

Oil price vulnerability in the Pacific

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The small island nations of the Pacific are highly vulnerable to world oil markets and the recent surge in oil prices is rapidly leading to serious microeconomic and macroeconomic problems such as declining real incomes, balance of payments pressures, increasing fiscal deficits, and government debt blowouts. This policy paper investigates this vulnerability and explores measures for mitigating its impacts.

What is happening in the world oil market?

The only thing certain about the world oil market is that forecasters are not able to predict its trajectory. For example, in mid 2007 the US government was forecasting that the indicator West Texas Intermediate (WTI) crude oil price would fall moderately to under US\$65 a barrel during 2008 (Energy Information Agency website). Australia's official commodity forecaster, the Australian Bureau of Agricultural and Resource Economics at the same time forecast 2008 prices would average US\$62 a barrel (ABARE 2007). At the end of 2007, the ABARE forecast was revised to US\$77 a barrel and in March 2008 to US\$86 a barrel (ABARE 2008). By June 2008, actual prices

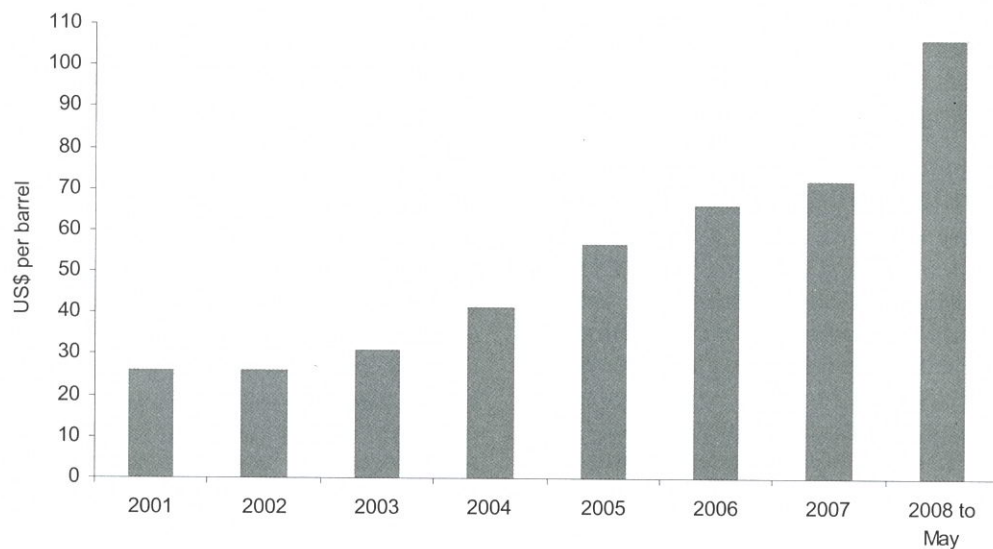
surpassed US\$130 a barrel and the average price for the first five months of 2008 was US\$107 a barrel—73 per cent above the forecast of just 11 months earlier.

The core reason for the rapid increase in prices are that supply has hit a brick wall and cannot meet the surging growth in demand, particularly as a result of rapid and sustained growth in China. With limited spare production capacity, surges in demand must be neutralised by higher prices. The problem is, demand for oil based fuels is highly inelastic so that rises in prices have only small effects on demand. This means that the price rises must be large to clear the market. Conversely, any future ramping up of supply or weakening of demand will lead to sharp falls in prices. The upshot is that prices heading into 2009 could be anything between, say, US\$80 a barrel and US\$200 a barrel, and what it will be no one knows.

What we do know is that price rises since the early part of the decade have been rapid and sustained. By comparison with the 2008 prices, the oil price was around US\$26 a barrel in 2001 and 2002 (Figure 1). These differences represent an average rate of increase of 26 per cent a year. But a point of clarification is needed. The US currency has depreciated significantly in this period against most other major currencies, and

