Pacific Economic Monitor

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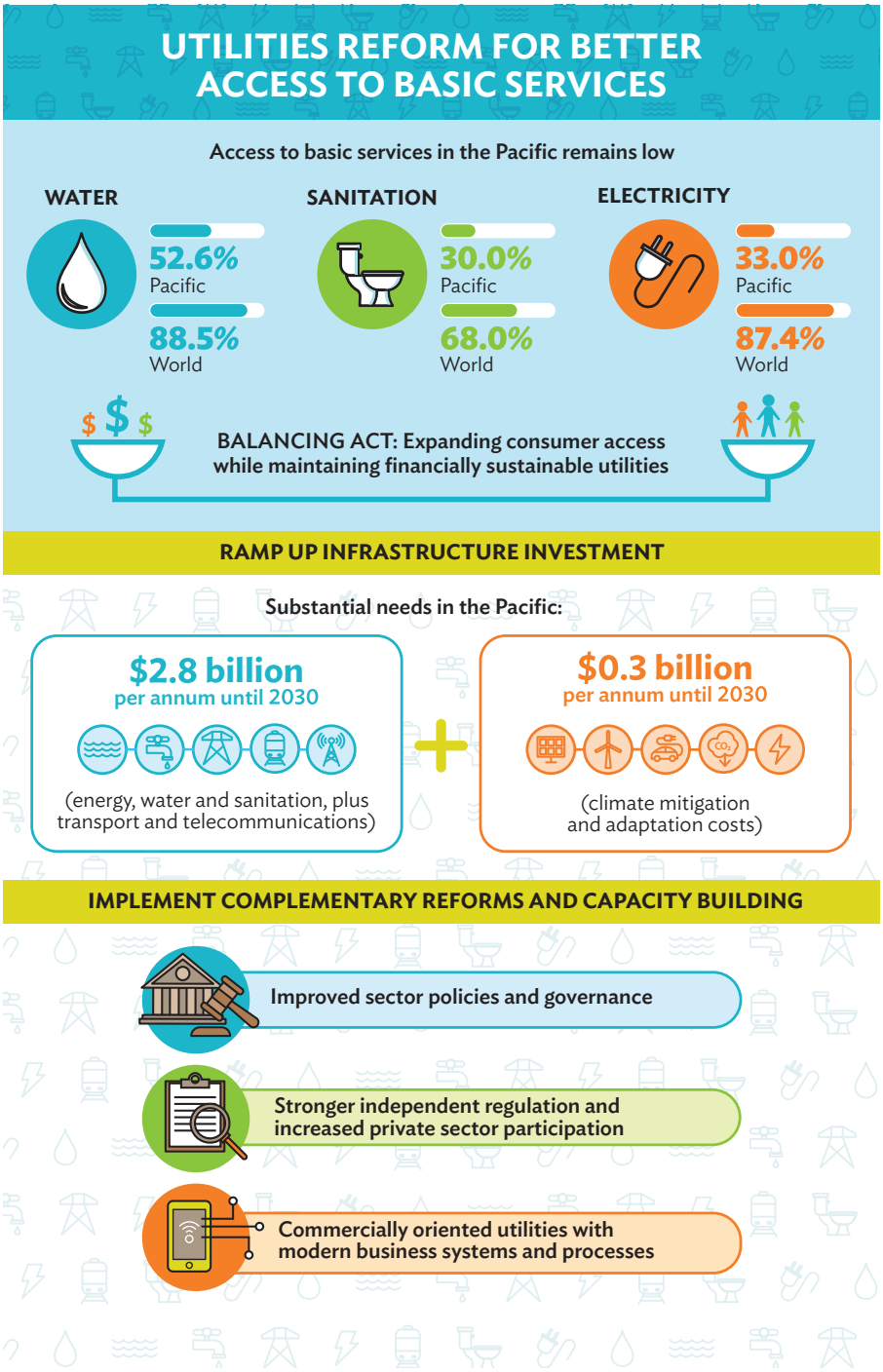
The *Monitor* provides an update of developments in Pacific economies and explores topical policy issues.

Contents

Highlights

- **Steady global economic growth expected amid continuing risks.** Although protectionist policies, which have resulted in growing trade tensions, and geopolitical strains underpin a more cautious outlook, global growth is projected to maintain its recent momentum. The Pacific's major economic partners—Australia, New Zealand, and the United States—are performing well, but growth in the subregion is seen to slow this year in part due to the impacts of recent disasters in Papua New Guinea and Tonga.
- **Low access to basic services in the Pacific.** For example, access to electricity remains well-below the global average, particularly in more remote outer island communities. Most Pacific governments are stepping up renewable energy investments to help reduce electricity costs and progress toward ambitious international climate change commitments.
- **Reform and capacity building for sustainable utilities.** Investments in basic services must be complemented by policy and regulatory reforms as well as capacity development to help support a shift toward more commercially oriented utilities. Most importantly, such a shift will require tariffs that reflect the full cost of service delivery, including asset depreciation, but with more transparent and progressive community service obligations addressing equity considerations.



Sources: ADB. 2017. *Meeting Asia's Infrastructure Needs.* Manila; Pacific Region Infrastructure Facility (PRIF). 2016. *2016 Pacific Infrastructure Performance Indicators 'PIPIs'.* Sydney: PRIF; World Bank. World Development Indicators online database; and ADB estimates.

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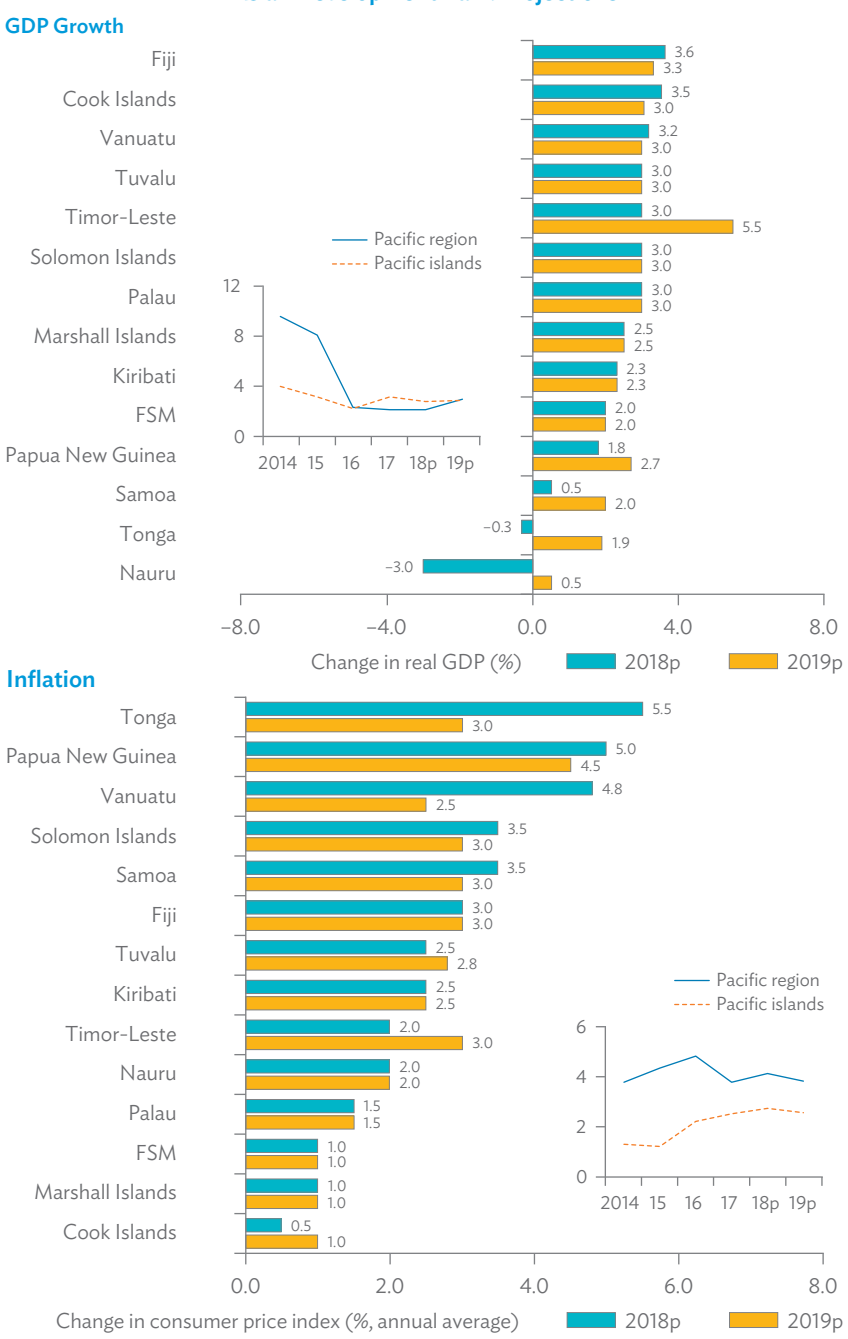
Abbreviations

A$	Australian dollar
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
F$	Fiji dollar
FSM	Federated States of Micronesia
FY	fiscal year
GDP	gross domestic product
ICT	information and communication technology
lhs	left-hand scale
m.a.	moving average
NZ$	New Zealand dollar
PNG	Papua New Guinea
PRC	People's Republic of China
rhs	right-hand scale
RMI	Republic of the Marshall Islands
SOE	state-owned enterprise
US	United States
y-o-y	year-on-year

Asian Development Bank Projections



FSM = Federated States of Micronesia, GDP = gross domestic product, p = projection, RMI = Republic of the Marshall Islands.
Notes: Projections are as of July 2018 and refer to fiscal years. Regional averages of GDP growth and inflation are computed using weights derived from levels of gross national income in current United States dollars following the World Bank Atlas method. Averages for Pacific islands exclude Papua New Guinea and Timor-Leste. Timor-Leste's GDP is exclusive of the offshore petroleum industry.
Source: ADB estimates.

Notes

This *Monitor* uses year-on-year (y-o-y) percentage changes to reduce the impact of seasonality, and 3-month moving averages (m.a.) to reduce the impact of volatility in monthly data.

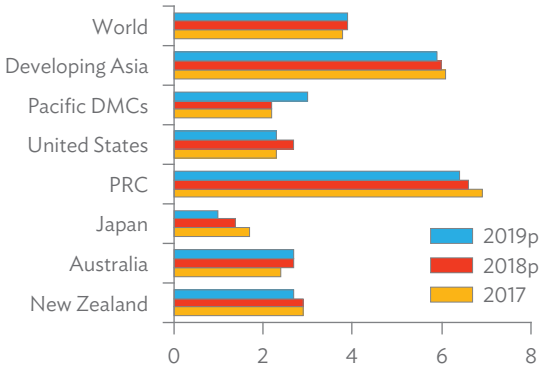
Fiscal years end on 30 June for the Cook Islands, Nauru, Samoa, and Tonga; 31 July for Fiji; 30 September for the Republic of the Marshall Islands, the Federated States of Micronesia, and Palau; and 31 December elsewhere.

International and regional developments

Cautious outlook amid mixed performances and risk of policy shifts

- The global economy grew by 3.8% in 2017, driven by significant recoveries in investments in major economies as well as world trade. Continued growth in developing Asia, advances in eastern and central Europe, and signs of recovery in several commodity exporters also supported the economic expansion. The world economy is forecast to grow by 3.9% both this year and in 2019, given the strong momentum and favorable market sentiment, but medium-term prospects remain cautious as shift toward protectionist policies have resulted in growing trade tensions and geopolitical strains.
- Prospects for the Pacific subregion remain positive, but growth will remain slow compared with other subregions. Papua New Guinea (PNG), the largest economy in the subregion, posted moderately higher growth in 2017 than in the previous year. However, in 2018 growth is expected to be lower as a result of an earthquake in February. This will dampen growth for the Pacific as a whole. Meanwhile, Timor-Leste and Palau registered economic contractions in 2017. Subregional growth expected to remain flat at 2.2% in 2018, and recovery in PNG and Timor-Leste is expected to push subregional growth to 3.0% in 2019.
- The United States (US) economy grew more slowly in the first quarter of 2018 than in the previous quarter, but the outlook remains positive. The economy grew by an annualized rate of 2.2% in the first quarter of 2018 compared with 2.9% for the last quarter of 2017. This was largely because consumer spending grew at its weakest pace in the last 5 years. Wages and salaries grew by 0.9% during this period, the largest increase since 2007. However, unemployment rose to 4.0% in June 2018 from 3.8% in May. Increased government spending, recent legislation lowering corporate and individual income tax rates, and latest positive developments, are expected to support the US economy's short-term prospects.
- The People's Republic of China (PRC) sustained strong economic growth of 6.8% in the first quarter of 2018, with retail sales expanding by 10.1% and property construction by 10.4%. However, growth is expected to slow to 6.6% in 2018 and 6.4% in 2019 as the government scales back on infrastructure projects to address debt issues, and imposes stricter controls on real estate purchases to curb speculation.
- Japan's economy contracted at an annualized rate of 0.6% in the first quarter of 2018 amid slowdowns in private consumption and capital expenditure. This is the first contraction recorded since 2015, ending the longest stretch of sustained growth since the 1980s. A global slowdown in demand for electronics translated to weaker exports, which, together with softer private consumption, contributed to the contraction of the economy. Although the full-year forecast for the Japanese economy remains positive at 1.4% in 2018 and 1.0% in 2019, uncertainty in global trade policies may pose risks.
- The Australian economy advanced by 1.0% in the first quarter of 2018 compared with the fourth quarter of 2017, and this increased annualized growth to 3.1% from 2.4% in the October–December quarter. While exports, business investment, and government spending all grew strongly, household consumption, which accounts for 57% of GDP, contributed only 0.2 percentage points to first quarter growth. Although cautious household spending and global trade concerns pose risks to the country's economic outlook, FocusEconomics expects Australia's economy to expand by 2.7% in both 2018 and 2019, backed by an accommodative monetary policy and robust exports of liquefied natural gas.
- New Zealand posted flat growth in the last quarter of 2017 as stronger activity in the services sector was offset by weaker primary industries. The economy

GDP Growth
(%, annual)

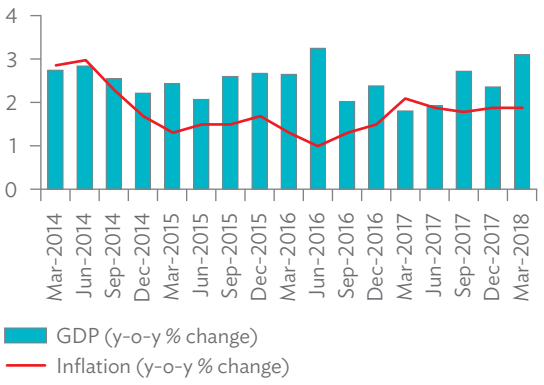


DMC = developing member country, GDP = gross domestic product, p = projection, PRC = People's Republic of China.
Notes: Developing Asia and Pacific DMCs as defined by ADB. Figures are based on ADB estimates except for World GDP growth.
Sources: ADB. 2018. *Asian Development Outlook 2018: How Technology Affects Jobs.* Manila; IMF. 2018. *World Economic Outlook April 2018: Cyclical Upswing, Structural Change.* Washington, DC.

GDP Growth in Developing Asia
(%, annual)

GDP = gross domestic product.
Source: ADB. 2018. *Asian Development Outlook 2018: How Technology Affects Jobs.* Manila.

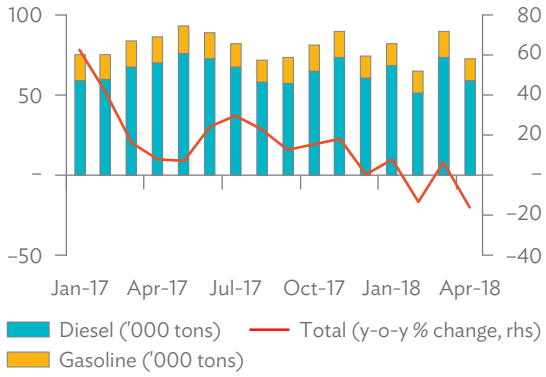
Australia Economic Indicators
(quarterly)



GDP = gross domestic product.
Sources: Australian Bureau of Statistics and Reserve Bank of Australia.

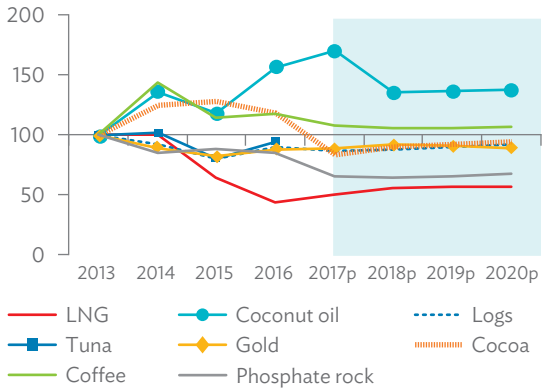
International and regional developments

Singapore Fuel Exports to the Pacific
(3-month m.a.)



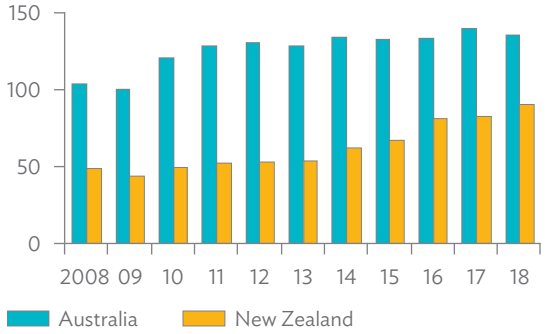
Source: International Enterprise Singapore.

Prices of Export Commodities
(2013 = 100, annual)



LNG = liquefied natural gas, p = projection.
Source: ADB calculations using data from World Bank Commodity Price Data (Pink Sheets) and FAO GIEWS FPMA Tool.

Tourist Departures to Pacific Destinations
('000, January–April totals)



Sources: Australian Bureau of Statistics and Statistics New Zealand.

Lead authors: Noel Del Castillo and Rommel Rabanal

grew by 0.6% in both the third and fourth quarters of 2017, bringing annual growth to 2.9%. The services sector expanded by 1.1% in the fourth quarter, mainly driven by business. Household spending on groceries and alcohol also rose. On the other hand, dry weather reduced dairy production, causing the agriculture sector to contract by 2.7% in the last quarter of 2017. Although growth may temporarily moderate in the first half of 2018 due to the recent change in government, continued low interest rates and looser fiscal policy can accommodate the forecast expansion of 2.9% in 2018 and 2.7% in 2019.

Higher input costs and tighter supply push commodity prices

- Commodity prices rose in the first quarter of 2018, driven by steady recovery of the global economy and supply constraints for certain commodities. Crude oil prices are forecasted to rise to $65 per barrel in 2018 and 2019 from $54 in 2017. Likewise, prices of agricultural commodities are expected to increase by 2% in 2018. Growing protectionist sentiments among the larger economies pose risks to the short-term outlook.
- Tighter supply has pushed up prices of agricultural products. Reduced planting of key crops and unfavorable weather limited global supply of grains and soybeans. The food price index advanced by 0.6% (year-on-year [y-o-y]) in the first quarter of 2018, with grain prices increasing by 12.3% (y-o-y). The beverage price index has largely remained flat as lower tea prices offset price increases in cocoa. Global food prices are expected to rise by 3.3% this year before easing to 1.3% in 2019. Although supply constraints and trade tensions pose risks to forecasts, their impact may be limited.
- Short-term prospects for key Pacific exports are optimistic, but more subdued over the medium term. Natural gas prices rose by 16.8% (y-o-y) in the first quarter of 2018 due to strong winter demand. Prices are expected to increase by 10.2% this year, but to decline in succeeding years. Meanwhile, increased global output resulted in phosphate rock prices falling by 16% during the first quarter. However, prices are expected to return to 2017 levels over the next few years. By contrast, the price of cocoa is forecast to rise over the next few years due to tightening supply, while higher global production is expected to slightly push down the price of coffee in the medium term. Although gold prices were up by 9% (y-o-y) in the first quarter of 2018, they are projected to fall in succeeding years like other key Pacific exports.

Tourism generally maintaining momentum

- The recent performance of the New Zealand economy appears to be boosting overall outbound tourism, to the advantage of nearby Pacific destinations. Departures from New Zealand to the South Pacific increased by 9.4% (y-o-y) over the first 4 months of 2018. In particular, Vanuatu saw over 40% more tourists from New Zealand during this period making up for last year's weak performance. Although Air New Zealand's services remain suspended due to safety concerns regarding the Bauerfield International Airport runway, Air Vanuatu expanded service frequency to Auckland, as well as other destinations, during the peak season. Fiji and Tonga likewise recorded strong growth in the number of tourists from New Zealand, a reversal of the weak performance seen early in 2017. New Zealand visitors to the Cook Islands and Samoa registered solid, albeit lower, rates of expansion.
- Australian tourism to South Pacific destinations fell by 3.1% (y-o-y) during the first 4 months of 2018, due to a downturn in trips to Fiji. The number of Australians visiting Samoa also held steady. By contrast, other South Pacific destinations saw increasing numbers of Australian tourists. The Cook Islands and Vanuatu led the way with increases of 10% and 7%, respectively, while Tonga withstood the impacts of Cyclone Gita to record modest growth of 4% in Australian tourism during this period.

Access to electricity is low in the Pacific, particularly in the more remote and less developed parts of the subregion. Factors contributing to this include dependence on costly fossil fuels for power generation, inadequate investment in infrastructure, and electricity services that may be beyond the means of poorer rural households.

To help address these challenges, most Pacific governments are taking steps to shift toward renewable energy and ultimately meet ambitious targets under international climate change commitments. Further, they have made strategic investments in more efficient transmission networks, and better collection and payment systems.

Such measures must be complemented by improvements in the performance of state-owned utilities, who are typically responsible for providing electricity services in Pacific economies, including further promotion of private sector participation and clarifying policies behind tariff-setting to ensure financial self-sustainability and minimize the need for government support.

Developments in Fiji's electricity sector

Lead author: Shiu Raj Singh

Over the past 2 decades, electrification projects have extended access to modern forms of energy to most rural households in Fiji's two main islands, Viti Levu and Vanua Levu. This has primarily been achieved by extending the national grid, but diesel-based mini grids have also been constructed. Despite this, many rural areas and more remote islands remain without power.

Most generation capacity and all transmission and distribution assets are owned by Energy Fiji Limited (EFL). The recently corporatized EFL is a vertically integrated, state-owned power utility that is responsible for providing grid-based electricity in Viti Levu, Vanua Levu, Taveuni, and Ovalau.

The sustainability of government-funded rural electrification schemes is not secure. Collection rates in rural areas are usually low, resulting in poorly maintained systems and large subsidy requirements. Further, supply to consumers connected to isolated grids and solar home systems is constrained to a limited number of hours each day or limited quantity of energy supply, impacting access for rural households.

