# A Whole-of-Sector Approach to Energy Development in the Pacific Islands

## Forum Energy Ministers Meeting, Brisbane

Charles Feinstein, Wendy Hughes and Tendai Gregan
The World Bank
June 21, 2010

*Abstract*

*In order to assist discussions among Pacific Island states and development partners, this brief outlines how the economic vulnerability of island nations to increasing oil prices and oil price volatility can be mitigated by a "Whole-of-Sector" energy development approach that seeks to balance: (a) the desire for increased access to secure, reliable, affordable, and high quality energy services; (b) the ability to capture gains from increasing energy efficiency; (c) the potential for increasing the share of renewable energy in the overall energy mix; and (d) the potential benefits from adopting more efficient practices in petroleum supply chain management and procurement. The recent "Tonga Energy Roadmap" experience has brought together a dozen development partners around a common agenda, and in so doing has served to recall and re-define a methodology that has become known as a "Whole-of-Sector" approach to energy planning and investment. Successful application of a whole-of-sector approach demands that government takes a leading role in the coordination of all relevant stakeholders, and that the development partners coordinate and fund the technical assistance required to undertake an analytically robust energy planning process. Other key principles underlying this approach are taking a least cost approach to meeting the objective of reducing vulnerability to oil price increases and shocks; managing risk by developing a portfolio of options to meet demand; promoting financial sustainability by ensuring that energy sector regulatory, operations, maintenance, fuel and financing costs are recovered; and defining clear, appropriate and effective of roles for government, utilities, and the private sector.*

# A Whole-of-Sector Approach to Energy Development in the Pacific Islands

by

Charles Feinstein, Sustainable Development Leader
Wendy Hughes, Sr. Energy Specialist
Tendai Gregan, Energy Specialist
for Timor-Leste, Papua New Guinea and the Pacific Islands, The World Bank [1]

> "Energy is a fundamental building block for the Kingdom in its social and economic development and in enhancing the livelihood and well-being of all Tongans. It affects all businesses and every household. Accessible, affordable and sustainable electricity that is environmentally responsible and commercially viable is a high priority. My Government recognized the importance of having dependable, accessible and reasonably priced power as a key catalyst for sustainable economic growth. Achievement of these goals is crucial to achieve the Government's primary target of 'poverty alleviation' including 100% accessibility to electricity."
>
> Hon. Dr. Fred Vaka'uta Sevele
> Prime Minister of Tonga
> April, 2010

## Purpose

In order to assist discussions among Pacific Island states and development partners, this brief outlines how the economic vulnerability of island nations to increasing oil prices and oil price volatility can be mitigated by a "Whole-of-Sector" energy development approach that seeks to balance:

a) the desire for increased access to secure, reliable, affordable, and high quality energy services;

b) the ability to capture gains from increasing energy efficiency;

c) the potential for increasing the share of renewables in the overall energy mix; and

d) the potential benefits from adopting more efficient practices in petroleum supply chain management and procurement.

## Background

Pacific Island states are among the most dependent in the world on imported petroleum products for meeting their energy needs. This oil dependency makes the Pacific Islands highly vulnerable to oil price

[1] The findings, interpretations and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank Group or those of the Executive Directors of the World Bank or the governments they represent.

shocks — which feed into the affordability of food, fuel and transport. This was highlighted in 2008, when crude oil prices peaked and over US$140 per barrel. However, it should be noted that many Pacific Island countries were effectively paying over US$100 per barrel well before then, because of the high costs associated with transporting and distributing fuel across the Pacific and between remote islands within each Pacific country. Many Pacific Island states remain exposed due to reliance on spot market purchases of petroleum products, without any mitigation measures such as petroleum supply contracts that limit the risks they face from rising oil prices and allow them to capture benefits from falling oil prices.

Over the last five years, there has been increased attention at the Forum annual meetings on the issues of the costs of energy in the Pacific Islands, the economic vulnerability of Pacific Islands to high and volatile oil prices, and ways in which the costs and vulnerability can be reduced. Related to these issues is a dialogue about the impact of global climate change on the Pacific Islands, and what can be done via adaptation and mitigation measures.

Increasing the use of renewables in the energy supply mix, almost as an end in and of itself, has often featured prominently. There has generally been less focus on the costs of such technologies, their effectiveness in delivering secure, reliable energy supplies that enable job-creating economic activities or the delivery of health and education services in remote, sparsely populated islands, or their role in the broader set of possible initiatives, including efficiency and petroleum supply chain improvements.