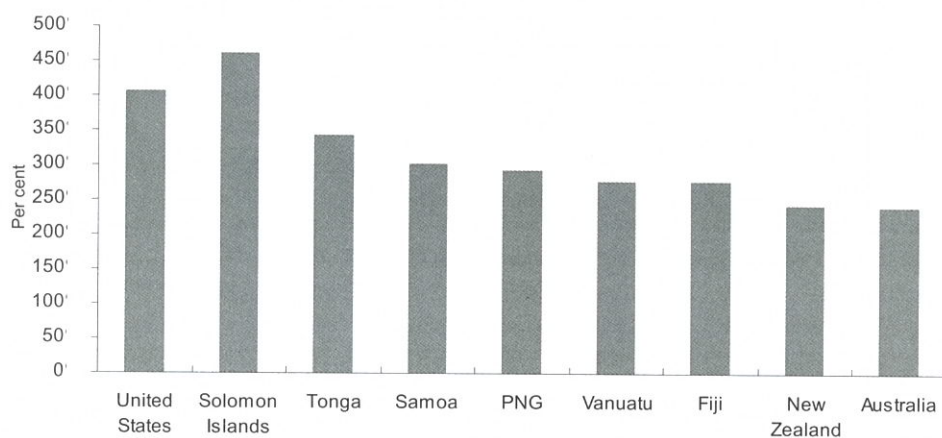
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Figure 1 World oil prices, West Texas Intermediate, 2001–08 (US\$/barrel)



Source: Energy Information Administration, http://tonto.eia.doe.gov/dnav/pet/pet_pri_spt_s1_a.htm.

Figure 2 Growth in the West Texas Intermediate oil price, in local currency, 2002–2008 (per cent)



Source: Compiled using oil price data from the Energy Information Administration, http://tonto.eia.doe.gov/dnav/pet/pet_pri_spt_s1_a.htm, and exchange rate data from the central bank websites of Australia and the various Pacific countries.

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indeed against most Pacific currencies. Over the period 2002 to 2008 world oil prices in US dollars have increased by 407 per cent; but as a result of currency appreciation Pacific countries have experienced less profound, but still rapid growth (Figure 2).

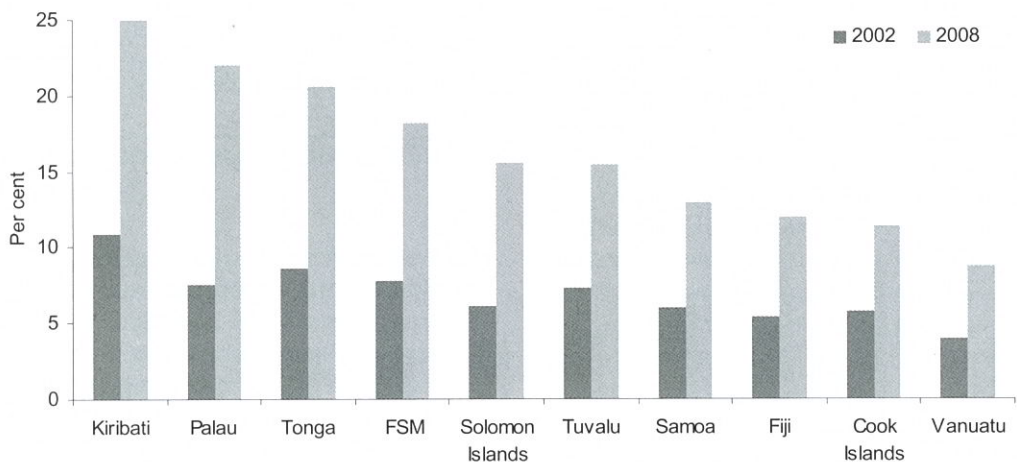
The vulnerability of Pacific island nations

The most vulnerable countries in the world to the rapid rise in fuel prices are to be found in the Pacific. This is because these countries have fossil fuel-intensive economies and, as a result, the rapid rise in fuel prices has meant that fuel imports have become very large relative to GDP. Even in 2002, imports

of fossil fuels were substantial, exceeding 6 per cent of GDP in most countries and up to 11 per cent of GDP in Kiribati (Figure 3). In 2008 imports are expected to be above 20 per cent of GDP in Kiribati, Palau and Tonga, and well over 10 per cent of GDP for all other countries except Vanuatu. These figures compare with a global average of about 6 per cent in 2008.¹

An additional vulnerability is that Pacific countries are remote and depend heavily on fossil fuel-based transport to connect to the rest of the world. This means rising oil prices have led to a sharp increase in the cost of bringing imports into each country—including imports of fossil fuels—and a decrease in income from exports. With the exceptions of Papua New Guinea and

Figure 3 Fuel imports as a percentage of GDP in Pacific island countries, 2002 and 2008



Note: The fuel import estimates for 2008 are extrapolated from 2006 data, and are based on the assumption of fuel imports increasing in line with price rises that have occurred since 2006, but with some adjustment according to estimated GDP growth. GDP estimates for 2008 were calculated using estimates from (AusAID 2008).