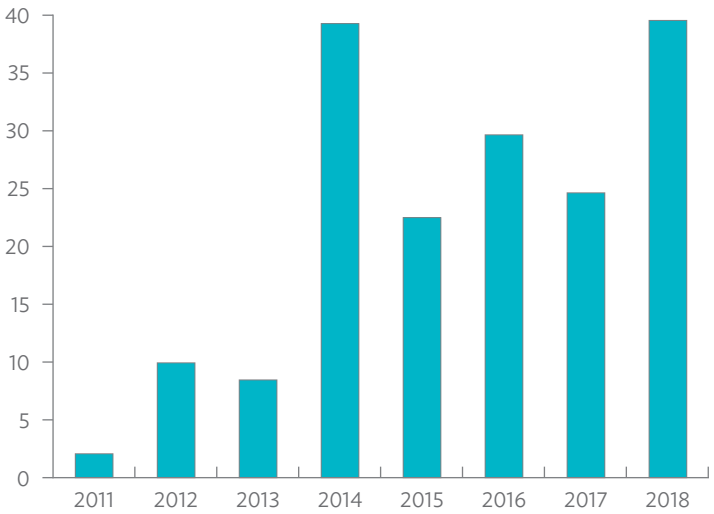
The government has made increasing budgetary allocations for grid extension and rural electrification (Figure 1). The budget was boosted in 2014 when the PRC provided a loan for the construction of a F$15.0 million hydroelectric power plant on Taveuni, the third-largest inhabited island after Viti Levu and Vanua Levu. An additional budgetary allocation of F$7.2 million was provided to EFL for the construction of a depot on Taveuni, and for the utility to take over the generation, transmission, and distribution of electricity on the island. The 2018 fiscal year has seen the most significant increase in rural electrification and grid extension budgets. This is partly in response to the finding from Fiji Bureau of Statistics 2013–2014 Household Listing that approximately 16,000 households (more than 8% of the total) still do not have electricity. The grid extension project of F$29.1 million is expected to connect 3,396 homes, schools, and community centers. In addition, subsidies will be provided to assist 2,600 households in remote areas with the installation of solar home systems, some of which were damaged by Cyclone Winston.

Apart from grid extension and direct support to households for access to electricity, the government also embarked on reforms to the sector's legal framework and corporatization of the electricity enterprise. Through these reforms, the government intends to bring innovation and international best practice to Fiji to help meet long-term energy sector development goals, including ensuring a more clean, stable, and accessible supply of electricity. The Electricity Act of 2017 (i) separates regulatory functions, including tariff setting, licensing and enforcing technical codes and standards, promoting competition, and dispute resolution; (ii) increases opportunities for private sector participation in electricity generation; (iii) authorizes EFL's exclusive right for transmission, distribution, and retailing of electricity in Fiji; and (iv) allows divestment of shares in EFL.

The Fiji Competition and Consumer Commission sets the electricity tariff, but its previous tariff orders do not contain the rigorous and comprehensive analysis that characterizes international best practice for electricity tariff regulation. More detailed regulations, regarding tariff setting, will be required under the Electricity Act 2017.

Independent power producers have operated in the past in Fiji, but these have been largely enterprises with government ownership.

Figure 1: Fiji Rural Electrification Budgets
(F$ million)



Source: Budget estimates (various years).

For example, the Fiji Sugar Corporation and Tropik Wood Industries have operated biomass plants with generation capacity of 34 megawatts (MW). More recently, a 10 MW biomass plant was established by the Nabou Green Energy Limited.

About 55% of Fiji's electricity is produced from renewable sources, but there is still considerable scope for further investment in renewable energy generation. This includes sizable hydropower projects that have already been assessed to prefeasibility level or beyond. Potential hydropower (Navua, Qaliwana, and Ba), solar, and pyrolysis (waste-to-energy) investments are currently being considered by the private sector and EFL.

EFL has been performing well in comparison with other utilities in the Pacific, although arguably less so when compared with the better-performing island utilities around the world. EFL scores well with respect to supply-side energy efficiency, both in fuel consumption and technical losses on the network. However, there are still significant opportunities to improve planning to deliver grid electricity through the most efficient mix of grid extension, diesel and hybrid mini grids, and solar home systems.

The government has offered a stake of 5% in EFL as nonvoting shares to eligible Fijian citizens who are domestic account holders. The new shareholders can acquire more shares when EFL shares are listed on the South Pacific Stock Exchange. The government has also been actively seeking a strategic investor that can bring international best practices to Fiji.

Expanding access to electricity in Papua New Guinea

Lead author: Edward Faber

About 20% of the population in Papua New Guinea (PNG) is estimated to have access to electricity, but this number falls to less than 13% in rural areas. Without access to electricity, basic health and public services cannot be delivered adequately, food cannot be refrigerated, radios and computers cannot be used for communication, small businesses cannot grow, and lighting is not available for safe public spaces or extended working hours. Business activity becomes severely constrained, resulting in unfulfilled economic growth potential.

Expanding access to electricity is therefore an essential component of PNG's national development agenda, which is targeting to reach 70% electrification by 2030. However, many hurdles exist to achieving such a goal. First, there is a need to find available finance, from both public and private sources, to invest in existing and new power infrastructure. Then there are also challenges around the cost of electricity, tariffs, subsidies, and the overall regulatory and operating environment. A growing population compounds these difficulties, as does PNG's mountainous terrain and populations dispersed in rural and island communities.

Currently, electricity generation capacity in PNG is estimated at 605 MW. PNG Power Limited (PPL), the state-owned electricity utility company, manages about 320 MW. As a vertically integrated company, PPL runs the generation, transmission, and distribution of electricity. This occurs across three main grids—Port Moresby, Lae–Madang–Highlands region (The Ramu Grid), and East New Britain—as well a number of smaller independent power systems that service 26 lower density urban areas. The remaining 280 MW is generated by the mining industry, largely for its own consumption, although mining operations do sometimes provide electricity to neighboring communities.

FINANCE FOR INFRASTRUCTURE INVESTMENT

For PNG to expand energy infrastructure, it needs investment. This can be sourced from either public or private sources, and from either domestic or overseas sources. On the domestic front, PNG continues to face a tough fiscal and borrowing context, making borrowing from the government's own resources difficult. PPL could self-finance projects, but that would depend on its operating profitability. While the media reports that PPL made a profit in 2015 of K63 million, more recent publicly available data is not available; and it is reported that the state-owned company suffers from a number of headwinds, such as aging infrastructure and electricity loss and theft. Although at the same time PPL is working to address such issues through strengthening its management.

Foreign sources of capital are, therefore, essential for the continued expansion of electricity infrastructure. Multilateral development banks and bilateral partners are one key source of foreign capital that can be used to finance public infrastructure. Such borrowing typically comes with concessional lending rates as well as technical expertise, making it attractive to the government. Several projects are currently being financed through this window in PNG. Such financing is also essential to facilitating projects that might not be attractive to the private sector, such as those in rural areas or in transmission and distribution of electricity.

The second source of financing is from the private sector. External foreign sources offer the best possibilities for PNG, given the limited size of PNG's own private sector and financial markets to make investments. Private sector investments can occur in generation, transmission, or distribution of electricity. However, it is the generation stage that offers investors the most certainty, since transmission and distribution are the natural monopoly of the state and can be subject to changing regulations. In addition, private sector investors often bring their international lenders with them and there is limited appetite for financing transmission and distribution because the revenue flow is less transparent and less easily ring-fenced, which is needed to repay debt.

A 26.4 MW diesel-fired plant (owned by a Republic of Korea-based company) supplying the Port Moresby grid under a 15-year build–operate–transfer agreement is one of the few examples of an existing private sector operation supplying power to the grid on a large scale in PNG. Under a typical private sector arrangement, power is generated by the private sector party, known as the independent power producer (IPP), and sold under agreed terms, to the purchaser, which in the case of PNG is the national utility, PPL. Terms of sale are detailed in a power purchase agreement, which clearly sets out the rate at which power will be sold and over how many years. More IPP projects are in the pipeline. These include

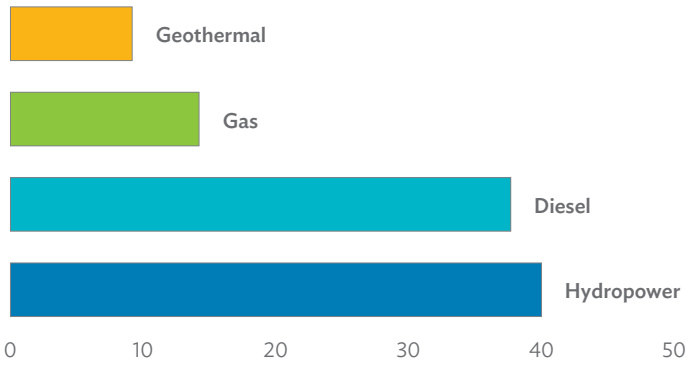
the Ramu 2 project, which is a 180 MW hydropower project that is backed by PRC interests and will supply the Ramu Grid, and the Naoro-Brown River hydro-project, which is expected to deliver 80 MW to the Port Moresby grid.

Obstacles to greater private sector investment, however, persist, including the challenging operating environment in PNG. One mechanism that can help address these challenges are guarantees that cover political and sovereign risk, as well breach of contract risk on power purchase agreements.

DIVERSIFICATION OF ENERGY SOURCES

Diversification of energy sources is a second key avenue to consider for expanding access to energy. Current electricity generation is 40% from hydropower, followed by diesel (38%), gas (14%), and geothermal energy (8%) (Figure 2). Diesel, however, is costly and can spike in price during shocks to the oil market. This means a higher cost of electricity must be passed on to consumers and businesses, which in turn makes it more difficult for people to get access to electricity, as well as impacting the cost competitiveness of the manufacturing sector.

Figure 2: Energy Sources in Papua New Guinea
(% of total)



Source: Government of Papua New Guinea, Department of Public Enterprises and Department of Petroleum and Energy. 2015. National Energy Policy 2016–2020. Port Moresby.

Gas, which is abundant in PNG, holds significant potential for power generation, with the added advantage that it is cleaner and cheaper than diesel. PNG began exporting significant quantities of liquefied natural gas (LNG) in 2014 under its flagship PNG LNG project, but domestic power generation from gas remains limited. Currently, there is one 25 MW gas-fired power plant supplying Port Moresby, built in connection with the PNG LNG operation. In addition, Oil Search, PNG's largest private oil and gas company, and Kumul Petroleum, PNG's national oil and gas company, have entered into a joint venture to build a 58 MW gas-fired power plant, which is due for completion by 2019.

Hydropower, which is the largest source of PNG's current energy supply, is also cleaner and cheaper than diesel. Thanks to its numerous rivers and mountainous terrain, PNG could generate an additional 15,000 MW from hydropower. Once constructed, the running costs of hydropower are low, making it attractive. On the other hand, initial construction costs are high and there are also environmental and social impacts to be considered.

Several other energy sources are also available in PNG, including biomass, solar, wind, and geothermal sources. Due to this overall abundance of available energy sources, it is possible that PNG could export power in the future.

TARIFFS, SUBSIDIES, AND REGULATION

Tariffs and subsidies are an important part of the equation in providing greater access to energy. High tariffs can make it expensive for people with low incomes to access electricity. However, if a government subsidizes tariffs, it distorts market forces, creates a burden on the state, and becomes unpopular to reverse. In PNG, there is no direct subsidy for tariffs. However, electricity is relatively expensive, with an average tariff rate of around $0.3 per kilowatt hour (kWh), similar to some developed countries where consumers can afford to pay more.

Independent tariff regulation is in operation in PNG through the Independent Consumer and Competition Commission. However, tariff-setting mechanisms can be opaque. Independence is important because evidence indicates that utilities operating under independent price regulation are more likely to perform better and be more profitable than those operating under prices set by governments.

Strong regulation and institutions are necessary requirements for a solidly functioning, efficient, and equitable power sector. To this end, the government approved the National Energy Policy (2016–2020) in March 2018, which will soon see the creation of a national energy authority and energy regulatory commission. These institutions will take over technical regulation functions from PPL, which currently self regulates, and ensure competition and fairness in tariff-setting. A strong supporting judicial system and clarity over landownership are also important elements to consider.

CONCLUSION

PNG has enviable potential to generate power. Several projects are in the pipeline which are set to boost power generation; however, significant ongoing investment in the sector is needed if PNG is to reach its goal of 70% electrification by 2030.

Development banks, bilateral partners, and private sector investors all have a role to play in financing the expansion. Diversifying energy sources can help to reduce costs by reducing dependency on costly diesel. Finally, strong and independent regulation can help to attract much-needed investment and expand consumer access to electricity.

Improving electricity access in Solomon Islands and Vanuatu

Lead authors: Prince Cruz and Jacqueline Connell

The enormous impact of access to energy services can be seen in its effects on productivity, education, health, water and sanitation, and information and communication services. The 2007 Human Development Report pushed the notion that electricity access is a fundamental right. This is mainly anchored on the role of access to modern energy services in "fulfilling basic social needs, driving economic growth, and fueling human development" (Gaye 2007).

Access to electricity is among the lowest in the Pacific subregion, in Solomon Islands (at 27% of households in 2009) and Vanuatu (33% in 2009). This was partly because electricity costs in these two economies were among the highest in the Pacific at $0.80 per kWh in Solomon Islands and $0.73 per kWh in Vanuatu in 2012 (Pacific Region Infrastructure Fund 2016). Electricity supply is also unreliable and prone to frequent outages.

The low access to grid-based electricity services in these economies is driven by three key factors:

(i) high per capita cost of power generation due to dispersed geography and small size of population centers;
(ii) lack of funding for government community service obligation for grid expansion;
(iii) where cost of generation exceeds the government-set tariffs due to the high price of diesel power generation, there is little incentive to expand the distribution network as it would operate at a loss. The tariffs are often based on the cost structure in the urban centers, with lower costs for transporting fuel for power generation.

In most cases, only the main urban areas are connected to the power grid. For rural areas and outer islands, demand is typically not enough to warrant the construction of a power plant. As with most of the Pacific, electricity is produced using diesel-powered generators. This article looks at the conditions in Solomon Islands and Vanuatu and provides context on the challenges faced in expanding electricity access, especially to rural households in outer islands. It then looks at the plans and programs in place to widen access, lower electricity costs, and make production more efficient.

SOLOMON ISLANDS

As of 2017, the population of Solomon Islands was about 670,000, dispersed over six major islands and about 900 smaller islands. Administratively, there are nine provinces: six based on the major islands, and smaller islands grouped into three provinces. The capital, Honiara, is home to around 13% of the population and is administered independently of the surrounding province of Guadalcanal.

Electricity generation and distribution services are provided by the Solomon Islands Electricity Authority (SIEA), a state-owned enterprise more commonly known as Solomon Power. SIEA provided grid-based electricity to around 12% of the population in 2009 (the latest Census available), including Honiara and eight isolated provincial centers in seven provinces. The grid access rate in Honiara's urban areas was 64% but 6% for the rest of the country, with five of nine provinces having rates below 4% in 2009. Overall, the electrification rate was 21%, with provincial access rates ranging from 8% in the Central Province to 75% in the Rennell and Bellona Province (mainly due to solar energy) (Figure 3).

Grid-based electricity produced by SIEA is heavily reliant on diesel fuel, leading to power tariffs beyond the reach of poor households. Small generators for other off-grid areas are also diesel fueled. Oil and other mineral fuels account for about 20%–25% of imports.

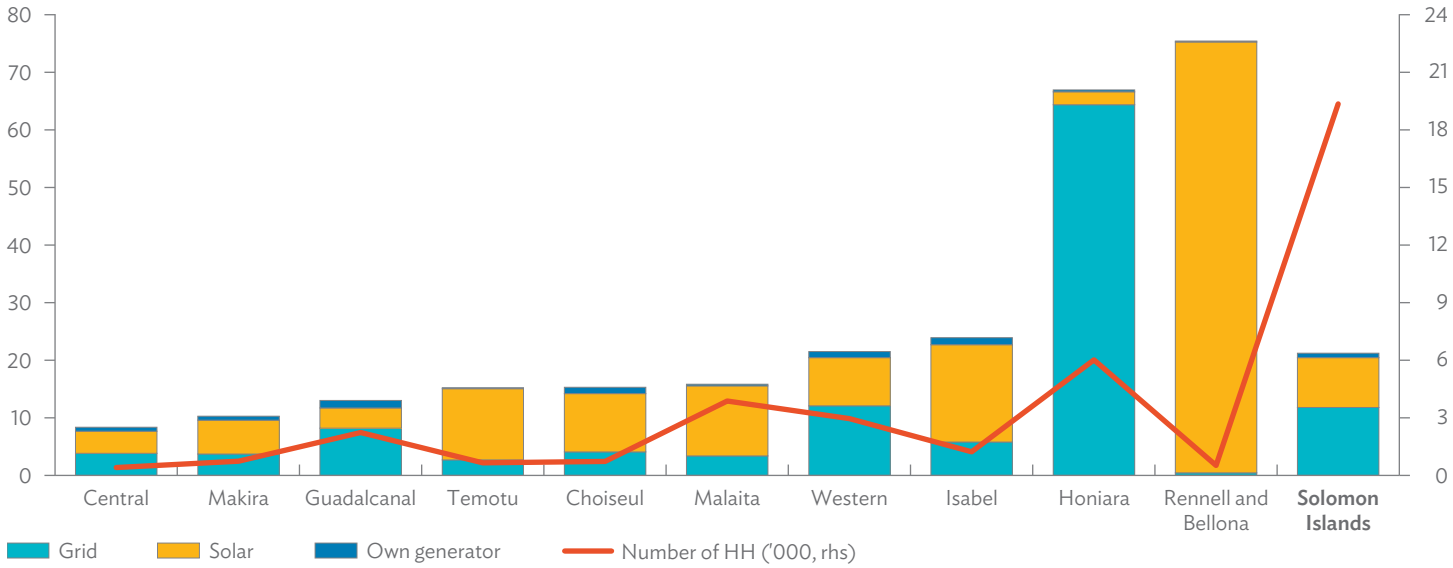
The use of solar power for lighting and electricity has been increasing largely because, over the past two decades, development partners have provided solar systems free of charge. According to the 2009 Census, around 12% of households reported using solar-powered lamps for lighting, while 79% use kerosene lamps. The lack of resources for maintenance, and replacement and recycling of batteries render these solar systems unsustainable. As the solar systems were given for free, households expect that replacement units and batteries would also be provided free of charge (Climate Investment Fund 2014).

Energy policy is implemented through the Energy Unit of the Ministry of Mines, Energy, and Rural Electrification, which also sets power tariffs based on government regulations. Although the existing tariff structure allows SIEA to recover costs and invest in infrastructure, this has not always been the case. From 2002 to 2014, approved tariffs were not sufficient to finance the expansion of power infrastructure and invest in the upgrade and maintenance of existing assets, yielding the SIEA an annual average return on assets of only 3%.

Revenue collection is now high at 97%. Historically, however, revenue collection was a problem. In 2012, SIEA embarked on a plan to install prepayment meters for all consumers in parallel with overhauling billing, accounting, and data management systems; this raised collection rates to their current level. A 5-year restructuring program was initiated in 2015, including capital expansion of more than SI$1 billion (up from a total equity of SI$769 million by the end of 2015). This program was supported by the passage in 2016 of new tariff rates, which are adjusted monthly.

SIEA also inaugurated two new solar hybrid power stations in 2017, the first of their kind in Solomon Islands. The hybrid systems—solar panels with backup diesel generators—are located in Seghe, Western Province and Taro, Choiseul Province. These added 375 kW to the 4 MW installed capacity in the provincial centers (SIEA 2018). Another project is expected to add a total of 2 MW through solar hybrid systems in five provinces (Central, Makira, Malaita, Temotu, and Western). These new hybrid power stations are expected to replace as much as 87% of diesel generation in one the five provinces (ADB 2018).

Figure 3: Electrification Rate in Solomon Islands
(% of households)



HH = households, rhs = right-hand scale.
Source: 2009 Solomon Islands Census.

SIEA reforms are part of the Solomon Islands National Development Strategy 2016–2035 (Government of Solomon Islands 2016). The strategy also targets that by 2035, the proportion of homes with no electricity supply will be reduced to 20% and that of households using solar power energy will rise to 50%. To ensure reliable power supply in all urban areas, the government aims to promote the use of renewable energy (such as the Tina River and Fiu River hydropower projects), open the electricity market to independent power producers, and ensure that SIEA has the proper expertise to run efficiently.

Once operational, the Tina River Hydropower Project is expected to add 15 MW to SIEA's 27 MW installed capacity for Honiara. The additional supply is projected to meet 65% of the capital's expected demand by 2022, the year the plant is expected to be commissioned (ADB 2018). The Fiu River Hydropower Project is expected to add 750 kW in Malaita, the most populous province. Only 3.4% of households in Malaita were connected to grid services in 2009.

VANUATU

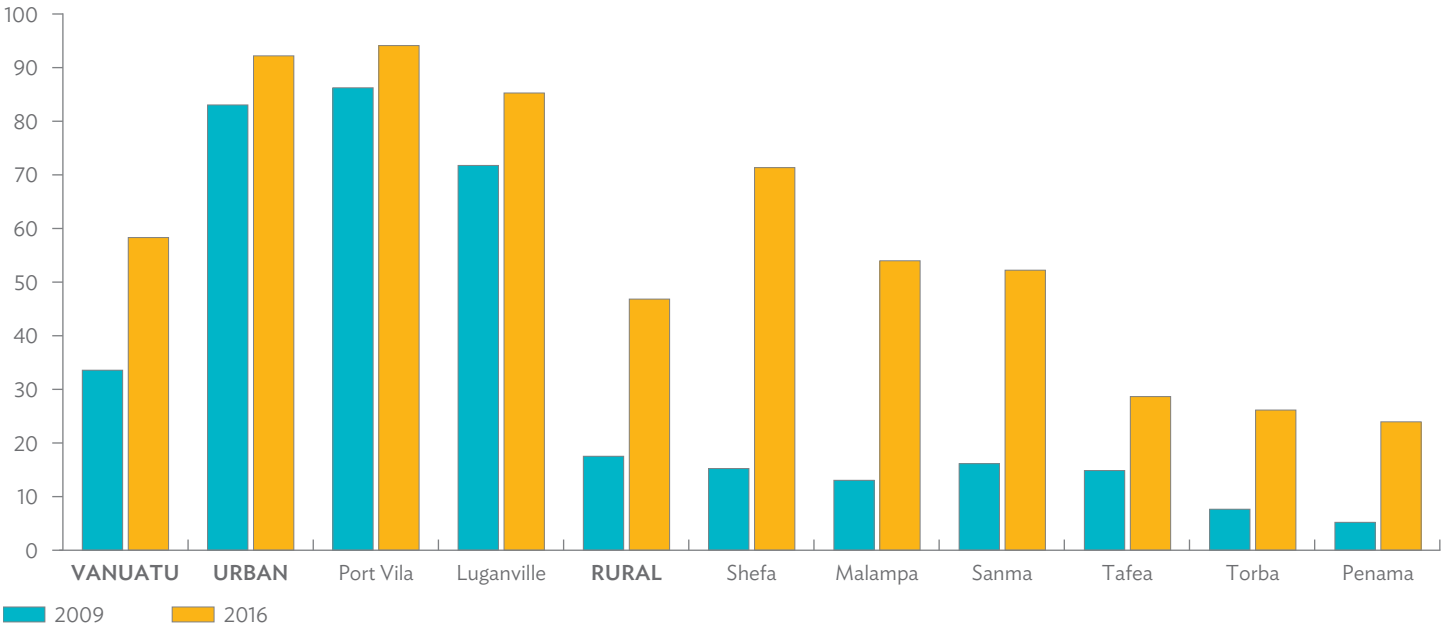
Vanuatu's population of around 272,000 (as of 2016) is scattered over 65 inhabited islands, with only 14 islands having an area of over 100 square kilometers. About 75% of the population lives in rural areas, while the remaining 25% lives in the two urban areas: Port Vila, the capital located in Efate, and Luganville, located in the island of Santo Domingo, Sanma Province. Economic activity and tourism are mainly focused on these two urban areas.

