

The Pacific solar puzzle: Assessing the market for solutions

Climate change story

Imagine paying some of the world's highest electricity prices in a region with an abundance of sunshine. **This is the reality for Samoa and Tonga**, where significant solar energy potential remains largely untapped.

Both countries remain heavily dependent on costly diesel and heavy oil for power generation. Compounding this, climate change poses significant challenges for small island nations, prompting innovative approaches to energy production. In response, Tonga and Samoa are taking steps toward a renewable energy transition that leverages solar power to meet ambitious climate commitments and address rising energy costs.

Tongans pay some of the world's highest electricity prices, relying on diesel and heavy oil for 87 per cent of power, while renewables contribute just 13 per cent. Despite abundant solar radiance and Nationally Determined Contribution (NDC) targets of

70 per cent renewables by 2025 and 100 per cent by 2035, the rooftop solar market remains underdeveloped, as local installers remain reluctant amid uncertain demand. In contrast, Samoa, with 98 per cent grid connectivity, sourced 33 per cent of its power from renewables in 2020. The grid operator has a 70 per cent renewable target by 2035, yet the rooftop solar market is still in its infancy, with few grid-connected systems.

To meet their ambitious renewable energy targets, Tonga and Samoa must overcome several barriers—ranging from high upfront costs to limited installer capacity. Attracting private finance will be key to addressing challenges

and meeting renewable targets. Global experience suggests that one promising way to achieve this is through enabling investment in rooftop solar by households and businesses to drive down their energy bills and improve reliability.

To better understand the market, MDF conducted studies in both Samoa and Tonga to identify challenges, opportunities and barriers to rooftop solar adoption. The study looked to demonstrate to solar installers and financiers that the rooftop solar market could be an attractive investment opportunity. Businesses and households were assessed on current energy costs, experiences of outages, and awareness of the costs and benefits of rooftop solar.

Power outages cause losses to brand and business

Samoa's businesses, particularly in tourism, reported high energy costs and losses from power cuts. They had a high willingness to pay despite lower overall investment interest compared to households. Both businesses and households lack a comprehensive understanding of available solar products, associated costs, benefits and financing options. The study findings highlight the need for targeted education, innovative financial products and government incentives to unlock Samoa's solar potential and attract private investment.

Businesses expressed different concerns about power cuts, the most notable being loss of productivity and revenue, as well as physical risks such as damage to equipment, alarm systems switching off, and impacts on safety and security.



Business challenges due to power outages

A business owner based in Apia shared,



The power outages cause physical risks like disarming the alarm systems, IT risks such as data security vulnerabilities, increased operational costs from using backup power, and reduced productivity, all of which impact revenue. It also impacts our brand and the reputation of our business.

Tongan businesses faced similar problems that affected both operations as well as reputation. A hotel owner from Nuku'alofa explained,



Power outages have an impact on our guests as the rooms rely on electricity for air conditioning, lighting and refrigeration. Sudden power outages also damage our appliances, which are costly to repair and replace on top of existing energy bills.

Businesses contend with steep energy bills in Tonga

Energy bills in Tonga among businesses vary significantly.

Key findings from Tonga



55% from the 20 businesses surveyed reported energy bills between TOP1,000 (AUD668) and TOP10,000 (AUD6,715) per month.



45% of businesses reported average monthly electricity bills of less than TOP1,000 (AUD668).

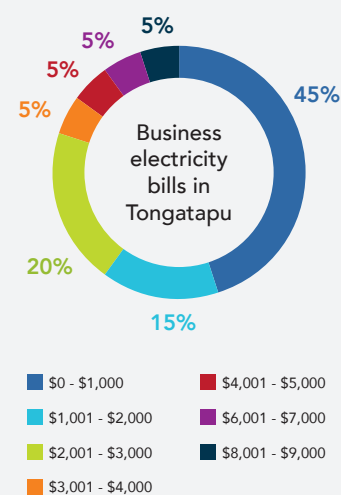
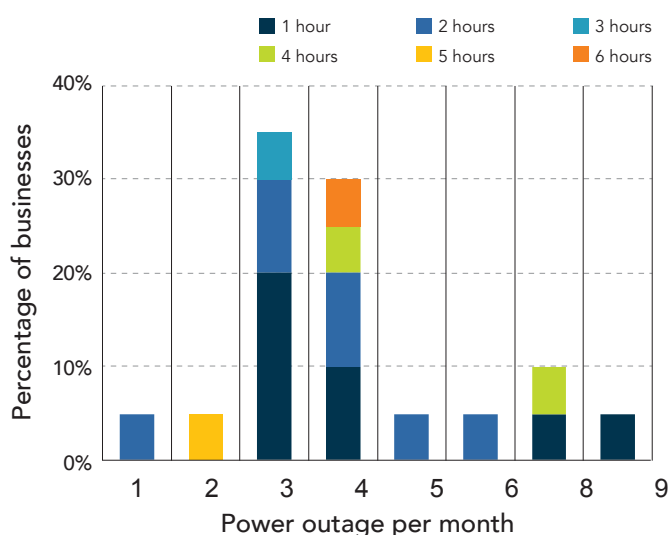


60% of businesses find tariffs expensive, with some reporting rising costs despite low appliance use.