Sources: Calculated from data available on the websites of the central banks of each country; the PRISM website of the Secretariat of the Pacific Community; Asian Development Bank, 2007. *Key Indicators of Developing Asian and Pacific Countries*, Asian Development Bank, Manila; Australian Agency for International Development (AusAID), 2008. *Pacific Economic Survey*, AusAID, Canberra.

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Solomon Islands, exports from Pacific island countries are dominated by tourism; but this industry is reliant on transporting visitors on long haul flights.

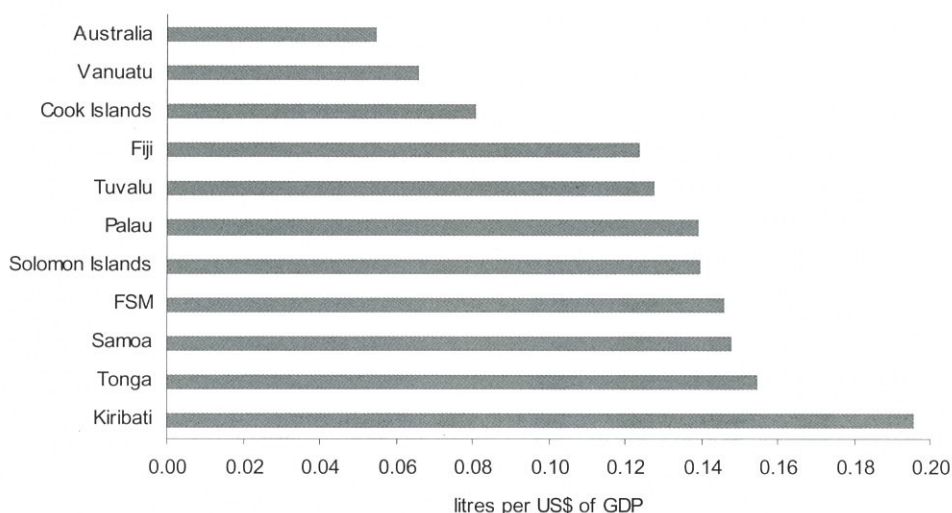
When discussing the vulnerability of Pacific island countries it is important to clarify the special circumstances for Papua New Guinea. The implications of rising oil prices are opposite in Papua New Guinea to what is seen in the rest of the Pacific because Papua New Guinea is a net exporter of oil and of refined fossil fuels. In 2007, the value of Papua New Guinea's oil and refined fossil fuel exports reached 18 per cent of GDP and it is set to rise further in 2008 on the back of the surge in prices. Because Papua New Guinea is a producer and exporter of fossil fuels it is outside the focus of this paper.

Why are fuel imports so high?

That fossil fuel imports should be so high in Pacific island countries is counterintuitive. There is a high degree of subsistence activities, very little manufacturing, low penetration of electricity, and limited car ownership. But the data in Figure 4 confirms that Pacific island economies are fossil fuel intensive. For each US dollar of GDP that Australia produces, 0.055 litres of oil-based fuels are consumed. This is less than half of all Pacific island countries except Vanuatu and Cook Islands. There are two key reasons for this

- the services sector is a low user of oil-based fuels and dominates the Australian economy, and

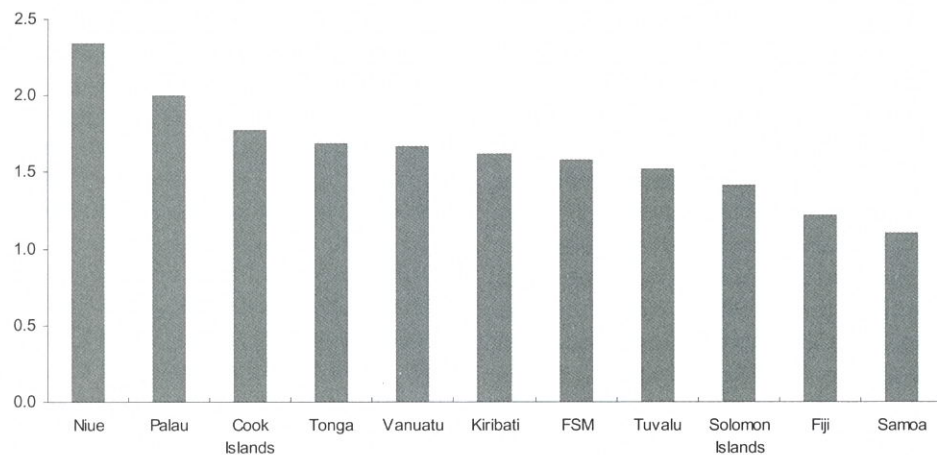
Figure 4 Litres of oil-based fuel consumption for each US dollar of GDP, 2006



