

Title:

Smarter Solar Procurement in the Pacific: Addressing lowest-cost risk

Authors:

Philip Martin, Sam Bunt & Terri O'Quinn

Abstract:

Australia, through the Australian Infrastructure Financing Facility for the Pacific (AIFFP), has provided USD22 million in financing to Solar Pacific Pristine Power (SPPP) to support the construction of Palau's first utility-scale solar and battery energy storage facility. Located on Palau's largest island, Babeldaob, the Project will comprise a 15.28-megawatt peak capacity solar photovoltaic facility, and a 12.9-megawatt battery energy storage system. When complete, it will be among the largest hybrid facilities of its kind in the Pacific and generate over 20 per cent of Palau's energy needs.

Following standard procurement policy and process, a solar module manufacturer was chosen based on competitive pricing, warranty coverages, and quality to withstand the environmental conditions in Palau, such as typhoons. A comprehensive due-diligence assessment conducted by AIFFP found that the proposed provider of the plant's solar modules was allegedly procuring polysilicon from factories suspected of using forced labour, however, meaning the project could breach Australia's Modern Slavery Act (2018). As a result, and at the request of the AIFFP, SPPP collaboratively initiated a second procurement to source a new supplier which could demonstrate its supply chain was not exposed to modern slavery. These actions not only ensured that the AIFFP's investment would do-no-harm, but also contributed to measurable improvements in global labour conditions by removing significant Pacific market demand for the exposed forced-labour-exposed polysilicon products. Although the new supplier's technology had a higher unit cost, a careful lifecycle analysis conducted by SPPP demonstrated that the new modules would satisfy all operational and production requirements. They also benefited from a supplier led recycling program at end of life. The outcome demonstrates how better-integrated risk assessment and review of supply chains during project preparation can strengthen solar project projects in the Pacific.

INTRODUCTION

The presence of forced labour in solar photovoltaic (PV) supply chains poses growing risks not only to workers but also to project developers and investors. Changing national and multilateral measures and requirements to exclude from global trade goods made with forced labour intersect with, and can confuse, market and local regulatory expectations around the threshold, sequencing and timing of supply chain due diligence and disengagement from suppliers in particular. Even as commitment grows towards global renewable energy transition, there are concerns that unclear and inconsistent requirements about PV modules will disable investors and developers' abilities to make solar project investments with certainty.

This paper describes the way Australian Infrastructure Financing Facility for the Pacific (AIFFP) worked together with a project developer to address forced labour risk in a solar energy value chain as part of a solar field investment in Palau. In this example, a loan from Australia was provided to a private sector developer from the Philippines to develop a solar field project in Palau. AIFFP loans must comply with Australian law, including Australia's Modern Slavery Act (2018), as well as the IFC Performance Standards and in-country laws and regulations. Lacking clear guidance as to how these requirements should be applied to the solar energy supply chain, AIFFP was obliged to occupy a position of policy broker and identify with the developer arrangements to remove modern slavery risk in the project's value-chain. While AIFFP were able to drive a positive outcome in the Palau solar project, the replicability and scalability of the approach taken remains an open-question for other investors.

ENERGY TRANSITION IN THE PACIFIC

Most Pacific countries – particularly the Pacific Small Island Developing States (PSIDS) – remain highly dependent on imported petroleum fuels, with oil making up about 80 per cent of the Pacific's total energy supply (UN ESCAP 2022). Fuel imports cost the region US\$6 billion annually, or around 5 to 15 per cent of GDP for each economy, leaving the region highly vulnerable to price and supply shocks (Ibid.). They also complicate PICs progress toward meeting climate change goals and commitments, even as they only produce 0.03% of global emissions in aggregate (Salem 2020).

