

Independent Completion Review

Australia's contribution to the multi-donor Tonga Outer Islands Renewable Energy Project

Review Report

February 2024

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Acronyms

| | |
|----------------|---|
| ADB | Asian Development Bank |
| AHC | Australian High Commission |
| BESS | Battery Energy Storage System |
| DFAT | Australian Department of Foreign Affairs and Trade |
| DMF | ADB Design and Monitoring Framework |
| ECOS | Electricity Cooperative Societies |
| GAP | gender action plan |
| GEDSI | gender equality, disability and social inclusion |
| GoT | Government of Tonga |
| HOIEP | Ha’apai Outer Islands Electrification project |
| M&E | monitoring and evaluation |
| MEIDECC | Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications |
| MTED | Ministry of Trade and Economic Development |
| NNUP | Nuku’alofa Network Urban Project |
| OIREP | Tonga Outer Islands Renewable Energy Project |
| PCREEE | Pacific Centre for Renewable Energy and Energy Efficiency |
| PMU | (OIREP) Project Management Unit |
| PSC | Project Steering Committee |
| PV | photovoltaic |
| RE | renewable energy |
| SHS | solar home system |
| SOE | state-owned enterprise |
| TA | Technical Assistance |
| TERM | Tonga Energy Roadmap |
| TPL | Tonga Power Limited |
| TREP | Tonga Renewable Energy Project |
| TSDF II | Tonga Strategic Development Framework 2015-2025 |

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Scott Rankin and Rob Passey

Executive Summary

The purpose of this Independent Completion Review of the Tonga Outer Islands Renewable Energy Project (OIREP) was to reflect on and assess OIREP's performance, and the contribution of Australia to the project. The review considered issues related to the overall project's relevance, effectiveness, efficiency, sustainability, as well as efforts focused on safeguarding, ensuring sustainability and localisation.

Led by the Asian Development Bank (ADB) and co-financed by Australia, the European Union, the Second Danish Cooperation Fund for Renewable Energy and Efficiency for Rural Areas, and the Global Climate Facility, OIREP's focus was installation of solar energy capabilities to nine outer islands of Tonga, with the aim of increasing the reliability, efficiency and affordability of electricity on these islands. The project was implemented across a ten year, four phase period with a total budget of USD 28 million, of which Australia contributed around one quarter of the total (AUD 9.58 million).

OIREP's proposed impact was to reduce Tonga's dependence on imported fossil fuel for electricity generation. Its primary outcome was the provision of on-grid and off-grid solar power generation at a reduced cost, and its three major outputs were:

- construction and installation of solar power systems with a total capacity of 1.32MWp on 9 outer islands, including rehabilitation of existing grid networks on 'Eua and Vava'u for on-grid distribution by TPL
- ensuring operations and management knowledge and capacity
- effective and efficient implementation and management

This review found OIREP to be of direct relevance to the needs and ambitions of Tonga given the importance the government and people place on climate adaptation measures and enhancing the country's resilience to climate risk, noting Tonga is one of the world's most climate-vulnerable countries. OIREP's specific focus on the sparsely populated and remote outer islands further enhanced its relevance, given the government has a stated aim of achieving more balanced approaches to development across island groups. Clear sighted, systematic investment in renewal of outer island energy systems is greatly valued by government, given it has helped quickly resolve the significant challenge of modernising outer island energy systems in order that they are more reliable and efficient. It also strengthens Tonga's social contract with remote island dwelling populations, given the economic and social opportunities that improved access to power provides.

The review team also noted the complementarity and appropriateness of the Tonga Renewable Energy Project (TREP) in augmenting the work of OIREP. TREP clearly reflects lessons learned through OIREP implementation and sits as a highly complementary and further evolved program that also places clear focus on outer island renewable energy systems. Alignment between OIREP and TREP is further enhanced by the two project management units of each sitting side by side at MEIDECC, and both being managed by the ADB, and both receiving DFAT funding.

In terms of effectiveness, the project delivered on its commitment to provide 1.32 MWp across nine outer islands, as well as rehabilitation of existing grid networks on 'Eua, Ha'apai and Vava'u. Assessing OIREP work is best achieved through separating out on-grid and off-grid (sometimes referred to as mini-grid) work.

OIREP's on-grid work was always a matter of laying the foundations for further investment in renewables and enjoyed the ease of working through one implementing partner – Tonga

Power Limited – who were incentivised to help ensure the program succeeded given they will manage all on-grid assets post-project. Rehabilitation and modernisation of existing grid networks has been effective in laying a firm foundation for further investment in renewable energy, and in Ha’apai and ‘Eua OIREP also installed valuable solar capacity. These three on-grid networks are now all well placed for further renewable investment, especially Vava’u which remains heavily reliant on diesel generation. Operations and maintenance capability also seems well in hand with TPL technicians confident in and capable of managing the refurbished systems.

Understandably, off-grid (mini-grid) systems on smaller, remote islands present a more significant challenge. While all systems were delivered as proposed in the OIREP design, it is noted that initial design decisions contributed to systems that today are mostly too small to meet demand. This situation relates to initial procurement decisions and under-estimation of growth in demand, which was factored in at 5% per annum, whereas growth has sat closer to 12% across the life of the project. However, growth in demand also highlights the value placed on the project’s contribution at household level.

The upshot of this situation is that there remains significant opportunity to quickly and easily further consolidate and complete the outer island energy grid through targeted add-on investments that respond to the specific needs of specific individual island contexts. Recommendation one of this review is that a ‘feasibility/prioritisation’ study be undertaken to assess options for further topping up and consolidation of OIREP (and TREP_ assets, with the aim of further reducing reliance and cost of diesel generation and moving closer to ‘resolving’ renewable energy on outer islands.

A major concern of this evaluation relates to uncertainty around ongoing operations and maintenance (O&M) of off-grid assets. While it had long been understood that TPL would take on this role, a decision was taken by the government mid 2023 that island-based Electricity Cooperative Societies (ECOS) would play the lead role in post-project management of solar assets, with support of MEIDECC. While this is quite probably a workable solution, systems for operating and maintaining the assets and the associated cost-structures are not yet clearly understood. Nor is the question of whether or not (or to what degree) government subsidies are available to support the costs of electricity on remote islands. Recommendation two of this review is that a thorough review be undertaken to clarify the tariff structures required to sustain off-grid assets, including the availability (or not) of government subsidies to mitigate costs.

It is also noted that these modern solar energy systems are complex and require sophisticated asset management plans. For this to be achieved, it is expected that ECOS will require significant training – training that has not yet occurred due to the expectation that TPL would assume the primary role for off-grid O&M. Currently, there is little clarity around the specific needs of ECOS in terms of capacity strengthening, meaning that the next 6 months will be critical in terms of determining an appropriate strategy and budget for ongoing management of OIREP’s (and TREP’s) off-grid assets.¹

Assessing the efficiency of delivery is complex. Due to the original project design intent which aimed for 50% renewable capacity (which was calculated at or 1.32 MWp in 2012) in its target areas, OIREP was never going to provide renewable systems that fully met demand and ongoing use of diesel was always going to be necessary. The design approach was

¹ It is currently proposed that TREP will close end 2024, with the plan being that many of its assets will also be handed over and managed by ECOS.

premised on spreading the available budget as best it could across an implementation area with electrification needs that spread far beyond the initial resources that were available to the project. With the value of hindsight, it might have been wise at the design stage to go deeper on fewer islands. However, it is noted that there is a significant transaction cost in the actual delivery and construction of solar systems, meaning that there is some loss of efficiency in later augmenting under-designed systems. On the positive side, OIREP and TREP work harmoniously and support each other's work in ways that enhance day to day delivery, and have allowed for topping up by TREP of some under-performing systems installed through OIREP.

Efforts to localise capacity and ownership have been mixed. As mentioned, support to TPL to manage and carry forward OIREP assets and also receive further renewable energy assistance appears to have been effective. Uncertainty over off-grid management has contributed to under-investment in the ECOS, who will play an integral role for at least the next 18 months in managing and troubleshooting off-grid assets. Recommendation three of this review is to clarify government plans for ongoing management of off-grid assets, and whether or not they will be handed over to whoever is responsible for delivery of Tonga's new electricity concession contract come 1 July 2025. Clarifying this now will be key to optimising assistance to the ECOS through MEIDECC.

Project monitoring efforts revolve around the milestone approach of the ADB's standard monitoring system – the Design and Monitoring Framework (DMF). While the DMF is effective in highlighting when delivery does and doesn't occur, and monitoring progress towards stated outcomes and outputs, it is less adequate in terms of facilitating understanding of more nuanced issues, such as: significantly sharper increases in demand than were anticipated; the project's gender and livelihoods impact; factors affecting tariff determinations; and, the on-the-ground efficacy of O&M training – especially on those islands with off-grid systems. This results in project monitoring that is relatively light touch and primarily focused on quantitative indicators. The availability of gender, safeguarding and M&E expertise within the PMU does offer some additional capacity for qualitative enquiry, however it is restricted by being compliance-focused, with efforts primarily ensuring that targets within gender and safeguarding plans were met.

OIREP gender and safeguarding efforts are guided respectively by a gender action plan (GAP) and an Environmental and Social Safeguarding policy respectively. These set out largely quantitative targets which are mostly input-output oriented, with neither approach involving significant depth or qualitative enquiry. More or less these targets were met. However, it is noted that while encouraging anecdotal evidence exists, the GAP has limited capacity to:

- investigate the project's impact on women at the household level, the degree to which they have 'voice', and changes to workload shifts and livelihoods behaviour
- measure project efforts to strengthen women's capacity to actively engage the project and become more substantively involved in energy-related decision-making
- reveal the impact of enhanced access to electricity on other facets of the lives of women living in remote locations

Recommendation five of this review is that a study be commissioned to explore the qualitative impacts of OIREP at household and community levels, given the project modality's potential relevance to other Pacific contexts.

Environmental and Social Safeguard monitoring is conducted bi-annually and is aligned with the ADB's Safeguard Policy Statement and the Government of Tonga's environmental laws

and regulations. Various checklists guide day-to-day safeguards monitoring, which mostly focus on a suite of environmental markers, such as land allocation, site clearing, dust control, noise control, visual amenity and waste disposal. Reporting raises relatively few issues and is light touch, with nothing of significant concern being raised. However, reporting does demonstrate that issues are captured and responded to – especially on smaller, outer islands. Of note is that the Tonga Electricity Commission has concerns that not all OIREP systems have been certified. The ADB and OIREP PMU dispute this. Recommendation seven is that evidence be provided that all OIREP assets are fully certified by the Tonga Electricity Commission prior to project close.

The area of greatest concern in terms of sustainability of OIREP assets relates to exit and handover arrangements for off-grid assets, given the dramatic change in direction that occurred when it was decided that responsibility for maintenance and upgrading of these legacy assets would not be managed by TPL, but by ECOS directly, with support from MEIDECC. While this is a feasible and workable alternative, there is currently uncertainty regarding the needs and subsequent costs entailed in i/ ongoing capacity strengthening of ECOS, and ii/ financing of the regular monitoring missions needing to be undertaken by MEIDECC that are now more important than ever, given the considerable costs associated with travel to and from these remote islands. Recommendation four of this review is that a review be undertaken to assess the capacity of ECOS to act as the central pillar in management, operations and maintenance of OIREP assets through until at least 30 June 2025, and for a relevant training program to be developed.

Sustainability will also potentially be affected by the availability of trained technicians, especially in the context of increasing opportunities for skilled workers in Australia and New Zealand. Recommendation six of this review is that consideration be given to the current context and pipeline of electrical technical training in Tonga to ascertain whether there is sufficient capacity to support and localise Tonga’s energy transition within both the public and private sectors.

Overall, OIREP has made an important and trailblazing contribution to Tonga’s ambition to transition towards renewable energy. By taking on the challenge of rolling out solar energy systems in remote areas, the project has helped strengthen the government’s social contract with remote dwelling populations, and also laid the foundations for easy topping up of both on-grid and off-grid systems. By helping resolve the outer island context, the project has also de facto allowed the government of Tonga to more clearly focus on the challenge of rehabilitating and transitioning its main network on Tongatapu.