Nationally, the electrification rate increased from 33% of households in 2009 to 58% in 2016, with urban areas reaching 91% (from 82% over the same period). Almost half of rural households (46%) remained without access to electricity in 2016, although this was a considerable improvement from only 17% with access in 2009. However, three of the six provinces had electrification rates below 30% in 2016 (Figure 4).

Although 80% of urban households had access to electricity grid services in 2016, only 12% of rural households were connected (the national level was 29%). Of the six provinces, two (Torba and Penama) had grid access rates of less than 1% of households, and two more (Tafea and Sanma) had grid access rates of around 10%. Although access to grid electricity was relatively unchanged from 2009 to 2016, there was a significant increase in the use of solar energy, largely due to projects funded by development partners. Access to electricity through solar systems jumped from 4% in 2009 to 40% in 2016, largely through solar home systems (SHS) (Table 1). Combined with the use of solar lamps (in 40% of households in 2016), the use of kerosene lamps was largely eliminated. In 2009, 62% of rural households used kerosene lamps (48% nationally).

The 2016–2030 Updated National Energy Road Map (NERM) envisions 100% access to electricity in both on- and off-grid areas by 2030. The Department of Energy of the Ministry of Climate Change and Natural Disaster is mainly tasked to implement the government's energy policy. The updated plan provides status reports and extends targets set in the first road map, adopted in 2013, from 2020 to 2030. The 2016 NERM also seeks to improve the efficiency of diesel generation and lower the cost of petroleum distribution. Further, it reaffirms the commitment to renewable energy by targeting that, by 2030, 100% of electricity generated off-grid would be from renewable sources. This was up from a goal of 65% in 2020 from the 2013 NERM, and a baseline of 19% in 2012 and 29% in 2015 (Government of Vanuatu 2016).

Figure 4: Electrification Rate in Vanuatu
(% of households)



Note: Electrification rate includes households connected to grid, with own generator, and with solar home systems. Provinces include rural areas only.
Sources: Vanuatu National Statistics Office, Mini Census 2016 and Census 2009.

Table 1: Main Source of Lighting in Vanuatu, 2016
(% of households)

Area	Electricity – Main Grid	Own Generator	Pico SHS (<50 watts)	Standard Domestic SHS (50–150 watts)	Commercial SHS (>150 watts)	Solar Lamp	Battery Lamp	Other	Memo: Number of Households
Vanuatu	**29.2**	**2.9**	**8.6**	**12.7**	**4.5**	**39.6**	**1.3**	**1.2**	**55,285**
Urban	**79.7**	**7.5**	**1.4**	**2.3**	**0.6**	**7.1**	**0.3**	**1.2**	**13,989**
Port Vila	80.6	9.3	1.3	1.6	0.5	5.2	0.2	1.3	10,965
Luganville	76.2	0.7	2.0	4.8	1.0	13.7	0.7	1.0	3,024
Rural	**12.1**	**1.3**	**11.1**	**16.2**	**5.8**	**50.7**	**1.7**	**1.2**	**41,296**
Torba	1.0	2.2	9.7	6.4	6.6	70.9	2.8	0.4	1,960
Sanma	10.3	2.0	15.8	16.5	7.1	45.0	2.6	0.7	7,680
Penama	0.7	1.5	7.8	10.8	2.9	73.8	1.9	0.6	6,959
Malampa	5.8	0.9	13.6	23.9	9.4	44.0	2.0	0.5	8,896
Shefa	32.9	1.1	9.3	21.8	5.6	25.9	1.1	2.2	8,948
Tafea	9.7	0.9	8.5	6.7	2.6	68.9	0.7	2.0	6,853

SHS = solar home system.
Source: Vanuatu National Statistics Office. 2017. Mini Census 2016.

The increased adoption of SHS and solar lamps is part of the Vanuatu Rural Electrification Project, which aims to scale up access to electricity services for rural households and groups in dispersed off-grid areas. Under the project, SHS are sold directly to households with a 50% subsidy by two accredited suppliers. With the subsidy, households pay around $100–$200 for a basic pico SHS. The project, which runs from 2014 to 2020, targets 17,500 households, 230 aid posts, and 2,000 not-for-profit community halls.

However, the NERM acknowledges that substantial gaps remain. Other than the Vanuatu Rural Electrification Project, projects such as the Solar Light Industrial Centres Project and hydropower projects in Talise and Loltong are expected to extend electricity access to around 2,000 more households in other islands. With all the projects funded and lined up as of 2016, the off-grid electrification rate is projected to be 55% by 2030.

The NERM estimates that an additional $20 million is needed to achieve its goals, including universal access to electricity especially in rural areas, and address the remaining gaps. The government envisions the creation of a national green energy fund that will consolidate existing financial resources, seek new domestic and international funding, and finance renewable energy-based investments. The fund will be managed by the government through a board that will ensure accountability and transparency. The Parliament passed the law creating the fund in June 2018.

Other projects planned to expand access in different islands include the Whitesands solar photovoltaic (PV) micro grid in Tanna, Tafea Province and the Takara geothermal power plant in Efate, Shefa Province. The 1.2 MW Brenwe Hydro Power Project in Malekula, Malampa Province is expected to replace 90% of diesel generation in Malekula. It is also seen to expand the residential customer base by 25% in Espiritu Santo, Sanma and 90% in Malekula (ADB 2018).

For households connected to the grid, the electric systems are operated by the private sector. The Government of Vanuatu, through the Utilities Regulatory Authority, focuses mainly on regulating the two private electricity operators: Union Electrique du Vanuatu Limited (UNELCO) and Vanuatu Utilities and Infrastructure Limited (VUI). UNELCO operates stand-alone island grids in Efate (including Port Vila), Tanna, and Malekula, while VUI has a memorandum of agreement in Espiritu Santo (including Luganville). Total power supply in the four grid areas was 34.8 MW in 2013, around 90% of which came from diesel or diesel hybrid generators (International Renewable Energy Agency 2015). Electricity assets remain government-owned and private operators do not receive any subsidies from the government.

Under the NERM, grid extension projects are expected in the concessions areas under UNELCO and VUI. UNELCO is also expected to implement the 1 MW Efate Grid Connected Solar Photovoltaic Project while VUI will expand the grid to the east coast of Espiritu Santo. A remaining challenge for grid-connected areas is the improvement in efficiency of diesel-based power generation and the shift from diesel to renewable energy.

Updates on renewable energy initiatives in the South Pacific

Lead authors: Shiu Raj Singh and Laisiasa Tora

A series of investments is under way to help the Cook Islands, Samoa, and Tonga achieve a shared vision of generating most of their electricity from renewable energy sources by the next decade. This article provides an update on these renewable energy investments, and complementary measures addressing demand- and supply-side energy efficiency, facilitating these South Pacific economies' shift away from fossil fuel-based energy.

THE COOK ISLANDS

In 2017, the Government of the Cook Islands adopted an energy strategy to meet its commitments under the United Nations Framework Convention on Climate Change. This is aimed at preserving the country's pristine environment and fragile ecosystems, enabling private sector job creation, and strengthening energy security. Increased use of renewable energy in the Cook Islands will reduce reliance on diesel.

Public investment plans focus on designing and installing solar mini-grid systems. In addition, a significant investment program is seen to transform Te Aponga Uira—the electricity utility—into a revitalized energy distribution and power system manager. Private investment, particularly on the islands of Rarotonga and Aitutaki, is anticipated to be a major lever contributing to the Cook Islands Renewable Energy Chart Implementation Plan 2012–2020, which specifies a target of electricity supply from renewable energy sources on all inhabited islands by 2020.

From 2012 to 2015, the Government of the Cook Islands, in partnership with New Zealand, rolled out solar-based renewable energy systems in the northern group islands of Manihiki, Nassau, Penrhyn, Pukapuka, Rakahanga, and Suwarrow, as well as a solar PV power plant of 961 kilowatts (kW) on the main island of Rarotonga. A current Asian Development Bank (ADB)-financed project is helping to construct solar PV power plants on five of the southern group islands, rehabilitate the existing distribution network, and provide institutional support to the government toward developing the energy efficiency policy implementation plan. The southern group is the dominant load center that accounts for 98.0% of current load demand of around 30.0 gigawatt hours (GWh) per annum, with load demand expected to grow to 38.5 GWh by 2020.

Implementation consists of two phases of subprojects. Phase 1 involves the construction of solar PV power plants in the southern group islands of Mangaia, Mauke, Mitiaro, and Atiu. Phase 2 extends this to the island of Aitutaki. For the main island of Rarotonga, additional assistance from the Global Environment Facility will be utilized to install a 1.0 MW battery energy storage system—capable of storing up to 4.0 megawatt hours (MWh) of energy—to the existing solar PV array at the Rarotonga Airport. It will facilitate load shifting and curtailment to provide firm output, allowing for 2.0 MW of additional solar installation. Further assistance from the Green Climate Fund will support the installation of three more

battery energy storage systems with a total preliminary capacity of 6.0 MW (up to 10.0 MWh of stored energy), which will enable (i) load shifting to allow for the installation of a further 6.0 MW solar facilities in Rarotonga; and (ii) grid-stabilization to manage the impact of fluctuations in generation on the grid, permitting the integration of more renewable energy generation while maintaining power quality and system reliability. This will help reduce fossil fuel consumption and enhance energy security on Rarotonga.

SAMOA

The Electric Power Corporation (EPC) is an SOE responsible for generation, transmission, distribution, and sale of electricity in Samoa, covering 96% of its population. Majority (68%) of the current electricity supply in Samoa is generated from petroleum products such as diesel, petrol, kerosene, and liquefied petroleum gas, but the development of renewable sources such as hydropower, wind, and solar is making significant headway. Developing clean, indigenous, and renewable energy resources; improving the reliability of the electric grid; and promoting energy efficiency and conservation have become high-priority objectives for the government. In its Nationally Determined Contributions under the Paris Agreement, Samoa set an ambitious target to generate 100% of its electricity from renewable sources by 2025.

EPC operates five hydropower generation plants, three of which were seriously damaged by Cyclone Evan in December 2012. These have since been refurbished with support from development partners, and Samoa is now investing in additional hydrogeneration capacity. EPC also operates an 8 MW wind farm as part of a partnership with a private company. Under this partnership, the company also has committed to build a hydro energy storage plant on Upolu, along with a second wind energy project in the pipeline. In addition, EPC has four solar facilities currently in operation on both Upolu and Savaii. Three independent power producers, currently providing solar power, complement EPC generation. Other private enterprises have also signed power purchase agreements with EPC, and will be investing in new generation capacity.

However, EPC has also invested in new diesel generators that pick up shortfalls during periods when solar energy supply is inadequate. This includes the Fiaga power plant project, commissioned in 2013, providing 23 MW diesel generation for the main grid of Upolu. It currently generates 85 million kWh annually, equivalent to 65% of the national power generation. This initiative has significantly improved the reliability of power generation for EPC's 35,000 residential, commercial, and government customers.

Further, EPC has converted the billing system for most of their customer base to prepayment meters. This included installation of approximately 21,000 prepayment meters for EPC customers and establishing a prepayment purchasing system. Prepayment meters require customers to purchase credit and activate their prepayment meter through an access code, which can be purchased by mobile phone. Postpaid metering is also available.

Samoa has demonstrated immense commitment at the global stage through its goal to be 100% renewable by 2025. This commitment indicates the government's role in addressing the energy challenges of the country and, at the same time, contributing to the global efforts to reduce greenhouse gas emissions. Currently, the government allows duty free importation of renewable energy equipment and, with much-improved energy infrastructure and systems, the country is well positioned to focus on developing the private sector to do its part in delivering a more prosperous future. Up until now, EPC has been the sole provider of electricity. However, with the government opening the electricity market to local and international independent power producers, the opportunity is there to capitalize on promoting and introducing renewable energy technologies as the way forward in keeping with Samoa's international commitments.

TONGA

In Tonga, 89% of households have access to electricity nationwide (97% in urban areas). Like many other small Pacific island countries, electricity production relies almost exclusively on diesel generation; until recently, over 95% of electricity in Tonga was generated using imported diesel fuel. In 2012 (the latest year with complete figures), an estimated 15 million liters of diesel were consumed to generate electricity at a cost equivalent to approximately 10% of GDP and 15% of national imports. Although Tonga has significant potential resources for renewable energy—notably solar, wind, and biomass—financial, technical, and other barriers have constrained their development.

Tonga Power Limited (TPL) is a vertically integrated SOE under the oversight of the Ministry of Public Enterprises. It has the concession for and operates four independent grids for electricity services. These are on the main island of Tongatapu, and main islands of the Vava'u, Ha'apai, and Eua island groups, where TPL generates, distributes, and retails electricity, and provides operation and maintenance services. Also, as part of the government's demand side management efforts, electricity line losses are to be reduced to 9% by 2020 (from a 2010 baseline of 18%).

Heavy reliance on diesel fuel imports has the following negative implications: high electricity production costs and tariffs, high input price volatility, high dependency on imports, and localized pollution. This has led to fluctuations in the electricity tariff, which peaked in September 2008 at $0.45 per kWh, spiked again in July 2011 to $0.43, and then slowly fell to $0.36 in March 2017, reflecting movements in global fuel prices. Recognizing these challenges, Tonga's Nationally Determined Contributions under the United Nations Framework Convention on Climate Change includes the following targets:

- By 2020, 50% of all electricity to be generated will be sourced from renewables. Since 2010, the government and TPL, with the support of development partners, have focused on many outer islands, which require much higher unit costs and longer implementation periods. Outer island renewable energy investments are guided by Tonga Energy Road Map (TERM) 2010–2020. The first phase of TERM (2014–2019) involves (i) installing solar power systems, including some smart meters

on nine outer islands; (ii) transferring operation and maintenance knowledge, and (iii) rehabilitating the existing grid network near the solar power generation systems on the islands of 'Eua and Vava'u. The second phase of TERM (2017–2019) includes a pilot solar farm to be funded and built by an independent power producer, and utility-scale wind farms to be funded by bilateral partners. The third, and final, phase of TERM (2018–2020) will see two small-scale solar plants coupled with battery energy storage systems constructed in 'Eua and Vava'u. This will enable increased integration of intermittent renewable energy (solar and wind) to be developed by the private sector on Tongatapu (the largest demand center).

- By 2030, 70% of all electricity is targeted to be generated from renewables. The government and TPL will focus on a few main islands, particularly Tongatapu, the largest demand center. However, as renewable energy penetration exceeds 50%, a comprehensive storage plan will be essential, and this is currently being prepared by TPL. In 2020–2030, the government and TPL will focus on improving grids and networks, and installing publicly financed supporting equipment to facilitate 20% additional renewable energy generation by the private sector without permanent damage to the grid. The government and TPL have no plan to install any new diesel generators after 2020.

- TPL has successfully sourced, structured, and negotiated the first independent power producer (IPP) for a 2 MW solar PV farm, which is currently in operation. Additional IPPs in the pipeline include (i) option for additional 4 MW (2 lots of 2 MW) of IPP solar through the current power purchase agreement; and (ii) the Government of New Zealand (MFAT) has committed NZ$5.0 million to support a 2.2 MW wind IPP project, which both MFAT and TPL have just started identifying the IPP.

For Tonga as a whole, electricity consumption in 2012 was 52.4 GWh. Most realistic scenarios are that consumption will rise to 66 GWh by 2020 and 107 GWh by 2030. The government and TPL are striving to lower generation and network management costs, and work with retail and commercial consumers to improve electricity efficiency by the following measures: (i) investing in energy-saving devices such as LED lighting and more efficient heating, ventilation, and air-conditioning systems; (ii) reducing electricity by managing lighting, equipment, machinery, and heating, ventilation, and air-conditioning usage; and (iii) smoothing the uptake and shedding of electricity usage during main peak period.

Strategies for improving energy access in small island economies

Lead authors: Jacqueline Connell and Laisiasa Tora

Geographic and demographic conditions present complex challenges to providing accessible and reliable energy supply in small island economies. This article highlights ongoing efforts by Kiribati, Nauru, and Tuvalu to overcome these hurdles through strategic investments that are complemented by much-needed reforms to help extend electricity access to most households.

KIRIBATI

The Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management 2014–2023 promotes the use of sustainable and renewable sources of energy, and energy efficiency. The government plans to reduce the use of fossil fuel in South Tarawa by 45%, of which 23% will be replaced by renewable energy. Further, fossil fuel use on Kiritimati Island—the other main growth center—is targeted to be cut by 60%, of which 40% must come from increased renewable energy use. Improved energy efficiency will account for the balance of the planned reductions. Also, through the Kiribati Joint Implementation Plan, the government seeks to strengthen its capacity to access finance, monitor expenditures, and maintain strong partnerships.

Imported fossil fuel (52%) and coconut and palm oil residue (42%) dominate Kiribati's energy mix, and demand for the latter has been steadily increasing in 2014–2017. The share of fossil fuel changed little between 2010 and 2016 despite additions of new solar installations for power generation. The residential sector is the largest consumer of energy, followed by land transport. As of 2016, electricity accounts for only 3% of households' energy consumption; the bulk comes from biomass in the form of coconut oil and palm oil residue (77%) and fuelwood and wood waste (10%), and petroleum products (10%). The government recognizes that the continued reliance on inefficient forms of energy and appliances, and dependence on expensive fuel imports, are challenges in the energy sector that negatively impact economic development and impose high costs on households.

The government's short- and long-term policy strategies—Kiribati Development Plan (2016–2019) and Kiribati Vision for 20 years (2016–2036)—reiterate the government's goal to increase access to high-quality and climate-resilient infrastructure by increasing the use of renewable energy in all sectors of the economy. The Kiribati Integrated Energy Roadmap, the medium-term strategy covering 2016–2025, provides a detailed overview of Kiribati's energy sector and its key challenges, sets targets for renewable energy use and energy efficiency to reduce fossil fuel consumption, and identifies activities and investments necessary to achieve these targets.

The electricity system on South Tarawa has a total installed capacity of 7.01 MW, most of which is diesel generation. Since 2014, 1,556 kW of solar PV generation have been added to the grid. As of March 2018, 22% of total installed capacity on South Tarawa is ground or roof-mounted solar PV. An 11-kilovolt transmission network serves the current load. The Public Utilities Board (PUB)—the sole power utility—has rehabilitated parts of the transmission and distribution network. It is also replacing transformers on the network and installing a supervisory control and data acquisition system that will monitor all transformers and solar systems on the grid. Technical losses fell dramatically from 22.6% in 2015 to 13.5% in 2016 as transmission and distribution upgrades were made. PUB also recently purchased three new high-speed diesel generators, which will be installed by the end of 2018. These will allow PUB to better manage the grid as intermittent generation from solar generation increases, as well as carry out planned maintenance of generation assets (insufficient assets in reserve has meant that, when generators fail, PUB has had to carry out load shedding).

There is no formal regulatory framework for setting electricity tariffs. These are proposed by PUB and approved by the cabinet, bypassing the Ministry of Infrastructure and Sustainable Energy, which is responsible for planning, managing, and coordinating energy sector activities. Tariff reforms were considered under a World Bank-funded study in 2016. The Performance Improvement Plan and the Preliminary Reform Options Report, prepared as a part of this study, recommended the following reforms:

(i) Increase the commercial rate to be the highest among consumer groups, with a recommended yearly increase of A$0.05 per kWh over 3 years; and reduce the government rate (currently charged at the commercial rate).
(ii) Adjust tariffs regularly for changes in fuel prices, whether increase or decrease.
(iii) Fund any lifeline tariff desired by the government through a community service obligation agreement.
(iv) Reduce the fuel price (PUB's largest cost item) from the current fixed price of A$1.27 per liter (set by the government) to the market price of A$1.16 per liter. This would allow for lesser tariff increases.

These recommendations are still being implemented, with only the lifeline recommendation currently in effect.

NAURU

Pacific island countries often struggle to extend electricity access because their populations are dispersed over several islands. In contrast, Nauru is a single, 21-square kilometer island nation with a population of just over 11,000 and almost all households and businesses connected to the electricity system. However, in the past, there were frequent power outages that regularly damaged equipment, undermined business productivity, caused food to spoil due to lack of refrigeration, and created safety concerns particularly during evening blackouts. Some consumers, particularly commercial consumers, resorted to using small, independent generators to maintain their power supply amid these challenges.

Power generation was also a large fiscal burden exacerbated by several distortions.

First, the government-run Nauru Utilities Authority (NUA) obtained fuel—the key input to power generation—free from government stocks. Consequently, the NUA had little incentive to minimize its use of fuel or to seek alternative, cheaper fuel.

Second, revenue from electricity tariffs went to the government's consolidated fund. This meant that the NUA's expenditure had to come from the government budget. This inevitably had adverse consequences for the NUA's investment, maintenance, and pricing decisions. As it was not operated on a commercial basis, and there was limited capacity in financial and human resource management, there were large costs to the government budget. This diverted funds away from more productive social and infrastructure investments such as education and health care.

One of the key components of the Nauru Sustainable Development Strategy 2005–2025 was to restructure the utilities sector. From 2011, Nauru has reformed its power system with far-reaching benefits. Beginning with corporatizing its power utility, Nauru has also established maintenance plans and capital investment procedures, begun to reform its electricity tariffs and subsidies to encourage cost recovery, and upgraded its power generation assets through development partner support.

In 2011, Nauru approved legislation to establish an SOE, the Nauru Utilities Corporation (NUC), to generate and distribute electricity and water. Electricity, water, and fuel were all previously provided by the government-run NUA, which had taken over utilities management from the Nauru Phosphate Company when it was dismantled. Establishing the NUC as a new SOE required the physical and accounting separation of its assets from the government. With few records available, a survey was used to identify assets, which were valued using international accounting standards and recorded into an asset register.