The governments of many — but not all — Pacific Island Countries (PICs) have, for many years, paid little or no attention to the issues of: Energy security and vulnerability; long term planning; the efficient operation of utilities; and the maintenance of energy infrastructure. The commitment of human and technological resources has not been commensurate with the importance of energy as an economy-wide development issue. Responsibilities for sector governance and management have often been dispersed and unclear, with one or more legs of the “policy – regulatory – utility industry” triangle either missing or dysfunctional. The consequence is that the citizens of many PICs have low access to secure, reliable, affordable energy services.

This inattention on the part of many PIC governments has been matched by major donors, who for many years avoided financing energy infrastructure investments or limited their energy support to off-grid renewables technologies (in particular household photovoltaics). Very little attention was paid to developing a balanced approach to energy issues that would cover: Energy sector planning; fuel supply chain management; power generation, transmission and distribution; risk management; and the policy frameworks needed to ensure secure, affordable, widely accessible, high quality energy services to the people of the Pacific.

However, this situation has changed — in part because of the rise of oil prices over the last few years; and in part because of the renewed recognition that the affordability of many goods, services and economic activities in the Pacific are adversely affected by high energy prices or poor quality energy services.

**Policy challenges**

Pacific Island leaders face a daunting constellation of challenges and constraints to the formulation of a coherent set of national and regional energy policies. The issues are embedded in the islands’ fiscal and macro-economic management and are further complicated by the emergence of climate change as a global concern.

1. Energy security — the supply chains to Pacific Islands are long, thin and vulnerable to disruption. Energy efficiency measures can help reduce the growth of demand for imported fuel. Increasing the share of renewables will reduce the risk of energy supplies being disrupted, as well as reducing the economic vulnerability of these countries to oil price shocks. And recognizing that imported petroleum will continue to play a major role in energy supply, improvements in efficiency and price risk management also need to be considered. Energy security can also be addressed through: a) allowing the market to flexibly respond to supply disruptions and shortfalls through, for example, the business continuity plans of fuel suppliers; b) ensuring adequate storage capacity and fuel reserves are in place, both in-country and off-shore; and c) having emergency plans in place that deal with energy supply disruptions and the prioritized rationing of limited supplies. These plans should be regularly tested and refined, through simulated emergency events.

2. Most Pacific Islands nations have to face serious threats from climate change which demands planning for both sea level rises and extreme weather conditions. Even the absence of climate change, Pacific Islands have always had to face cyclones, tsunamis and volcanic eruptions, all of which further increase the vulnerability of energy infrastructure and the supply chains. Critical energy infrastructure should be designed, built and operated in ways that mitigate threats to energy supply reliability posed by such events. Existing infrastructure should be assessed for its robustness, and a cost- and risk-based assessment made of what improvements are required to limit the possible impacts of climate change, cyclones, and other environmental threats.

3. Climate change concerns and the global nature of greenhouse gas (GHG) emissions bring pressures on all nations to reduce their carbon footprint and at times introduce conditions for access to external funding sources that have more to do with global trends than national priorities. Yet even if access to fossil energy increased significantly across the Pacific Islands, their emissions would make a negligible difference to the overall global situation.

4. Transition to reduce the level of dependence on oil — for energy security reasons — will require investment in new assets. Most Pacific Island governments are suffering severe budget pressures from shrinking sources of income and rising costs, one of which is the cost of oil. Tight budgets restrict possibilities for investment in initiatives for energy-saving, oil substitution, or efficiency improvements.

The challenge is to formulate and implement a balanced set of energy policies and initiatives identified through a credible least-cost planning process that highlights the expanding role of low-carbon energy forms while at the same time recognizing that petroleum will continue to play a key role in meeting energy needs. Improved donor dialogue and coordination are required to ensure that the scarce donor resources allocated to the Pacific are harnessed in a way that supports the above-described balanced approach, and serves the priorities of the PICs. Pacific Island governments should take the lead in defining the regional energy agenda as one of improving energy security (of which development of renewable energy is an important part) rather than an agenda of promotion of renewable energy driven by global climate change concerns.