Solar PV is considered a crucial pillar of clean energy transition in the Pacific, underpinning regional efforts to reach international energy and climate goals, as well as increasing energy security. Dramatic reductions in the levelized cost of electricity generated from solar power have provided a powerful signal to both Pacific Governments, finance institutions and project developers, and correlated with increasing finance flows into solar projects (Pastukhova 2022:93). The installed PV capacity in the Pacific has grown at a remarkable average annual growth rate of 33 per cent for nearly two decades (UNESCAP 2022:42).

PSIDS are helping to enable the solar energy transition by investing in enabling regulations and programs. Some PSIDS countries have focused on reducing or eliminating the tariffs for solar panels, batteries, turbines, windmills, and other goods needed for deploying renewable energy projects. Pacific tertiary institutions are also providing sustainable energy related training at all levels – from technicians and installers to system designers and energy management professionals. For example, the University of the South Pacific (USP) is working with the Sustainable Energy Industry Association of Pacific Islands (SEIAPI) to offer accredited solar training courses to regional technicians. UNESCAP (2022) concludes that,

“...if total generation continues to grow at 2 per cent per year and PV generation continues to grow at just half the rate of 2000–2017, which is likely given that the costs of developing

new solar PV will probably be lower than the operating costs of existing petroleum-based generation, PV would account for 43 per cent of generation by 2040". (p.42)

As we shall see in the next section, however, moving steadily toward these goals will require addressing widely known risks which threaten to undermine the legitimacy of the energy transition while also delaying solar energy uptake and making it more costly, as governments and market actors take steps to address modern slavery in supply chains.

SOLAR PV SUPPLY CHAIN RISK

By one estimate, some 97% of global PV solar panels may include components that may have been made by forced labour (Cockayne et al., 2022, 6). In response, a range of safeguard and legal instruments have emerged to manage risks during project development, ranging from forced labour bidder declarations, qualification requirements and strengthened contractual provision in MDB procurements involving financing of solar panels/solar components through to national regulations preventing the import of goods made with forced labour and the use of Tariff Laws to confiscate them. Some development finance institutions and multilateral development banks have begun developing approaches to the risks which will see them stop financing projects and withdraw from relationships that exceed defined forced labour risk thresholds, or where suppliers or clients fail to take required remedial actions within defined periods.

In attempting to exclude modern slavery risks from the solar energy production system, however, complex due diligence requirements or forced labour import bans may slow the critical uptake of solar energy, replacement of expiring capacity, and of overall decarbonization. Cockayne et al., 2022, surmise that while a global roadmap for transitioning the industry to a forced labour-free footing is urgently needed, negotiating the roles of governments, manufacturers, industry associations, investors, civil society – and those vulnerable to or harmed by modern slavery – presents a highly complex public policy problem that “involves long-term and complex reconfigurations of policy, infrastructures, finance and power” (p.8). In the meantime, SPIDS, investors and developers must seek practical ways forward, to increase solar energy generation capacity while also addressing modern slavery risk in the project value-chain.

CASE STUDY: THE AIFFP PALAU SOLAR PROJECT

Launched in 2019, the AIFFP partners with Pacific governments and the private sector to design high impact, safeguarded projects and enable their delivery through up to AUD3 billion in loan financing and up to AUD1 billion in grants. In early 2022, the AIFFP provided USD22 million in financing to Solar Pacific Pristine Power (SPPP) to support the construction of Palau’s first utility-scale solar and battery energy storage facility (the Project).

Located on Palau’s largest island, Babeldaob, the Project will comprise a 15.28-megawatt peak capacity solar photovoltaic facility, and a 12.9-megawatt battery energy storage system. When complete, it will be among the largest hybrid facilities of its kind in the Pacific and generate over 20 per cent of Palau’s energy needs. The Project is wholly private sector-led and demonstrates how Australian financing can leverage and encourage private sector investment to deliver major infrastructure projects in the Pacific, importantly without adding to sovereign debt.