Gradually, the NUC was corporatized by developing a corporate strategy and performance contracts for senior management. The performance contracts, first completed for the chief executive officer in March 2013, represented an innovative way to strengthen the oversight of the SOE given Nauru's limited capacity to establish and implement formal regulation. Initially, process indicators were used because service quality indicators were unavailable. Over time, a benchmarking exercise enabled performance indicators to be incorporated into management's terms of reference.

In 2015, the NUC established maintenance plans and trained staff on equipment maintenance. The NUC plans to establish a maintenance fund in 2018, which will help to ensure the sustainability of ongoing investments.

Meanwhile, the NUC's operations continued to represent a drain on the government budget for some time following corporatization. It did not receive adequate revenue because its tariffs were below cost-recovery levels and government subsidies were distortionary. To transition the NUC from a fiscal burden to a financially viable power utility, tariff and subsidy reforms were needed. This required analysis of NUC's long-term marginal costs and its revenue requirement through tariffs. Consideration was needed on the capacity to pay of Nauru's poorer communities, and situations where explicit government budget transfers would be appropriate.

An allocated cost of service study found that the weighted average tariff charged by NUC in 2017 ($0.53 per kWh) was below the average cost of service ($0.75 per kWh). The government was also subsidizing households' first 300 electricity units, benefiting wealthy households with their higher electricity consumption. The NUC has since adjusted its tariffs toward cost recovery levels and halved the subsidized electricity units to households. In May 2018, the NUC recovered 98% of its operating expenses (including fuel) through tariffs. Government funding has transitioned to a cash transfer mechanism, which reimburses the NUC based on actual forgone electricity revenue.

Despite electricity prices increasing for some households, the number of grid connections has increased by 46% from 2015 to May 2018. This may be due to the improved reliability of the electricity supply. The average electricity outage duration has dropped to around 2 days per year at the end of 2017, compared with 47 days in 2015. The average number of interruptions had dropped to 1.0 outage every 8 days at the end of 2017, compared with 1.3 outages every day in 2015.

With development partner support, the NUC also recently upgraded its assets. In 2018, two new energy-efficient, medium-speed 2.9 MW diesel generators were installed to replace the 40-year old, poorly maintained generators. During peak electricity usage periods, the NUC reported that the new generators have increased power generation by 156%, which means they are producing almost three times the amount of power to households, compared with the capacity of the old generators.

Diesel consumption for electricity generation is expected to drop by 16% due to the new generators' improved energy efficiency. It should drop further when off-grid consumers choose to retire their less efficient generators and connect to the grid. Importing less diesel supports the government's ambitious goal under the Nauru Energy Road Map of reducing fossil fuel consumption to only 50% of the energy mix by 2020, thereby helping to reduce carbon dioxide emissions. Renewable energy is currently limited to about 700 kW of grid-connected solar PV, which is estimated to be about 2% of output. Nauru is trialing small amounts of grid-connected solar to gain experience in integrating intermittent renewable energy. Early indications are positive and the government plans to establish a solar park.

Although NUC has made progress in improving its operational and financial performance, further institutional reforms are needed to sustain its operations in both diesel generated and renewable energy.

TUVALU

Tuvalu's energy sector is managed by the Department of Energy within the Ministry of Public Utilities. The government established the Tuvalu Electricity Corporation (TEC) in 1991 and, in 2010, TEC became a full SOE, responsible for managing and operating grid-connected systems in the eight islands.

Over 90% of Tuvaluans have access to electricity. Residential users account for approximately 45% of total electricity consumption, commercial users for 28% and the government for 27%. TEC faces an issue with overdue payments, particularly from its largest customers.

Major issues currently facing the power sector include (i) high dependency on diesel and other imported fuels; (ii) insufficiency of tariff revenues to meet TEC's operation and maintenance costs, requiring additional subsidies from the government; (iii) high maintenance cost of generation and distribution systems in remote environments; and (iv) the need for capital to finance the power infrastructure requirements of Funafuti and the outer islands.

To address these issues, Tuvalu has formulated a long-term energy policy and a master plan that sets clear policy targets. The Tuvalu National Energy Policy, which was formulated in 2009, clearly defines and directs current and future energy developments. It highlights an ambitious target of 100% renewable energy for power generation by 2020.

TEC, with assistance from the Government of New Zealand, developed the *Enertise Tutumau* 2012–2020 or the Master Plan for Renewable Energy and Energy Efficiency, which promotes the provision of sustainable energy systems toward achieving the Tuvalu National Energy Policy goal of 100% renewable generation. Development partners are assisting Tuvalu to implement the Master Plan for Renewable Energy and Energy Efficiency though institutional strengthening and investments in solar, wind, and energy efficiency.

The strategies, aimed at achieving the 100% renewable generation target, prioritize outer islands, primarily to address the costs of transporting diesel fuel to these remote locations. Relatively low electricity consumption in these areas—20–39 kilowattpeak (kWp) for Nukulaelae, Nukufetau, Nui, Niutao, Nanumaga, and Nanumea; and 95 kWp for Vaitupu—make them suitable for small-scale renewable energy projects. Currently, seven of the eight outer islands are powered by 48 kW–80 kW diesel generators; these are typically oversized and thus inefficient to operate as they use more diesel fuel than necessary. Blackouts are a regular occurrence, more often from a lack of diesel fuel and spare parts than from mechanical breakdown. The diesel generators run for 12–18 hours per day to save fuel and maintenance and are reported to be in reasonable condition, but they may require replacement by 2020.

Development partners are helping to improve the supply and installation of power generation and grid management equipment to increase the contribution of renewables in Tuvalu's hybrid generation system and reduce diesel generation. This equipment will include (i) solar PV (about 925 kWp) and wind-power generation (about 200 kW); (ii) batteries sufficient for the hybrid system's storage requirements, including the expected energy spillovers from the solar generation systems that are now being built without storage; (iii) battery inverters and an integrated power control system to provide grid stability and other ancillary services; and (iv) a satellite-based communication system on Funafuti and three of the seven outer islands to enable TEC—with the support of external contractors and advisors, as needed—to remotely monitor, control, and improve the operation and maintenance of its hybrid power system and enhance customer service. TEC is also receiving assistance to install prepayment meters for its customers and smart meters for the largest electricity consumers, as well as selected energy-efficient investments, such as enhanced insulation and more energy-efficient lighting and appliances in buildings.

North Pacific economies: Caution on cryptocurrencies

Lead authors: Rommel Rabanal, Cara Tinio, and Noel Del Castillo

From a broad perspective, digital currencies are already part of the daily lives of most people in the Pacific. Their most common form—electronic money or e-money—is regularly used not only for e-commerce transactions but also as a more efficient and less costly means for overseas workers to remit money back home. While e-money is a digital representation of the value of legal tender (also known as fiat currency), other digital currencies are virtual currencies that are denominated in different units of account (e.g., frequent flyer miles, retailer rewards points, and online game coins).

Cryptocurrencies are a subset of virtual currencies that are characterized by two key features: (i) full convertibility, including payment for goods and services, or other virtual currencies; and (ii) decentralized systems for issuance, exchange, and payments and settlements (as opposed to a "central bank") underpinned by cryptography, which converts data into a secure format that is only accessible to participants. Decentralization is commonly operationalized through distributed ledger technology, where each transaction record is shared digitally and subjected to verification by a large peer-to-peer network.

A CALL BACK TO MICRONESIAN HISTORY

An early form of distributed ledgers was already in use in the North Pacific as early as over 1,000 years ago, with the *Rai* or stone money of Yap in the Federated States of Micronesia (FSM). *Rai* derives value from being made of limestone, which is absent in Yap and, therefore, had to be quarried and transported from other islands, mostly Palau. All Yapese were free to import and produce additional units into the monetary system, with associated labor and transport costs acting as a check on rapid inflation (Berentsen and Schar 2018).

As stone discs measuring up to 3.6 meters in diameter, 0.5 meters thick, and weighing up to 4,000 metric tons, the largest and most valuable *Rai* were difficult to physically exchange at every transaction. The Yapese instead just transferred ownership of the stones, regardless of its physical location. The system works for as long as everyone on the island is eventually informed of all changes in ownership—a distributed ledger, subject to some communication lags—such that the owner of each stone is common knowledge. Any ownership conflict was settled collectively, which was possible given the relatively small size of, and close relationships within, the island community.

CRYPTOCURRENCY AS MONEY?

Recently, there were several attempts to introduce cryptocurrencies in the Pacific. In the Marshall Islands (RMI), a law passed in February 2018 paves the way for issuance of a cryptocurrency—the Sovereign (SOV)—to be recognized as a second legal tender in the country, in addition to the US dollar. Another private company also offered to partner with the FSM to introduce the country's own legal tender cryptocurrency, while Palau has received inquiries about potentially establishing a bank specifically catering to cryptocurrency transactions. Neither of the latter proposals has so far gained any traction.

The RMI's move to back the Sovereign as legal tender raises several important issues. First, it is unclear whether the Sovereign, or any cryptocurrency, can adequately fulfill any of the economic functions of money (Table 2). Recent experience has shown that cryptocurrencies (e.g., BitCoin) can be subject to large price volatility swings that limit their use as stores of value.

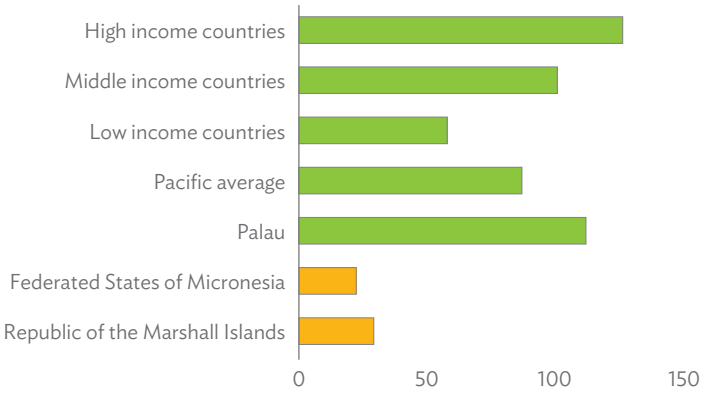
It remains unclear how initial issuance costs will be financed, but the government plans to issue 20% of its Sovereign allocations to residents. The cryptocurrency will immediately be accepted for settling debts and paying taxes and other public fees within the country, with hopes of facilitating its eventual use for other day-to-day transactions. Sovereign users would be required to identify themselves in transactions, moving away from the anonymity of conventional cryptocurrencies but enabling government regulation. However, regular use of the Sovereign as a medium of exchange and unit of account will depend heavily on people's access to quality information and communication technology (ICT) services. Unfortunately, this is an area where the RMI is clearly lagging, which will likely hinder the development of the Sovereign as day-to-day money (Figure 5).

Table 2: Cryptocurrencies versus Fiat Currency

Economic Functions of Money	United States Dollar	Marshall Islands Sovereign (legal tender cryptocurrency)	Other Cryptocurrencies (e.g., BitCoin)
Medium of exchange	Yes	Partial, initially for transactions with government	Partial, mostly online retail transactions
Unit of account	Yes	Possible, but requires critical mass of users	No
Store of value	Yes, but subject to inflation	Yes, but highly volatile exchange rate or value	Yes, but highly volatile exchange rate or value

Sources: D. He et al. 2016. Virtual Currencies and Beyond: Initial Considerations. *International Monetary Fund Staff Discussion Note 16/03.* January; and Asian Development Bank.

Figure 5: Mobile Phone Subscriptions per 100 People
(2016, or latest available year)



Source: World Bank World Development Indicators online database.

More importantly, countries tend to decide to create their own domestic currencies based on their need and capacity to employ independent monetary and exchange rate policy toward ensuring macroeconomic stability. However, the Sovereign appears to be considered more as an investment opportunity to raise much-needed government revenues. Banking on creating value from being the first cryptocurrency that, as legal tender, could bridge conversion between fiat and virtual currencies, the government and its private partner anticipate large proceeds from the initial coin offering. Rather optimistically, a windfall of almost six times the current domestic revenue generation is expected, plus a sharp appreciation in the value of tokens thereafter. The RMI already plans to split its share of the proceeds among climate change mitigation efforts, the national budget, and Marshallese affected by nuclear testing.

However, realizing these windfall revenues depends on the eventual uptake of the Sovereign. Like other cryptocurrencies, the Sovereign's value will be largely driven by expectations that other users will also adopt and use it. Some potential investors may ascribe additional value to the Sovereign being backed by the government, but this may be muted given risks associated with the RMI's narrow resource base and economic vulnerability. If the Sovereign fails to reach a critical mass of investor-users, then the government, resident citizens, and the private partner will be left with tokens of limited value. Further compounding the situation would be monetary and financial stability risks stemming from the introduction of the Sovereign as a fully convertible legal tender without the monetary and exchange rate policy framework, among others, to support the Sovereign's integration into the mainstream economy.

Finally, the issuance of a legal tender cryptocurrency could further expose the RMI to possible money laundering and terrorism financing risks, as well as to cybersecurity attacks. Should the Sovereign become prone to use for criminal purposes, it may deteriorate into a liability for the RMI and its standing in the global financial community.

FINANCIAL ACCESS AND INCLUSION

Although advancements in financial technology could revolutionize access to financial services, Pacific governments will be well advised to proceed with caution to avoid false starts with unproven ventures. Instead, focus should be on strengthening policy and institutional frameworks that would help underpin steady improvements in financial access and inclusion, particularly in the North Pacific.

The FSM lags peers in terms of financial access and inclusion. Only about half of the population has deposit accounts. Its financial system comprises two commercial banks: one local (Bank of FSM) and a foreign bank (Bank of Guam), which combine for a total of 8 branches and 10 ATMs. Despite the FSM's geographical layout, there is no mobile banking service for those living in the outer islands. Further, the protracted implementation of land reform provides limited options for people who are unable to use their land properties, either as collaterals or to develop them for bankable projects.

Likewise, the banking system of the RMI comprises two commercial banks, but these maintain only five branches and two ATMs. The sector also has two large money transfer operators (MoneyGram and Western Union), two insurance companies, and a pension fund. The risk of losing the correspondent banking relationship between First Hawaiian Bank, a US bank, and the Bank of the Marshall Islands, RMI's only domestic commercial bank will not only adversely affect the economy, but could disrupt cross-border payments and economic activity, and weaken financial inclusion, particularly in the outer islands.

Palau's finance sector is dominated mainly by five commercial banks, two pension funds, and a development bank. Booming tourism in the country has contributed to steady growth in deposits. However, the total number of depositors has declined from 2014 to 2016. The prevalence of asymmetric information, exacerbated by weak informational requirements of the prevailing tax system, makes it difficult for banks to assess the creditworthiness of potential borrowers.

Greater financial access and inclusion has been shown to have a positive impact on economic growth globally. In the North Pacific, the crucial role of banks and other intermediaries in mobilizing scarce financial resources has been hindered primarily by an inability to use land as collateral, as well as skills gaps in business development. Reforms allowing for long-term land leases and expanded use of secured transactions can help ease collateral constraints, while capacity development in basic financial literacy and business planning should help stimulate entrepreneurial activity. These will be crucial pieces toward solving the private sector development puzzle, and put North Pacific economies in a better position to capitalize on opportunities afforded by digital financial solutions.

Increasing competitiveness in Timor-Leste

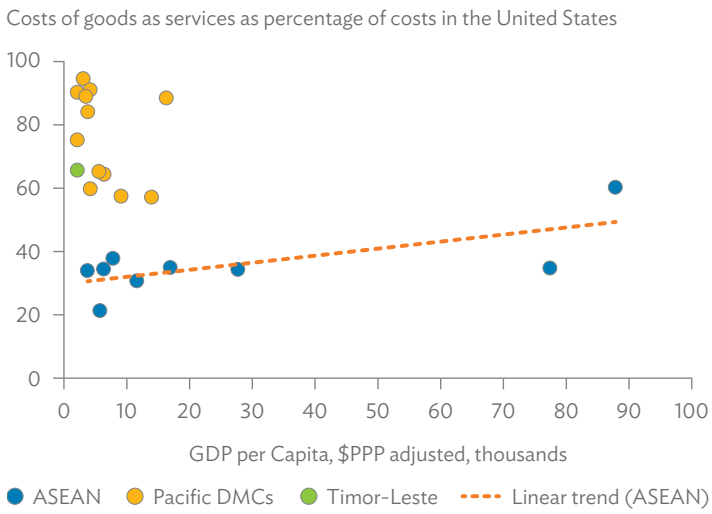
Lead author: David Freedman

Although Timor-Leste shares some of the characteristics of Pacific island countries, it looks to Southeast Asia and the membership of the Association of Southeast Asian Nations (ASEAN) for a pathway to prosperity. Diversification of the economy through development of tradeable sectors, such as agriculture and tourism, is essential for sustained growth. However, a high cost structure and an overvalued real exchange rate make it harder to produce goods and services competitively. This article considers the factors that have contributed to Timor-Leste's recent loss of competitiveness and identifies policy measures to improve competitiveness in the medium term.

Goods and services in Timor-Leste are expensive compared with ASEAN member countries. Figure 6 presents a comparison of benchmarked costs for an equivalent basket of goods and services in Timor-Leste relative to ADB's Pacific developing member countries and ASEAN member states. The high costs seen in the Pacific reflect the small markets, low economies of scale in production, and high trade costs faced by these countries. Timor-Leste uses the US dollar as its official currency, so the comparison of costs with the United States is not affected by exchange rate movements. However, competitiveness vis-à-vis other countries is affected by the exchange rate and has been undermined by a significant appreciation of Timor-Leste's nominal and real effective exchange rates since 2010 (Figure 7).

The nominal effective exchange rate is a weighted average of the exchange rate between the US dollar and the currencies used by Timor-Leste's main trading partners. The real effective exchange rate is based on the nominal exchange rate, but accounts for differences in price levels between countries. Therefore, it provides the truest measure of how the relative prices of goods and services in Timor-Leste and its trading partners are changing over time.

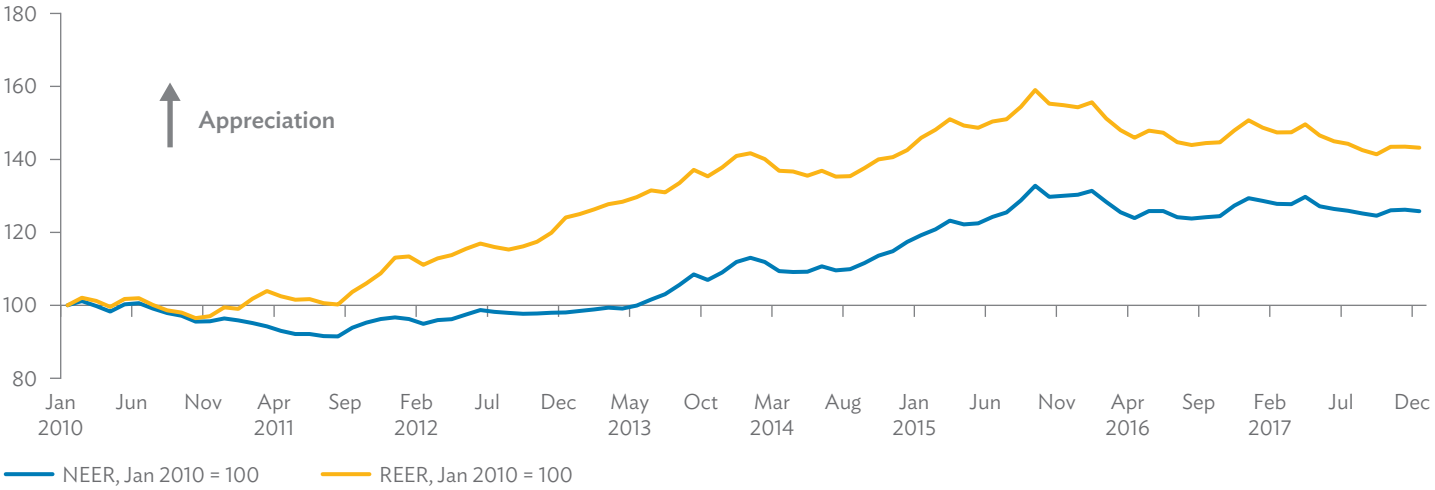
Figure 6: Price Levels and per Capita Incomes, 2016



ASEAN = Association of Southeast Asian Nations, DMC = developing member country, GDP = gross domestic product, PPP = purchasing power parity.
Source: Asian Development Bank estimates using data from World Development Indicators.

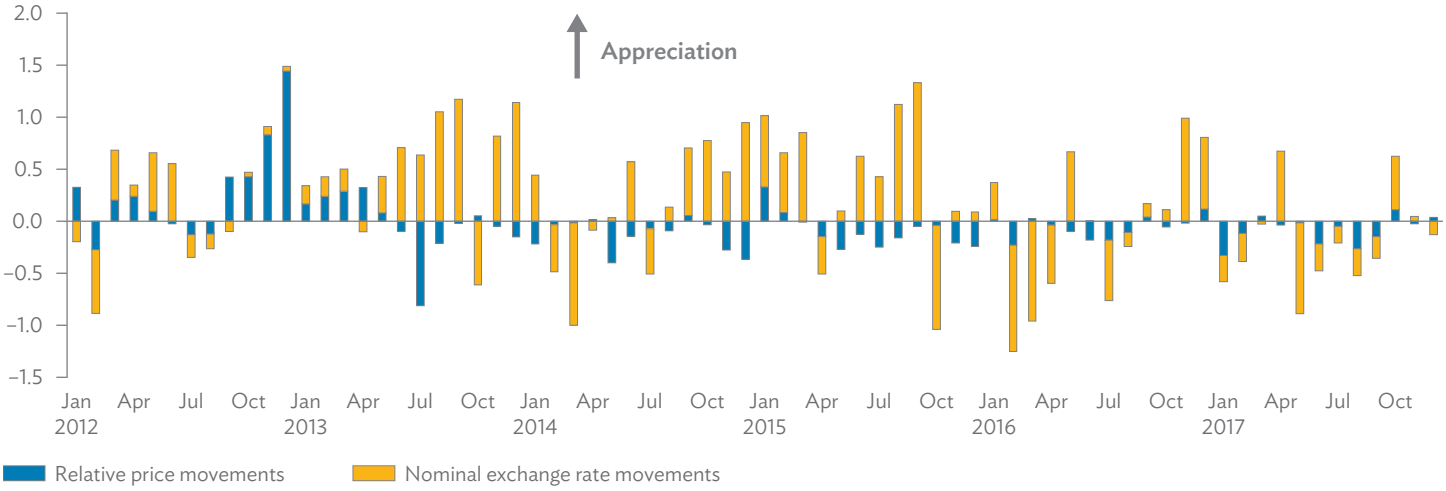
A 2017 International Monetary Fund (IMF) assessment concluded that Timor-Leste's real exchange rate is overvalued by 26.6%–44.1% (IMF 2017). Figure 8 decomposes the movements in the real exchange rate into nominal exchange rate movements and differences in the inflation rates between Timor-Leste and its trading partners. Since 2012, real exchange rate appreciation has been driven by the nominal appreciation of the US dollar. Inflation in Timor-Leste has been lower than that seen in key trading partners, but this has not been sufficient to offset the impact of a stronger US dollar. The real appreciation has not had a significant impact on current production of oil, gas, and coffee, as these commodities are generally priced and traded in US dollars. However, it does add to the challenge of establishing new exports or developing local production to replace imports.