Only **30%** of businesses had a backup power option, mostly diesel generators.

Impact of power outages on businesses



Key findings from Samoa



Over **80%** of households are keen to invest in rooftop solar to lower bills, mitigate outages, and reduce emissions.



27% of households have already adopted standalone solar products, such as hot water systems and outdoor lighting.



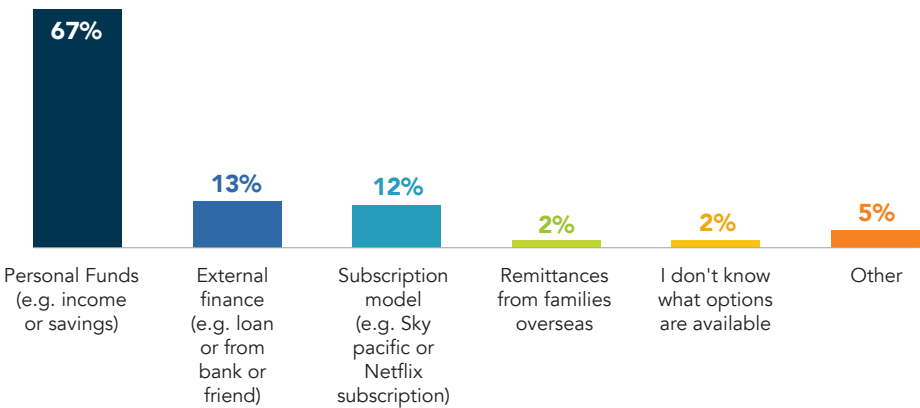
60% of households prefer to use their own funds to purchase a solar solution.



25% of households would consider loans or subscription models.

Household payment preferences for rooftop solar systems

How would you prefer to pay for a solar system?



In Tonga, the study found that while households and businesses knew about solar technologies, many lacked detailed knowledge of installation, maintenance costs or long-term benefits. Moreover, rooftop solar installations remain scarce in Tonga. Only three businesses from the 20 surveyed had solar installations, two of which produced surplus electricity that they used to offset past electricity expenses. One business opted for a ground-mounted solar system due to limited roof space and the need for a larger setup to fulfill its electricity needs. All early solar adopters reported significant savings and are increasingly considering integrated battery storage for future energy independence.

What needs to change for solar to succeed?

Particularly in the tourism industry, investments in solar could be stimulated through tailored solar packages that highlight lower energy expenses, better guest experiences and the potential for 'green' branding. Businesses also require clear guidance on the types of systems available, tariff arrangements and potential battery storage integrations to minimise operational disruptions.



Solar would be a welcomed initiative, but the problem is the cost implication for my business. It is a small business, and adopting solar energy at the moment is very expensive.

A **business owner** from Apia



I would be willing to invest in a rooftop solar system. It would be a good back-up for our business during power outages and our services won't be affected.

A recycling business owner from Tongatapu



The barrier of financial hardship is real and is recognised by the government. We are looking into the possibility of developing a Green Energy Fund initiative that would involve local banks, businesses and donors to solve this issue and allow private investment in renewable energy in Tonga.

Ms Feauini Laumanu,
Director of Energy at
the Tonga Ministry of
MEIDECC

Households would benefit from targeted educational campaigns broadcast via radio, television and social media. These would clarify frequently asked questions relating to investment requirements, available financing options and long-term cost benefits.

The MDF-supported studies also identified the role that financiers and banks could play, by partnering with solar installers to develop innovative financial products that reduce the upfront financial burden of solar installations. This could include solar loans, subscription models, lease-to-own schemes, home loan packaging and power purchase agreements. Early adopters with high power usage or frequent outages stand to benefit most from these innovations. Additionally, insurance companies can enhance market confidence by offering tailored policies that mitigate installation and operational risks.

While private investment can drive solar adoption, government intervention can help to enable investment. Initiatives such as import duty reductions, VAT cuts or partial subsidies could lower costs and encourage uptake, particularly among lower-income households. Innovative models from power utilities like Tonga Power Limited—such as net metering or on-bill financing could help to increase uptake. Innovative financial products such as solar leasing, shared solar and solar subscriptions—could also reduce up-front costs for consumers.

Director of Energy at the Tonga Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC), Ms Feauini Laumanu, emphasised the importance of collaboration at the Solar Demand Study launch in Tonga.

The transition to solar energy in Samoa and Tonga presents a significant opportunity to enhance energy security, improve reliability, reduce costs and support climate goals such as the NDCs. However, unlocking its full potential requires a coordinated effort from governments, financial institutions, utilities and installers. By expanding public awareness, offering innovative financing options and implementing supportive policies, both Samoa and Tonga can unlock the full potential of rooftop solar—reducing costs, driving economic growth and securing a reliable energy future.



Launch of 'Economic Impact of International Yachting in Tonga' report in Nuku'alofa, Tonga.