SPPP is a special purpose vehicle incorporated in Palau by Solar Pacific Energy Corporation. Solar Pacific Energy Corporation is a renewable energy developer based in the Philippines and part of the Alternergy group. This investment is an example of the AIFFP’s market leading approach to infrastructure safeguards, financing, innovation, and quality. Indeed, the AIFFP’s investment in Palau

demonstrates that value for money can go beyond more than just price to also encapsulate robust social and environmental outcomes which maximise development impact. The AIFFP is enabling prosperity across the Pacific, and in Palau, by ensuring that all its work enhances locally determined goals and priorities, and strengthens quality infrastructure by elevating climate resilience, social inclusion, and innovation to the forefront of infrastructure investment processes.

The AIFFP is committed to ensuring that its investments are climate resilient; ensuring all its projects respond to climate change risks and impacts, and maximise opportunities for low-emissions, climate resilient development. Like many Pacific and small island countries, Palau is highly dependent on imported fossil fuels to service its energy needs. At present, more than 99 per cent of the island's electricity is generated using automotive diesel, leading Palau's energy sector to issue up to 96 per cent of all national greenhouse gas emissions (Republic of Palau 2019). The AIFFP's investment in the Project was designed in part to assist Palau to meet – and even exceed – its self-determined Paris Agreement emissions reductions targets early; a rare and notable achievement for a country with one of the world's highest per capita greenhouse gas emissions rates (World Bank 2022). For instance, when operational, the Project will immediately and renewably generate over 20 per cent of Palau's energy needs, reducing Palau's energy sector emissions in line with its self-determined commitment of 22 per cent below 2005 levels by 2025 (Republic of Palau 2015). The solar and battery facility will also contribute considerably to Palau's efforts to meet its targets of 45 per cent renewable energy, and 35 per cent energy efficiency by 2025 (Ibid.)

The investment also demonstrates that quality infrastructure can be installed without any ecological cost. Palau is home to the most species-diverse native forests in Micronesia, and many of its plants and animals are rare and endangered (Convention on Biological Diversity). To preserve this pristine ecology, and prevent critical habitat loss, SPPP worked with biodiversity specialists to find an existing site for capital works that was already degraded, and which would be large enough for electricity generation. Months of careful effort and close cooperation with local stakeholders to meet the environmental requirements of Palau and the AIFFP also enabled SPPP to mitigate the risk that the solar and battery facility would damage surrounding pristine environment. For instance, and unusually for a capital works as large as the Palau solar and battery facility, no new roads have been required to allow materials to pass through to the site during construction.

STRENGTHENING SUPPLY CHAINS AND BLENDED FINANCE STANDARDS

The investment demonstrates the benefits offered by a best-practice approach to meeting and exceeding global standards on social and environmental safeguards. In May 2021, a comprehensive due-diligence assessment conducted by the AIFFP found that the proposed provider of the plant's solar modules was procuring polysilicon from factories suspected of using forced labour. As a result, and at the request of the AIFFP, SPPP collaboratively initiated a second procurement to source a new supplier which could demonstrate its supply chain was not exposed to modern slavery. These actions not only ensured that the AIFFP's investment would do-no-harm, but also contributed to measurable improvements in global labour conditions by removing significant Pacific market demand for the exposed forced-labour-exposed polysilicon products. Although the new supplier's technology had a higher unit cost, a careful lifecycle analysis conducted by SPPP demonstrated that the new modules would satisfy all operational and production requirements, including capacity to withstand typhoon strength winds. They also benefited from a supplier led recycling program at end of life. In recognition of the additional and unforeseen project costs generated by the change in supplier, the AIFFP contributed a further USD4 million, alongside the original USD18 million loan, in DFAT funding to ensure that the Project would remain viable. The value of this innovative blended-finance contribution was carefully determined by the AIFFP to ensure that it covered only costs in excess of

what could be funded by the original debt facility, and SPPP's equity contribution. In line with OECD Development Assistance Committee standards for blended finance, this ensured that the AIFFP's additional funding was not market-distorting, and that the updated arrangement would not interfere with a strong market incentive for the borrower to generate commercial returns from the solar and battery facility (OECD 2021).