Figure 7: Timor-Leste Nominal and Real Exchange Rates



NEER = nominal effective exchange rate, REER = real effective exchange rate.
Source: Central Bank of Timor-Leste.

Figure 8: Decomposition of Real Exchange Rate Movement in Timor-Leste



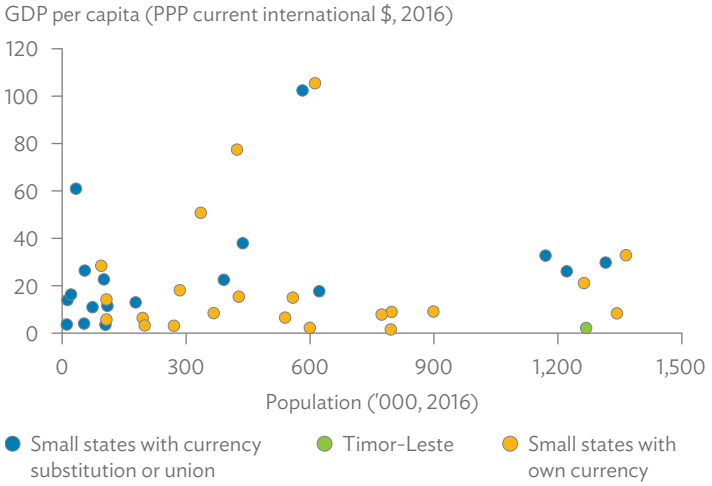
Source: Asian Development Bank estimates using data from the Central Bank of Timor-Leste.

In principle, moving to an alternative currency regime, such as a peg to a trade-weighted basket of currencies, could help Timor-Leste achieve a more stable and competitive exchange rate. Many small states do manage their own currencies, including several Pacific countries with populations significantly smaller than that of Timor-Leste (Figure 9). However, recent assessments continue to conclude that use of the US dollar is appropriate, given capacity constraints and limited development of the finance sector (IMF 2017). This suggests that Timor-Leste is unlikely to move away from dollarization within the next 5 years.

It is therefore important to consider what else could be done to improve competitiveness and mitigate the recent impacts of a stronger US dollar. Maintaining low inflation is crucial. A previous episode of high inflation was seen during 2009–2012, where Timor-Leste's inflation was significantly higher than other small states (Figure 10). The inflation spike was associated with a sudden increase in public spending that exceeded the local absorptive capacity. Price stability should, therefore, be incorporated as an explicit consideration in the formulation of fiscal policy. The inflation target of 4%–6% per annum, established in Timor-Leste's Strategic Development Plan 2011–2030, should also be lowered.

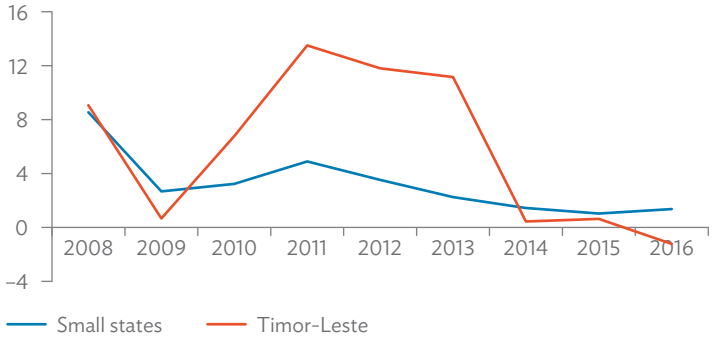
A range of other policies can help to mitigate the loss of exchange rate competitiveness. Lowering transaction costs by investing in basic infrastructure and making financial intermediation more efficient are clear and widely recognized priorities. Efforts in these areas should be complemented by policies to improve productivity by increasing competition, improving the functioning of markets for land and labor, and working to address sector-specific constraints in agriculture and tourism. Policy considerations in these areas are discussed further below.

Figure 9: Gross Domestic Product per Capita, Population, and Currency Arrangements for Timor-Leste and Other Small Countries



GDP = gross domestic product, PPP = purchasing power parity.
Source: World Development Indicators, 2016.

Figure 10: Average Consumer Price Inflation in Timor-Leste and Small States (%)



Source: World Development Indicators, 2016.

STIMULATING MARKET COMPETITION THROUGH PROCUREMENT REFORM

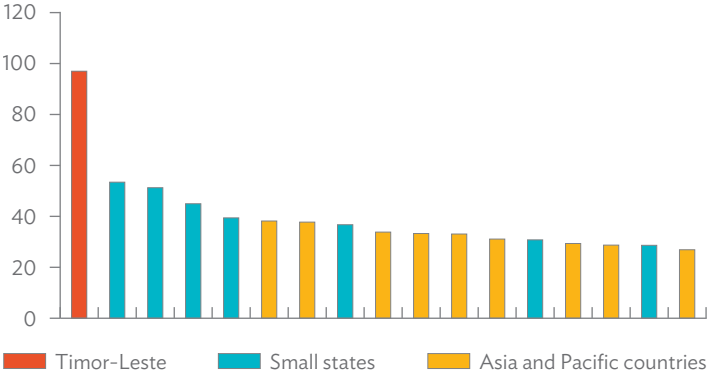
It is common for the public sector to account for a larger share of economic activity in small states because of indivisibilities in public service provision. Nonetheless, the size of Timor-Leste's public sector makes it an outlier in Asia and the Pacific (Figure 11). During 2012–2017, annual government expenditures were, on average, equivalent to 87.2% of non-oil GDP. Of this, spending on goods, services, and capital projects averaged 54.3% of non-oil GDP (Figure 12). This expenditure represents the single largest source of demand for private businesses operating in Timor-Leste, and means that government procurement practices are crucial in shaping the incentives for businesses to become more productive and efficient.

Timor-Leste's procurement regime is defined through a series of decree laws that have been approved since 2005. The broad intent of the legal regime is to establish a robust procurement system. A National Procurement Commission was established in 2011 and is responsible for managing procurement of works with value above $1.00 million, goods and services valued above $0.25 million, and consulting services valued above $0.20 million. A procurement portal was established in 2011 to increase access to procurement information and promote transparency.

Analysis of summary data from the portal shows that the use of the least-competitive procurement modality (single-source procurement) has been reduced over time (Figure 13). Construction contracts account for most single-source procurement, but use of this modality is also seen across all other areas of procurement (Figures 14–15). While usage of single-source procurement has declined, other widely used procurement modalities may incorporate little or no competition. Enterprise surveys also suggest that corruption is common and contributes significantly to costs (Figures 16–17).

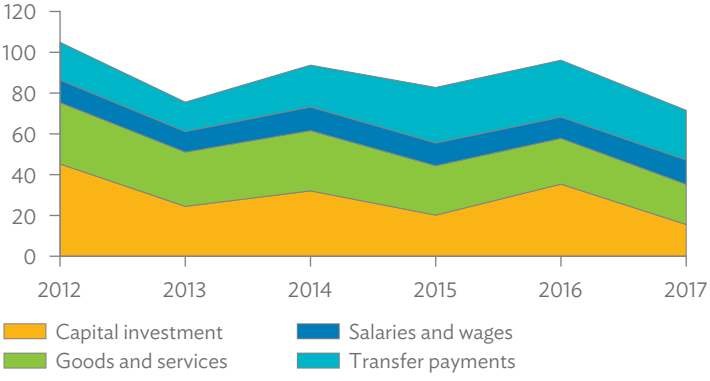
Reviews of the legal regime for procurement note that the distribution of legal provisions across a series of separate decree laws reduces clarity (ADB 2015). There are also gaps and ambiguities in the legal framework that may undermine procurement processes or reduce competition. Public sector capacity to manage procurement is also an issue. The National Procurement Commission is well regarded, but development of specialized procurement functions in line ministries remains limited.

Figure 11: Government Expenditure in Asia and the Pacific
(% of gross domestic product, 2016)



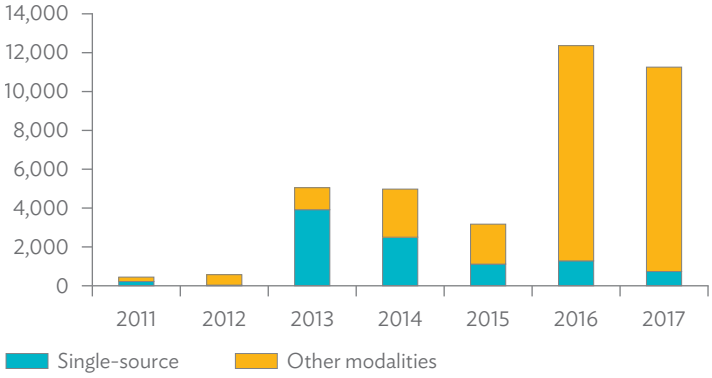
Source: Asian Development Bank statistical database system.

Figure 12: Timor-Leste Government Expenditures
(% of non-oil gross domestic product)



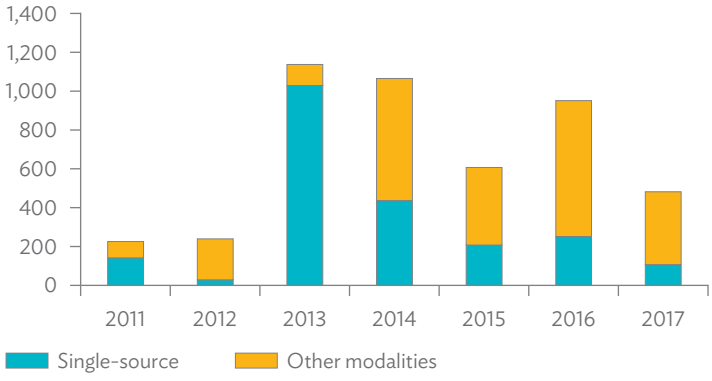
Sources: Timor-Leste Transparency Portal; Asian Development Bank estimates.

Figure 13: Timor-Leste Procurement Actions by Modality



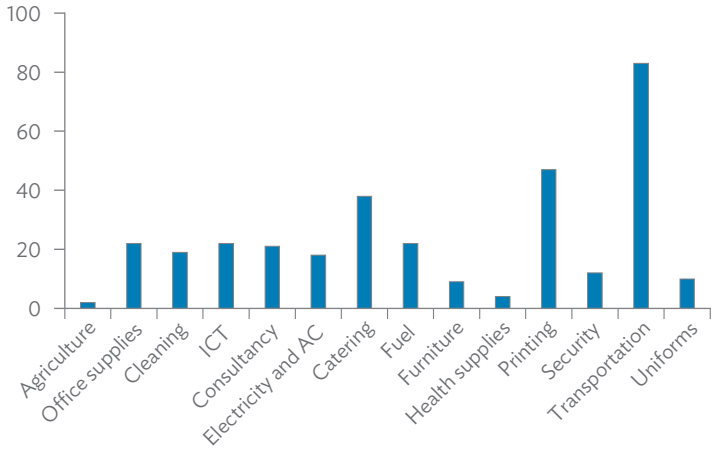
Sources: Timor-Leste Procurement Portal; Asian Development Bank estimates.

Figure 14: Timor-Leste Construction Procurements by Modality



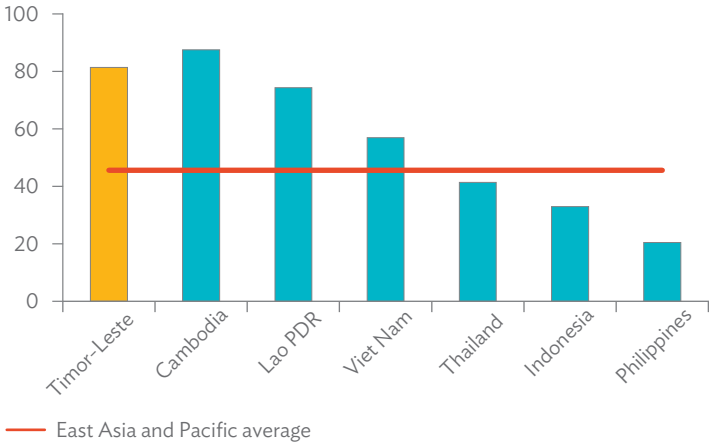
Sources: Timor-Leste Procurement Portal; Asian Development Bank estimates.

Figure 15: Timor-Leste Single Source Procurements by Sector, 2016



AC = air conditioning, ICT = information and communication technology.
Sources: Timor-Leste Procurement Portal; Asian Development Bank estimates.

Figure 16: Firms Reporting That They Are Expected to Give Gifts to Secure Government Contracts (%)



Lao PDR = Lao People's Democratic Republic.
Source: World Bank. 2015–2016. *Business Enterprise Surveys.* Washington, DC.

Policymakers have recognized these issues. Significant resources were invested in preparing a package of procurement reforms, including replacing the existing decree laws with a single updated procurement law. These reforms did not progress due to a change in political priorities, but should now be revisited to ensure that public procurement is as transparent and competitive as possible.

DEVELOPING LAND MARKETS

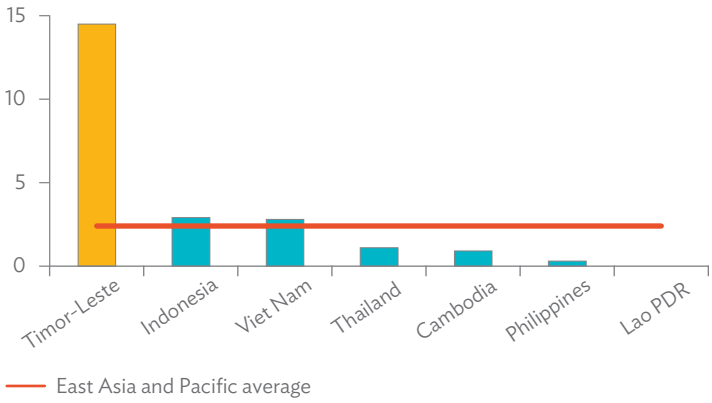
Challenges in accessing land can constrain productive activities and add to costs. In Timor-Leste, the history of Portuguese and Indonesian administration has resulted in complex overlapping land claims. The resulting uncertainty about landownership is likely to have constrained the development of formal land markets and limits the use of land as collateral for borrowing thus impeding financial sector development.

A 2016 survey of 1,152 households in Dili and two other municipalities found that only 26% of households hold titles to their land, with most of these titles dating to the Indonesian period. Almost all households (98%) stated that land titles are important for securing property rights. Responses to other survey questions also showed that land titles are seen as a prerequisite for some economic activities (Figure 18).

Land titling can stimulate business activity, while also paving the way for development of deeper and more transparent land markets and a deeper financial market. Current land markets are limited, with only 10% of the households surveyed in 2016 having acquired their landholdings through purchases. In Dili, which has seen rapid population growth over the last decade, 34% of households reported purchasing land, but 80% reported that it was difficult to obtain more land.

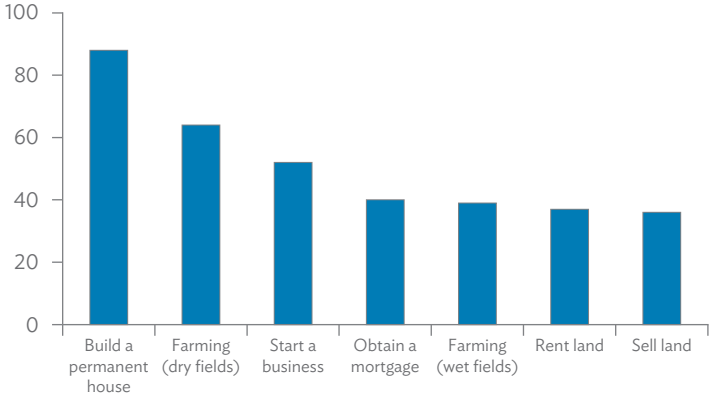
A program to develop a national cadastre through spatial mapping and documentation of land claims began in 2015. This was followed by approval of a new land law in 2017 that defines processes for

Figure 17: Average Value of Gift Required to Secure Government Contract
(% of contract value)



Lao PDR = Lao People's Democratic Republic.
Source: World Bank. 2015–2016. *Business Enterprise Surveys.* Washington, DC.

Figure 18: Importance of Land Title for Economic Activities
(affirmative response as % of total household respondents)



Source: The Asia Foundation. 2016. *Survey on Access to Land, Tenure, Security, and Land Conflicts in Timor-Leste.* Dili.

registering ownership and resolving competing claims. The land law and cadastral project pave the way for establishment of a land registry, issuance of titles, and development of a formal market. This is an important enabler of commercial activity, but implementation will take time and disputes will need to be carefully managed.

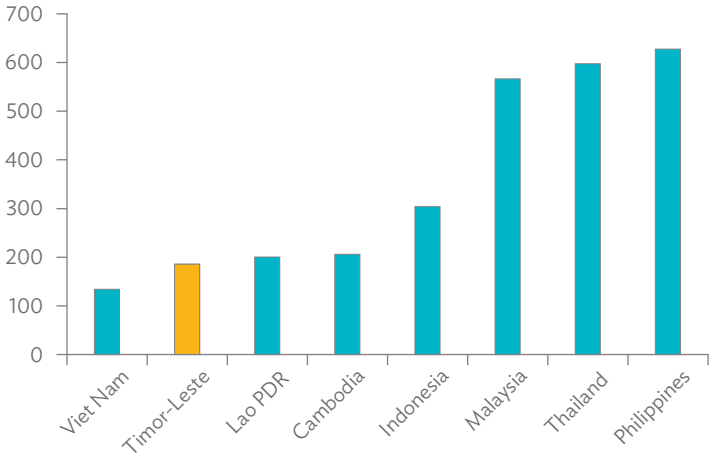
To date, leasing of state land has been the most secure means for businesses to access land. Specific legislation regulates the leasing of state land and allows for leases of up to 50 years. By law, state property that is being made available for medium- or large-scale commercial activities should be offered to potential users on an open and competitive basis, but these provisions have generally not been implemented (Asia Foundation 2016). Timor-Leste's Civil Code also enables leases between private parties. It is reported that uncertainty about underlying ownership has slowed the development of private leasing, but this is difficult to assess as there is no centralized registry for recording lease agreements.

Lease contracts may become more important as landownership rights are resolved. It is also likely that state landholdings will increase significantly because the new land law defines the state as the owner of all land that is not subject to other legitimate claims. While the implementation of the cadastral project will take time, clarifying the availability of existing state land and implementing more transparent processes for leasing this land could be done quickly. Consideration should also be given to strengthening the broader framework for land leasing and the potential to record lease agreements in a central registry.

INCREASING LABOR MARKET EFFICIENCY

The availability of labor at various skill levels and costs is a key driver of competitiveness. Timor-Leste's labor regulations include a statutory minimum wage of $125 per month (including 13th-month pay). Comparisons based on market exchange rates show that this is higher than minimum wage rates in some ASEAN members, and is high relative to GDP per capita (Figure 19). Increased competitiveness, therefore, calls for a slower pace of growth in nominal wages. However, adjustment to reflect differences in the cost of living between countries suggests that Timor-Leste's minimum wage is not especially generous to workers (Figure 20).

Figure 20: Purchasing Power Parity-Adjusted Minimum Wage in Timor-Leste and Southeast Asia
($ per month)

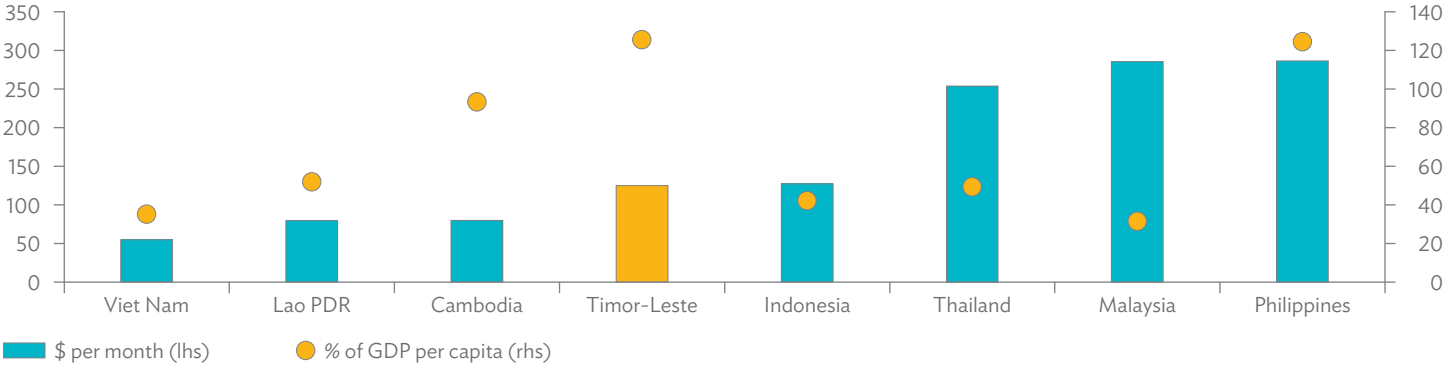


Lao PDR = Lao People's Democratic Republic.
Sources: International Labour Organization, World Development Indicators, and Asian Development Bank estimates.

The terms and conditions offered to public servants help to shape wage expectations across the whole economy. Public sector employment accounted for an average of 37.2% of formal employment during 2012–2016, and has been increasing (Figure 21). Average wages paid to government officials are significantly higher than average wages in the private sector (Figure 22), and were increased by an average of 15% in 2017 to compensate government workers for previous inflation.

Recent increases in public sector wages may contribute to pressure to increase the minimum wage. However, any changes in the minimum wage should be based on careful analysis of the likely impact on current employees and businesses, and on the employment prospects of people who are not formally employed. Regulatory changes, such as a relaxation of current limits on the use of fixed-term contracts, could help to stimulate job creation and should be considered when labor laws are reviewed (ADB 2018).