1 Introduction

1.1 Investment context

The population of the Kingdom of Tonga is estimated in 2023 to be around 107,000 people. While the total land surface area of Tonga's 171 islands is just 750 sq kms, the country's maritime boundaries cover more than 750,000 sq kms. This highlights the dispersed nature of the archipelago, with the distance between the southernmost island group of Tongatapu and the northern most islands of the Niuaus being more than 600kms. While boat and air travel exist between the main islands, these networks can be unreliable due to weather and other factors, restricting outer island access to services and support.

Just 36 of Tonga's islands are inhabited, with more than 70% of the total population residing on just one island – Tongatapu. This means that little more than 30,000 people are spread across 35 islands, presenting acute issues in terms of the provision of modern infrastructure.

At OIREP commencement, the ADB estimated that 89% of all households across Tonga had access to electricity. Disaggregated, that broke down as 97% of households in urban areas and 86% in the rural parts of islands enjoying access. It was further noted in the OIREP design that about 98% of the total electricity supplied in Tonga in 2011 was grid-connected and generated from diesel, requiring importation of 15 million litres of diesel. This represented about 10% of total gross domestic product and about 15% of total imports. The OIREP Design team assessed that the solar power capacity to be provided by the project would save about 0.48 million litres of diesel per year. ²

In 2021, the ADB undertook a further study which concluded that 97% of urban and 89% of rural households nationwide had access to electricity, and that 14 million litres of diesel was still needing to be imported, but that diesel as a percentage of total imports had dropped from 15% to around 10%. ³

Both studies highlight that Tonga remains highly dependent on imported fossil fuels to meet its overall energy requirements. This has contributed to the Tongan economy and electricity consumers being exposed to high and volatile electricity prices due to fluctuations in the price of oil internationally. According to UK-based aggregate website [Cable](#), Tonga's electricity is the 13th most expensive in the world, at an average cost of USD 0.35 per kilowatt hour (kWh). Furthermore, this research, released in late 2021, found Oceania was the most expensive region in the world, with an average of USD 0.30 per kWh (based on a study of 230 countries)⁴, highlighting the transformational role that renewable energy can potentially play in Pacific economies.

Tonga is also consistently rated one of the world's most at-risk countries across various climate, natural disaster and sea level rise risk assessments. In 2021, the World Risk Report ranked Tonga the third most at-risk country in the world for natural hazards (cyclones, flooding) and sea level rise. This context has helped ensure strong support and commitment across the Tongan population for climate adaptation measures, including the introduction of renewable energy to overcome its historical total reliance on fossil fuelled electricity.

² Report and Recommendation of the President to the Board of Directors - Proposed Grant and Administration of Grant Kingdom of Tonga: Outer Island Renewable Energy Project, Project Number: 43452, June 2013, p.1

³ Initial Environmental Examination; Tonga: 6 Megawatt Hihifo Solar Power Project, ADB, June 2021

⁴ <https://www.cable.co.uk/energy/worldwide-pricing/#regions>

1.2 OIREP background, structure and objectives

In 2013, Australia agreed to co-finance the Tonga Outer Islands Renewable Energy Project (OIREP). The project was led by the Asian Development Bank (ADB) and co-financed by Australia, the European Union, the Second Danish Cooperation Fund for Renewable Energy and Efficiency for Rural Areas, and the Global Climate Facility.

OIREP's focus was installation of solar energy capabilities to nine outer islands of Tonga, with the aim of increasing the reliability, efficiency and affordability of power on these islands. The overall project implementation period was November 2013 – December 2023. DFAT funding ceased on 31st October 2023. The total OIREP budget was USD 28 million, with Australia contributing around one quarter of the total (AUD 9.58 million).

The project was supportive of and in alignment with the Government of Tonga's (GoT) aim to transition to 70% renewable energy by 2025, as well as DFAT's Climate Change Strategy for Action 2020 – 2025, which aims to promote a shift towards lower emissions development in the Indo-Pacific region. The project also aligns well with the Australian Government's new international development policy, launched in August 2023, given its Pacific and climate focus.

In terms of OIREP governance, the Tongan Ministry of Finance was appointed as the executing agency and is responsible for the overall implementation of the project. The Energy Department of the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC) and Tonga Power Ltd (TPL) are the implementing agencies and since 2016 have worked through a Project Management Unit (PMU) which is responsible for day-to-day implementation of the project, in compliance with the provisions of funds and government policies and guidelines, project administration, preparation of withdrawal applications, and maintenance of records.

The proposed **impact** of the OIREP project is to reduce Tonga's dependence on imported fossil fuel for power generation.

The primary **outcome** of the project is the provision of on-grid and off-grid generation solar power at a reduced cost.

The project occurred across four phases and originally had **three major outputs**:

- construction and installation of solar power systems with a total capacity of 1.32MWp on 9 outer islands, including rehabilitation of existing grid networks on 'Eua and Vava'u for on-grid distribution by TPL
- operations and maintenance knowledge and capability
- effective and efficient implementation and management

Development objectives were also agreed with the GoT that align OIREP outcomes with the government's TERM targets:

- Reduced diesel consumption - solar powered electricity generation offsetting that of diesel
- Increased accessibility to electricity - more households connected to the distribution grid
- Improved energy efficiency - reduction in line losses reducing generated power waste
- Lower electrical tariff – tariffs that are ultimately lower tariff than the existing price

1.3 Other Australian renewable energy-related programming in Tonga

More broadly, Australia has been a strong contributor over a sustained period to Tonga achieving its energy objectives, including supporting its transition to renewable energy. Across the period 2010-20, Australia (with development partner support) committed support to the Tonga Energy Roadmap 2010 – 2020 (TERM) – a ten-year plan aimed at providing a workable framework to reduce Tonga’s vulnerability to oil price shocks and achieve an increase in quality access to modern energy services in an environmentally sustainable manner. Australia is a contributor to the Nuku’alofa Network Urban Project (NNUP) which is an electrical network upgrading project being implemented by TPL to upgrade the Nuku’alofa area’s low and high voltage capacities.

Australia also has a long history of engagement in relation to helping secure Tonga’s outer island energy needs. In the early 2000s, Australia funded the Ha’apai Outer Islands Electrification project (HOIEP), which involved the installation of diesel-powered generators and electrical reticulation on four islands in the Ha’apai group.

Australia is also a co-financing partner to the Tonga Renewable Energy Project (TREP) which builds on OIREP objectives by delivering renewable energy mini grids to seven outer islands not included in OIREP. TREP is also increasing Tongatapu’s large battery storage systems.

1.4 Implementation context

According to a recent ADB Review mission, overall implementation progress as of 1 October 2023 was estimated at 84% against an elapsed grant/loan utilization period of 95.48%. Cumulative contracts have been awarded that total US\$26.80 million or 95.48% of the US\$28.07 million project, and cumulative disbursements total US\$24.10 million or 85.87%.

Overall, the project currently has US\$1.27 million in uncommitted funds, of which (i) US\$0.16 million is the interest on the ADB loan; (ii) US\$0.87 million is earmarked for the remaining 5 packages left to be procured; and (iii) US\$0.24 is savings.⁵

1.5 Review purpose and context

The purpose of this Independent Completion Review (hereafter referred to as the Review) was to reflect on and assess OIREP’s performance and Australia’s contribution to the project. This occurred through consideration of issues related to the overall program’s relevance, effectiveness, efficiency, sustainability, as well as efforts focused on safeguarding, ensuring sustainability and localisation. Consideration was also given to Australia’s specific contribution as a member of a multi-partner co-financing partnership.

This Review aims to provide the Australian High Commission (AHC) in Tonga with more general perspectives that could assist Australia in consolidating and further building on its energy investments in both a strategic and efficient manner, including a desire to synchronise efforts at the country level and in forms that are consistent with Tongan Government priorities. More broadly, renewable energy is a central component of Australia’s dialogue with Pacific countries on climate change efforts. It is also anticipated that it will play an even more significant role in Australian development programming

⁵ ADB OIREP Review Mission; 4-12 October 2023; Memorandum of Understanding, p.2

following the announcement of Australia’s new international development policy in August 2023, which places even greater emphasis on climate action.

From this overall effort, conclusions have been reached on program performance and lessons learned, informing recommendations to DFAT and implementation partners aimed at securing sustainability of Australia’s OIREP investment, while also helping inform options for future support to Tonga’s renewable energy transition.

The Review commenced the month prior to the conclusion of Australian support to the project scheduled for 31st October 2023, and continued into November with remote follow up meetings. (The ADB has extended its work through until 31st December 2023.)

2 Methodology

2.1 Review objectives

The Review objectives were to:

- a) assess the performance of OIREP as measured against end of program outcomes and make judgements about likely impact and sustainability of results.
- b) assess whether the activities implemented under the project were implemented in an efficient and effective manner.
- c) assess the value of Australia’s partnership and resourcing and the quality of implementation arrangements.

2.2 Review outputs

- A Review Plan - that detailed the methodologies to be applied, as well as a schedule for in-country field work.
- An Aide Memoire - that presented initial findings and initial recommendations (delivered in an online workshop and in report form)
- Draft and final Review report.

2.3 OIREP monitoring and evaluation processes

OIREP project monitoring and evaluation (M&E) occurs primarily through the ADB’s Design and Monitoring Framework (DMF), which is developed at project inception and used throughout the project cycle for performance measurement of sovereign operations and technical assistance (TA).

The aim of the DMF is to help ensure strong performance and accountability by applying a clear, logical framework to plan, measure and manage a project with a focus on achieving the intended development results. In theory, it aims to facilitate a process of continuous learning and to ensure that decisions to improve performance are evidence-based. By their nature, DMFs are generally guided by quantitative indicators.

An element of this Review was consideration of the effectiveness of the DMF and other ADB systems in project monitoring, and ensuring well-rounded understanding of project performance. DFAT also undertakes parallel monitoring through steps such as the Annual Investment Reporting process, which provides an opportunity to shed light on approaches not reflected within the DMF, such as qualitative performance in relation to gender equality, disability and social inclusion (GEDSI).

2.4 Methodological context

This Review occurred in the context of the OIREP investment being just one of a suite of climate and energy-related investments that Australia has committed to in Tonga. It was therefore important that the Review methodology ensured capacity to reflect on historical project performance, complementary activities (notably TREP) and future opportunities.

The Review ToR also placed emphasis on community-level understanding, including issues such as asset management capacity, access and the degree to which the project was effective in terms of social inclusion and safeguarding.

The methodology proposed for the Review was based upon ensuring a blend of qualitative and quantitative evidence from which conclusions could be reached with regards to the overall performance of the project, and the questions raised within the Review ToR.

In terms of Review implementation, the following approaches were drawn upon:

- **Document analysis** – including review of design and implementation documents; ADB and DFAT reporting; internal DFAT documentation; and DMF and broader M&E documentation.
- **Stakeholder Interviews** – working with the DFAT Post to identify a relevant cross-section of key interviewees from across government, development partners, community and civil society.
- **Community-level engagement** – was also seen as important, requiring meetings with community leaders as well as ‘average user households’. However, this approach was compromised by the limited time spent on each island, as well as the overall time available for field work.
- **Case studies** – were developed to explore the experience of different OIREP user cohorts to help illustrate strengths and weaknesses in program implementation.

A List of interviewees is attached at Annex One.

Tailored key interviewing guides were developed for different OIREP cohorts. Specific questions related to the safeguarding, gender and inclusion dimensions of OIREP programming were integrated within each guide. While guides were developed, key interviews were undertaken in an open-ended manner that was responsive to the context of the interviewee, and encouraging of additional information of importance to be presented and captured as appropriate.

2.5 Risks and Limitations

As mentioned throughout the report, the original (ten year old) design and inception for OIREP carried only limited baseline information. This compromised the evaluation team’s ability to establish firm answers to some key performance-related questions. Of most note, there has been very limited consideration of monitoring, measuring and unpacking a key phrase of the project outcome statement related to provision of ‘solar power at a reduced cost’.

In terms of review methodology, the ability to reach users of OIREP-funded systems was limited, with only very limited time available per island visited to meet with ‘average users’. In general, time limitations restricted ‘user voice’ and left the team reliant on anecdotal evidence of user experience and the contribution of OIREP systems to women’s

empowerment. There remains an opportunity for a more thorough qualitative evaluation of the OIREP beneficiary experience.

