Chapter 10
Sustainable Energy Development in the Pacific: The Evolution of Energy Frameworks and National Policies

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Abstract Over the past decades, the region has been actively engaged in finding ways in which these challenges could be addressed, and solutions that would reduce the region's reliance on imported fuels. The earliest thinking relied heavily on the possible use of renewable energy to substitute for fossil fuels. Over the years however, there has been a gradual evolution of thought, with the consequence that recent energy strategies, at both the national and regional levels, have realised the limitations of this one-pronged approach. It has been realised that some energy use sectors will continue to depend on fossil fuels for a long time. The importance of energy efficiency and effective energy policies and plans is also acknowledged. Another important development has been the use of the whole-of-sector approach to the solution of energy problems. This paper traces the development in energy policies that have taken place in the Pacific over the last decade, and critically assesses the key elements of new thinking in energy planning for the region. After deliberating the need for energy policies in general, it examines the features of the Pacific Island Energy Policy and Plan (PIEPP), and discusses the possible reasons why it was unable to deliver its expected outcomes. The importance of the whole-of-sector approach, as well as other considerations that are now thought to be essential tools for energy planning and implementation in the Pacific region, is discussed. The present status of the development of a regional energy strategy, as embodied in the Framework for Action on Energy Security in the Pacific (FAESP), is then outlined.

Keywords Sustainable energy development · Energy policy · Energy efficiency · Pacific Island Countries (PICs) · National energy policy · FAESP

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Short Introduction

The Pacific Island Countries and territories (PICTs) face a number of common energy challenges. One of these is the lack of indigenous fossil-fuel resources This leaves these nations with no option but to import the required fuels from abroad at great expense. The remoteness of these island nations imposes further costs and introduces supply chain issues.

This paper traces the development in energy policies that has taken place in the Pacific over the last decade, and critically assesses the key elements of new thinking in energy planning for the region.

Energy Challenges of the Pacific

The Pacific Island countries and territories (PICTs) comprise 22 island nations and territories, stretching from the Northern Marianas in the north-west of the Pacific to French Polynesia and the Pitcairn Islands in the south-east. They include American Samoa, the Cook Islands, the Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, the Marshall Islands, Nauru, New Caledonia, Niue, the Northern Mariana Islands, Palau, Papua New Guinea, the Pitcairn Islands, Samoa, the Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and the Wallis and Futuna Islands. The total population that inhabits these 79 million km^2 of the mid-Pacific region is about 10 million. However, when the population of 7 million belonging to Papua New Guinea alone is ignored, the true picture of a sparsely populated region of nations separated by vast distances emerges.

The PICTs are faced with many energy challenges because of their remoteness, sparse populations and their geological nature. Because of their general lack of indigenous oil reserves (except for Papua New Guinea), they are heavily dependent on imported fossil fuels for their energy needs. Almost all of this is required for their power generation and transportation needs, with 25 % of the imports going towards the former sector and 75 % towards the latter (Gould et al. 2011). Imported petroleum is responsible for more than 80 % of power generation in the PICTs. The Cook Islands, Kiribati, Nauru, the Solomon Islands and Tonga are entirely dependent on imported fuel for their power generation (Gould et al. 2011). Figure 10.1 indicates the large contribution imported fossil fuel makes to the power generation mix of selected PICs.

A matter of great concern to all PICs is that fuel import costs as a percentage of their GDP have more than doubled between 2002 and 2008. In the case of Fiji, the ratio of fuel import costs to GDP increased from 5 % in 2002 to 12 % in 2008, while this ratio increased from 12 to 25 % between the same years for Kiribati (Levantis 2008). Because of the almost total dependence of the PICs on imported fuels for power generation and transportation, a rise in fuel prices contributes to inflation, deterioration in balance of payments and lower real incomes in these

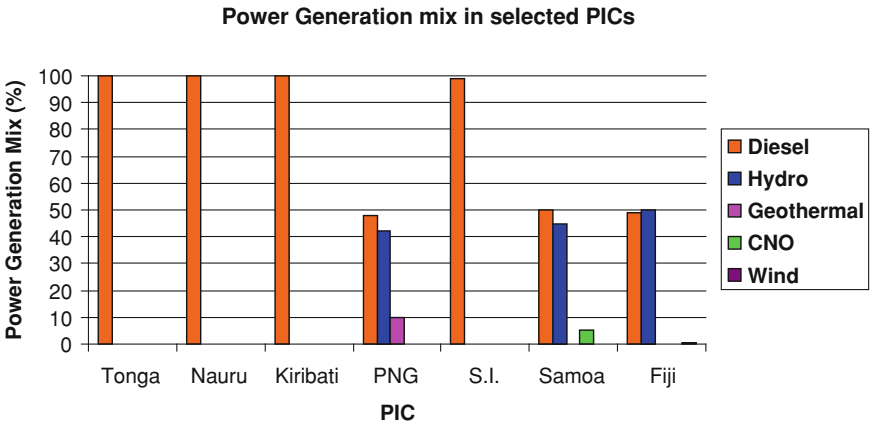

Fig. 10.1 Comparison of imported fossil fuel and other primary energy sources for power generation—selected PICs (*Source* Singh 2012)