Figure 19: Minimum Wage in Timor-Leste and Southeast Asia

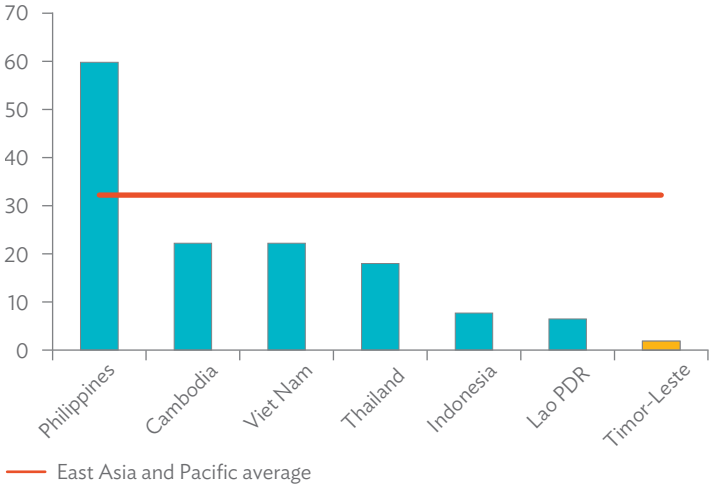


Lao PDR = Lao People's Democratic Republic, lhs = left-hand scale, rhs = right-hand scale.
Sources: International Labour Organization, World Development Indicators, and Asian Development Bank estimates.

Figure 21: Formal Employment in Timor-Leste (by sector)

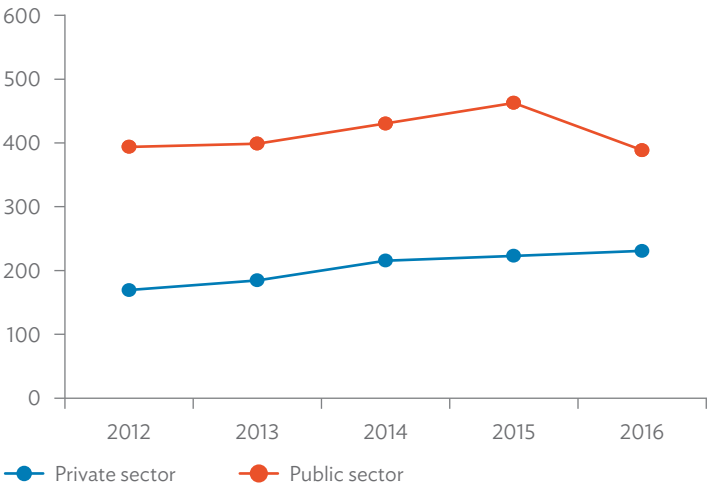
Sources: Timor-Leste Business Activity Survey 2016; Timor-Leste in Figures, 2016; Timor-Leste Budget Transparency Portal; and Asian Development Bank estimates.

Figure 23: Firms Offering Formal Training to Their Staff in Timor-Leste (% of total)



Lao PDR = Lao People's Democratic Republic.
Source: World Bank. 2015–2016. *Business Enterprise Surveys.* Washington, DC.

Figure 22: Average Wages in Timor-Leste, by Sector ($ per month)



Sources: Timor-Leste Business Activity Survey 2016; Timor-Leste in Figures, 2016; Timor-Leste Budget Transparency Portal; and Asian Development Bank estimates.

Where there are clear skills shortages, a facilitating approach should be taken to enable the employment of foreign workers. Attention should also be given to strengthening training and skills development for local workers. Enterprise surveys suggest that businesses in Timor-Leste invest much less in formal staff training than businesses in ASEAN member countries (Figure 23). The reasons for this difference are not well understood, and should be explored further. At the same time, investments to strengthen secondary education and post-secondary technical and vocational education and training should be prioritized as this will help to improve the skills base and work-readiness of the working-age population.

RAISING AGRICULTURAL PRODUCTIVITY

Food products account for 64.3% of the nationally representative household consumption basket, and 62.0% of the consumption basket for households living in Dili. This means that movements in food prices play a significant role in determining consumer price inflation, wage expectations, and the overall price level in the economy. Improving the productivity of the domestic agriculture sector can, therefore, contribute to improving overall competitiveness.

Subsistence and semi-subsistence farming systems are prevalent in Timor-Leste, and this has led to some calls for increased tariffs on imported food products. While increased tariffs could strengthen the incentives for local production, they would also push up local prices and could lead to increased wage demands. Therefore, policies to stimulate domestic production through improved productivity should be given priority. There has been clear progress in developing domestic value chains of fruits and vegetables, but many inefficiencies remain. Improving basic rural infrastructure and intensifying the provision of market-oriented extension services can help to accelerate the adoption of improved technologies and the integration of small producers into markets.

There may also be scope for targeted policy interventions to increase the local production of grain, meat, and fish. Private entrepreneurs have begun to grow maize on large areas of previously uncultivated land on Timor-Leste's south coast. Increased grain production can be supplied to consumers and used as an input into locally produced animal feeds. Developing an efficient animal feed industry, using both imported and locally produced inputs, would help to promote production of both meat and fish, thus increasing the supply of these products and lowering their prices. The government can help to enable this by encouraging private investment in the agriculture sector, facilitating access to land and technical expertise, and working with entrepreneurs to resolve specific issues as they emerge.

GROWING THE TOURISM SECTOR

High costs are likely to deter price-sensitive tourists who can choose to visit cheaper destinations in Southeast Asia. With little prospect for an immediate restoration of exchange rate competitiveness, efforts to develop tourism should focus a development of product offerings that are consistent with the overall cost structure, and implementation of sector-specific initiatives to reduce costs.

The cost of air travel to Timor-Leste from key markets such as Australia is relatively high, and could be reduced through licensing of additional air carriers. New carriers have expressed interest, but may be deterred by perceived risks. In this case, risk-sharing arrangements between the government and private airlines during the trial phases of new air routes could be considered.

Efforts to develop new air routes should be closely coordinated with tourism product development and marketing. Hoteliers and tour operators should take the lead in this area with support and facilitation from the government. A well-coordinated marketing strategy would support a steady increase in tourist arrivals. This would contribute to industry learning, improve capacity utilization in existing hotels, and help to achieve other economies of scale within the sector, leading to a gradual reduction in costs and improvement in the quality of the product offering.

CONCLUSION

A period of high inflation during 2009–2012 and appreciation of the US dollar during 2012–2017 have reduced Timor-Leste's external competitiveness. This will make it harder to develop new export sectors such as tourism, or to displace imports with local production. A move to an alternative exchange rate regime could be considered, but is unlikely to be feasible in the short to medium term. This raises the question of how best to restore competitiveness.

Maintaining low inflation is key, but beyond this there are no simple answers. Policy reforms to make public procurement more competitive, and improve the efficiency and depth of markets for land and labor, would help to boost productivity and restore competitiveness. Carefully considered policies in the agriculture and tourism sectors can also help to accelerate development of these sectors and offset the impact of high costs.

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Access to basic utilities is both a human right and fundamental to upholding human rights. However, the big differences in the degrees of access across sectors and among Pacific economies highlight the hindrances faced by utilities in improving the quality and reach of their services. These include weak institutional capacity and financial management, and lack of planning, coordination, and policy support.

Building a more efficient and financially self-sufficient utilities sector requires change on all levels of implementation. These can range from developing human resources, to promoting commercially oriented utilities, to developing a holistic and programmatic approach to sector management, to ensuring that the necessary legal, policy, and regulatory support is in place to improve performance and extend services to a greater share of the population.

Improving access to utilities in the Pacific

Pacific countries face significant and distinct challenges in providing basic utilities. Most utilities require huge initial investments, with the additional cost of service falling as the number of users is increasing and economies of scale are achieved. In most Pacific countries, the opportunity for economies of scale is limited due to remoteness and isolation, with consumers dispersed over numerous, far-flung islands. Further, compared with non-island economies, the required investments and subsequent operating costs are also typically higher because of exposure to extreme weather, vulnerability to disasters, and the rising negative impacts of climate change.

Although many people in the Pacific benefit from improved access to basic utilities, numerous challenges remain, especially for those in remote areas such as outer islands or mountain districts. Those with access still face problems in terms of quality, consistency, and affordability. For instance, although several Pacific countries have almost universal access to water, the piped water supply is not available all day and may need additional treatment to be potable.

A reliable supply of electricity remains unavailable to many households in the Pacific; and while the coverage of the information and communication technology (ICT) network has broadened, high cost of providing service has limited access and hinder people from taking full advantage of better connectivity. Clearly, more innovation; better planning and targeting; and greater cooperation between governments, citizens, and development partners are needed to improve the situation.

Access as a fundamental right

Investments in different forms of utilities, such as energy, ICT, transport, and water and sanitation, are vital to achieving sustainable development and empowering communities. Providing reliable utilities also promote the welfare of households through better health and education outcomes, and higher incomes. Better transport and ICT networks also enhance disaster response, minimizing possible losses of lives and properties.

Although utilities may be usually viewed as mere instruments in promoting the well-being of individuals, their importance cannot be understated as, in many respects, access to it is considered as a basic right. The United Nations General Assembly, through Resolution 64/292, explicitly recognizes that access to clean drinking water and sanitation is a human right. Further, this is important to upholding other human rights (United Nations 2010).

Recognition for certain other utilities as basic rights is less explicit than others, but there exists a general appreciation that providing access to utilities forms part of the basic obligations of any government. For example, access to energy is a necessity in a modern society, enabling individuals and communities to function smoothly and develop faster. The lack of access to modern energy services prevents people, particularly those from developing countries, to pursue activities that might promote economic development and increase living standards. A reliable energy system enables the seamless functioning of all sectors across the economy: from businesses, medicine, and education, to agriculture, infrastructure, communication, and high technology. Meanwhile, the lack of access to energy supply impedes development. Clearly, access to energy services is fundamental to overcoming poverty.

The same argument can be made for transport and ICT. Efficient transport systems are necessary in connecting people to centers of economic activity and social services. This is especially true for Pacific islanders living in outer-most islands, far away from urban centers where jobs, schools, medical services, and other public services are concentrated. Access to reliable transportation enables people to be mobile and productive, and helps promote better living standards.

In a similar vein, access to ICT becomes increasingly important for broad participation in the digital age. Communities that were previously isolated due to the high cost of conventional modes of communication would be able to utilize and enjoy the connectivity provided by ICT. Information dissemination becomes easier with increased digital access, which is being harnessed by both the public and private sectors. The growth of ICT has also helped in promoting more competition in the marketplace by offering new prospects for budding entrepreneurs and helping start-up businesses to tap new markets, which are continuously expanding and evolving. Weak transport systems and underdeveloped ICT do not only prevent mobility and connectivity of Pacific islanders, but also deprives them of opportunities for individual advancement and community development.

Water and sanitation

Most Pacific islanders have good access to water services. Of the 15 Pacific countries reviewed in this policy brief (comprising ADB's 14 Pacific developing member countries and Niue), 7 have almost universal access to basic water services, where more than 95% of the population can get safe drinking water. The people of Kiribati, Papua New Guinea (PNG), Solomon Islands, and Timor-Leste have poorer access, with a combined average of only 64% (Figure 24). PNG has the largest land area and population in the Pacific subregion, but also the lowest percentage of its population (40%) with access to an improved water source. People in urban areas fare better than their rural counterparts, with an estimated average of 96% of the population having access to water services across the 15 Pacific countries, compared with 85% in rural areas.

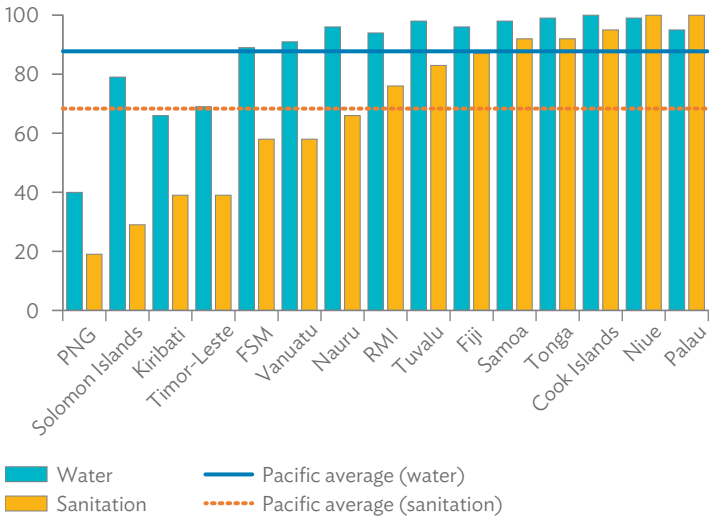
Meanwhile, an average of 69% of the population in the 15 Pacific countries have access to improved sanitation. Unlike access to improved water sources, access to sanitation services varies greatly across countries. While all of Niue and Palau have universal access to sanitation services, only 19% of the populations in PNG and 29% of Solomon Islands, have access. Only 5 countries have at least 90% of their respective populations with access to sanitation services, while this proportion is only 60%, at most, in six countries.

Energy

Latest available data indicate that at least 90% of households in 8 of the Pacific countries reviewed have access to electricity (Figure 25), while the overall average for the 15 countries reviewed is 75%. Households located in larger countries, beset with geographical constraints, tend to have lower access compared with smaller countries since the latter generally have fewer logistical barriers to installation. Bigger countries like PNG, Solomon Islands, Timor-Leste, and Vanuatu, collectively, have an average percentage of only 36% of households with access. In most households without electricity, kerosene lamps were used as primary source of lighting.

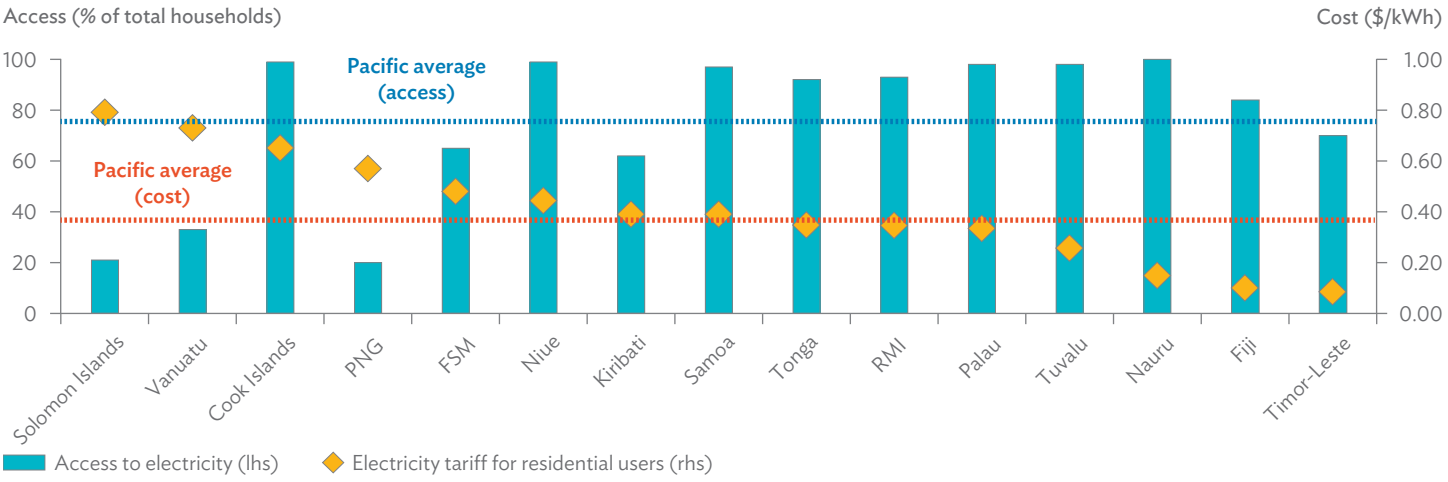
Another potential barrier to access is the cost of electricity, which is high in the Pacific mainly because of the heavy reliance on diesel for power generation. The distances and relatively small shipments involved add considerably to the cost of these imported inputs. In addition, the dispersed geography of many Pacific countries entails huge logistics costs that contribute to the high electricity price. Based on 2015 data, electricity tariffs across the 15 countries under review are estimated to average $0.40 per kilowatt hour (kWh) for residential users. Except for the Cook Islands, higher electricity costs were observed in countries with weaker access to electricity; costs in the PNG, Solomon Islands, and Vanuatu averaged $0.70 per kWh.

Figure 24: Access to Improved Water and Sanitation Services, 2012 or Latest Available
(% of population)



FSM = Federated States of Micronesia, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands.
Sources: 2016 Pacific Infrastructure Performance Indicators and World Development Indicators.

Figure 25: Cost of and Access to Electricity, 2015 or Latest Available



FSM = Federated States of Micronesia, kWh = kilowatt hour, lhs = left-hand scale, PNG = Papua New Guinea, rhs = right-hand scale, RMI = Republic of the Marshall Islands.
Sources: 2016 Pacific Infrastructure Performance Indicators, Pacific Power Benchmarking Report, and World Development Indicators.

In terms of reserve capacity, all power utilities in the Pacific countries have reserves to a certain degree. The weighted reserve capacity average across all countries reviewed is 43%, with Niue having the highest reserve capacity at 71%. Fiji, Kiribati, Nauru, Solomon Islands, and Tonga had reserve capacity below 35% (Pacific Region Infrastructure Facility [PRIF] 2016).

Transport

Roads, airports, and seaports are crucial to the survival of Pacific islanders and the growth of their respective economies. A reliable domestic road network is essential to socioeconomic development, as it provides the initial infrastructure in accessing markets, and health and educational services. In cases where many rural communities rely only on a few urban centers, a functioning road network is crucial for an integrated transport system that promotes safe and fast transport of people, and vibrant commerce. Limited financial resources and institutional capacity contribute to protracted development of transport infrastructure in the Pacific. This has resulted in inadequate transport networks and rapid degradation of existing assets.

Road density, which measures road length in relation to land area, greatly varies among the Pacific countries—countries with larger land area generally have lower road density (Figure 26). Although the largest Pacific countries, like PNG and Solomon Islands, are expected to have the lowest road density, only 3 countries—the Cook Islands, Nauru, and Tonga have more than 100 kilometers of road per 100 square kilometers of land area. Pacific average for road density was at 58 in 2011. Further, the proportion of paved roads averaged only 41% of the total road network, with 8 countries falling short of the Pacific average.

Aviation and maritime transportation also play important roles, given the geographical layout of most Pacific countries. There are 730 airports in 15 Pacific countries, with at least one international airport for each. The FSM has the highest number of international airports, with one in each of its four states. Despite the high number of airports across the Pacific, many of them located in PNG, only 7% of these have paved runways. In terms of accessibility, there is an average of 0.17 airports for every 1,000 persons, and 10 Pacific countries fall below this benchmark.

Meanwhile, there are 32 international shipping ports in the Pacific, with PNG having five international ports—the highest in the subregion.

Information and communication technology

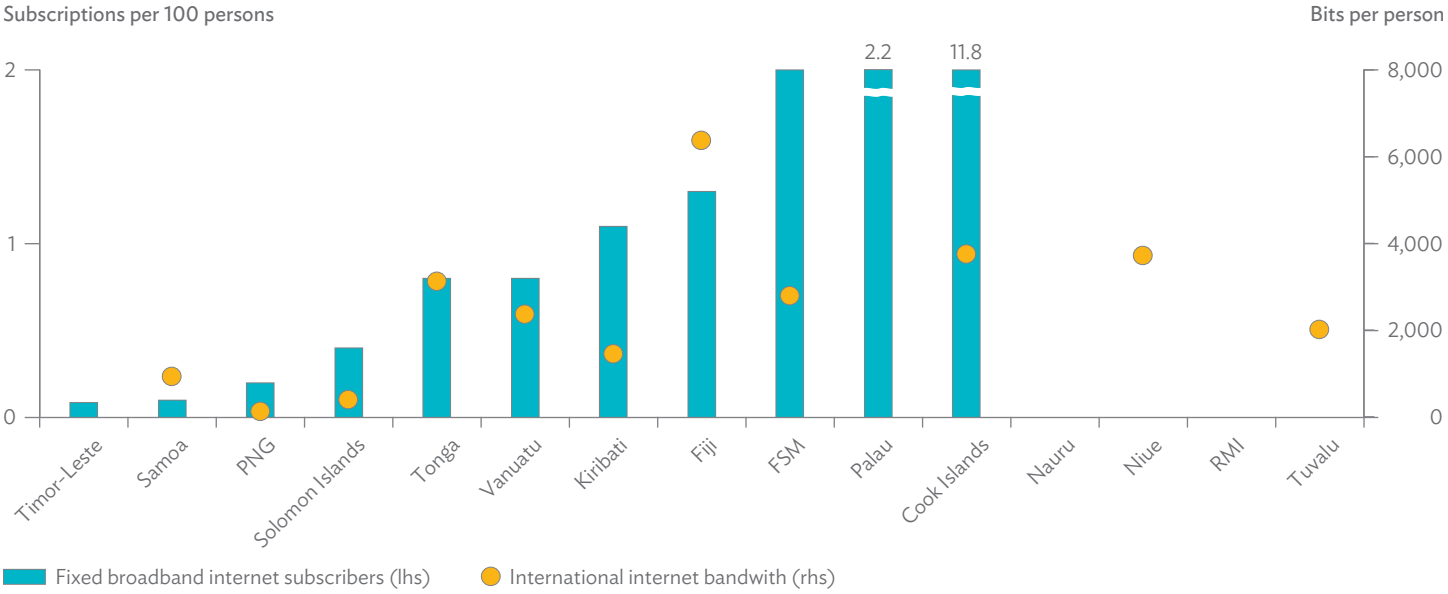
Costly and unreliable communication services (i.e., mobile network coverage, broadband internet subscription, and international internet bandwidth) persist in the Pacific. Outdated technology and weak private sector participation limits the capacity to access faster, more efficient communication systems. Most of the Pacific countries reviewed are covered by second-generation (2G) mobile networks with at least 80% of the population in 11 countries able to access basic mobile cellular services. Out of the 12 countries with data on mobile network coverage, Kiribati ranks the lowest with only 56% of the population having access to a mobile signal.

Access to the internet is more difficult (Figure 27). Fixed broadband internet is commercially available only in 12 of the 15 Pacific countries reviewed, while 3G and 4G mobile technologies were available in fewer countries (PRIF 2016). On average, there are 1.9 fixed broadband internet subscriptions for every 100 persons, with subscription penetration being the highest in the Cook Islands and lowest in Samoa and Timor-Leste.

Figure 26: Paved Road Network and Road Density, 2011 or Latest Available

FSM = Federated States of Micronesia, km = kilometer, km² = square kilometer, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands.
Note: No data available for Palau. Regional average for road density excludes figure for RMI at 1,149, which was flagged as abnormally high by the 2016 PIPI.
Sources: 2016 Pacific Infrastructure Performance Indicators and World Development Indicators.

Figure 27: Internet Access, 2014 or Latest Available



FSM = Federated States of Micronesia, lhs = left-hand scale, PNG = Papua New Guinea, rhs = right-hand scale, RMI = Republic of the Marshall Islands.
Notes: Data not available on fixed broadband internet subscribers for Nauru, Niue, RMI, and Tuvalu. Data not available on international internet bandwidth for Nauru, Palau, RMI, and Timor-Leste.
Sources: 2016 Pacific Infrastructure Performance Indicators and World Development Indicators.