Sources: Calculated from data in Morris, J., 2006. 'Small island states bulk fuel procurement of petroleum products: feasibility study', Pacific Island Forum Secretariat, Suva; Asia Development Bank, 2007. *Key Indicators of Developing Asian and Pacific Countries*, Asian Development Bank, Manila; Australian Agency for International Development (AusAID), 2008. *Pacific Economic Survey*, AusAID, Canberra; ABARE, 2008. *Australian Commodities, June Quarter 2007*, Australian Bureau of Agricultural and Resource Economics, Canberra; Australian Bureau of Statistics website.

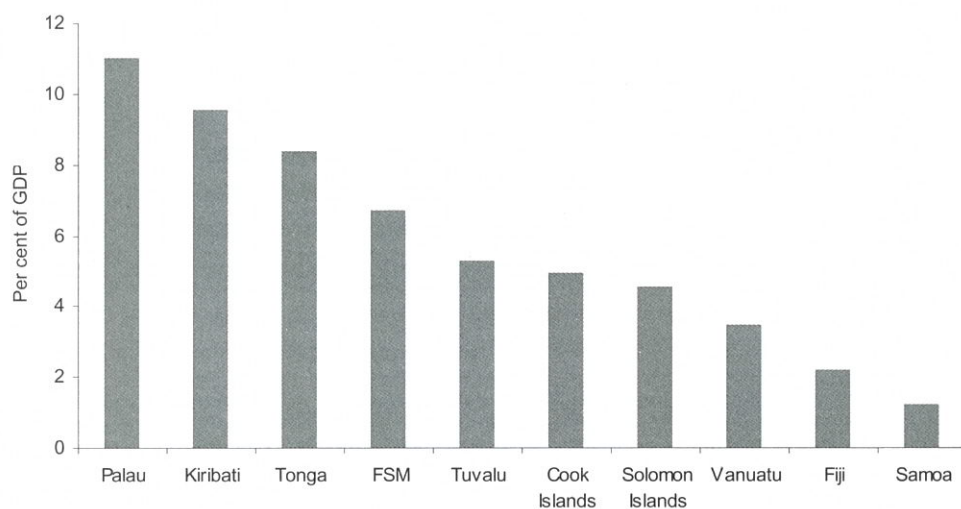
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Figure 5 Ratio of pre-tax wholesale fuel prices to the ex-Singapore price, 2005–06



Source: Calculated from data in *Pacific Fuel Monitor*, available on the Pacific Islands Forum Secretariat website.

Figure 6 Estimated transport margins as a percentage of GDP, 2008



Source: Calculated using the GDP data collated for Figure 3 and the price ratio data collated for Figure 5.

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- only a tiny fraction of electricity generation is from diesel generators.

Most Pacific island countries rely almost exclusively on imported diesel for grid-connected electricity generation. Although there has been significant investment in hydroelectricity in Fiji and Vanuatu, diesel generation continues to dominate in these countries. That Vanuatu and Cook Islands have less fossil fuel-intensive economies than the other countries in the region might be explained by the dominance of the large tourism-related services sector in their economies. The high volumes for Kiribati would in part reflect the heavy use of fuel for fishing, but would also be the result of the consumption effects of national income that is almost double that of GDP. The relatively large Gross National Income is due to the importance of fishing licence revenues, trust fund income, and remittances in the economy. As a result of their high level of remittances, Tonga and Samoa too have gross national incomes that far exceed GDP.

High import volumes relative to GDP are only half the story of why fuel imports are so high. The other major contributor is that prices paid to land fuel in Pacific island countries are substantially higher than the prices paid in Singapore from where almost all fuel in the region is sourced. For most countries, imported fuel lands at a premium of more than 50 per cent compared to the ex-Singapore price (Figure 5).