**Suggested positioning**

It is suggested that policy-makers and development partners consider jointly taking the following position when seeking to frame discussions on energy sector development in the Pacific Islands:

a) Emphasise the need for energy security, energy sector planning and its strategic importance to the economies of the PICs. These are issues of national importance that require attention at the highest levels of government — in good times, not just in bad.

b) Focus the energy policy discussions on:

- Increasing access to services that improve economic opportunities; and

- Increasing the affordability, quality and security of energy services through:

  - energy efficiency at all levels (e.g., utilities, enterprises, households);

  - petroleum supply chain efficiency and price risk management; and

  - renewable energy (when economically justified, taking into account environmental externality and energy security benefits).

c) Emphasise the need for the energy debate to shift beyond just access to lighting and instead be linked to the creation of economic opportunities, jobs, and delivery of healthcare, education and other vital services.

d) Seek to have a sensible balance between on-grid and off-grid power in the Pacific Islands and emphasise that the creation and retention of a high level of energy sector expertise — commercial, technical and policy — is required.

e) Put climate change mitigation in the Pacific Islands in its proper global context. Argue that it makes little sense to impose high (or prohibitive) costs on island countries with few resources, so that they adopt 'clean and green' renewable energy sources, which in the end have a negligible impact on global emissions or the impact that those global emissions will have on the Pacific Islands.

f) Note that while renewable energy in Pacific Islands is important for reasons related to energy security and has negligible impact on climate change, resources made available from donors in the context of global climate change might nevertheless be a source of funding for PICs to develop renewable energy, even though the rationale for doing so rests of domestic rather than global drivers.

**A "Whole-of-Sector" approach**

The recent "Tonga Energy Roadmap" experience has brought together a dozen development partners around a common agenda, and in so doing has served to recall and re-define a methodology that has colloquially become known as a "Whole-of-Sector" approach to energy planning and investment. Succeeding paragraphs lay out the salient characteristics of this approach. While some may attribute this "meeting of the minds" as being motivated by the donor community, the key principle underlying this discipline is that external parties cannot substitute — government leadership is a must. Specifically, successful application of a whole-of-sector approach at the national level demands:

- That the government coordinates all relevant stakeholders, and facilitates the provision of an unprecedented level of accessibility for its development partners in the details of the energy sector, which to a large degree would rely upon the cooperation of the utility authorities; and

- That the development partners coordinate and fund the technical assistance required to undertake an analytically robust energy planning process, which would have as its output an assessment of and recommendations relating to the different options available to address problems of high vulnerability to oil price rises and oil price shocks, while ensuring that other objectives, such as increasing good quality access to electricity, are also achieved.

The remaining principles underlying this approach may be summarized as follows:

*Least Cost Approach to Meet the Objective of reducing vulnerability to oil price increases and shocks.* To identify the least cost approach, the full range of options must be considered and evaluated relative to one another rather than being considered in isolation. These include improvements in the petroleum supply chain efficiency; supply and demand side efficiency improvements; and options for non-diesel power generation for both grid and off-grid electricity supply. The selection of each new investment will be based on the principle of the lowest life-cycle cost among the technically feasible alternatives. Energy usage in both the stationary and transport sectors should be examined, given that generally well over 60% of energy is used in the transport sector. Any examination of the transport sector should examine the growth in the motor vehicle fleet, fleet age, vehicle fuel efficiency and emissions, and public transportation.

*Managing Risk.* The introduction and implementation of new technical and institutional approaches will be designed and managed to avoid inadvertently increasing interruption risks in the effort to address price risk issues. The sequencing and timing of adjustments will allow sufficient time to undertake the detailed work and get in place the required specialist expertise. An important element of managing risk is to develop a portfolio of options to meet demand, notably for electricity. The value of establishing a portfolio of supply sources will be considered when evaluating alternatives with comparable cost characteristics.

*Financial Sustainability.* In this context "financial sustainability" means that the cost of operating the energy sector, including regulatory, operations, maintenance, fuel and financing costs are recovered through the tariff. While the provision of a subsidy for a particular investment is not incompatible with the concept of financial viability, it should be applied in cases where there are specific objectives outside the normal commercial operation. For example: (i) to address specific social or equity objectives related to providing electricity services in remote areas; (ii) to address specific negative externalities including funds aimed at supporting a transition to renewable energy to reduce GHG emissions, or (iii) to support gaining experience with technologies that may be expected to become more cost effective over time. The essential feature is that the source of any subsidy required to keep the sector financially viable must be secure and that the required subsidy should be an efficient one. Continued dependence on significant injection of subsidy to meet the cost of normal operations and expansion would not be considered a financially sustainable situation. If cross-subsidies are used (e.g. uniform national pricing of electricity with town customers effectively subsidizing higher cost remote customers), their pros and cons should be understood; particularly the potential distortionary affects that cross-subsidies can have on consumption and investment decisions. Investment options must be evaluated considering the cost implications over the investment lifetime, to avoid substituting short term price relief for continuing high prices in the medium to long term.

