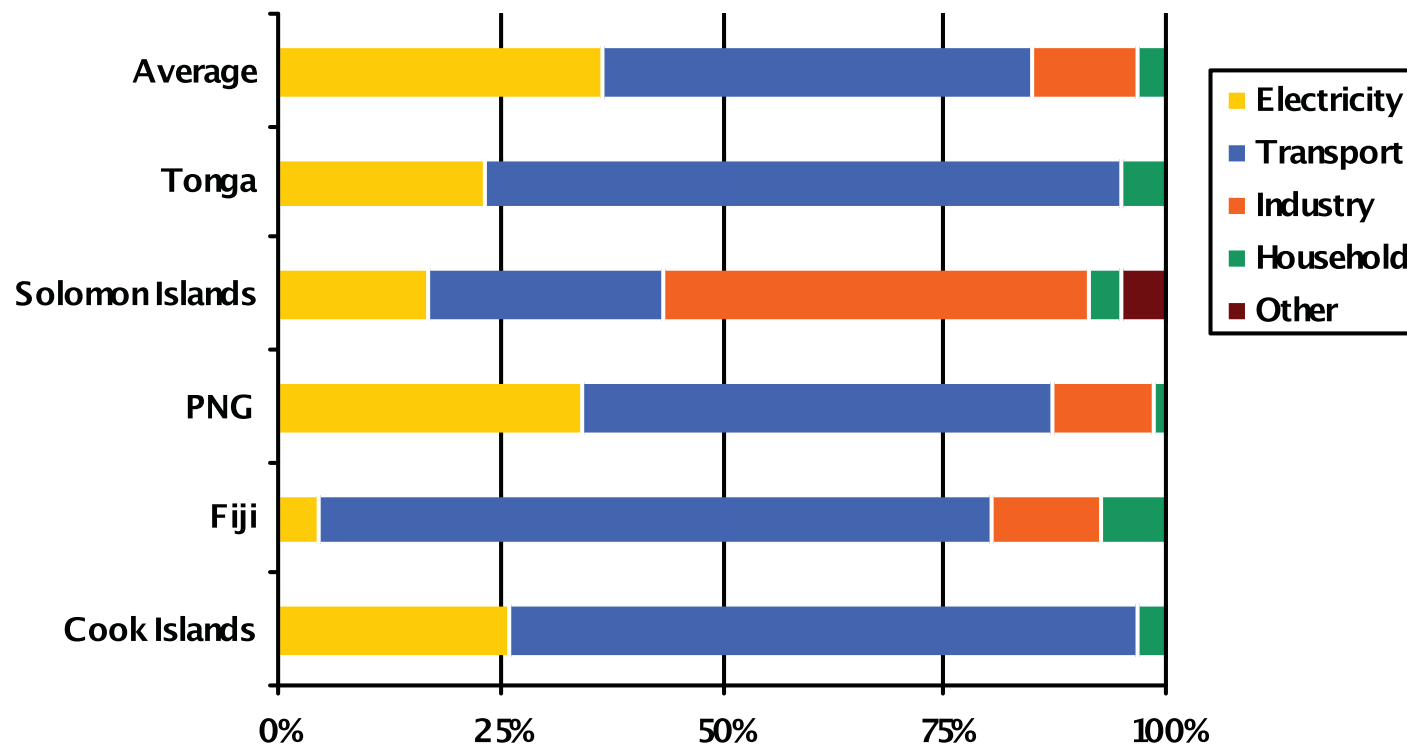


Aecom 2010



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Energy sector end use



Data from Pacific Regional Energy Assessments, World Bank and ADB, 2002.



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Electricity costs

- Residential tariffs often subsidised – consumers sometimes shielded from benefits of renewable energy
- Tariffs increasing as fuel costs go up
- Cost of generation in excess of NZ\$2.50/kWh in some situations

Country	Approx. residential tariffs (US c/kWh)	Approx. cost of generation (US c/kWh)
Tokelau, and other outer atolls or remote grids		150
Solomon Islands	58	
Cook Islands	46	120 - 200
Vanuatu	44	
Tonga	42	
Samoa	36	
Fiji	35	
Tuvalu	33	77
New Zealand	16	6



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The role of marine energy in the Pacific

- Current pace of development is very rapid, but what role can it play in Pacific?
- Some work has been done on resource mapping
 - Some strong possibilities for tidal and wave
- Generally at immature / prototype stage
- Commercial viability will arrive
- Current emphasis on reducing diesel consumption
 - Difficult for marine energy technologies to compete with PV, wind, geothermal in this regard