2.6 Key Audiences and Use

It is anticipated that the Review will be of interest to a range of audiences. The primary audience will be DFAT providing Post and Canberra-based staff with perspectives that will assist Australia in further building on its renewable energy investments in a strategic and efficient manner.

The Review will also be made available to co-financing partners, in the hope that it will help inform their programming options for Tonga and also their thinking related to the broader Pacific, given the relevance of OIREP-related learning to other Pacific island countries.

3 Key Review Findings

3.1 Relevance and appropriateness to context

As one of the world's most climate vulnerable countries, climate adaptation measures are seen within the government and by the people of Tonga as being both urgent and of critical importance. This is based in three key factors. Firstly, Tonga is severely vulnerable to the impacts of climate change on extreme weather events, such as tropical cyclones, sea-level increases, and changes in temperature and precipitation, which heighten risks posed by drought, flood, and coral bleaching. Secondly, the Tongan economy is heavily dependent on climate sensitive sectors such as agriculture, fisheries and tourism, and a limited natural resource base that is sensitive to external shocks. Thirdly, the agricultural sector is central to livelihoods and supports the majority of the population for subsistence and for cash income, employing a third of the labor force and accounting for at least 50% of export earnings.⁶ Given this context, the GoT is invested in promoting actions aimed at reducing global warming driven by fossil fuels.

The centrality of climate risk to Tonga is reflected in the second Tonga Strategic Development Framework 2015-2025 (TSDFII), which sets out a high-level integrated vision of the direction that Tonga seeks to pursue over the framework's ten-year period, based around seven outcomes. OIREP can be seen to be responsive to several of these outcomes, notably Outcome Six which speaks of the need to ensure resilience to climate risk.

OIREP is also supportive of advancing the GoT's social contract with outer island populations, given its focus on ensuring more equitable access to reliable and affordable electricity for remote outer island communities. This aligns with Outcome Two of TSDF II which identifies the need for more balanced approaches to development across island groups.

OIREP (along with TREP) also helps resolve the complex challenge of financing the adaptation of outer island grids to renewable energy. These islands are lightly populated making it difficult for Government to justify (on a cost-benefit or per-beneficiary basis) the levels of expenditure required to totally restructure outer island grids towards renewable

⁶Reference:

<https://climateknowledgeportal.worldbank.org/country/tonga#:~:text=The%20economy%20of%20Tonga%20i,s,%20sensitive%20to%20external%20shocks.>

energy. By investing broadly (along with TREP) across the most populous outer islands, the project has helped resolve a significant complexity for the Government, helping allow it to focus on other challenges within its energy transition.

Improved and expanded access to electricity also presents livelihood opportunities for remote dwelling populations who have long fallen behind the rest of the Tongan population in terms of information and educational access, economic opportunities and lifestyle improvements enabled by reliable access to electricity.

It is also widely held by different stakeholder groups that OIREP's investment has helped build grid resilience to cyclones through the roll out of new poles and lines, and also the placement of some lines underground. This is backed up by research undertaken by the Institute for Sustainable Futures at the University of Technology Sydney following tropical cyclone Gita, which found that infrastructure upgraded by OIREP on the island of 'Eua proved to be more resilient to the cyclone than did older poles and wires on Tongatapu, which had similar cyclone exposure, with many community members commenting that the new infrastructure appeared to be more resilient to weather, safer and more reliable.⁷

Given the above, OIREP's impact, outcome and major outputs are all relevant to Tonga's context. OIREP aimed to reduce Tonga's dependence on imported fossil fuel for power generation (proposed project impact) and has been successful in doing so with a reduced total amount of diesel imported in 2021 (14 million litres) than was the case in 2012 (15 million litres), despite overall growth in Gross National Income of roughly 20% in the period 2012-2020.⁸ ⁹This has occurred through the provision of on-grid and off-grid generated solar power (proposed project outcome).

The proposed project outcome also suggested that solar power would result in reduced costs. At design in 2013, the average charge for electricity on the outer islands under the then TPL concession was \$USD 0.52c per kwh (TOP 0.92 at the time) on Vava'u, Ha'apai and 'Eua, and \$USD 0.76 (TOP 1.34) on the Niues. Currently, the tariff sits at TOP 91.86 per kwh meaning that prices have more or less stayed the same across the course of the project. However, there are many factors at play in that calculation that have not been fully explored, and the aspiration of reduced costs remains highly relevant in the context of outer island living given that the cost of living is higher in outer islands than on Tongatapu.

At inception, the project set the aim of avoiding at least 2,400 tons (2,310 tons original project + 90 tons of additional financing) of annual carbon dioxide emissions. It is now expected that OIREP will exceed calculated emission avoidance due to off-grid outer islands capacity to operate up to 24 hours on solar and battery, instead of just 18 hours a day.¹⁰

The project's three major outputs were all relevant and appropriate to context and factored in localisation and sustainability considerations. Collectively, they provided a logical foundation for a major transition of outer island power grids towards new systems that were renewable-focused, and therefore climate responsive.

⁷ See https://climatewise.apclimatepartnership.com.au/apex/f?p=208:51:0:::P51_POSTCARD_ID:1382

⁸ <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=TO>

⁹ 2020 chosen as a reference point given the sharp drop in GNI caused by COVID across 2021-2

¹⁰ Report and Recommendation of the President to the Board of Directors - Proposed Grant and Administration of Grant Kingdom of Tonga: Outer Island Renewable Energy Project, Project Number: 43452, June 2013, p.1

While the proposed approach was generally relevant and appropriate, there were some limitations and/or deficiencies, related to i/ the resources available at inception, and ii/ issues related to management and operations and maintenance (O&M) planning into the future. These issues will be addressed in detail within other sections of the report.

Despite being a co-financed project, it is clearly understood across the GoT that Australia is both an important investor and contributor to OIREP. More broadly speaking, the relevance and appropriateness of Australia's overall ongoing commitment to advancing outer island energy grids is clearly recognised by the GoT, with appreciation for the evolution of Australia's investment decision-taking through HOIEP, OIREP and then TREP.

3.2 Project effectiveness and impact

3.2.1 Project outputs and outcomes

The proposed **impact** of the OIREP project is to reduce Tonga's dependence on imported fossil fuel for power generation.

The primary **outcome** of the project is the provision of on-grid and off-grid generation solar power at a reduced cost.

The project occurred across four phases and had **three major outputs**:

- construction and installation of solar power systems with a total capacity of 1.32MWp on 9 outer islands, including rehabilitation of existing grid networks on 'Eua and Vava'u for on-grid distribution by TPL
- operations and maintenance knowledge and capability
- effective and efficient implementation and management

In relation to the first output, the initial design was premised on a target of OIREP achieving 50% renewable energy across its target area. It is assumed that 1.32MWp was the original calculation as to what was required to achieve 50% renewable. However, the evaluation team was unable to locate any baseline data explaining this calculation.

In terms of solar system delivery, **the first output** of OIREP was clearly defined and will deliver the agreed total capacity of 1.32MWp of renewable energy across 9 outer islands by project close, including rehabilitation of existing grid networks on 'Eua, and Vava'u. By this measure, the project fully delivered on its key first output, which in turn established a firm foundation for the project to achieve its intended outcome of 'provision of on-grid and off-grid generation solar power at a reduced cost'.

However, it is also assumed – ten years since inception – that the end result in terms of renewable energy coverage will be far less than the 50% of current demand, given significant growth in demand over the project implementation period.

The question of 'reduced cost' is also complex. As stated above, at design in 2013, the average charge for electricity on outer islands under the then TPL concession was \$USD 0.52c per kwh (TOP 0.92 at the time) on Vava'u, Ha'apai and 'Eua, and \$USD 0.76 (TOP 1.34) on the Niues – meaning that prices have not reduced across the course of the project. However, there are many factors at play in that calculation that have not been fully explored, and the aspiration of reduced costs remains highly relevant in the context of outer island living given that the cost of living is higher in outer islands than on Tongatapu.

In terms of specifications of the different solar systems installed through OIREP, it is noted that many early design decisions resulted in systems that today are too small to meet demand, given they are 1/ of reducing appropriateness to growing demand, 2/ have needed augmentation through batteries (sometimes addressed through TREP), and/or 3/ are degrading at a more rapid rate than intended (due to sub-optimal battery use reducing battery life). In some cases – notably the main on-grid site in Vava’u – the OIREP investment was only ever aimed at the foundational work of grid rehabilitation, while noting that a solar installation has now been contributed through TREP investment.

While initial design decisions were understandably restricted by the available resources, a lesson learnt is that there is a significant transaction cost in undertaking works on remote islands. It is therefore important from an efficiency perspective that design specifications are suitable at the outset to accommodating the inevitable growth in demand that comes with more reliable access. It is also noted that system designs were based on an average increase in demand of 5% per annum, but have averaged higher than 10% across the project lifetime, meaning that OIREP systems are now increasingly inadequate to current needs, resulting in increasing usage of diesel to supplement night-time electricity access.

Another factor affecting early design decisions was that OIREP occurred over four funding phases, meaning that not all resources were available or even known at project onset. This context has been both a strength and a weakness. If final total resources had been known at project outset, it is likely that design specifications would have been different and not constrained by budget uncertainty. However, the iterative nature of funding through a multiphase project has also had benefit in terms of allowing for adaptation and responsiveness to context and events that have unfolded over the course of a ten-year project, which in this case included a massive volcanic eruption and tsunami.

Later tranches of funding allowed the installation of batteries (sometimes occurring through TREP) that enabled electricity access in the evening. However, undersizing of the PV systems at design stage has meant that the batteries are being cycled more deeply and frequently than ideal, which has resulted in them degrading at a more rapid rate than optimal. The upshot of this overall context is that there remains a need and opportunity for further topping up of OIREP assets to consolidate renewable energy performance and further reduce reliance on, and cost of, diesel generation.

One difficult to assess and poorly defined aspect of the project outcome was that the provision of on-grid and off-grid generated solar power would result in electricity at a reduced cost. While this has not been the case in real terms, it is possible that solar power has helped minimise power price increases, as the price of diesel has soared across the latter years of the project period. However, the reality is that no systematic effort has been undertaken to define or measure this metric in any robust way.

The second output of OIREP - relating to ‘operations and maintenance knowledge and capability’ – is poorly defined. The DMF details various milestones around outputs such as a ‘manual for solar electric equipment being finalized’, and an ‘O&M program being designed’ with ‘training for solar electric and hybrid equipment for 5 years after commissioning’. However, there is generally a lack of definition around O&M needs, which has contributed to the O&M budget being significantly underspent as the project approaches closure.

The third output of OIREP - relating to efficient and effective project management – is more clearly defined than output two, with a cross-section of measurement milestones included within the DMF.

Overall, the second and third output descriptions lack granularity in terms of addressing the vastly different needs of those involved in management of TPL assets and those responsible for O&M and mini-grid management on the outer islands. The impact of this lack of granularity around O&M and management approaches has been exacerbated by a lack of clarity within the GoT regarding post-OIREP management of off-grid assets, with a decision taken only months before project closure that island-based Electricity Cooperative Societies (ECOS) would be responsible for management of OIREP assets until end June 2025, when this model will be reassessed. This is discussed in detail below.

Table One below details the current and projected status of islands reliant on off-grid power generation. It highlights that OIREP achieved its ambition of providing 50% renewable power, and helps identify opportunities for augmentation in terms of providing additional battery capacity to further reduce reliance on diesel generation.