countries (Gould et al. 2011). Some experts have predicted that the situation is currently (2012) developing towards another fuel price crisis for these countries. As global fuel prices have nearly doubled over the last two years (2010, 2011) an oil price shock to the PICs comparable to that of 2008 is imminent.

These economic ramifications of imported fuel prices has made the region well aware of the need to reduce, if not eliminate its imported fuel dependency. Ways that come to mind are substitution of imported fuels by indigenously-sourced energy supplies, the most obvious of which is renewable energy. Import bills can also be reduced by reducing the landed price of imported fuels, and by making more efficient use of this commodity through energy efficiency measures.

In working towards a viable solution to the fuel import issue, the region is faced with several challenges. These include the small, isolated nature of most PICs, the limited and varied availability of indigenous renewable energy resources, and the lack of human and institutional capacity to meet these challenges (FORUMSEC 2011). A crucial first step towards developing solutions to these energy challenges is the formulation of energy policies, both at the regional and national levels. This paper outlines the attempts that have been made over the last decade to achieve these aims.

Early Attempts at a Regional Policy

The PICs differ vastly in their demography, geography and geology. They range from low-lying coral atolls to mountainous volcanic island states, and from populations of a few thousand to several millions. There are also many social and cultural differences, including language differences. Apart from English and

French, the region boasts a rich diversity of indigenous languages. Geological differences between the volcanic islands and coral atolls mean the availability of energy resources such as hydropower and biomass resources is not even across these island nations.

While the PICs have many energy issues in common, there are also many differences in their energy needs and their ability to satisfy them. Each nation thus needs an energy policy that is tailor-made to suit its own requirements. However, there are also challenges each shares with other PICs, a notable example being the fossil fuel supply problems to remote small island states. There is, therefore, a need for regional policies to cater for such common requirements. These small nations also need guidance in the development of their individual national energy policies.

The first regional energy policy to be attempted was the Pacific Island Energy Policy and Plan (PIEPP) (Pacific Islands Energy Policy and Plan 2002). It was developed in 2002 by the Energy Working Group (EWG) of the Council of Regional Organizations of the Pacific (CROP) and was to act as a "guideline for a regional organization energy policy and for developing PICT national energy policies" (Wade et al. 2005). This plan was revised in 2003 to strengthen the renewable energy (RE) component and presented to the Regional Energy Ministers' Meeting (REMM) in Oct/Nov 2004 (Wade et al. 2005).

The PIEPP consists of six themes and four cross-cutting issues, collectively labelled as the ten sections. The six themes are: regional energy sector coordination; policy and planning; transportation; renewable energy; and petroleum. Rural and remote islands, environment, efficiency and conservation, and human and institutional capacity comprised the four cross-cutting issues.

The nature of a section was defined via the statement of a goal. For each section, policies were stated, a strategy or strategies adopted for its implementation, activities stipulated for the implementation of the strategies, and indicators of success (i.e. key performance indicators) identified for assessing the outcomes of each activity. The goal, policies and strategies of a typical section (Theme 5, renewable energy) are listed in Table 10.1.

The task of ensuring that each strategy was properly implemented was allocated to a specific regional organisation, called the "lead agency". In 2004, the overall administrative responsibility for energy was given to the Pacific Islands Applied Geoscience Commission (SOPAC). There were also assumptions associated with each strategy that had to be clearly recognised, and a timeframe implemented to indicate the expected time of completion.

All these features are exemplified using the case study of renewable energy strategy 5.1.1 in Table 10.2 below.

In December 2004, the PIEPP was separated into two complementary documents—the Pacific Islands Energy Policy (PIEP) which was a policy document only, and the Pacific Islands Energy Strategic Action Plan (PIESAP) which was the associated working document (FORUMSEC 2011). The two documents were endorsed by senior energy officials at their Regional Energy Meeting held in December 2004 in Madang, Papua New Guinea (FORUMSEC 2011).