*Environmental and Social Sustainability*. Environmental and Social sustainability encompasses both minimizing local negative social and physical environmental impacts of the energy sector, as well as aligning with global goals with respect to minimizing impact on climate change where possible. New energy investments would be subject to Environmental and Social Impact Assessments and Mitigation Plans as necessary, as per international practice. Special consideration should be given to those groups with specific vulnerabilities including youth, women, and those with special needs. Investments that have major negative environmental or social impacts or constraints that cannot be mitigated or solved will be avoided. As a group of countries which has contributed least to global climate change, yet stands to be severely impacted, the Pacific Islands are committed to setting an example for larger countries with respect to responsibly and sustainably reducing GHG emissions. Social sustainability also incorporates an element of equity. Hence the scope of whole-of-sector approaches includes the provision of sustainable, affordable electricity supply that meets the needs of people living in remote areas.

*Clear, appropriate and effective definition of roles for Government, Utilities, and the Private Sector*. The government is responsible for strategic direction in the energy sector (policy and legal framework), sector oversight (regulation), creating an enabling environment and monitoring of progress to achieve the strategic goals, and facilitating where possible the direction of financial assistance to the sector in accordance with the principles listed above. This implies a strong role in overseeing the implementation of sector-wide least-cost planning and actions to revise policy, legal and regulatory arrangements. This requires appropriate governance arrangements and accountabilities to be established, particularly when energy utilities are government-owned. State owned utilities should operate on an efficient and commercial basis, with their performance closely monitored by their boards, the regulator, and the shareholder. State owned utilities should have adequate capital, access to debt financing, and a clear dividend policy that is regularly reviewed in light of investment needs. For projects and investments that have as a major goal the testing and gaining experience with technologies new to the national context, to the extent that public sector funding is available ownership should remain with government, possibly but not necessarily through the utility. Private sector competition for new generation will play a key role in maintaining downward pressure on prices and limiting the commercial and operational risk borne by electricity consumers. By maintaining a financially sustainable energy sector and maintaining utilities as financially viable companies, the option of attracting broader private sector participation also remains open.

**Conclusion: Applying the lessons of experience**

Ultimately, an effective approach to Pacific energy development rests more on a philosophy than a particular set of technical interventions. While the so-called whole-of-sector approach has recently taken on a new and heightened visibility in the Pacific due to the attention accorded to the Tonga Energy Roadmap effort, in reality it is built upon foundations derived from decades of global experience in energy planning and implementation:

- There must be high-level leadership of national energy policy and strategy, with alignment across line departments.

- A non-silo approach should be taken, with energy treated as an integrated sector. Energy planning should also be strongly coordinated with other infrastructure plans that are intensive in the use of energy; such as: water and sewerage services; schools, hospitals and health clinics; commercial and industrial developments (e.g. hotels, offices, factories, smelters).

- Initiatives and investments should be guided by a realistic, time-bound and costed whole-of-sector plan that leads to measurable, tangible outcomes.

- The starting point for energy planning should be the underlying demand for energy services, which should naturally lead to a focus on efficiency across the energy chain, including end-use.

- Renewable energy should be pursued for its economic, energy security, access-enhancing and environmental benefits, and not as an end in itself. It is also essential to consider how renewables can be integrated into the main national energy system**.**

- Energy plans should be linked to national budget processes and should be based on true costs, with any subsidies also realistically costed and sustainable sources for their financing identified.

- Consideration of environmental, socio-cultural and gender issues must be appropriately incorporated into all energy policies and plans at national and regional levels.

- The role of the private sector should be recognized, and avenues for private sector participation defined under a clear and transparent regulatory framework.

The approach is deceptively simple but powerful, and the scope of its application can match the sophistication of the target environment and the range of available and cost-effective energy options — this is in keeping with the pragmatism that characterizes Pacific decision-making. But taking this route offers many benefits, and avoids many pitfalls. Energy infrastructure can be treated like the long-lived, maintainable asset that it is, rather than depleting capital replaced at the whim of external grantors. Governments, instead of being relegated to benefactors confined to attempting to address the special problems of isolated off-grid populations, become a true guardian of the public interest in a Pacific environment marked by strong monopoly elements and limited competition. And energy policy-makers, rather than constantly being in a “catch-up” or reactive mode to new proposals emanating from promoters, can view the private sector as a source of energy development dynamism and true implementation partners.