Table One: Tongan islands reliant upon off-grid power generation (supported through OIREP and TREP)

| Project | Island Group | Island Name | Number of Households | On Grid or Off Grid | Technology Mix | Generation capacity | Peak Demand | Average Demand |
|---------|--------------|--------------|----------------------|---------------------|----------------------------|--------------------------------|---------------------|----------------|
| OIREP | Ha'apai | Nomuka | 158 | Off Grid | Diesel Gen | 50kW | 17kW (Post Tsunami) | 9kW |
| | | | | | Solar | 100kW | | |
| | | | | | BESS | 108kW/210kWhr | | |
| OIREP | Ha'apai | Ha'afeva | 80 | Off Grid | Diesel Gen | 30kW | 27kW | 10kW |
| | | | | | Solar | 60kW | | |
| | | | | | BESS | 110kWhr | | |
| OIREP | Ha'apai | Uiha | 197 | Off Grid | Diesel Gen | 50kW | 27kW | 11kW |
| | | | | | Solar | 100kW | | |
| | | | | | BESS | 108kW/210kWhr | | |
| OIREP | Ha'apai | Ha'ano | 156 | Off Grid | Diesel Gen | 50kW | 37kW | 14kW |
| | | | | | Solar | 100kW | | |
| | | | | | BESS | 108kW/210kWhr | | |
| OIREP | Niuas | Niuatoputapu | 291 | Off Grid | Diesel Gen | 100kW | 28kW | 11kW |
| | | | | | Solar | 150kW | | |
| | | | | | BESS | 295kWhr | | |
| OIREP | Niuas | Niuafu'ou | 160 | Off Grid | Solar Home System | DC Charge for 2 lights & Phone | | |
| | | | | | Health Clinic Solar & BESS | 5.3kW | | |
| | | | | | Health Clinic Solar & BESS | 56kWhr | | |
| TREP | Ha'apai | O'ua | 36 | Off Grid | Solar | 61.2kW | | |

| | | | | | | | | |
|------|---------|----------------|-----|----------|-------|-------------|--------------------|--------------------|
| | | | | | BESS | 696kWhr | Construction Phase | Construction Phase |
| TREP | Ha'apai | Tungua | 49 | Off Grid | Solar | 72kW | Construction Phase | Construction Phase |
| | | | | | BESS | 696kWhr | | |
| TREP | Ha'apai | Kotu | 51 | Off Grid | Solar | 72kW | Construction Phase | Construction Phase |
| | | | | | BESS | 696kWhr | | |
| TREP | Ha'apai | Mo'unga'one | 26 | Off Grid | Solar | 50.4kW | Construction Phase | Construction Phase |
| | | | | | BESS | 464kWhr | | |
| TREP | Niuas | Niuafu'ou | 170 | Off Grid | Solar | 250kW | Construction Phase | Construction Phase |
| | | | | | BESS | 2,552kWhr | | |
| TREP | Vava'u | Hunga | 83 | Off Grid | Solar | 72.24kW | Design Phase | Design Phase |
| | | | | | BESS | 1,231.2kWhr | | |
| TREP | Vava'u | Kapa (Falevai) | 37 | Off Grid | Solar | 27.52kW | Design Phase | Design Phase |
| | | | | | BESS | 437.76kWhr | | |
| TREP | Vava'u | Kapa (Otea) | 40 | Off Grid | Solar | 30.96kW | Design Phase | Design Phase |
| | | | | | BESS | 510.72kWhr | | |
| TREP | Vava'u | Ofu | 52 | Off Grid | Solar | 41.28kW | Design Phase | Design Phase |
| | | | | | BESS | 684kWhr | | |

It is important to note when reviewing Table One that the OIREP-supported generation systems are based on a mix of solar PV systems, diesel generators and batteries. In all cases the solar PV capacity is double the diesel generator capacity, apart from Niuatoputapu where the solar PV is 50% greater. The batteries were deliberately sized to provide power capacity (kW) similar to the solar PV capacity, and energy capacity (kWh) roughly double the power capacity – which is technically referred to as ‘2 hour battery’ – meaning the objective of two hours of battery capacity.

During the review, it was reported that the batteries do not last as long as expected, which requires that diesel generators turn on sooner and operate for longer than desired – and at additional expense. This could be explained by a range of factors, but is most likely simply because electricity demand has increased at a greater rate than expected (which was calculated at 5%, but has been closer to 10% on average). This results in more solar being used during the day, meaning that less energy is available to charge the batteries. Come night, there remains increased demand, which partially charged batteries are unable to meet for long (in some cases as little as 15 minutes). This situation can also lead to deeper and more frequent cycling of the batteries which increases their degradation rate, which in turn would reduce both their available capacity and their lifespan.

While using a ‘4 hour battery’ (instead of a ‘2 hour battery’) would provide additional capacity for use overnight and during cloudy periods, this would not help if there was insufficient solar generation to charge them. Also, with a combined solar/battery/diesel system, inclusion of a longer energy capacity battery may not be cost-effective, and would only be pursued if the aim was to remove diesel generation entirely – as has been the case on TREP islands.

Table Two: Tongan islands currently with no renewable energy systems, and estimates of their potential need

| Island grouping | Location | Est. pop-ulation ¹¹ | PV kW + BESS kWh | Approx. USD \$ |
|-----------------|-----------------|--------------------------------|-------------------|----------------|
| Vava`u | Nuapapu Island | 86 | 160 kW + 1460 kWh | 3.52 M |
| | Kapa Island | 30 ¹² | 200 kW + 1860 kWh | 3.99 M |
| | Taunga Island | 36 | 59 kW + 470 kWh | 1.32 M |
| | Ovaka Island | 95 | 59 kW + 470 kWh | 1.32 M |
| Ha`apai | Lofanga Island | 126 | 59 kW + 470 kWh | 1.32 M |
| | Matuku Island | 84 | 50 kW + 390 kWh | 1.10 M |
| | Fonoifua Island | 69 | 50 kW + 390 kWh | 1.10 M |
| | Mango Island | 36 | 50 kW + 390 kWh | 1.10 M |
| | Fotua Island | 235 | 50 kW + 390 kWh | 1.10 M |

¹¹ Population numbers sourced from 2021 Tongan census

¹² 2 of the three villages on Kapa (Otea and Falevai) are already covered through TREP savings. Given Kapa village has a population of only 30 people, it is likely the estimated costs here refer to something more sophisticated than just serving the Kapa population.

There are also several smaller islands that have as of yet received no support in terms of solar energy systems. Table Two above represents the majority of the remaining islands with any significant population, and reflects information prepared by MEIDECC for potential donors. The primary issue with these smaller islands in terms of rolling out solar systems is that the establishment cost per household becomes very large and hence the effective tariff (if calculated at purely market rates) becomes even more unattractive.

3.2.2 What were the most significant results achieved by the project?

3.2.2.1 Output One - Construction and installation of solar systems

Table One above details OIREP delivery by island. Completed phases of OIREP work are as follows:

- i) Phase One on-grid generation - installation of solar photovoltaic generators and connection to the existing distribution networks (200 kWp on 'Eua, 'supervisory control and data acquisition' repair program on Vava'u, and 550 kWp on Ha'apai with 330 kWp of batteries).
- ii) Phase Two mini-grid generation - installation of 6.5 kWh of batteries across 130 solar home systems (SHS) on Niuafu'ou, as well as a new solar system for the Health Clinic and 160 kWp SHS on Niuafu'ou.
- iii) Phase Three on-grid distribution - rehabilitation of 100% of existing grid network on 'Eua.

Ongoing works in relation to Output One are as follows:

- i) Phase Two mini-grid generation - solar photovoltaic generators are still to be installed and connected to existing community-owned and community-managed electrical mini-grids on 4 Ha'apai outer islands:
 - 100 kWp of solar and 210 kWh of batteries on 'Uiha
 - 100 kWp of solar and 210 kWh of batteries on Nomuka
 - 100 kWp of solar and 210 kWh of batteries on Ha'ano
 - 60 kWp of solar and 110 kWh of batteries on Ha'afeva
 - 150 kWp of solar and 295 kWh of batteries on Niuatoputapu
 - *To be completed by 30 November, 2023*
- ii) Phase Three on-grid distribution - rehabilitation of 100% of the existing grid network on Vava'u
 - *To be completed by December 31, 2023*
- iii) Phase Four – mini-grid distribution - upgrade of the existing service lines on 4 Ha'apai outer islands and the construction of a new mini-grid on *Niuatoputapu*.
 - *To be completed by December 31, 2023*

Outer Island Institutional Set-up Consultations:

MEIDECC continues to carry out consultations, formalizing institutional setups and conducting training for the O&M work on the 4 Ha'apai outer islands and on Niuatoputapu. The consultations are continuing and will be completed by December 2023. However, a lack of clarity remains regarding future O&M of off-grid assets.

Tariff uncertainty

Lightly populated, isolated islands, such as those targeted through OIREP, face unique challenges in terms of providing electrification. Power systems generally face inhospitable environments, including salt spray and high wind loadings. Being isolated, the capital costs involved with setting up systems are high, as are the operational and maintenance costs. It is also common that technical issues may take longer to fix than desirable, which can compound existing problems. Remote islands also present organisational problems relating to monitoring the technical health of systems (so that experts can be called in) as well as administrative issues such as collection of payments. Furthermore, many of the expenses are more or less fixed, making it very likely that islands with lower populations will face disproportionately higher costs of electricity supply if real costs are applied.

The context of islands reliant on off-grid power generation is further complicated by changed thinking around post-project management of OIREP assets, with a late decision taken for this to occur through local Electricity Cooperative Societies (with support from MEIDECC), and not through TPL as had been originally conceived. Currently, it appears that ECOS with MEIDECC support will operate and be responsible for OIREP systems commencing 1 January 2024 through until at least 30 June 2025, when Tonga's new electricity concession contract negotiations will have been concluded.

However, questions exist over whether the ECOS have the capability to fulfil their role, given uncertainty over their technical understanding, their ability to recruit technical staff to support day to day operations, how and by whom decisions will be taken on tariff setting for off-grid power, and whether or not government subsidies are available to reduce costs.

Both MEIDECC and an OIREP funded O&M Consultant have recently estimated the tariffs required for financial sustainability of the OIREP grids on the four Ha'apai islands (Nomuka, Uiha, Ha'ano and Ha'afeva) and the Niuas island of Niuatoputapu. Although they use the same assumed capital replacement costs, MEIDECC and the consultant use different methodologies to calculate the final tariff. The O&M Consultant's report uses the TPL tariff model which results in tariffs that range from TOP \$1.34/kWh (Ha'afeva) to TOP \$4.40/kWh (Niuatoputapu) for 2024, which if applied as a single tariff for OIREP islands would be TOP \$2.10/kWh. MEIDECC's method results in tariffs that are significantly less: ranging from TOP \$1.10/kWh (Ha'ano) to TOP \$1.44/kWh (Niuatoputapu).

The O&M Consultant's report further calculated that if OIREP systems are incorporated into TPL's Concession Contract, this would increase TPL's uniform tariff by TOP \$0.0264/kWh from TOP \$1.1672 to TOP \$1.1936/kWh (calculated at July 2022). At that time the consultant calculated an average tariff of TOP \$1.20/kWh - slightly more than the TPL rate. Although this assumed a significant cross subsidy would be available. From July 2020 to June 2021, users on the main island of Tongatapu paid on average a 6% subsidy to cover the costs of outer islands, with the result being that Vava'u, Ha'apai and 'Eua received 40%, 40% and 26% subsidies respectively. MEIDECC estimates for post OIREP tariffs factor in a 20% subsidy, however it is still unclear whether the Tongan government is willing to provide a subsidy, or how much that subsidy would be.

Given this confused context, it is recommended that independent analysis of the tariff context be undertaken by someone familiar with the workings of the Tonga and Outer Islands electricity system. It should ideally include a stocktake/audit of all OI sites, both OIREP and TREP, and should include not only their current status, but the need for replacement capital expenditure as well as any additional capital expenditure required to meet increased demand. This study should also characterise the different levels/types of O&M required for each island, the types of training required for each island - both technical and administrative, and work to clarify if subsidies are available to help reduce costs of Tongans living on islands reliant on off-grid power systems. This latter point re subsidies might well need support and advocacy from the Australian High Commission and ADB, since there is an urgent need for a clearly articulated position to be reached that enjoys endorsement of the Prime Minister and Minister of MEDIECC, and other key decision-makers.

TPL's commitment to maintenance can be safely assumed, since there is a strong business case for TPL ensuring they are consistently functioning. Less certainty can be assumed regarding outer island mini-grid O&M given there continues to be a lack of clarity around who is responsible, and how O&M will be ensured.

3.2.2.3 *Output Three – Project Management*

The current PMU functions well and maintains close and effective relationships with both TPL and MEIDEC. The inclusion within the PMU of a 'Social Gender Development Safeguards and M&E Specialist' has helped ensure project compliance with the project's Gender Action Plan (GAP) and Safeguarding plan.