Table 10.1 The goal, policies and strategies of PIEPP corresponding to theme 5 (Renewable Energy) (*Source* Pacific Islands Energy Policy and Plan 2002)

Theme	Goal	Policies	Strategies
5. Renewable energy	5. An increased share of renewable energy in the region's energy supply	5.1 Promote the increased use of proven renewable energy technologies based on a programmatic approach	5.1.1 Implement a regional RE programme
			5.1.2 Ensure access to information and training materials in RE
			5.1.3 Assess RE potentials in PICs
			5.1.4 Assist PICs in obtaining funding for RE projects
			5.1.5 Carry out feasibility studies of RE technologies in PICs
		5.2 Promote the effective management of both grid-connected and stand-alone renewable-based power systems	5.2.1 Support the establishment of stand-alone power systems by utility providers
		5.3 Promote a level-playing-field approach for the application of renewable and conventional energy sources and technologies	5.3.1 Remove biased barriers to the application of RE technologies
		5.4 Promote public–private partnerships and mobile external funding for RE	5.4.1 Implement externally-funded projects through public–private partnerships

Inadequacies of the Pacific Island Energy Policy and Plan (PIEPP)

Possible problems with the PIEPP became evident as early as 2004 (Wade et al. 2005) when it was observed that the division of responsibilities for the implementation of the plan would be a major difficulty. The plan was the responsibility of the Energy Working Group (EWG) of the Council of Regional Organizations of the Pacific (CROP) and was administered by SOPAC. However, the EWG seemed to have an "unclear mandate, outdated terms of reference, and … no budget for its meetings" (Wade et al. 2005). It is also obvious that while the EWG had the overall responsibility for the plan, the themes were apportioned to several different regional organisations, each of which had an interest in energy.

Table 10.2 The organisational features of RE strategy 5.1.1 of the PIEPP (*Source* Pacific Islands Energy Policy and Plan 2002)

Strategy 5.1.1 Design and implement a regional programme to promote the widespread and sustainable utilisation of proven renewable energy technologies				
Activities	Lead organisation	Indicators	Assumptions/ Risks	Time frame
Install 10,000 solar water heaters in schools, hospitals and community based premise	SOPAC	Number of installed systems [Regional programme reports]	Resources (financial and TA) available	2012
Install 20,000 solar modules in rural electrification projects	SOPAC	Number of installed systems [Regional programme reports]		2012
Install 5 wind power projects with a combined capacity of 5 MW	SOPAC	Number of installed systems [Regional programme reports]		2012
Install 1pilot micro-hydro project	SOPAC	Number of installed systems [Regional programme reports]		2012
Support the use of bagasse and wood chips where feasible	SOPAC	Energy Mix statistics [Energy Sector annual report]		2012
Plant 0.5 million fuelwood seedlings in atoll countries	SOPAC	Energy mix statistics [Energy Sector annual report]		2012

In a review of the plan carried out in 2010 (Johnston et al. 2010), it became clear that there were several underlying flaws that presented serious barriers to its successful implementation. The two main objectives of the plan were to coordinate the regional energy sector planning and programmes of regional organisations, and to offer guidelines in the planning of National Energy Policies and Plans of individual PICTs. It was essentially found that while the plan was largely successful in its second objective, it was unable to carry out its first objective with any effectiveness. The main reason for this failure seemed to lie in the lack of clear vision for the regional energy programme, as well as uncertainty in the role the lead agency assigned to this task (SOPAC) was supposed to play. But there were several other serious failings pointed out by the review committee. Among these were:

- the objectives of the plan were vague, and lacked focus
- there were no guiding principles for energy sector development
- no proper timeframes had been set
- there were no clear allocations of responsibility
- there was no mechanism mentioned for the monitoring and evaluation of the success of the activities

- the plan did not emphasise that the region would be dependent on imported fossil fuel for a long time to come, and subsequently that fuel pricing and supply issues should be addressed as a priority
- the importance of data on energy in decision-making was not stressed

At the Pacific Energy Ministers' meeting (PEMM) at Nuku'alofa, Tonga, in April 2009, it was resolved that the lead role for energy in the region was to be given to the SPC. It then became evident that the PIEP and PIESAP had to be revised if the SPC was to succeed in its new role. This was brought to the notice of the Pacific Leaders at the Pacific Islands Forum Meeting in Cairns, Australia in August 2009. The ministers agreed on the need to review the PIEP and its associated Action Plan (PIESAP). The key priorities to be addressed in the review included strengthening coordination of regional services and donor assistance, and the delivery of energy services to the region through one agency (the SPC) and through one programme (FAESP 2010).