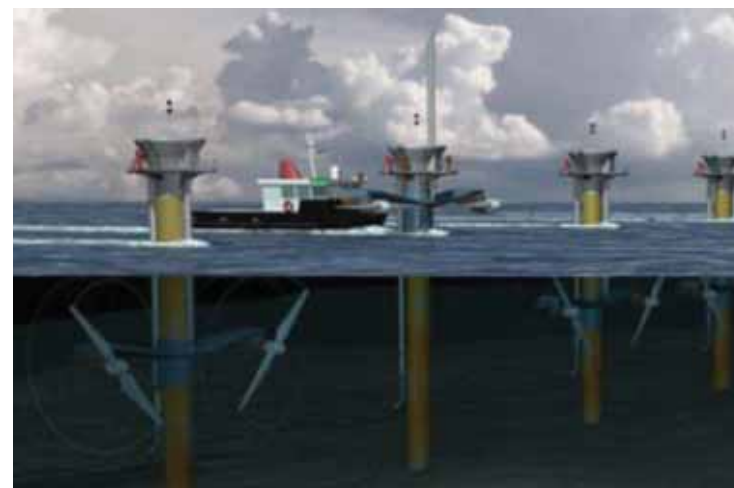


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Marine energy in the Pacific

- Technologies must be commercially-proven, mature, before they can be funded by the Programme
 - Not a research or demonstration fund
- How can NZ companies tap into opportunities?
 - NZ as the gateway into the Pacific
 - Smaller-sized applications connected to smaller island grids
 - Work with partner countries in the Pacific
 - Understand difficulties of remoteness, maintenance, parts and repairs





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Renewable energy in the Pacific

- Long history, but many project failures
- 1970s/80s oil spikes prompted construction of RE, including PV, biomass gasification, and trials of wind turbines
- Many fell into disrepair and disuse for reasons including:
 - Inappropriate or immature technologies
 - Inadequate maintenance, training, and access to spare parts
 - Inadequate focus on institutional capacity and capability building
- Many of the technological problems have been remedied, but importance of the social, cultural, and political context needs to be fully understood

Cook Islands – wind, PV mini-grids, grid-connected PV

- CIGov set ambitious renewable electricity targets
 - 50% by 2015, and 100% by 2020
- Rarotonga peak demand = 5MW
 - Other islands <500kW peaks
- New project looking at possible NZ funding support for grid-connected PV, PV mini grids, wind development
- Capability and capacity building
- Possible capacity for 2MW of wind on Rarotonga, grid-connected PV
- PV mini grids on outer islands, including Mitiaro, and some of the Northern Group



Tonga – Roadmap and village network upgrades

- 10 year energy roadmap (TERM) to reduce reliance on imported fuel for electricity
- Tonga Village Network Upgrade Project aims to provide access to safe, reliable and efficient electricity to all grid-connected rural and semi urban households
- Phase one - NZD \$5.9 mil to cover 17 villages on Tongatapu Island
- Provides villages with smart meters, reduces line losses, provides quality supply, connect all houses in the grid area.





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Tuvalu – renewable energy capability and delivery

- A Renewable Energy and Energy Efficiency Unit (REEEU) established within Tuvalu Electricity Corporation (TEC)
 - Aim to reduce reliance on imported diesel, improve the efficiency of supply infrastructure, develop PV and explore other viable renewable energy options, and enhance the regulatory environment.
 - New Zealand funding \$500,000 to date





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Papua New Guinea – rural electrification

- Less than +/-10% of population have access to electricity
- Considering a new project looking at distribution and electrification of rural, poor communities located near transmission lines
- Working with ADB Towns Electrification (hydro) project, considering constructing distribution connections to poor communities located near the transmission lines to the towns.





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Samoa - coconut oil biofuel

- NZ funded study into potential for a commercially viable operation to run generators on a blend of 80% coconut oil and 20% diesel on Savai
- There is potential, but outstanding questions remain relating to price structure, impact on other markets and users, and roles and responsibilities
- Further work being considered





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Further work in Indonesia - geothermal

- Vast geothermal potential in Indonesia (40% of world's reserves)
- RI has significant needs that NZ is able to help deliver on
- Looking at ways the NZ Aid Programme can support Indonesia's geothermal energy plans and increase electrification rates
- New programme, still under development





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Further work in Afghanistan – hydro and/or solar PV

- Still at an early feasibility and pre-design stage
- Afghanistan has one of the lowest electricity use rates in the world
- Assessing the viability of renewable energy option for Bamyan province, focusing on essential government infrastructure and central bazaars
- Close collaboration with other donors
- Opportunities include small-scale hydro for provincial centres, and use of photovoltaics





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International Partnership for Energy Development in Island Nations (EDIN)

- EDIN aims to promote the deployment of energy efficiency and renewable energy technologies in island nations
- New Zealand is represented in EDIN by MED and MSI
- The United States, New Zealand and Iceland are the first EDIN Partners (since mid 2008).
- EDIN is a framework, not a fund or research body

Challenges for EDIN – NZ perspective

- EDIN is not a funding body, nor a research body
- Capitalising on opportunities to collaborate and learn from US and Iceland on clean energy
- Possibility for joint EDIN projects (i.e. US, NZ and Iceland working together on a single project/area)...where and how can NZ best contribute?
- Possibility that EDIN membership extended in future (e.g. Portugal wanting to join)...what might this mean for NZ?

Conclusion

- Renewable energy priority for Pacific
 - Strong emphasis placed on projects to deliver sustainable economic development benefits
- A number of projects already underway
 - Watch out for more
- Marine energy has huge potential in the region, but difficult to deliver in the short term

Thank you



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