There are a combination of factors contributing to these exorbitant transport margins (Morris 2006; Sanghi and Bartmanovich 2007). First and perhaps foremost is the non-competitive conditions for importing and distributing fuel as a result of the small scale of these markets. The exception is Samoa where a regular competitive tender process is in place for the right to procure fuel. The results are clear. For Samoa the premium over the

ex-Singapore price is just 10 per cent—by far the lowest in the region. Also key for Samoa, as well as for Fiji, is the capacity to import fuel direct from Singapore. Most countries are forced to double-handle fuel procurement through Fiji due either to inadequate storage and port facilities or to lack of incentives to make alternative procurement arrangements as a result of monopoly market conditions.

To put these transport margins into context, the transportation of fuel to Kiribati costs the equivalent of nearly 10 per cent of GDP, and for Tonga just over 8 per cent of GDP (Figure 6). In contrast, about 1 per cent of GDP goes toward transportation of fuel for Samoa. This suggests that if, for example, Tonga were able to duplicate the procurement arrangements and infrastructure capacity of Samoa, then national income would benefit by 7 per cent of GDP.

The macroeconomic challenges

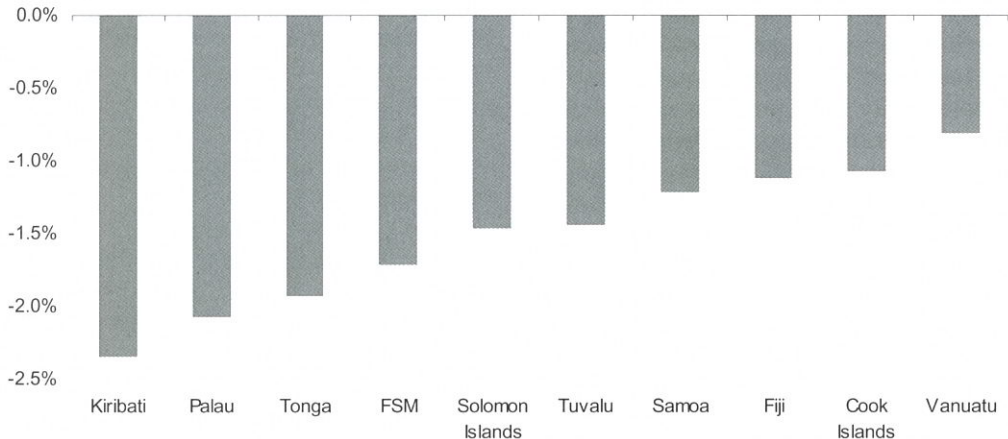
The economic impact

The impact on Pacific economies of the surge in oil prices is profound. One way of understanding this impact is to look at the fuel import shares of GDP in 2002 in Figure 3 and compare them with 2008. The difference is almost entirely attributable to price rises, and as such, is an indicator of the direct impact on national incomes. For example, the estimated rise in fuel imports to Kiribati from 11 per cent as a share of GDP in 2002 to 25 per cent in 2008 could be interpreted as a direct negative impact on national income equivalent to 14 per cent of GDP. Even the smallest impact of 5 per cent for Vanuatu is acute.

It is estimated that each US\$10 a barrel increase in the world price of oil directly reduces national income by more than 2.4 per cent in Kiribati, by about 2 per cent in Palau and Tonga, by 1.5 per cent in

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Figure 7 Direct impact on national income of each US\$10 a barrel rise in world oil prices (per cent of GDP)



Sources: Compiled and calculated from data available on the websites of the central banks of each country; the PRISM website of the Secretariat of the Pacific Community; Asian Development Bank, 2007. *Key Indicators of Developing Asian and Pacific Countries*, Asian Development Bank, Manila; Australian Agency for International Development (AusAID), 2008. *Pacific Economic Survey*, AusAID, Canberra.

Federated States of Micronesia, Solomon Islands and Tuvalu, and by about 1 per cent in the other countries (Figure 7). This should be understood in context of the US\$40 a barrel increase in world oil prices from the end of 2007 through to May 2008.

Normally, these direct impacts on national income would be mitigated to the extent that the price rises would lead to a fall in demand for fossil fuels. Such a fall in demand would represent an offsetting indirect effect. But there are two big problems with this. First, energy demand is highly inelastic because there is little alternative to using electricity, and the scope for conversion of combustion engines to alternative fuels is small.