The region has traditionally relied on satellite connections for international internet connectivity, which is more expensive and generally unreliable. Recent undertakings of digital infrastructure projects in both the North and South Pacific have linked participating countries to cheaper and more reliable submarine fiber-optic cable systems. The overall weighted average international bandwidth, which measures the quality of internet connectivity, is 893 bits per person in the Pacific, but as with most other indicators examined in this policy brief, this greatly varies across the region. Fiji, the landing hub for three submarine cables, has the highest bandwidth penetration; and bandwidth penetration is also above-average in the FSM, which first connected to the Guam hub in 2010. The RMI was also one of the first to be connected to the Guam hub, but its available bandwidth capacity remains underutilized due to high costs brought about by an underdeveloped market structure and elevated installation cost recovery fees.

Strengthening investment in basic utilities

Pacific countries have made significant strides in upgrading utilities and broadening access to promote basic welfare, increase mobility, and improve connectivity. However, many people and communities continue to have no or limited access to utilities, hampering their development. Countries with bigger populations, larger territories, and poorer households tend to face greater difficulties in extending access to services. At the same time, the plight of smaller countries cannot be neglected as they are more vulnerable to disasters.

This underscores the need to accelerate investment in more and reliable utilities throughout the Pacific. However, investment decisions must be supported by solid, relevant, and timely data. Proper benchmarks and updated information on performance levels will better inform efforts to upgrade existing and introduce modern utilities. Improved water sources and adequate sanitation, reliable energy sources, an integrated transport network, and stable mobile networks and internet connectivity would provide essential support toward achieving the longer-term development goals in the region.

Lead authors: Noel Del Castillo and Prince Cruz

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Sustainable energy in the Pacific—back to basics

"Sustainable energy" is a catchphrase that energy professionals encounter on a seemingly daily basis, in one context or another. Virtually without exception, it refers to the transition away from fossil fuels as a primary energy source for power generation in favor of renewable sources. The rationale for prioritizing investment in this renewable energy transition is intuitively easy to understand and fundamentally sound, especially in remote island states in the Pacific. Renewable generation technologies can lower costs of additional generation as demand increases, reduce utilities' consumption of fossil fuel for power generation, and likewise reduce utilities'—and national economies'—exposure to world oil price volatility. Increasingly over the past several years, development partners, including ADB, have allocated considerable resources in support of this vision of "sustainable energy."

Not to detract from the efforts and investments being made by utilities, governments, and development partners in support of the vision of a sustainable energy future, the almost singular focus on increased renewable energy generation toward achieving "sustainable energy" has diminished discussion of a more fundamental (if mundane) aspect of sustainability—that of the electric utility as a viable and sustainable enterprise.

Regardless of its sources of power generation or other technologies used to deliver service to its customers, an electric utility cannot operate sustainably unless it is able to marshal resources to cover both its short-term and long-term costs (operational and capital), and to use those resources with reasonable efficiency. Throughout the Pacific subregion, this is typically not in evidence. To the contrary, few utilities are able to generate sufficient revenues from their customers to cover their full costs (both as a matter of tariff policy and as a consequence of inadequate billing and collection practices). Many utilities in the region do not record the full value of their assets on their balance sheets (if they are included at all), and thus fail to account for asset depreciation in calculating their revenue requirement. This ultimately leads to the utilities' decapitalization and eventual insolvency, undermining any notion of providing "sustainable energy" (regardless of generation technology). Numerous other shortcomings in utilities' operational practices, and in management and governance arrangements that allow their perpetuation, combine to jeopardize countries' sustainable energy objectives.

The business of the utility as a business

The provision of adequate electricity service is crucial for ADB's poverty reduction mandate: economic growth, public health, and general quality of life of people in developing member countries depend on it. Performance of electric utilities in the Pacific varies greatly from country to country: service is almost universally available in some countries with highly concentrated populations (e.g., Nauru, Palau, and Samoa), while in other countries, service is available in only a few major urban centers that account for a small percentage of the total population (e.g., Papua New Guinea, Solomon Islands, and Vanuatu).

Notwithstanding this variation in service availability, most electric utilities in Pacific developing member countries share several common features: (i) their financial and operational performance generally fails to provide for efficient and sustainable service delivery; (ii) they represent a significant and recurrent drain on the public purse, or have otherwise significant welfare-diminishing effects due to highly distortionary subsidy and tariff-formation practices; and (iii) their legal, policy, and regulatory environments fail to provide adequate stimulus for sector performance improvements and investments, especially from prospective private sector partners.

Despite many years of effort and support from bilateral and multilateral development agencies and international financial institutions, service quality and reliability in utilities—whether providing electricity or other network services—is poor; in several countries, services remain unavailable to a significant portion of the population. Most utilities have not yet achieved service quality or access objectives, let alone attained financial self-sufficiency. The causes are many, but afflict most Pacific utilities, albeit to varying degrees. Among other things, governance arrangements and regulatory policy do not properly incentivize management to achieve appropriate performance targets; utilities are frequently abused as tools of social policy or to serve short-term political objectives; financial management and accounting practices are not designed or applied to achieve appropriate performance targets; authorities and functions are poorly defined and often fragmented; utilities' workforces do not receive sufficient training and are not supported or incentivized to perform core functions effectively.

While most development partners, including ADB, include capacity-building assistance as a component of their investment projects in Pacific utilities, achievement of significant and lasting improvement in utilities' operations has proven elusive. Typically, capacity building is undertaken within the context of a discrete investment project's implementation, consisting of the creation of systems and processes within a project management unit that is established explicitly to support that project's implementation. The implicit assumption for this approach has been that capacity-building within the project management unit will catalyze incremental change throughout the utility—that good practices, systems, and processes created for the relevant investment project will be absorbed and adopted throughout the utility. Unfortunately, this has not been widely observed. More often, improved practices, systems, and processes fail to take root, and the assets financed by development partners are absorbed into the partner utilities' existing inadequate systems, where a "build–neglect–replace" paradigm in providing public infrastructure services prevails. This is the antithesis of sustainability.

The "build–neglect–replace" paradigm is "sustainable" only for as long as development partners continue to tacitly condone it by returning periodically to provide new subsidized investments in replacement assets. Systemic weaknesses within utilities and their operating environments go unaddressed, and so service remains poor or unavailable, resources are wasted that could otherwise be put to more productive uses, and economic growth and general welfare gains are undermined.

To provide for a truly sustainable energy future, utilities in the Pacific must begin to operate more efficiently and as financially self-sufficient, commercially oriented enterprises. In partnership with the Green Climate Fund, ADB is preparing an order-of-magnitude increase in resources devoted to the reform of utility sector policies and governance arrangements, and the modernization of business systems and processes within client utilities. Apart from returning focus to these crucial dimensions of long-term energy sustainability, this would also help ensure the sustainability of the large capital investments that governments and development partners are currently making in the energy systems in the Pacific.

A programmatic approach to sustainability

Reform and capacity-building interventions will be tailored to the needs of each beneficiary utility. As a first step, baseline performance evaluation and an in-depth, comprehensive diagnostic assessment of each utility's circumstances and practices will be completed. This will provide the basis for the design of a comprehensive sector reform and utility capacity-building program that yields a wholesale and enduring transformation of the utility and the policy, institutional, and governance arrangements that comprise the environment in which it operates. Superficial or cursory analysis of utilities' reform requirements will not suffice.

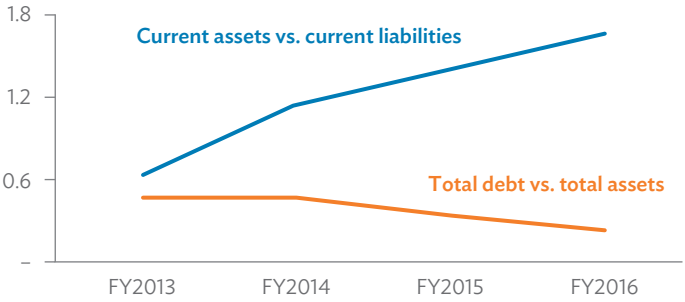
The evaluation and diagnostic assessment should underpin future utility investment project design so that reform implementation is integral to, and part-and-parcel of, development partner-supported investments. Crucially, consulting services for reform package implementation will need to be incorporated into the project design in a qualitatively different way from the practice of the recent past: rather than being ring-fenced to focus on a specific investment project's implementation, the scope should be broader, to encompass all of the utility's internal systems and practices, as well as the environment in which the utility operates (legal, regulatory, governance, and policy environment).

The packages of reform and capacity-building measures developed through the performance evaluation and diagnostic assessment of utilities' performance should not be viewed as a smorgasbord of separate discretionary actions, but rather as essential ingredients in a complex recipe. Just as crucial is the need to recognize that the wholesale transformation of Pacific utilities that is essential for attaining truly "sustainable energy" cannot be achieved in small increments. Successful reform implementation will require steadfast commitment and perseverance by all stakeholders, and a commensurate investment in consultant support, to include long-term residential assignments and embedment of consultants within the management structures of the subject utilities to effect transformational change.

This approach has proven successful in other venues, but also within the Pacific: the US Office of Insular Affairs-supported appointment of an expatriate chief executive officer to the Chuuk Public Utility Corporation (CPUC) in the FSM achieved a remarkable turnaround in the utility's fortunes. Though it took over 5 years to fully bear fruit, CPUC's ability to meet its financial obligations has improved following the change in management. This bodes well for an entity engaged in a capital-intensive (and financing-intensive) industry such as energy.

Audited financial statements for fiscal year (FY) 2013 up to FY2016 show that the utility now holds far more current assets than current liabilities (i.e., those payable within 1 year), indicating that it is more than able to service short-term obligations (Figure 28). Current assets have been boosted by increases in cash reserves and accounts receivable, which in turn result from improved cost recovery and collection efficiency. CPUC has also become more financially solvent, meaning that its capacity to meet long-term obligations has improved as well. The equivalent share of total debt to total assets declined steadily over the period, especially in FY2015–FY2016 when the utility expanded its plant assets (mainly in water and sewerage).

Figure 28: Liquidity and Solvency of the Chuuk Public Utility Corporation



FY = fiscal year, vs. = versus.
Sources: Chuuk Public Utility Corporation audited financial statements, various years.

Conclusion

Truly sustainable energy entails more than shifting power generation away from conventional fossil fuel sources. It also means ensuring that the operations of electric utilities are efficient and financially viable. Addressing this, particularly in Pacific utilities, would require reform across all areas of operation: from tariff-setting, financial management, and corporate governance to creating a legal, policy, and regulatory environment conducive to improvements in the energy sector.

To this end, ADB is working with the Green Climate Fund to provide greater support to help Pacific utilities modernize their business systems and processes toward becoming efficient and financially self-sustaining, and effect change in utility sector policies and governance arrangements. However, such efforts should be complemented by steadfast commitment from all stakeholders, as well as closer, more long-term partnerships with client utilities beyond project implementation, in order to effect genuine transformational change.

Lead author: J. Michael Trainor

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Institutional reform to improve water services in Timor-Leste

Water supply and sanitation are essential public services that are vital to public health, economic development, protection of the environment, and the general welfare of the population. While water is essentially free from nature, making it accessible to households in a potable state can be very costly. Water supply and sanitation services are natural monopolies, characterized by huge initial investments for the construction of reservoirs, treatment plants, and distribution networks.

Timor-Leste is committed to developing its water supply and sanitation services to improve the quality of life of its population. However, it is essential to ensure that such development is sustainable and well-coordinated. This emphasizes the importance of suitable public policy to avoid undertaking huge investments with limited benefits to society.

International framework of water services

Internationally, there are many policy initiatives to encourage governments to give greater attention to water services. In December 2014, the United Nations Secretary General announced that 2015 would be a historic year with the adoption of global goals related to the most important challenges for humankind, and a global agreement on climate change. The first part has been achieved: both developed and developing countries agreed to share 17 priorities for the period 2016–2030, the Sustainable Development Goals (SDGs) (Figure 29).

Succeeding the eight 2000–2015 Millennium Development Goals (MDGs), the adoption of SDGs as a new global agenda is far more ambitious. The SDG program is not legally binding, but every government will be obliged to report on its national achievements. This will be a strong incentive to act toward the SDG targets.

Goal 6 of the SDGs is dedicated to water supply and sanitation, specifying six operational targets, plus two related to water governance. One of the targets is to secure universal access to safe drinking water. This means access to water that is not contaminated and is available on a regular basis. Another target is to halve by 2030 the wastewater flows that are untreated. Over 80% of wastewater flows globally are currently untreated. Like most SDGs, SDG6 targets are ambitious and, hence, public policies will have to be strengthened to accomplish them.

Figure 29: The 17 United Nations Sustainable Development Goals

Source: United Nations. 2015. Sustainable Development Goals. New York.

Public policy for water services

Water services have essential characteristics, some of which differentiate them from other services. They tend to be regional or national, using assets designed for peak demand. Further, they have an extended period for return on capital, low price elasticity of demand, and last but most important, are natural or legal monopolies. Another characteristic of the water services is the numerous and diverse types of stakeholders. These are split into several groups, including consumers, service utilities, government regulators, other entities providing services, and civil society.

In Timor-Leste, water services must comply with a set of obligations: universal access, adequacy of services in terms of both quantity and quality, continuity of services, structural and operational efficiency, adequacy of services pricing, fair prices for services, and adoption of codes of good practice. Further, users have rights, particularly regarding physical and economic access to services, the quality of drinking water, information about services, participation in decision-making, and channels for complaints about services.

Public water policy, concerning access to drinking water supply and wastewater management, should be developed through a holistic and integrated approach that covers several components (Figure 30). Implementation of one or only a subset of these components is generally not sufficient to ensure the achievement of results in a sustainable manner. For example, construction of infrastructure absent other components, such as a sound legislative and institutional framework, an effective tariff policy, and human resources capacity building, will likely result in very small odds of success, with investments not yielding the expected return. Moreover, it is necessary for public policy to promote inclusive access to basic-needs water services, particularly for Timor-Leste's poorest users (ADB 2018).

Figure 30: Public Policy Components

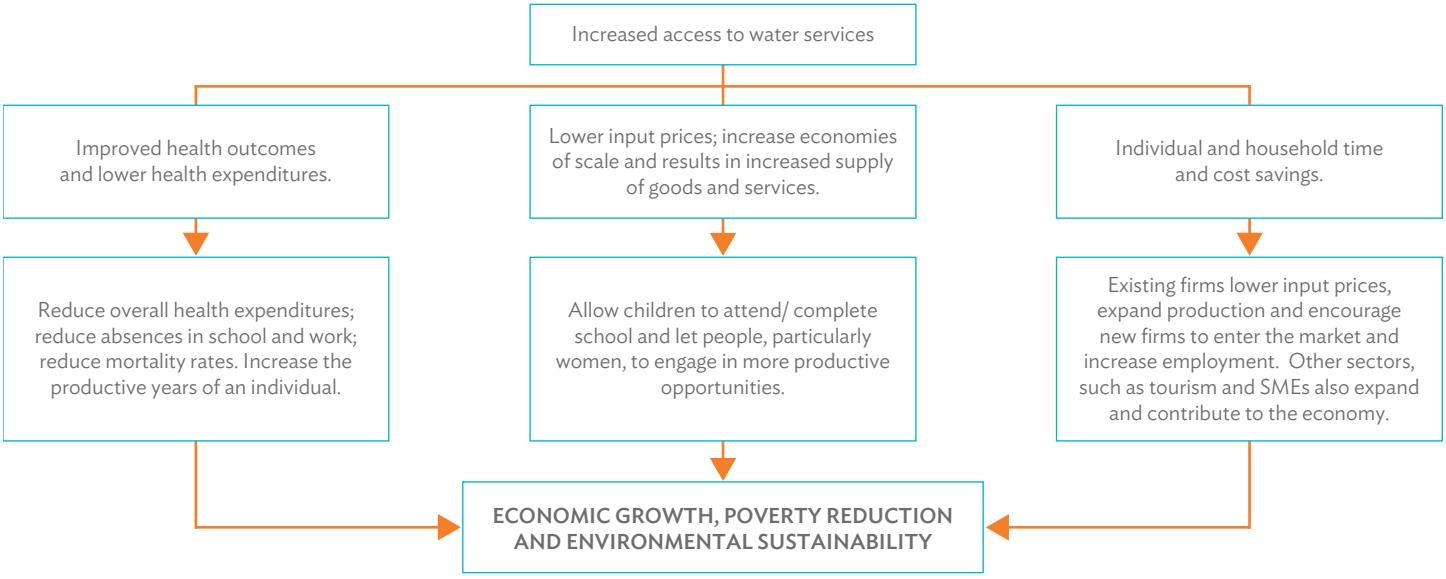
Source: ADB. 2018. Water Supply and Sanitation Services Investment Plan, Policies, and Institutional Reform 2018–2030. Forthcoming.

Increased access to water services will result in benefits not only at the individual or household level, but also for the broader economy (Figure 31).

Water services play an important role in supporting economic growth through improved health outcomes, with possible flow through effects on school attendance and tourism and job-creation potentials (Table 3).

Improved water services can also result in more benefits for women. In Timor-Leste, 49.2 % of the 1.2 million population are women, who mostly have the responsibility for child care, caring of family members who fall ill, and domestic tasks (United Nations Women 2015). Women must walk for hours to fetch water daily and some

Figure 31: Benefits of Investing in Water Services



SMEs = small and medium-sized enterprises.
Source: ADB. 2018. Water Supply and Sanitation Services Investment Plan, Policies, and Institutional Reform 2018–2030. Forthcoming.

Table 3: Socioeconomic Benefits from Water Supply and Sanitation Improvements

Beneficiary	Benefits	Valuation of Economic Benefits
Health sector	Cost savings in health care due to reduction in treatments for waterborne diseases	Unit cost of treatment, which includes the full health care costs (consultation, medication, and overhead) spent by the government multiplied by number of cases averted
Patients	Reduced health care expenditure for seeking treatment of waterborne diseases from private providers	Unit cost of consultation and medication for private paying patients multiplied by the number of private patient cases averted
	Reduced non-health-related costs for visits to health facility such as transport, etc.	Unit costs of non-health-related costs for private paying patients multiplied by the number of private patient cases averted
	Avoided productive work days loss	Assumed workdays off per episode multiplied by the number of averted cases and the minimum wage rate
Education	Avoided days of school absenteeism	For school age children, time not spent in school (days absent) multiplied by the minimum wage For infant or under 5 years of age, where caregivers are needed, opportunity costs of caring for a sick baby or under 5 years old estimated by a percentage of the product of work days off and minimum wage
Consumers and/or households	Reduced and/or saved time for water collection (per household)	Value of time savings are estimated by multiplying the total annual time saved (distinguished between work and leisure) per individual and multiplied by the minimum wage
	Cost savings due to switching from more expensive/alternativ e water sources	Annual costs saved per household per year on alternative water sources multiplied by the number of new connected households
	Incremental benefits from additional consumption of water	Additional water consumption per household due to availability of water service multiplied by the willingness to pay
Tourism	Increase in net expenditures of tourist arrivals	Difference of the assumed tourist growth arrivals between with- and without-project growth scenario multiplied with the average spending for international tourists
Employment and private sector development	Additional employment generated; establishment of new small and medium-sized enterprises	Increase in number of employment related to the sector and its ancillary services; growth in number of small and medium-sized enterprises in the project area

Source: ADB. 2018. Water Supply and Sanitation Services Investment Plan, Policies, and Institutional Reform 2018–2030. Forthcoming.

families even keep their daughters at home so that they can help collect water instead of going to school. Fetching water can be dangerous for women and girls due to potential conflicts at water sources. Similar dangers arise when they do not have access to private toilets or latrines.

Increasing women's access to water services would help free up hundreds of hours annually that could be devoted to more economically productive pursuits. Hence, greater access to water services can improve women's health and safety, while creating more opportunities for income generation (Swedish International Development Cooperation Agency 2015).

Timor-Leste's water supply and sanitation sector

The 2015 census indicated that 73% of the urban population and 68% of the rural population have access to water. However, only 34% of the urban population has access to the public water supply system at the household level. Although 81% of the country's urban population has access to sanitation facilities, most of the people in rural areas (62%) still lack access to improved sanitation (Government of Timor-Leste 2015).

Despite being included in the government's annual priority sectors for the last 4 years, the level of investment is still considerably low to meet defined targets. Moreover, the lack of an investment plan and the limited coordination between financing stakeholders have led to a disjointed multiyear public investment program.

Institutional capacity challenges need to be addressed immediately to improve sector service performance. Some of these include narrow administrative and financial autonomy, limited number of skilled management and technical staff, weak accountability and incentives for sustaining services, and inadequate planning and coordination.

In addition, the current institutional setting is also not appropriate for the sector to deliver services. This is because there is no separation between regulatory authorities and service providers. Further, the current legislative framework for regulation is also insufficient, and new policies are needed to achieve the desired standard of service provision. The enforcement of the existing legislations is also limited due to institutional capacity constraints.

The Timor-Leste Strategic Development Plan (SDP) 2011–2030 and SDG6 outline that the government has to provide water services to 100% of the population, both in urban and rural areas, by 2030 (Figure 32). Having one of the highest population growth rates in the Pacific at 2.4% per annum, and current low levels of access to these services, immediate investment and institutional reform will be essential for the government to meet its commitments (Government of Timor-Leste 2011).

Figure 32: Implementation of Institutional Reform in Line with Strategic Development Plan and Sustainable Development Goals

Source: ADB. 2018. Water Supply and Sanitation Services Investment Plan, Policies, and Institutional Reform 2018–2030. Forthcoming.

The water sector by nature is a priority for Timor-Leste and to achieve medium and long-term targets as outlined in the SDP and SDG6, the government has prepared urban master plans for several municipalities. Further, the Investment Plan for Water Supply and Sanitation estimates total investment needs of $1.3 billion (inclusive of capital outlays and operating expenditures) for the period 2018–2030 (Figure 33). Acknowledging that investment alone will not be sufficient to address challenges and ensure the sustainability of services, policy and institutional reform in the context of sectoral development will be essential.

Institutional reform

Public policies for water services and related water resources should be developed and implemented in an integrated, coherent, and holistic manner. The government should establish an appropriate institutional framework, with a clear mandate and responsibilities for each of the public entities involved.