The ministers also called for (FAESP 2010):

- human capacity development to support national and regional energy programmes
- strengthening of national capacity in collection and analysis of energy data and information
- support for the regional bulk procurement initiative
- facilitation of investment in sustainable renewable energy technologies, energy efficiency and energy conservation

The document that resulted from this decision was the Framework for Energy Security in the Pacific (FAESP) (FAESP 2010) and its associated implementation plan, which were endorsed by the Pacific leaders in 2011.

New Thinking in Regional Energy Planning

A novel feature of FAESP is its use of the "whole-of-sector approach" (WOSA) in problem-solving. It is also based on a "many partners, one team" philosophy, which acknowledges that energy solutions for the region require input from many stakeholders, who should be accorded equal status, and consider the energy sector in its entirety rather than focusing only on a limited aspect. So what is the whole-of-sector approach?

This new approach to energy planning was used earlier for the first time in the formulation of the Tonga Energy Roadmap (TERM), the new national energy policy for Tonga, by the several development partners and other stakeholders involved in the exercise (Tonga Energy Roadmap 2010). The essential features of WOSA are described in a paper delivered by the World Bank at the Forum Energy Ministers Meeting (FEMM) in Brisbane, Australia, on 21 June 2010 (Fernstein et al. 2010). According to this paper, a successful WOSA at the national level

requires that the government coordinates the activities of all relevant stakeholders involved in the planning, and allows access to all relevant energy information to the team members. In addition, the development partners should fund and coordinate the technical assistance required for the planning process.

The other features of this approach include

- a least-cost approach to meeting the overall objectives
- risk management through, for instance, the development of options to meet demand, especially electrical demand
- assurance of financial cost-effectiveness of the task
- environmental and social sustainability of the outcomes
- clear delineation of the roles of the government, utility providers and the private sector

The WOSA is not a new problem-solving methodology. It is a well-understood principle used in the past that includes (Fernstein et al. 2010):

- the need for high level leadership in National Energy Policy and Strategy development, with alignment across line departments
- energy being treated as an integrated sector in the overall infrastructure development of the nation
- the realisation that tasks should be realistic, time-bound, costed, and lead to measurable outcomes
- renewable energy should be considered for all its perceived benefits, including economic benefits, improving energy access, and its environmental and social impact
- energy plans should be linked to national energy budgets
- the role of the private sector must be recognised.

Features of the FAESP

The FAESP starts with the following clear statements of vision, goal and expected outcomes

Vision	An energy-secure Pacific
Goal	Secured supply,efficient production and use of energy for sustainable development
Outcomes	i) Access to clean and affordable energyii) Optimal and productive use of energy

The framework is based on eleven guiding principles (FAESP 2010), and the following seven themes which embody the principles:

- leadership, governance, coordination and partnership
- energy planning, policy and regulatory frameworks
- energy production and supply

- petroleum and alternative liquid fuels
- renewable energy
- energy conversion
- end-use energy consumption
- energy use in transport
- energy efficiency and conservation
- energy data and information
- financing, monitoring and evaluation

These statements of policies are realised via an implementation plan (called the Implementation Plan for Energy Security in the Pacific—IPESP) (SPC 2011) that assigns actual activities to the policies, apportions responsibilities and institutes a system of monitoring and evaluation. The overall structure of FAESP is depicted in Fig. 10.2 below.

The FAESP has learnt from the lessons provided by the PIEPP example, and is a product of an analysis and development process involving the cooperative efforts of many stakeholders, including regional agencies, development partners and country beneficiaries, that took two years and several stages of vetting and approval by Pacific energy officials and leaders.

It is a well-structured document which has a clearly stated vision, goal and expected outcomes. It is based on clearly-stated guiding principles that provide the basis for the rational development of the framework. Responsibility for activities is