Second, and perhaps most importantly, cost increases are often not passed through to price increases. If prices are not allowed to increase, demand will not change. This

situation is the norm amongst Pacific island countries for electricity generation. Typically, governments restrict the ability of state-owned electricity utilities to raise electricity prices. The result is that the economic cost of the rise in fuel prices in large part is manifest in losses and increased debt for electricity utilities. Ultimately, this would lead to insolvency and threaten electricity supplies—a situation that has already arisen in the Marshall Islands. In some countries, price controls go further, with state-owned fuel distribution businesses, airlines, and shipping services also incurring increased losses due to the failure to pass through costs.

Neutralisation through debt accumulation

This diversion of the economic impact of fuel price rises into the debt of state-owned enterprises is masking the extent of the fiscal

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impact. In effect, government subsidies are being applied when these enterprises are forced to absorb cost increases; and by applying government subsidies in this way, the subsidies do not appear in the budget's bottom line. So the full fiscal impact of the rise in fuel prices is not being reported.

The lack of transparency in subsidisation warrants criticism; however, the subsidisation strategy does have some merit as it amounts to a fiscal expansion. The large adverse economic impact of the oil price rises warrants a fiscal expansion to help neutralise its impact. Neutralisation is all the more effective when fiscal expansion is financed by foreign borrowings. With this approach, the losses in national income due to the rises in oil prices will be tucked away into increases in foreign debt positions. But in the event that oil prices remain high, the policy is unsustainable and governments

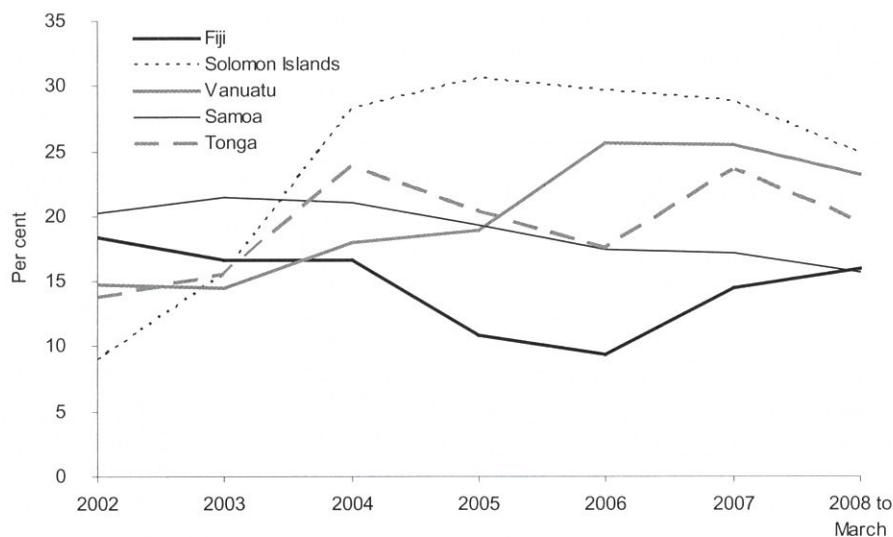
will be left with only two options—a change in policy to allow prices to adjust to cost increases (leading to economic hardship) or fiscal and financial crisis.

It is worth noting that Papua New Guinea, which faces the opposite situation from increases in prices for its oil and mineral exports, is doing the opposite of debt accumulation: it is stockpiling its increases in national income into trust funds and reducing government debt.

Currency crisis

A related issue is vulnerability to currency crisis. The small countries of the region do not have their own currency—using the US, Australian or New Zealand currencies—and thus there is little choice other than for increases in debt to be financed by foreign borrowings. However, those countries with their own currency might see the extent

Figure 8 Foreign reserves as a percentage of GDP, 2002–08



Sources: Compiled and calculated from data available on the websites of the central banks of each country, and from Asian Development Bank, 2007. *Key Indicators of Developing Asian and Pacific Countries*, Asian Development Bank, Manila.

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of foreign debt accumulation reduced through balance of payments deficits and reductions in foreign reserves. This may happen, for example, if increases in debt are domestically financed. Again, if oil prices remain high, this situation will be unsustainable as continued balance of payments deficits would eventually lead to a crisis in the form of the depletion of foreign reserves and pressure to devalue.