3.2.3 **What evidence is there of impact?**

As will be discussed throughout this report, project M&E systems are relatively light touch and poorly positioned to reach clear, evidence-based conclusions around project impact. However, substantial anecdotal evidence surfaced through the review process that indicated project impact at different levels.

Household level impact

A significant finding of the review relates to there appearing to have been little if any reduction in electricity costs charged to consumers. It was difficult to fully interrogate this, but it appears to relate to a confluence of issues including the initial design decision that the target for OIREP solar was only 50% of electricity demand; that the price of diesel has increased significantly across the implementation period; and that tariffs need to factor in issues such as the cost of staff to manage the solar systems, administration and future capital replacements.

This is a source of frustration amongst consumers, since it is standard for households to have assumed that renewable energy would result in lower prices. While there are many extenuating circumstances affecting prices, these have not been effectively communicated to consumers. An insufficient communications approach has also contributed to limited appreciation of the environmental benefits of renewable energy.

There is also general uncertainty regarding tariffs and tariff structures, especially in relation to islands reliant on mini-grids for their power supply. This is described on the page above in "Tariff Confusion", but will also be discussed in more detail later in the report, but generally reflects a lack of clarity around the total cost of maintaining a mini-grid over time, and also whether there is an appetite within government to subsidise energy costs of outer islands.

Anecdotally, there have been important social benefits emerging from OIREP investments related to business, social and educational outcomes. Stories exist of small-scale livelihood opportunities that have been increased by access to reliable daytime electricity supply; womens' workloads having been transformed by near 24/7 power supply reducing their need to work in the evenings (when electricity from diesel generators was available); businesses having grabbed opportunities, and children no longer needing to attend boarding schools on larger islands to ensure they have sufficient light and energy access to succeed at their schooling.

Deeper investigation of this nexus would be worthwhile. Is there a clear correlation between the increased electrification and broader social benefits, such as improved education outcomes, the creation of employment/business opportunities, and impacts on women's workloads and inclusion?

More broadly, the situation also brings into question the suitability of the ADB DMF to Australian reporting needs, given growing emphasis placed on demonstrating progress on GEDSI issues.

Tonga Power Limited

As Tonga's primary agent for delivery of electricity, TPL has benefited significantly from the rehabilitation and expansion of its outer island solar assets through OIREP. Through interviews with TPL's senior leadership, as well as technical staff at sites in 'Eua, Vava'u and Ha'apai, it is clear that TPL staff benefited from the training and support provided through OIREP, and have developed the skills necessary for management, operations and maintenance of OIREP-provided solar assets post project closure. Progression of this general organisational capacity also positions TPL well in terms of paving the way for further expansion of solar assets in years to come.

National level

Determining national level impact is difficult, in part because of the absence of a robust project baseline and a qualitatively focused M&E framework. However, interviews with national-level actors did highlight the importance of the OIREP contribution to the national energy challenge.

Firstly, OIREP has contributed to Tonga progressing towards its renewable energy targets - 50% by 2020 (missed) and 70% by 2025. OIREP renewable energy systems are working as expected and are therefore contributing to meeting Tonga's renewable energy target as well as increasing the percentage of the population with access to electricity. Rehabilitation of antiquated and wasteful grids has also been effective in increasing usage efficiency and reducing line losses. According to the original grant proposal of 2013, the solar power capacity provided by the project would save about 0.48 million litres of diesel per year.

Being focused on particular outer islands, OIREP is only catering to a small percentage of the overall national population. However, there is great appreciation within the GoT that the intensive effort that OIREP has placed on resolving outer island energy needs has helped resolve a significant challenge – given it is difficult to justify in terms of crude cost-benefit analysis. By helping resolve the outer island energy context (along with TREP), OIREP has helped allow the government to more clearly focus on resolving Tongatapu's energy issues.

Another way of framing OIREP's contribution to the development context of the outer islands is through the lens of the 'social contract' that the government has to citizens in remote locations, and its ambition to ensure equal opportunity to those living in more populated areas. When viewed through this lens, OIREP's (anecdotal) impact of helping facilitate more equitable opportunities for remote dwelling citizens can help address any concerns re 'project cost-benefit' given the limited number of beneficiaries on lightly populated remote islands.

3.2.4 How well was OIREP managed from a partnership and policy dialogue perspective?

The ADB's primary partner in Tonga is the Ministry of Finance, which is charged by the Tongan government as the executing agency responsible for overseeing implementation of OIREP. The implementing agencies are the Energy Department of MEIDEC and TPL, with the PMU responsible for day-to-day implementation of project activities, in compliance with the provisions of the grant/loan agreements and government policies and guidelines.

It is important to note that the PMU was only introduced to support OIREP implementation in 2016. Introduction of an appropriately staffed PMU is widely reported to have strengthened project management, responsiveness and accountability.

In terms of partnership and policy dialogue, the ADB works through the MoF at an official level but is most engaged with MEIDECC and TPL, given their respective responsibility for management of mini-grid and on-grid assets.

OIREP exists within a portfolio of renewable energy projects being delivered in Tonga, with the ADB responsible for managing many of these projects (often with Australian funding support). While the ADB takes care to manage each project individually, ADB management also occurs at a broader 'energy portfolio' level when it comes to partnership and policy dialogue. This has been a significant strength, since it allows for consideration of synergies between projects, and demonstrates to the GoT that Tonga's energy needs are being considered holistically.

This is especially the case with OIREP and TREP, which are in many respects collectively managed to maximise the synergies that exist between the two projects and their objectives, given both place significant focus on outer island needs. In many respects, TREP emerged from dialogue around OIREP's approach and weaknesses, and was designed to both address the remaining outer island needs, and to adapt and build off lessons learned from OIREP implementation.

The AHC has also been utilised by the ADB as an ally within policy dialogue, given its role as Tonga's leading bilateral donor and as a donor committed to climate issues and renewable energy.

One complexity related to partnership arrangements is that TPL (an SOE) and MEIDECC (a government agency) are very different organisations dealing with very different challenges, and requiring very different types of support and engagement. The challenge posed by this diversity has been exacerbated by there having been shifting goalposts around post-project management of mini-grid assets, which appears to have caught all parties by surprise.

3.2.5 What were the enablers and barriers to success?

The key enabler of OIREP's success has been the clear alignment between GoT priorities and OIREP outputs. Climate action is of existential importance to the government and people of Tonga, requiring a whole of nation response. Donor willingness to step into the space of setting up solar systems on the outer islands was greatly appreciated by the government, and has helped fast track an outcome that otherwise would have been a long time coming.

Procurement decision-making also impacted success (noting that early procurement decisions were affected by the cutting-edge nature of the technology and uncertainty regarding future funding). As mentioned, solar system design specifications appear (with the value of hindsight) to have not adequately reflected predictable growth in demand. Contractor selection was also influential in terms of system delivery, with the Spanish provider of mini-grid systems (GAMMA) presenting various challenges throughout implementation in terms of timeliness of delivery (significant COVID related delays) and quality of structures (notably the robustness of mini-grid solar panel framing which required retrofitting to strengthen structures). GAMMA's selection was due in large part to an ADB system requirement that they accept the lowest conforming bid. However, ADB procurement systems have since been modified to allow for review of 'abnormally low bids',

which could potentially address some procurement issues faced during OIREP implementation.

While project outputs were delivered as detailed, communications of messages related to key program implementation issues were light touch and have contributed to limited understanding in the general population of key issues such as pricing and tariff structures, and the contribution of the project to addressing climate change.

Similarly, while program M&E was adequate to track higher-level program performance, it was poorly positioned in terms of tracking the impact of improved energy delivery on households, livelihoods and workloads.

Case Study: Reliable electricity access - an economic stimulus.

On 'Eua, the family of Fila Vave have long run a small store selling a range of household consumer goods to the local community. However, the range of goods he was able to offer was restricted by the irregularity of the power supply, since there was significant risk stocking anything that required refrigeration. With the arrival of reliable electricity through OIREP, Fila Vave has been able to significantly expand the range of goods he is offering by purchasing a refrigerated container. This has had multiple positive impacts for his business. He has also been able to purchase a broader range of goods in higher volumes. This has offered consumers greater choice and reliability in terms of the goods on offer. By buying in greater volumes, he has also been able to reduce many of his prices, making the business a more attractive shopping option. Since having more reliable access to electricity, he has moved from having three to seven employees, and is now looking at more general expansion of his business interests to include accommodation, a café and plans for a restaurant.



Store-owner Fila Vave with DFAT Program Manager Edwina Tangitau

3.3 Implementation efficiency

3.3.1 Did project implementation occur efficiently?

Solar system generation was correctly sized for demand in that the original aim was to achieve 50% of demand being met by renewables. While this means that the project has fully met its brief in terms of delivery of proposed assets, there is a question over whether or not this was the most efficient way of addressing the costly challenge of resolving the transition of outer-islands towards renewable energy. Would it have been more cost-effective to more fully address individual island needs than simply target 50%, given the transaction costs of building systems in remote, under-resourced locations? As things currently stand, without further augmentation of renewable systems and batteries, diesel usage will rise to meet growing demand.

Growth in demand appears to have also been under-estimated. Systems were designed on the basis of an estimated 5% increase per annum in demand. However, growth in demand

has mostly sat at higher than 10% across the project lifetime, meaning that current renewable systems are increasingly inadequate to needs, resulting in increasing usage of diesel and/or reduced availability of electricity on some islands.

In terms of procurement, ADB procurement systems require that the lowest cost conforming bid be accepted. This resulted in a different contractor (GAMMA) being selected for mini-grid outer island work than for the on-grid work, with implications including framing of mini-grid systems being significantly lighter than that provided to the on-grid solar farms. While rectification has occurred, some concerns remain as to the capacity of mini-grid solar farms to withstand extreme weather.

In terms of cost, a competitive process was followed, with bids reviewed by people with a good understanding of reasonable costs for solar system installation in the Pacific. Beyond that, it was not possible within the scope of this review to do a thorough assessment of the cost of systems installed over the past five year period.

Some delays have been experienced with system installation, especially the mini-grid systems where timelines were affected by COVID-19 and the availability of the contractor. Entry restrictions imposed by the Tongan government in relation to COVID also impacted timelines. The shift of responsibility for the project in 2018 from ADB headquarters in Manila to the ADB's South Pacific Support Office in Fiji appears to have helped ensure more responsive project management and reduced delays.

3.3.2 Were monitoring and evaluation systems suitable to ensuring project efficiency?

The milestone approach of the DMF is effective in highlighting when delivery does and doesn't occur, as well as progress towards higher-level key outcomes and outputs – as defined in the DMF. However, it is less adequate in terms of facilitating understanding of more nuanced issues, such as significantly sharper increases in demand than were anticipated, gender and livelihoods impact, and factors affecting tariff determinations.

As already indicated, an observation of this review is that project monitoring and evaluation is relatively light touch and overly focused on quantitative indicators. Overall, the project would have benefited from a more rigorous approach to ensuring depth of understanding of different qualitative and quantitative aspects of implementation.

The availability of gender, safeguarding and M&E capacity within the PMU does offer some additional capacity for qualitative enquiry, however it appears to be restricted by being compliance focused, with efforts primarily focused on ensuring that targets within gender and safeguarding plans were met. The PMU has also utilised social media to showcase gender and safeguarding performance.

An M&E system that more deliberately set about capturing in-project trends around demand increases, tariff structures, and asset governance and O&M would allow greater responsiveness to shifts in the implementation landscape, and provide line of sight to adjustments that could potentially contribute to greater efficiency. It is noted that an important amount of informal information gathering occurs in terms of day-to-day interactions between the PMU and TPL, MEIDECC and community members resident in outer islands. However, this is not systematically captured and vulnerable to not being acted upon as it is gathered.

3.3.3 Is the project well harmonised with other partners and projects of relevance?

The ADB takes lead responsibility for partner liaison. While the project enjoys contributions from multiple financiers, the ADB and DFAT are by far the most active contributors to day-to-day project governance.

As already mentioned, the ADB and DFAT work closely in terms of management of their collective portfolio of energy-related projects, and enjoy easy and effective collaboration with both TPL and MEIDECC, who appreciate the two agencies as central and active contributors to Tonga's energy transition.

While the Project Steering Committee (PSC) draws all key actors together, there appears to be an opportunity for the project to more pro-actively bring TPL and MEIDECC together to resolve complex issues such as the management of off-grid islands, especially regarding O&M into the future.