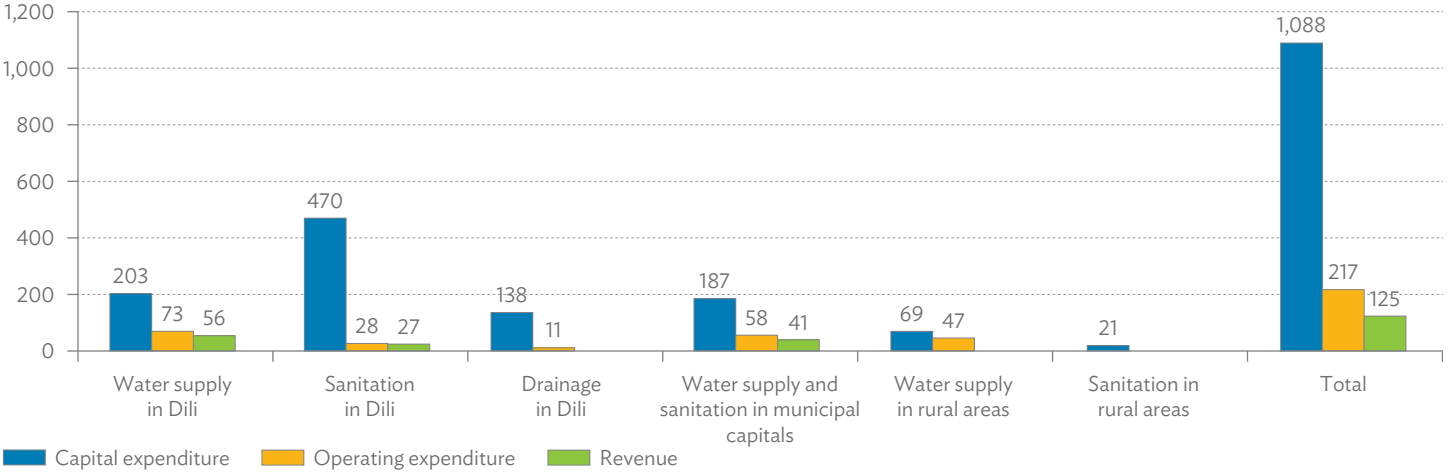
Considering Timor-Leste's country context, institutional models for the short term (2018–2023) and the medium term (2024–2030) need to be adopted as part of a broader reform strategy (Figure 34). The proposed model should:

- Be progressive, but implementable and achievable;
- Transform sector authorities, increasing their capacities and splitting their responsibilities;
- Allow for human resources to adapt and enhance their knowledge and training;
- Separate regulatory authorities and service provisions roles and responsibilities; and
- Untangle water services and water resources regulations.

For the period 2018–2023 (phase 1), the following reforms are recommended:

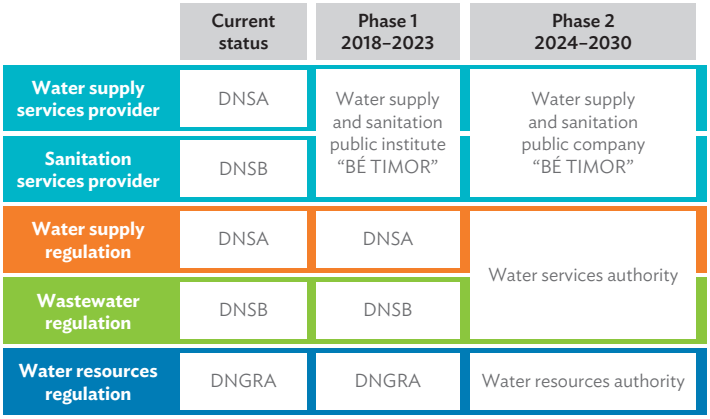
- Detach the water supply and sanitation services provider component from the National Directorate for Water Services (DNSA) and the National Directorate for Basic Sanitation (DNSB), and create a Public Institute for Water Services (Bé Timor). This public institute will be partially responsible for infrastructure development and services provision;
- Reinforce the role of DNSA as the regulator for water supply services in its regulatory capacity;
- Reinforce the role of DNSB as the regulator for sanitation services in its regulatory capacity; and
- Reinforce the role of the National Directorate for Water Resource Management (DNGRA) as the regulator for water resources in its regulatory capacity.

Figure 33: Breakdown of Water Supply and Sanitation Investment Plan, 2018–2030
($ million)



Source: ADB. 2018. Water Supply and Sanitation Services Investment Plan, Policies, and Institutional Reform 2018–2030. Unpublished.

Figure 34: Proposed Model for Institutional Reform



DNGRA = National Directorate for Water Resource Management, DNSA = National Directorate for Water Services, DNSB = National Directorate for Basic Sanitation.
Source: ADB. 2018. Water Supply and Sanitation Services Investment Plan, Policies, and Institutional Reform 2018–2030. Forthcoming.

Subsequently, for the period of 2024–2030 (phase 2):

- Transform Bé Timor into a public company that will be responsible for the implementation of the infrastructure development (in coordination with relevant government entities), operation and maintenance, and commercial activities in Timor-Leste; and
- Integrate DNSA and DNSB as an independent water services authority, with DNGRA becoming the Water Resources Authority.

Summary and conclusion

Water services are essential for the well-being of the population. However, the current service level in Timor-Leste is still below expectations. To meet the SDP and SDG6 targets, both physical investments and institutional reforms institutions will be required. More specifically, Timor-Leste authorities concerned should:

Investment

- Ensure that the Investment Plan for Water Supply and Sanitation—with estimated needs of $1.3 billion over the period 2018–2030—is a long-term commitment integrated into the medium- to long-term planning and expenditure framework, and operationalized through a multiyear public investment program;
- Establish a multiyear pool of all available financial resources (from government and development partners) through which potential projects can be coordinated and implemented in an efficient, integrated, accountable, and transparent manner;
- Review investment plan scenarios and adopt the scenario(s) that is(are) in line with the government priority for private sector development and job creation for the period 2018–2023;
- Implement priority investments at the municipality level, where water supply and sanitation master plans are ready to be implemented; and
- Complete the preparation of master plans for the remaining municipalities and rural areas prior to the investment.

Institutional reform

- Proceed with implementation of recommended reforms as detailed in the Water Supply and Sanitation Investment Plan, Policies and Institutional Reform 2018–2030 report;
- Adopt an institutional reform model, appropriate to the country context, to assist the sector to meet the SDP and SDG6 targets;
- Separate roles and responsibilities between the service provides and the regulatory authorities;
- Establish Bé Timor as a public institute in 2019, for transformation into a public company by 2024, to be the primary service provider;
- Strengthen regulatory capacity of DNSA, DNSB, and DNGRA as part of the transition process to become the Water Services and Water Resource Authorities by 2024; and
- Prioritize human resources development, both for technical and managerial skills, as well as promote research and innovation among the stakeholders.

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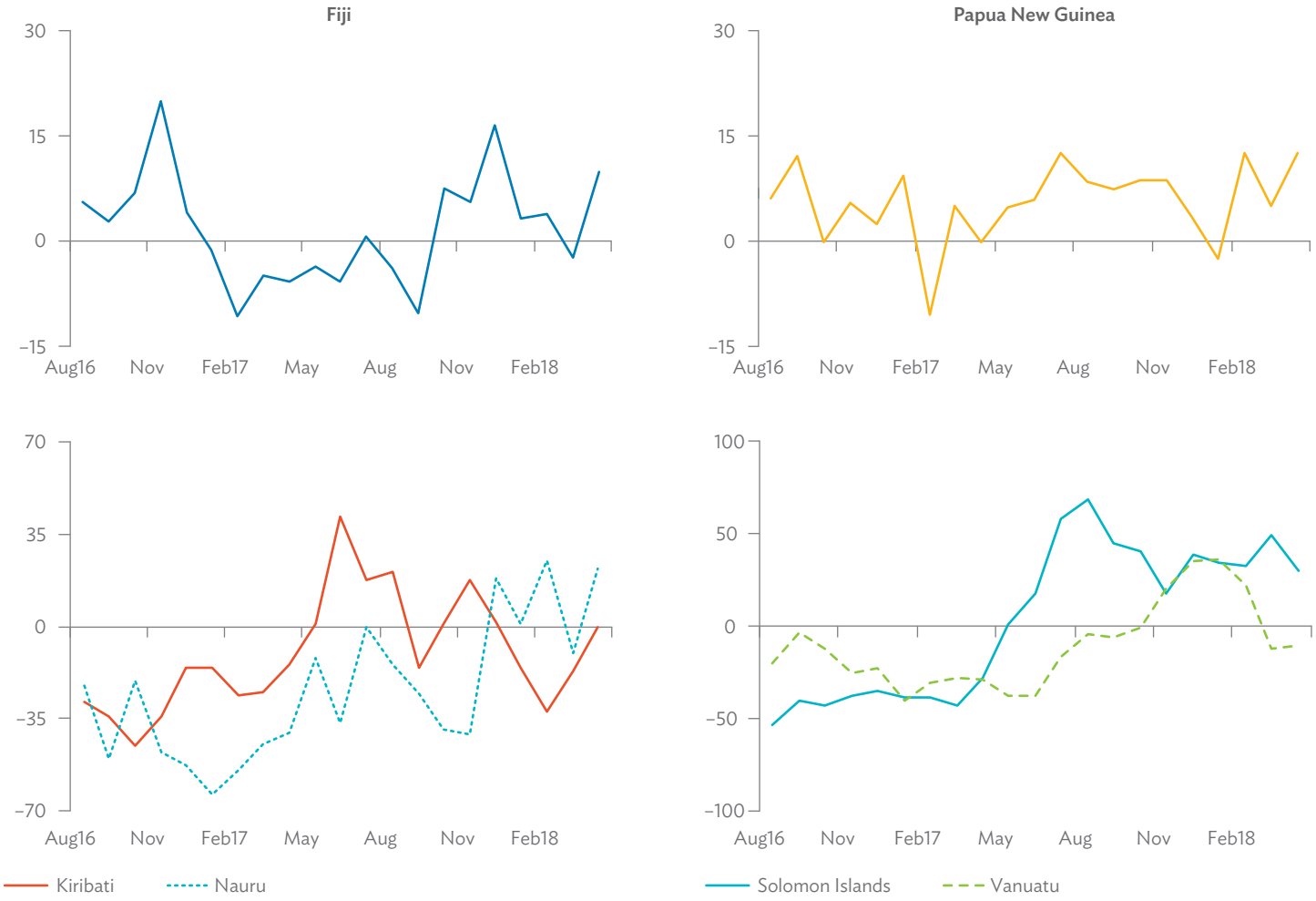
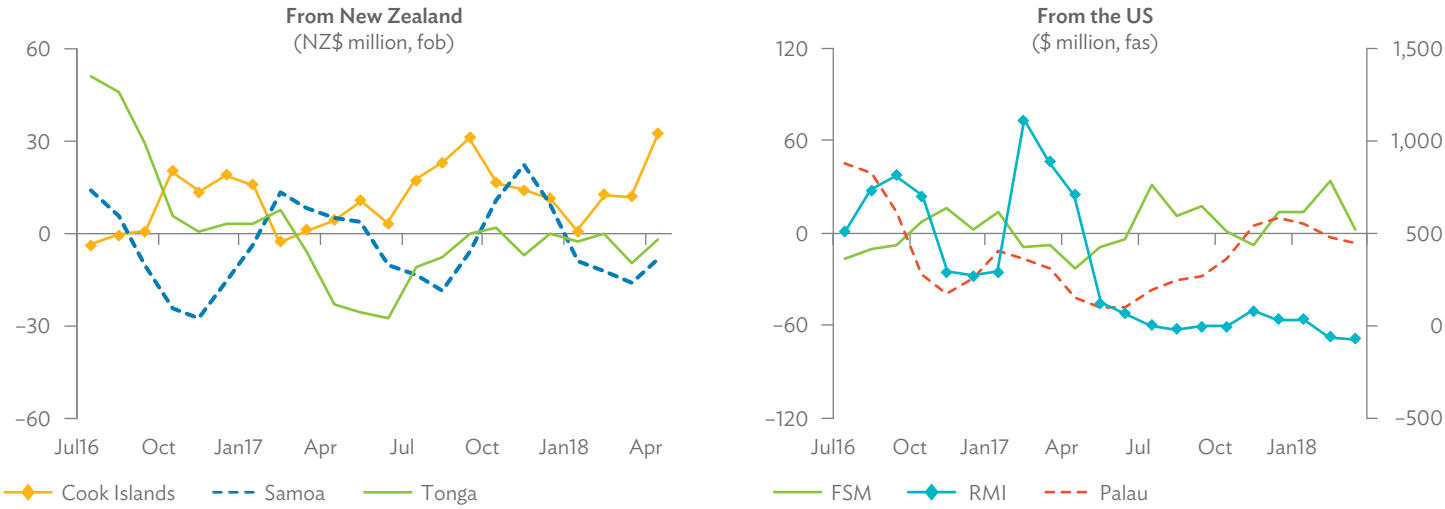
Nonfuel Merchandise Exports from Australia
(A$; y-o-y % change, 3-month m.a.)



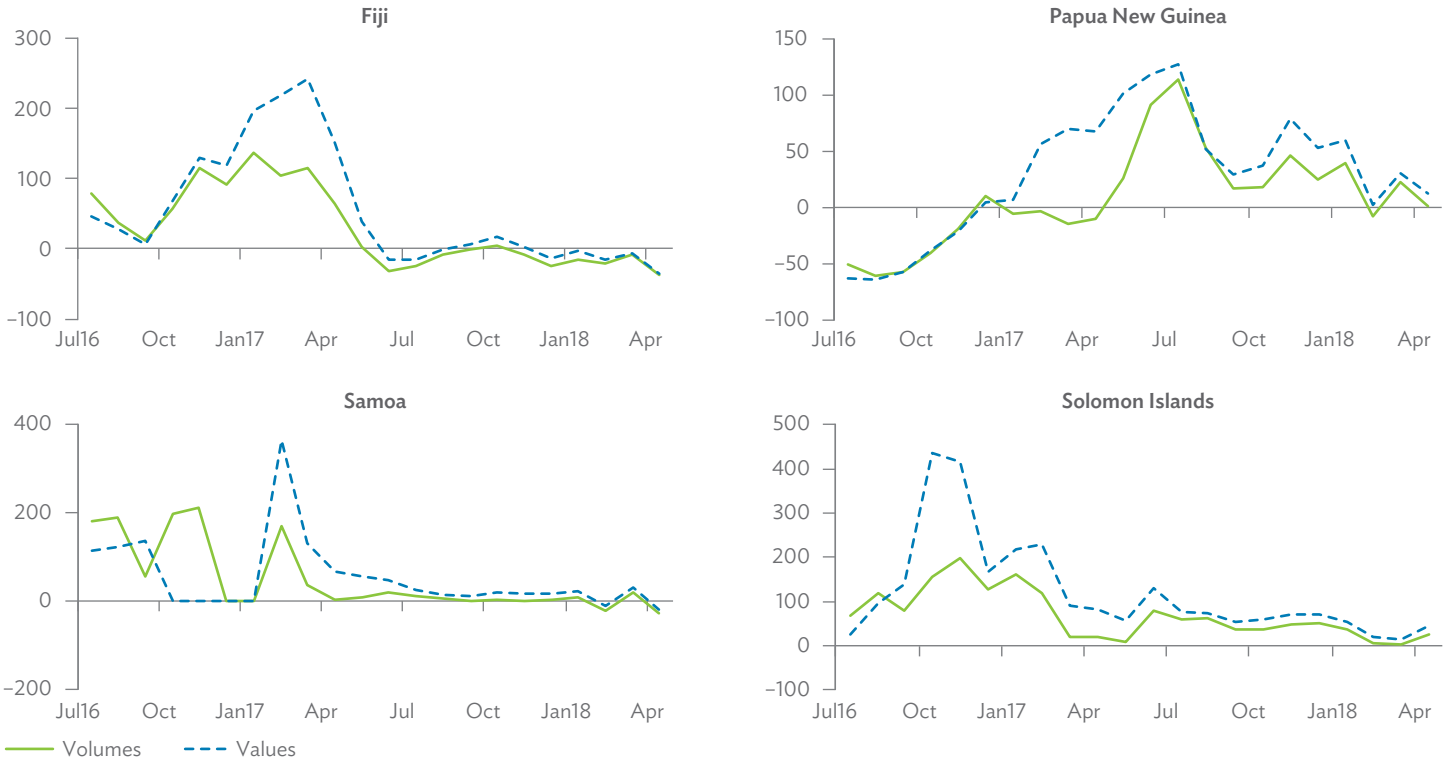
A$ = Australian dollars, lhs = left-hand scale, m.a. = moving average, rhs = right-hand scale, y-o-y = year-on-year.
Source: Australian Bureau of Statistics.

Nonfuel Merchandise Exports from New Zealand and the United States
(y-o-y % change, 3-month m.a.)



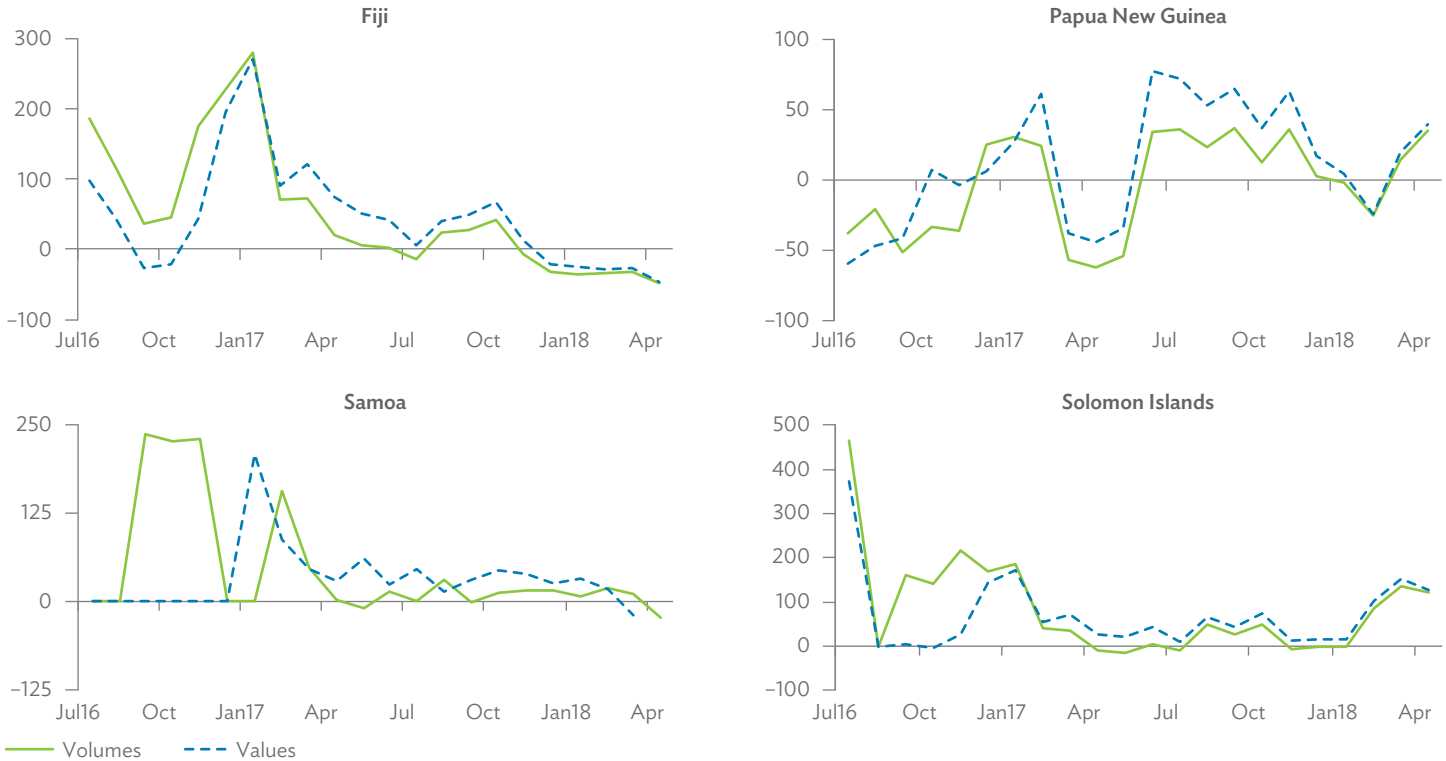
fas = free alongside, fob = free on board, FSM = Federated States of Micronesia, m.a. = moving average, NZ$ = New Zealand dollar, RMI = Republic of the Marshall Islands, US = United States, y-o-y = year on year.
Sources: Statistics New Zealand and US Census Bureau.

Diesel Exports from Singapore
(y-o-y % change, 3-month m.a.)



m.a. = moving average, y-o-y = year on year.
Source: International Enterprise Singapore.

Gasoline Exports from Singapore
(y-o-y % change, 3-month m.a.)



m.a. = moving average, y-o-y = year on year.
Source: International Enterprise Singapore.

Departures from Australia to the Pacific
(monthly)

rhs = right-hand scale, y-o-y = year on year.
Source: Australian Bureau of Statistics.

Departures from New Zealand to the Pacific
(monthly)

rhs = right-hand scale, y-o-y = year-on-year.
Source: Statistics New Zealand.

Latest Pacific Economic Updates

	GDP Growth (%, p.a.)			Inflation (%, annual avg.)			Fiscal Balance (% of GDP)		
	2017e	2018p	2019p	2017e	2018p	2019p	2017e	2018p	2019p
Cook Islands	3.5	3.5	3.0	−0.1	0.5	1.0	7.3	−8.7	−3.8
Fiji	3.9	3.6	3.3	3.3	3.0	3.0	−2.3	−3.5	−3.0
Kiribati	2.5	2.3	2.3	2.2	2.5	2.5	−8.9	−7.0	−13.4
RMI	3.6	2.5	2.5	0.0	1.0	1.0	3.3	−2.5	−3.0
FSM	2.0	2.0	2.0	0.5	1.0	1.0	7.0	10.0	10.0
Nauru	4.0	−3.0	0.5	5.0	2.0	2.0	7.4	5.4	10.0
Palau	−3.7	3.0	3.0	0.9	1.5	1.5	4.5	5.0	5.0
PNG	2.2	1.8	2.7	4.7	5.0	4.5	−2.5	−2.5	−2.2
Samoa	2.5	0.5	2.0	1.4	3.5	3.0	−1.1	−3.5	−3.6
Solomon Islands	3.2	3.0	3.0	0.1	3.5	3.0	−4.0	−4.0	−4.1
Timor-Leste[a]	−2.0	3.0	5.5	0.6	2.0	3.0	−17.5	−24.5	−32.0
Tonga	2.8	−0.3	1.9	7.4	5.5	3.0	−0.4	−2.3	−1.8
Tuvalu	3.2	3.0	3.0	2.9	2.5	2.8	17.6	−1.0	−7.7
Vanuatu	3.5	3.2	3.0	3.2	4.8	2.5	−2.0	−1.8	−1.8

FSM = Federated States of Micronesia, GDP = gross domestic product, p = projection, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands.
[a] Timor-Leste GDP is exclusive of the offshore petroleum industry.
Sources: ADB. 2018. *Asian Development Outlook 2018 Supplement (July 2018)*. Manila; and statistical releases of the region's central banks, finance ministries and treasuries, and statistical bureaus.

Key data sources:
Data used in the *Pacific Economic Monitor* are in the ADB PacMonitor database, which is available in spreadsheet form at www.adb.org/pacmonitor

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