What is notable about the pattern of foreign reserves since the early part of the decade is that the surge in oil prices has not led to a significant drop in reserves. In the Solomon Islands, an influx of foreign aid has helped protect reserve levels; Vanuatu has benefited from a surge in tourism and property development. Strong growth in tourism and remittances has helped protect the reserves position of Samoa and Tonga. The increase in Fiji's reserves after 2006 is reflective of increased use by the government of foreign debt and the exchange controls in place since the December 2006 coup. Whether further increases in oil prices during 2008 and into 2009 will lead to pressure on foreign reserves for these countries remains to be seen and will depend on the extent that the increase in oil prices is offset by growth in tourism, remittances and aid, as well as the use of foreign financing of debt.

Fiscal management

Good budget management requires robust revenue forecasting and forward planning of expenditure programs. But the ability to do this is compromised because oil prices have such a large impact on national income and the fiscal position. With oil prices as high and volatile as they are, forward estimates are becoming increasingly unreliable. This situation undermines the progress that has been made across the region in developing multi-year budgeting frameworks.

The urgent need for action

The profound impact on national incomes, the huge pressures on macroeconomic stability, and expanded foreign debt point to urgent and immediate action to find solutions. Fortunately, there are ways to make significant progress in reducing the exposure of Pacific countries to world oil markets. Further delays in designing and implementing effective plans to do this will come at tremendous economic costs for these countries and will delay their capacity to pursue Millennium Development Goals.

There are three clear ways forward

- reform of institutions and infrastructure for fuel procurement
- increase efficiency of energy use
- conversion to renewable energy sources.

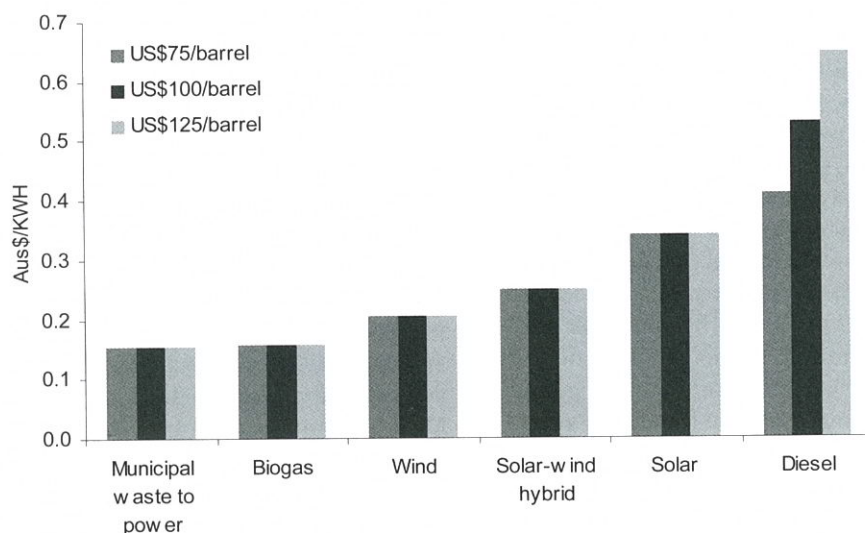
Reform of institutions and infrastructure for fuel procurement

Earlier it was explained that Pacific island countries are paying exorbitant margins for importing fossil fuels. Yet Samoa has shown that these are entirely avoidable. By replicating the institutional framework and infrastructure design of Samoa, most countries could reduce their import bill by at least one-third. For most countries, this would save wasteful expenditure on margins amounting to 5 per cent of GDP or more (Figure 6). For smaller countries, the Samoa model is likely to need adaptation, but the key principles of competition and appropriate infrastructure should hold.

The centrepiece is a competitive framework for the right of fuel procurement. Designing and implementing this framework came at low cost for Samoa, and should be low cost for other countries wishing to follow. The more difficult challenge is getting the infrastructure right so that fuel can be imported at sufficient scale and direct

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Figure 9 Cost comparison of electricity technologies for Kiribati



Source: Calculations are based on analysis in World Bank, 2005. *Technical and Economic Assessment: off grid, mini-grid and grid electrification technologies*, World Bank, Washington, DC. Assumptions relating to capacity utilisation and cost premiums are adapted for conditions in Kiribati.