One ministry worthy of greater engagement is the Ministry of Trade and Economic Development given its responsibility for policy and financial oversight of Cooperative Societies, such as the ECOS that will assume responsibility for management of OIREP's off-grid investments for at least the period 1 January 2024 through until 30 June 2025.

3.3.4 To what extent were implementing partners sufficiently accountable to, and engaged with beneficiary communities?

Feedback loops with/from beneficiary communities seem light touch, with only limited engagement of on-grid power consumers and little understanding within the community of their right to impact project decision-making and direction-setting. Much of the feedback occurs as part of the project's Environment and Social Safeguarding work, which reports six monthly and is led by the project's Social Safeguards Specialist.

TPL also has accountability mechanisms in place, but these are more directed towards managing complaints than seeking up-front input into project design.

Engagement of the ECOS management committee - who are central to off-grid system management - is more robust, but there appears to be very limited engagement of community members beyond those active in the management committee. This feeds into the lack of textured, evidence-based understanding as mentioned above regarding household-level impact.

Restricted engagement of 'solar energy users' also contributes to limited understanding of the complex mechanics of solar electricity system management, factors affecting tariff decision-making, and the project's contribution to climate-change abatement and the environment. This lack of engagement of the broader population is impacting support for the project, given frustration that electricity prices have not reduced. It is also affecting issues such as energy efficiency, with households often leaving lights on all day since the energy from the sun is 'free'.

3.4 Localisation

Localisation efforts of OIREP are best viewed through the lens of OIREP being one component of a broader, longitudinal program effort being undertaken by Australia to build the necessary capacity to progress Tonga away from fossil fuel reliance and towards a renewable energy future – bookended by other projects such as HOIEP and TREP, but also including NNUP.

Before assessing progress with localisation efforts, it is important to reflect on the significantly different context of OIREP's two primary delivery partners - TPL and MEIDECC – since it is understandable that localisation efforts vary by partner due to their context.

TPL is a state-owned enterprise and responsible for the generation, transmission, and distribution of electricity in Tonga. It was established in 2008 to act as the concessionaire in Tonga's concession-based electricity regulation regime. This concession will expire in 2025, with negotiations of a new concession to commence in 2024. While it is expected that TPL will be awarded the new electricity concession, it remains the cause of some uncertainty with some variables in how a new concession might be conceived.

According to *Finding Balance*, a study undertaken through the ADB's Pacific Private Development Initiative project that benchmarks performance of Pacific SOEs:

TPL is a vertically integrated state-owned power utility which produces and delivers about 90% of the power consumed in Tonga. It is subject to the government's climate change mitigation and adaptation policies, most notably the renewable energy targets articulated in the Tonga Energy Roadmap (TERM) and Tonga Strategic Development Framework II. TPL has incorporated the TERM target of 50% diesel fuel savings by 2020 and Strategic Development Framework target of 50% renewable energy by 2025 into its business plan, and is working towards TERM's goals of 70% renewable electricity by 2030 and 100% by 2035. While TPL has not yet achieved the 2020 goal of 50% diesel fuel savings¹³, it has increased the share of renewable sources of fuel from 8% in 2015 to 13% in 2020. In 2021, renewables accounted for 11.5% of total generation.¹⁴

As an SOE, TPL is expected to be self-sustaining and commercially viable. Historically TPL has been a profitable firm, and Tonga's most profitable SOE.¹⁵ At the same time, it experiences pressure from government to keep prices in check, which can run counter to its commercial viability. A recent report benchmarking Pacific SOEs noted that "Despite Tonga's robust governance and monitoring framework, maintaining commercial returns requires ongoing political commitment at the highest level. Pressure continues to be placed on some SOEs, most notably TPL, to provide services below their true cost."¹⁶ Furthermore, TPL is currently without a CEO and is experiencing some staffing challenges related to staff turnover and skilled staff taking up opportunities in Australia, New Zealand and elsewhere.

By contrast, MEIDECC – the Ministry for Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications - is a government ministry overseeing a vast range of different activities relevant to OIREP. However, as a government ministry, it often faces challenges related to resourcing, staff churn and its obligation to respond to shifting policy directions. Changes in government also present challenges for the Energy Department in terms of needing to reassess and adjust its approach to meet new requirements.

OIREP's primary partner within MEIDECC is the Energy Department, which is responsible for the country's energy planning and development. However, within OIREP, the Energy

¹³ For fiscal year 2020, Tonga Power Limited estimated the fuel saving from renewable energy at 2.3 million litres, for a total fuel displacement of 14.5%.

¹⁴ See *Finding Balance: Benchmarking Performance And Building Climate Resilience In Pacific State-Owned Enterprises*; 2023, p. 64

¹⁵ *Ibid*, p. 61

¹⁶ *Ibid*. p.62

Department has needed to take on a more hands-on role in terms of supporting construction of off-grid solar assets, and also planning for their O&M given that the solar assets now needing to be managed are more technologically sophisticated than the diesel generators that outer island populations have been used to managing.

It is important to note that the project's localisation planning with regards to off-grid assets has been significantly impacted by a change in plans for their O&M. All parties – PMU, TPL, MEIDECC and ADB – have been working on the understanding that TPL would assume responsibility for off-grid assets. However, in July 2023, this changed with an alternative approach emerging – which was continued management of assets post-OIREP by the island-based ECOS. Further complicating matters was the fact that this decision seemed not to have been definitively taken, with uncertainty even at the time of this review over whether TPL or MEIDECC would be responsible for off-grid asset oversight. The latest information suggests that it is now near certain that MEIDECC will be tasked with providing support to ECOS in oversight and management of off-grid assets through until mid 2025 – a date which will coincide with final decision-taking and commencement of Tonga's new energy concession, which will be negotiated between now and then.

These contextual issues faced by both TPL and MEIDECC are significant in terms of OIREP efforts to build capacity and promote ownership, and will be discussed in more detail below at 3.4.2.

3.4.1 To what extent did the project strengthen skills, capacity and leadership within implementing agencies?

Both TPL and MEIDECC speak positively of the support they have enjoyed through OIREP (and TREP) to systematically build and progress their institutional capacity, and also the capacity of local operators. In the case of TPL, 'local operators' are those technicians working at TPL-run on-grid facilities in 'Eua, Ha'apai and Vava'u. While somewhat remotely located, these training recipients are relatively easily engaged.

'Local operators' in the case of the smaller outer islands refers primarily to members of the island based-ECOS, who have been receiving support from MEIDECC, and present a far more significant challenge in terms of logistics, capacity development and retention – with it common for people (especially men) to locate away from an island as opportunities arise – including seasonal opportunities such as the Pacific Australia Labour Mobility scheme.

TPL

Support over the years to TPL has been effective in fostering capacity for management of solar power, especially on-grid contexts. OIREP has also de facto helped consolidate TPL's operating position given that it has significantly expanded its asset base and opportunities for generating additional income through expanded use of electricity.

In terms of training, TPL staff received a systematic portfolio of training opportunities through OIREP, occurring under the banners of i/ project planning and asset management maintenance, and 2/ procurement, anti-corruption, and safeguards, and iii/ strengthened awareness and capacity to integrate gender considerations within day-to-day operations. TPL also benefits from training coming through other renewable energy focused projects,

As indicated above, the nature of the DMF system for monitoring is very input-output related, which means in this case that delivery of the training is the output, rather than measurement of the capacity that it developed.

However, interviews with TPL staff at site demonstrated clear confidence to both manage and maintain the OIREP installed systems, and to also integrate other renewable assets into outer island grids – including through TREP.

As mentioned in more detail below, safeguarding plans are in place to which TPL align and report, with no significant issues having been reported.

TPL management also speak of their growing confidence and capacity in terms of being more gender responsive. In particular, they spoke very positively of the women they have recruited to work in skilled positions, and how this has transformed their thinking on the potential contribution of skilled women technicians in the organisation.

MEIDECC

In many instances, MEIDECC has received training alongside TPL. They have also been provided additional training in terms of positioning them to support smaller, off-grid installations on outer islands. This is appropriate given that systems and capacity in relation to off-grid solar assets on smaller outer islands are far more complicated, and capacity and access issues more acute.

ECOS members have also had access to training through OIREP. This has primarily focused on asset management. Efforts have also been made to strengthen understanding of ECOS around demand side management of the Societys' customers. Efforts have also been made to enhance ECOS management capacity, including supporting greater levels of women's participation in Societies. MTED also provides support to Societies in terms of bookkeeping and financial literacy, and undertakes annual auditing.

While this constitutes a reasonable approach to strengthening local capacity for strengthening community ownership of off-grid assets, the approach was conceived on the understanding that TPL would be the responsible authority for O&M, whereas now far greater responsibility sits with the ECOS - on multiple levels - since it is proposed that each island will recruit and manage two technicians and a finance officer, be central to asset management and financing, collection of funds from users, and potentially setting tariffs.

3.4.2 Has sufficient focus been placed on O&M?

The primary issue in relation to O&M as the project approaches closure is the dramatic shift in how off-grid assets will be managed. Having invested heavily in TPL capacity to manage solar energy systems, the project had reason to assume that it had a capable and reliable system in place to support O&M of all OIREP assets. Under the original post-project plan, ECOS would still have played an important role, but would have had access to and been backstopped by TPL's corporate and technical capacity to troubleshoot, provide technical support, and support tariff setting and forward planning regarding financing of replacement equipment.

This context has now changed, in part because the ECOS are very keen to maintain control over what they consider 'their' systems. ECOS now need to be far more centrally involved in day-to-day management and planning for coordination, tariff setting and collection, and asset management and replacement. While MEIDECC will be able to provide much of the support that would have been provided by TPL, the reality is that many of the responsibilities needed to keep solar assets functioning and sustainably financed sit outside MEIDECC's day to day experience, and will inevitably require support (possibly from TPL) around tariff structuring and sub-contracting of technical support to address and repair faults that arise on the off-grid systems.

It is also noted that the USD100,000 O&M budget allocated to MEIDECC by OIREP is significantly underspent (20% spent), highlighting that they had assumed that they would play only a limited role in O&M post-project. As things stand now, MEIDECC's Energy Department will play a fundamental role in ensuring that off-grid systems remain functional – at least in the period through until 30 June 2025. This change presents a significant and expensive workload for MEIDECC to now integrate within its planning. It is also unclear whether the SHS on Niuafu'ou will be included in the O&M for the other OIREP systems. Currently MEIDECC undertakes quarterly servicing (also of the refrigeration systems), but it is unclear how this will be integrated into O&M going forward.

This situation leaves the O&M situation for off-grid assets somewhat precarious, with no clear plan or financing arrangement currently in place for monitoring of off-grid assets and supporting ECOS to develop the required capacity to address the various needs associated for sustainable management of OIREP assets.

The other reality needing to be factored into O&M is that there is significant additional cost related to any work requiring on-the-ground visits to the remote islands where off-grid assets are located. While there has been some discussion of a government subsidy to underwrite additional costs related to ensuring electricity access of outer islands, this subsidy is neither quantified nor confirmed as being available.

An urgent need exists to clarify how O&M will be assured to OIREP's off-grid legacy assets come January 1st 2024. MEIDECC has prepared an indicative 'OIREP Institutional Monitoring and Assessment' budget which proposes quarterly monitoring missions to each island with off-grid assets being managed by an ECOS, at a total cost of TOP 164,700 for the 18 months through until 30 June 2025. A commitment also exists for the Department of Energy to be provided TOP 100,000 annually for O&M of OIREP assets. However it is unclear how far this budget is needing to be stretched, and whether or not it is needed to cover MEIDECC monitoring costs for OIREP, or whether it will need to stretch to TREP and/or support for repair and replacement of solar system equipment.

3.5 Safeguarding and inclusion performance

3.5.1 Were adequate safeguarding and inclusion systems in place?

OIREP gender and safeguarding efforts are guided respectively by a GAP and an Environmental and Social Safeguarding policy respectively. These set out largely quantitative targets which are mostly input-output oriented, with neither approach involving significant depth or qualitative enquiry. More or less these targets were met.