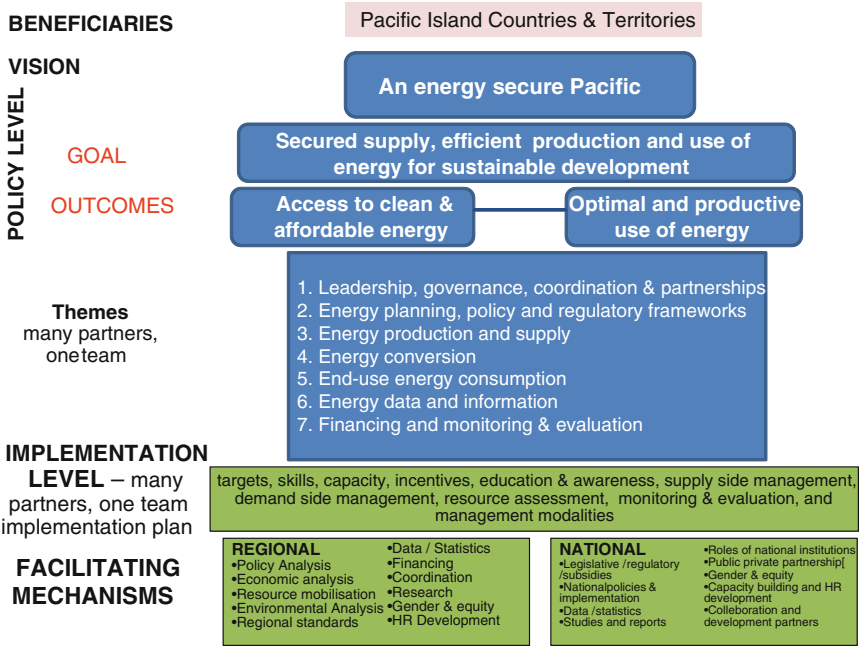

Fig. 10.2 Structure of FAESP (*Source* SPC Division of Energy)

Table 10.3 Comparison of features ofPIEP and FAESP

PIEP	FAESP
1. It has no clear allocation of responsibilities	SPC is the lead agency responsible for theFAESP
2. It has no guiding principles	It is based on eleven clearly-stated guiding principles
3. Its objectives are vague and lack focus	It has seven themes, each with a rationale, expected outcomes, long-term objectives and key priorities
4. Has no clearly-specified timeframes for its activities	The activities are assigned clearly-defined timeframes in the associated IPESP
5. The importance of energy data (statistics) for decision-making is ignored	The importance of energy statistics is clearly acknowledged in Guiding Principle 8 and is re-iterated in Theme 6 of the FAESP
6. It has no formal status	It was endorsed by the Pacific Energy Ministers' Meeting in Tonga in April 2009 and at the Pacific Islands Forum meeting in Cairns, Australia, in August 2009. Or Vanuatu in Aug 2010. The Brisbane ministerial meeting was in June 2010.
7. No monitoring and evaluation framework	Has an M&E framework in terms of the IPESP and the development of energy security indicators
8. No specific budget	Has an itemised budget which tallies to US$ 20 m (excluding personnel costs) for a 5-year timeframe

assigned unambiguously, and metrics for determining the successful achievement of outcomes are clearly stated. It is a pragmatic document that learns from previous experiences and includes new thinking in the formulation of strategies

Some of the obvious differences between the PIEP and FAESP are outlined in Table 10.3 below.

There are three notable new elements that FAESP introduces to regional energy planning. Firstly, it is based on the whole-of-sector approach. Secondly, it is sensitive to issues of sovereignty when it acknowledges the primacy of national energy policies over regional ones. Lastly, it formalises the need for inclusiveness in the "many partners, one team" philosophy it embraces.

National Energy Policies

All PICTs have some form of national energy policy or energy document that acts as a guide to national energy activities. The comprehensiveness of these documents varies from country to country. Over the past decade, national energy priorities have rarely changed as compared to current initiatives with the focus still on energy security, as outlined at the regional level, and, more specifically, on the reduction in the use of fossil fuels.

The challenge has always been on the availability of resources for the implementation of energy plans. More specifically, it has been to obtain these resources through national budget allocations. Generally speaking, these policies have not been realised in practical terms, as many countries are yet to have specific energy regulations and legislations enacted to support their policy statements.

Conclusions

Will FAESP work?

It is too early to make a definitive statement. But no plan is ideal, and the FAESP is bound to have problems that will only appear over a period of time. Considering the complexity of the situation, with such a diversity of people and their needs, and the heterogeneity of available energy resources, it will be very surprising if the FAESP succeeds in meeting all its requirements on its first application. Further reviews will therefore almost certainly be in order.

Perhaps a more appropriate question to ask is what the situation would have been in the absence of the FAESP. There can be no doubt that, having learnt the lessons of the past, this new regional energy plan will be a significant improvement over the last.

It must be noted in passing that the FAESP and its implementation plan have been designed to be administered by the CROP agencies. It would therefore be appropriate for all the CROP agencies to coordinate their efforts by putting together their annual work plans in one document, where it could be centrally monitored. There can be no doubt that the FAESP has already brought about a noticeable improvement in cooperation within CROP members, as compared to the PIEPP, with the result that some joint activities are now taking place. However, a combined work plan will bring about a vast improvement in the collaborative efforts of these Pacific organisations.

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