Table 1 Composition of costs of electricity technologies for Kiribati, 2005 (per cent)

Generation technology	Capital costs (per cent)	Operation and maintenance (per cent)	Primary energy costs (per cent)
Solar PV	92.0	8.0	-
Wind	71.2	28.8	-
SPV-wind hybrid	59.2	40.8	-
Municipal waste to power	82.2	3.4	14.4
Biogas	72.5	11.9	15.6
Diesel (at US\$100/barrel)	2.0	9.0	89.0

Source: Calculations are based on analysis in World Bank (2005) with assumptions relating to capacity utilisation and cost premiums adapted for conditions in Kiribati.

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from Singapore. The current situation of double handling of fuel through Fiji adds substantial costs to procurement. The key is having storage facilities of sufficient capacity and appropriate port facilities.

The Pacific Islands Forum Secretariat is currently working on a 'bulk fuel procurement' plan. The plan has taken some time to progress, perhaps largely due to the realisation that the main problems lie in the institutional arrangements and infrastructure, and not the scale of purchases. As a result, the bulk fuel procurement initiative has shifted toward a plan for the smaller countries to group together in purchasing fuel within a single institutional framework modelled on the Samoa experience. There is also planning within this initiative to develop appropriate infrastructure. If these things happen, they will be moves in the right direction.

Increase efficiency of energy use

Significant gains may be possible by raising energy efficiency, particularly in the generation and transmission of electricity. Roper (2008) explains that generation and transmission losses can sometimes be 20 per cent or more and that substantial savings in diesel costs have been made in electricity utilities of the Caribbean as a result of improved maintenance, operations, and investments in energy efficiency. Efficiency efforts can go further to things such as installation of energy efficient lights, reduction of wasteful energy use in public buildings, and improving the energy efficiency of buildings.

Conversion to renewable energy sources

A World Bank (2005) report analysed the costs of various forms of electricity generation for small grid applications, as are found in the Pacific. In calculating the cost of diesel generation, a world oil price of

just US\$38 a barrel was assumed, yet at this price, diesel generation was found to be one of the highest cost forms of generation. Not only have oil prices tripled since that time (Figure 1) but in the Pacific the substantial premium for margins that are paid over and above world prices for fossil fuels makes the case against diesel generation even more compelling (Figures 5 and 6).

In Figure 9, the World Bank analysis is used to calculate comparative costs for grid-connected electricity generation under the conditions operating in Kiribati, and updated to account for more recent prices and margins paid in the Pacific. Diesel generation is found to be by far the highest cost form of electricity generation. At world oil prices of US\$100 a barrel, diesel generation would cost around 53 cents per kilowatt hour (KWH) in Kiribati, compared with just 34 cents per KWH for grid-connected solar power. Diesel generation is also more than three times more expensive than 'municipal waste to power' and biogas options, and more than twice as expensive as wind and hybrid systems. For some countries in the Pacific, mini-hydroelectric generation is feasible and the World Bank analysis found their costs to be similar to biogas, and so are also a fraction of the cost of diesel generation.

At world oil prices of US\$75 a barrel, the cost of diesel generation falls to 41 cents per KWH—a level still much higher than the other generation types. At US\$125 a barrel, diesel generation rises to 65 cents per KWH, nearly double that for solar. The variability in costs for diesel generation is a result of the dominance of diesel fuel inputs in the cost structure. Nearly 90 per cent of diesel generation costs may be attributable to fuel costs at world oil prices of US\$100 a barrel (Table 1). Renewable generation technologies are capital intensive (Table 1) and in contrast to diesel fuel inputs, capital

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costs are stable. The stability is a result of the costs being incurred up front with the possibility of financing the costs through borrowing. In this way, the capital costs become predictable and regular outlays. Another important characteristic is that most renewable technologies use primary energy inputs that are free.

There are therefore two big wins for Pacific island countries that choose to convert to capital-intensive renewable technologies. The first win is that the cost of electricity generation will be slashed. This would not only avoid the potential macroeconomic crisis of high oil prices, but improve the general cost competitiveness of these countries. The second win is that renewable technologies prevent the macroeconomic instability that volatile oil prices create. Removing the uncertainty surrounding the impacts of oil prices on budget deficits, government debt, subsidies, foreign exchange reserves, and inflation not only sets the scene for a better business and investment environment but also allows better forward planning of government expenditures and development initiatives.

There is a third win too. Conversion to renewable technologies is great for the environment.

Note

- ¹ Calculated from World Bank GDP data, and Energy Information Administration price and consumption data.

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