Gender Action Plan

The GAP is set out against the project outputs and uses indicators detailed below:

- **Output One (construction of solar systems and grid rehabilitation)**
 - Community consultations having 50% women's participation
 - Note that there is a far higher proportion of women than men on most islands, due to men relocating for work
 - Contractors encouraged to provide work for unskilled and semi-skilled women (30% of total)
 - This target has been mostly met, with women providing support at community level to small scale construction needs
 - Requirement of contractors that 10% of total recruited for power line installation are women

- While this has been successful, there still remains a challenge in motivating interest of women to become technicians, with very few women still entering the system. Availability of training is also problematic, with there being a need to undertake Level Four Lines training in New Zealand, which is prohibitive and often problematic for women.
 - TPL note that the few women who are now working on powerline installation have proven very successful, and will look to recruit more women whenever possible.
 - Ensuring service lines to at least 20% female headed households
 - This is a somewhat redundant indicator given most households on smaller outer islands can be classified as ‘female headed’
 - Improving existing toilet and sanitation facilities at energy hubs so that they are suitable for women
 - This has involved refurbishment of existing facilities, compared the TREP approach of building new sanitation facilities. ‘Refurbished’ facilities observed during field visits were often basic, poorly maintained and uninviting.
 - Ensure 50% of participants in business skills training on income opportunities from increased electricity supply are women
 - Provided by the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), business skills training occurred alongside household energy management and efficiency. While well received, no funding was available for business incubation, despite women having many ideas with regards to fishing and sewing related businesses emerging from improved electricity access.
- **Output Two (operations and maintenance knowledge and capability)**
 - A simple 50% participation target for women in all O&M-related training
 - While a relevant gender indicator, it is noted that there were no specified targets for active involvement in O&M activities, with the exception of 50% target for women on ECOS management committees.
 - At ECOS level, there is room for women’s active participation in management and troubleshooting of mini-grids, but there appears to be no reliable data as to the extent to which this is occurring, and anecdotal evidence that in most cases men still oversee and troubleshoot mini-grids.
- **Output Three (effective and efficient implementation and management)**
 - Appoint a Gender and Safeguards specialist
 - It was noted that the person recruited to this position had very strong understanding of his portfolio, and was able to discuss issues with depth and beyond the level of mere compliance to the various policies.
 - Provide gender awareness training to all PMU and project staff
 - PMU and staff of TPL and MEIDECC were articulate and persuasive when asked about the project’s gender performance, and seem genuinely committed to ensuring optimal performance. However, they also note limited capacity to gather the required data to determine project impact.
 - Gender disaggregate project performance indicators
 - This does occur, but is primarily focused on relatively simple consultation of workforce participation rates.

While these represent relevant actions, they lack depth and are not sufficiently holistic to capture much of the nuance of project performance. For example, the GAP has limited capacity to:

- investigate the project's impact on women at household level, in relation to issues such as voice, workload shifts, changes to livelihoods behaviour, and other opportunities that could potentially arise from expanded and improved access to electricity
- interrogate whether target's related to women's participation have actually resulted in active engagement of the project by women, or whether consultations continue to be primarily led by males
- measure the results of project efforts to strengthen the capacity of women to better engage in the project and become more substantively involved in energy-related decision-making at household and community levels
- reveal the impact of enhanced access to electricity on other facets of the lives of women living in remote locations

The lack of depth in relation to analysis of gender programming is quite likely a missed opportunity given there is anecdotal evidence that the project has had a transformational impact on *some* women, including improved livelihood opportunities for women; quality of life and workload improvements stemming from broadened electricity access; and, trailblazing opportunities in terms of new employment opportunities for women that had previously not existed (for example working as skilled labour within TPL). However, the depth and breadth of this anecdotal evidence is unknown, and a hole in terms of fully understanding the project's gender performance.

It also restricts the degree to which conclusions can be reached in terms of project impact, learning and replicability around women's empowerment and gender equality.

Environment and Social Safeguarding

The Environmental and Social Safeguard monitoring report is conducted bi-annually and is aligned with the ADB's Safeguard Policy Statement and the Government of Tonga's environmental laws and regulations. The objective of project safeguarding efforts is to identify and mitigate adverse environmental and social impacts, including protecting the rights of those likely to be directly impacted by the project.

This occurs primarily through site visits and community engagement undertaken by the Social Safeguards Specialist, but with further input from other PMU members and implementing partners. Various checklists guide day to day safeguards monitoring, which mostly focus on a suite of environmental markers, such as land allocation, site clearing, dust control, noise control, visual amenity and waste disposal. The OIREP GAP monitoring is also integrated to some extent within safeguarding reporting.

While the markers included within checklists are all relevant, it is difficult to assess to what degree they were pro-actively managed. Reporting raises relatively few issues and is light touch, with nothing of significant concern being raised. However, reporting does demonstrate that issues are captured and responded to – especially on smaller, outer islands. Reporting in relation to on-grid sites appears to be higher level and less granular, reflecting the difficulty of holistically engaging larger populations.

This scenario of reporting being light touch is likely impacted by the nature of the project, which brings with it relatively few safeguarding risks – especially given the absence of land disputes.

An interview with the Tonga Energy Commission (TEC) raised concerns related to a lack of certification being granted by the commission to OIREP assets. The PMU, TPL and MEIDECC all dispute this saying that all completed works under OIREP have been certified, explaining the TEC perspective as likely to do with incomplete work under TREP. (Certification is the responsibility of contractors, who should provide to relevant authority as it is received). Clarifying this issue to ensure TEC satisfaction is necessary.

More broadly, the TEC feels sidelined by aid projects which do not sufficiently engage and include this important, independent regulatory authority.

It is to be noted that at the corporate level, the ADB has been energetic across the OIREP implementation period in reviewing and strengthening its safeguarding procedures, including a full Safeguard Policy Review which was completed in early 2023. While this demonstrates strong commitment to safeguarding, the review is primarily focused at the government level and on approaches to be adopted within different financing modalities.

3.5.2 Was there active and sufficient management of risks to achieve intended safeguarding and inclusion outcomes?

As already mentioned, safeguarding and gender objectives of the project are described and actioned on the basis of the project's safeguarding policy and GAP. There is no specific reference to either safeguarding or gender in the project outcome statement or outputs.

While safeguarding and GAP monitoring has been consistent, they both lack depth given they're compliance focused. This in turn brings into question the degree to which there is opportunity for risks to fully surface, given the focus of monitoring on ensuring compliance.

Similarly, the GAP approach lacks sufficient qualitative dimensions to delve into the project's overall gender performance, which requires that conclusions be reached based on case studies and anecdotal evidence.

3.5.3 How did the program engage and benefit persons with disabilities?

There has been no active consideration of issues related to disability inclusion and access. ADB defend this situation on the basis that such approaches were never part of the co-financing agreement. DFAT has raised their desire that OIREP consider such issues, but it has not proven possible in the context of the core project approach simply being the delivery of solar energy systems.

Moving forward, this dissonance between the ADB and DFAT regarding the need for rigorous reporting around disability inclusion programming efforts is likely to reduce, given the ADB is currently looking to transform its approach to disability with the aim of giving it similar status to that of gender within its overall portfolio.

3.5.4 To what extent did Australia actively monitor identified risks throughout the project period?

It is clear that the Australian AHC in Nuku'alofa monitored the project in general, and placed significant focus on performance related to gender and disability given observations that these were areas where the project had the opportunity to strengthen its performance.

Within DFAT's Annual Investment Monitoring Reporting, performance in relation to disability was constantly given the lowest possible IPR rating of one. However, as already stated, the ADB defends itself on this front on the basis that the project never had any defined disability focus.

Australian assessments of gender performance have been more fluid, with IPR ratings ranging between mid-range (3) and strong performance (5).

3.5.5 How effectively did Australia influence and inform partner programming with respect to meeting protection, gender and disability inclusion commitments?

It was clear during the evaluation that there is a healthy dynamic between the AHC and ADB teams responsible for project oversight. The AHC is invited and joins most ADB monitoring missions, where it raises issues around protection, gender and disability inclusion.

Furthermore, interviews with the ADB team highlight their awareness of the priority placed by DFAT on gender and disability performance. At the headquarters level, the ADB has been working consistently over recent years to strengthen its systems around monitoring gender and disability performance, in part because of advocacy from donors such as DFAT.

3.6 Sustainability of investment

3.6.1 Is there a clear indication of an exit and handover plan for the project and sustainability of maintenance and upgrade of the project's funded utilities?

Much of the discussion related to sustainability has been addressed above when discussing arrangements for O&M. This section will be used to summarise that longer discussion specifically through a sustainability lens.

The ADB has standard procedures for project completion and handover. As activities are completed throughout the life of ADB projects, assets and related reports are handed over to the implementing agency. The ADB's last Project Review Mission also aims to follow-up on remaining activities to be completed and includes an Action Plan aimed at smooth closure of the project. At project closure, the PMU are left to handover their assets (office equipment, vehicle, etc) and reports to the implementing agency – in this case, MEIDECC.

Within a year of the project having been financially closed, the ADB will commission a Project Completion Review Mission to prepare a Project Completion Report which evaluates the overall performance of the project (including evaluating relevance of project design at approval and completion; effectiveness in achieving outputs and outcomes and assessing achievement of output targets; efficiency in delivering outputs and outcomes; and sustainability in achieving outputs and outcomes). The PCR also identifies remaining issues (if any) and lessons learned for future projects.

In practical terms, project on-grid assets will continue to be operated and maintained by TPL on a commercial basis. Training provided to TPL in relation to solar power seems to have been effective in building the necessary capacity for ongoing maintenance and upgrading.

There is also good reason to believe that OIREP grid-strengthening work will build greater resilience to natural disasters, given that new poles have been installed in many locations, and wires have in some key places been placed underground.

The area of greatest concern in terms of sustainability of OIREP assets relates to exit and handover of off-grid assets, given the dramatic change in direction that occurred when it was decided that responsibility for maintenance and upgrading of these legacy assets would be managed by ECOS directly, with support from MEIDECC. While this is a feasible and

workable alternative, there is currently uncertainty regarding the costs entailed in i/ ongoing capacity strengthening of ECOS, and ii/ financing of the regular monitoring missions needing to be undertaken by MEIDECC that are now more important than ever, given the considerable costs associated with travel to and from these remote islands. There is also an urgent need to ensure clarity around ECOS monthly processes for management and billing, especially since these seem to vary island to island.

At time of report writing, it is envisaged by MEIDECC that TPL will be contracted to undertake maintenance. However, interviews with TPL suggested this is not yet clearly agreed and that clear agreement regarding maintenance of OIREP off-grid assets is urgently needed.

More generally, challenges remain in terms of supporting Tonga to achieve its renewable energy targets remain, including the need for upgrading of network infrastructure, installation of additional battery storage capability, more timely completion of land negotiations, and efforts to mitigate the impact of tropical cyclones – such as strengthening of power poles, and installation of underground service lines.

3.6.2 To what extent are the project outcomes sustainable beyond the life of the project (people's capacity, community ownership and hard infrastructure)?

As Tonga's most profitable SOE, there is good reason to believe that TPL has the commercial capacity, technical capacity and financial incentive to sustain, maintain and further develop OIREP assets beyond the life of the project given the revenue they can generate.

Having said that, TPL is currently without a CEO and is spoken of as currently having a tenuous relationship with the Tonga Common Utilities Board, which governs TPL.

Sustainability and handover of off-grid assets is another story, with concerning levels of uncertainty over arrangements, approach and financing as OIREP approaches closure.

3.7 Lessons learned

3.7.1 What lessons from OIREP can be applied to the design of longer-term assistance to Tonga's energy?

Overall, OIREP has achieved significant success and has laid strong foundations for Tonga's outer islands to transition to renewable energy. However, as with all projects, there have been lessons learned:

- OIREP's success can be attributed in part to the decision to augment and support OIREP outcomes through TREP. This highly complementary program has worked hand in glove with OIREP, and has allowed some OIREP deficiencies to be quickly addressed.
- The need for TREP relates in some part to some of OIREP's initial design decisions, which failed to sufficiently factor in the growth in demand that accompanied more reliable access to electricity. This highlights the importance from an efficiency perspective of design specifications being rigorously interrogated to ensure they are suitable from the outset to accommodate the inevitable uptick in demand that comes with more reliable access. However, TREP also highlights the value of knowledge management systems that allow for lessons to be learnt and incorporated within subsequent programming, and to also address design deficiencies of projects such as OIREP.