DISCUSSION

Solar PV technology is the most geographically concentrated of all clean energy technology supply chains, and current investment plans indicate further concentration by 2025 (IEA 2022). One country dominates the majority of the solar PV value chain, including refinement of silicon dioxide (SiO₂) into solar-grade polysilicon (80% of global market as at 2022), number of companies producing polysilicon (7 of the top 10, including the top 3), suppliers of solar manufacturing equipment (10 of the top 10), as well as the balance of module components, the production of inverters that convert direct current (DC) output to alternating current (AC) as well as aluminium and steel frames that are used to mount solar panels (Powell 2022). While such concentration in the supply chain presents risk, it also presents economies of scale: state support and investment for a favourable business environment, cheap coal-generated electricity and low labour costs correlated with solar module costs fall by about 97 percent between 1980 and 2012 (Trancik et al., 2018). It is simply not possible to meet climate targets and drive energy transition through solar PV in Pacific or anywhere without relying on and investing in this concentrated supply chain.

Nonetheless, and amid the broader, long-term and complex reconfigurations of policy, infrastructures, finance and power that will characterise energy transition in the Pacific and beyond, AIFFP's comprehensive supply chain due diligence, close partnership with the project developer and ability to innovate blended-finance solutions in line with OECD standards to offset higher module costs contributed to removing market demand for the forced-labour-exposed polysilicon products in the Palau Solar Project. While AIFFP's blended finance loan/grant solution was ideal for this project, enabling the developer to quickly swap-out risky suppliers and ensure strict offtake contract deadlines could be met, the approach is not necessarily well-suited to all solar projects. Most investors don't have access to grant funds to offset additional costs associated with sourcing solar modules free of forced labour risk. In this regard, the case study may reveal as much about AIFFP's adaptive, tailored approach to solving problems and developing quality infrastructure in the Pacific as it does about scalable, replicable approaches to supply chain risk management for solar PV investors and developers. On the one hand, the case study might remind stakeholders of the important 'stewardship' role investors and lenders have to play in driving change across the PV ecosystem. On the other hand, however, the future investments necessary to meet global climate targets will inevitably have to deal with PV supply chains, and there is a clear demand for improved policy signalling from governments, and preferably on a coordinated basis. Steps toward this future need to encompass not only investors and developers but also manufacturers, major solar energy buyers, key governments and workers.

References

Cockayne, J., Rodriguez Huerta, E., & O. Burcu (2022) 'The Energy of Freedom'? Solar energy, modern slavery and the Just Transition ([the-energy-of-freedom-full-report.pdf](#) ([nottingham.ac.uk](#)))

Convention on Biological Diversity, n.d. [cbd.int](#), Country Profiles: Palau Main Details, accessed 1 June 2022, <https://www.cbd.int/countries/profile/?country=pw#:~:text=Palau%20is%20home%20to%20many,most%20species%2Ddiverse%20in%20Micronesia>.

OECD (2021), The OECD DAC Blended Finance Guidance, OECD Publishing, Paris, <https://doi.org/10.1787/ded656b4-en>.

Powell, J. 2022 [China's dominance of the solar photovoltaic value chain](#)

Republic of Palau, 2015, Intended Nationally Determined Contribution, pp.1

Republic of Palau, 2019. Pathway to 2030: Progressing with Our Past Toward a Resilient, Sustainable, and Equitable Future - 1st Voluntary National Review on the SDGs, pp. 38.

Salem, S. 2020. [Climate Change and the Sinking Island States in the Pacific](#)

Trancik, K., McNerney, J. & G. Kavlak (2018). [Evaluating the causes of cost reduction in photovoltaic modules](#), Energy Policy

UNESCAP 2022 [Pacific Perspectives 2022: Accelerating Climate Action](#)

World Bank Data, [data.worldbank.org](#), CO2 emissions (metric tons per capita) – Palau, accessed 1 June 2022. <https://data.worldbank.org/indicator/EN.ATM.CO2E.PC>