- Related to this is the importance of appropriate procurement decisions being taken. While appropriate procurement decisions appears to have mostly been the case with OIREP, an obligation by the ADB to accept the lowest conforming bid resulted in the contracting of a supplier that has proved problematic in delivering off-grid assets. These issues include significant delays and the use of materials for solar panel framing in off-grid systems that has raised durability concerns amongst some stakeholders. Notably, ADB procurement systems have now changed and allow for further analysis of unusually low bids, to ascertain their appropriateness and the degree to which they are fully transparent.
- It is also noted that there is a significant transaction cost in the actual delivery and construction of solar systems, meaning that there is some loss of efficiency in multi-phased rollout of systems, and later augmenting under-designed systems.
- Project monitoring and evaluation has been light touch and framed within the ADB's DMF approach, which tends to being quantitatively focused, and poorly positioned to capture qualitative impact. This is likely a missed opportunity with OIREP, since there is anecdotal evidence of a range of household-level impacts, many related to women's role in the community and in business.
- Project monitoring has also failed in terms of tracking a key component of the project outcome statement – that electricity would be provided at reduced cost. While it hasn't been, there are many contributing factors to that situation that could have been investigated and assessed to help better understand how OIREP has impacted energy cost structures in outer island contexts. This generally points to a need to better monitor, understand and interpret how projects such as OIREP impact the cost of electricity, including a robust baseline to measure against. Reliable baseline and monitoring data would also allow for more pro-active dialogue with local authorities of options for tariff reform that further build momentum for and incentivise the transition to renewable energy.
- Operations and maintenance are fundamental to sustainability. While they have been actively considered throughout OIREP, the project is concluding with considerable uncertainty of O&M arrangements for islands with off-grid systems. While this is the result of an unexpected change in plans, it highlights the importance of constant monitoring of arrangements, and the need to lock in clear decisions on this vitally important aspect of post-project sustainability.
- While the project had a Communications Strategy, it needed to be more pro-active in raising awareness of global factors affecting energy pricing given the project commitment to *reducing energy costs*. That costs have not reduced has left users with a sour taste in their mouths that could have been avoided if there was a more robust communications campaign helping educate communities regarding running and replacement costs of renewable energy systems, as well as the higher costs of diesel, which would have resulted in even higher electricity costs had it not been for the renewables installed through OIREP.

3.7.2 Specific areas for further support to Tonga's energy sector?

There remains a need and opportunity for a further topping up of OIREP assets to consolidate project performance, further reduce reliance on and cost impacts of diesel generation, and – together with TREP – help largely resolve the challenge presented by the rollout of renewable energy on lightly populated outer islands.

The most obvious point for further investment is expansion of on-grid solar on Vava'u. OIREP undertook important grid rehabilitation work, as well as supervisory control and data acquisition, which refurbished the central control system for the electricity network and generation. TREP has since provided some solar capability (1,003kW/2,007Wh and BESS capacity of 0.3MW), but currently Vava'u remains heavily dependent on diesel generation. Discussions with TPL and both OIREP and TREP PMUs suggest that a realistic, short-term approach would be the installation of an additional 1.8MW of solar power and rehabilitation of the existing solar plant (420kW La'a Lahi Solar Farm installed by the United Arab Emirates in 2013), at an estimated cost of USD 3 million. This would bring the total renewable percentage of electricity use in Vava'u to 39%. The land is readily available and installation could occur quickly because the current installed BESS would be able to accommodate the additional solar.

To achieve 70% renewables in Vava'u, at least an additional 10MWh of storage would be needed and 3.9 MW of solar, at a cost around USD 10.5 million.

In Ha'apai, there is a need to replace switchboards installed through HOIEP, at an estimated cost of TOP 40,000 each. This should have formed part of the OIREP design but was missed. New switchboards would improve reliability, ease of management and sustainability of off-grid systems. There is also a need for an additional BESS in Pangai (on-grid) to maximise solar penetration and decrease diesel usage during the evening peak.

Efficient troubleshooting of off-grid systems is heavily reliant on internet connectivity. However, connectivity is marginal on many islands. Improving connectivity of remote outer islands would not only support sustainability of OIREP systems, it would also provide a broader community service by improving access to all the knowledge and services available online.

Consideration of options for enhancing enrolments, especially of women, in electrical trade school would be worthwhile, given their intrinsic contribution to sustainability and localization efforts, and the inevitability that there will be a need for a new generation of electricians qualified and skilled to maintain modern systems of production and distribution.

4. Conclusion

Occurring over ten years, the OIREP project has been successful in terms of supporting the Government of Tonga to progress further along its roadmap to a renewable energy-based future. The project achieved its proposed **impact**, in terms of helping Tonga reduce its dependence on imported fossil fuel for power generation with OIREP assets estimated to have reduced diesel usage by 0.5 million litres annually.

Central to the project **outcome** was the provision of on-grid and off-grid generation solar power at reduced cost. While costs have not actually fallen, price increases have been mitigated by world standards by the rollout of solar power systems.

OIREP has also delivered on its key output of providing 1.32MWp of renewable energy across nine outer islands. However, significant needs and opportunities exist to further expand renewable energy systems on outer islands.

Less tangible, but also important is the role played by OIREP in consolidating Tonga's social contract with remote island dwelling communities, by allowing for enhanced and more reliable access to electricity.

5. Recommendations

| No. | Recommendation | Potential actions to be considered |
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| 1 | <p>To consolidate the outer island energy grid, DFAT should undertake a feasibility/ prioritisation study to assess in more detail how well current and future demand are likely to be met by existing OIREP assets, and to then consider options for further topping up and consolidating OIREP (and TREP) assets, and to further reduce reliance and cost of diesel generation.</p> | <p>a. Undertake a study of all OIREP project locations to clearly determine how well current and future demand is likely to be met by existing assets - island by island.</p> <p><i>Cost consideration: Could likely be done as a desk exercise drawing from existing knowledge available through OIREP and TREP, with support from MEIDECC, with costings verified by an independent consultant.</i></p> <p>b. Replacement of switchboards on islands reliant on off-grid. systems would improve reliability, ease of management and sustainability.</p> <p><i>Cost consideration: Estimated cost of AUD 25,000 each.</i></p> <p>c. Provision of additional solar and storage for Pangai (on-grid) to reach OIREP target of 50% renewable, and to decrease diesel usage during evening peak</p> <p><i>Cost consideration: Estimated cost of AUD 3 million</i></p> <p>d. Resolve connectivity status of off-grid islands to ensure efficient trouble-shooting capability.</p> <p>e. In Vava’u, consider installation of an additional 1.8MW of solar power and rehabilitation of the existing solar plant (420kW La'a Lahi Solar Farm installed by the United Arab Emirates in 2013)</p> <p><i>Cost consideration: Estimated cost of AUD 4.5 million.</i></p> <p>f. Consider more extensive support for Vava’u aimed at supporting shift to 70% renewables, involving installation of an additional 10 MWh of storage and 3.9 MW of solar.</p> <p><i>Cost consideration: Estimated cost of AUD 15 million.</i></p> <p>g. Consider feasibility and value for money of rolling out solar systems to remaining outer islands that have not yet been included through OIREP and TREP.</p> <p><i>Cost consideration: Could likely be done as a desk exercise drawing from existing</i></p> |
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| | | <i>knowledge available through OIREP and TREP, with support from MEIDECC. Could also be integrated within potential action a/ listed above.</i> |
| 2 | Working with the ADB, further clarify government plans for ongoing management of off-grid assets, and whether or not they will be handed over to the successful concessionaire (most likely TPL) on 1 July 2025. | <ul style="list-style-type: none"> a. Unite with ADB to get agreement across all relevant bodies of government (and at the highest possible levels) as to plans for management of off-grid assets in the short and longer term, and whether or not tariff subsidies will be provided. b. Consider providing financial support to MEIDECC to i/ ensure regular monitoring and support to OIREP’s off-grid legacy assets – to ensure ‘the lights stay on’, and ii/ support ECOS to manage, troubleshoot and plan for asset O&M. c. Factor in TREP to all planning, given that many TREP islands will be in the same situation come end 2024, when TREP closes. <p><i>Cost consideration: MEIDECC have prepared a proposal outlining costs of providing support to the ECOS that will manage OIREP assets from 1 January 2024 to 30 June 2025 (assessed at TOP 164,500)</i></p> |
| 3 | Based on the outcome of recommendation three, and assuming that ECOS will be centrally involved in the management, operations and maintenance of OIREP assets through until at least 30 June 2025, a study should be initiated by DFAT and the ADB to assess ECOS capacity – for O&M, but also more broadly in terms of mobilising communities in support of climate adaptation. | <ul style="list-style-type: none"> a. Commission a study to assess the different capacities of different ECOS – for O&M, but also more broadly in terms of mobilising communities in support of climate adaptation and on issues such as energy efficiency. b. The study should include TREP islands, in anticipation of TREP closure at end 2024. c. Consider options for DFAT supporting capacity-building of ECOS, including support to help the islands better understand and respond to GEDSI issues. <p>Look at innovative options aimed at resolving other community issues, such as rainwater capture off solar farms.</p> |

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| 4 | <p>Given the potential relevance of OIREP and TREP to DFAT programming in other Pacific nations, DFAT should commission a further study to help clarify more qualitative impacts of OIREP at household and community levels, noting such a study could be of relevance to better augmenting ADB M&E in other energy co-financing agreements.</p> | <ul style="list-style-type: none"> a. Commission a further evaluation specifically designed to investigate household and community-level impacts of renewable energy investments such as OIREP and TREP. b. Disaggregate the study between on-grid and off-grid contexts, to shed light on whether or not different levels of impact are experienced. c. Frame study as a ‘Pacific case study’ so that findings are prepared in a manner that is of relevance to and able to inform other ‘outer island energy contexts’. <p><i>Cost consideration: Such a study could be as limited or expansive as desired. However, time MUST be made available for significant time to be spent on each island</i></p> |
| 5 | <p>Consider the current context and pipeline of electrical technical training in Tonga to ascertain whether there is sufficient capacity to support and localise Tonga’s energy transition.</p> | <ul style="list-style-type: none"> a. Work with relevant stakeholders such as PCREEE and the National Electrical Contractors Association to ascertain current context of technical training, including strengths and weaknesses, with a view to integrating technical training considerations within future renewable energy investments in Tonga. <p><i>Cost consideration: This could simply involve meetings with key informants, or a broader study that explored broader issues such as the perspectives of young women and men to technical training; the availability of training; the role of certification in the Tongan context (most electricians are not qualified), and the likelihood of trained technicians remaining in Tonga.</i></p> |
| 6 | <p>The ADB should ensure all OIREP assets are fully certified by the Tonga Electricity Commission prior to project close, given the TEC’s concern that some OIREP activities are non-compliant.</p> | <p>Through ADB, ask TPL and MEIDECC to provide evidence of TEC certification for all OIREP assets (noting this is the responsibility of contractors).</p> |

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| 7 | <p>DFAT should more broadly consider whether a need exists for DFAT to prepare their own targeted M&E systems when entering co-financing arrangements with the ADB, that i/ complement and augment ADB systems and ii/ ensure ease of reportability for DFAT, especially in relation to GEDSI issues.</p> | <ul style="list-style-type: none"> a. Raise as a discussion within DFAT to determine whether it is felt that there is sufficient need b. Consider piloting on select co-financed projects. |
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Annex One: Evaluation Interviewee List

Government of Tonga

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| Sione Pulota 'Akaula | CEO, MEIDECCC |
| Saane Lolo | Deputy Chief Executive Officer at Ministry of Finance |
| Ofa Sefana | Energy Planning Specialist, DoE at Department of Energy, MEIDECC |
| Lucy Fa'anunu | Officer in Charge, Officer in Charge – Vava'u, MEIDECC |
| Lily Tanoa | Energy Specialist, MEDIECC |
| Samiuela Matakaiongo | Principal Energy Planner, MEIDECC |
| Dr Tevita Tukunga | Director, Common Utilities Board |
| Siamelie Latu | CEO, Tonga Electricity Commission |
| Kilimasi Ma'asi | Financial Controller, Tonga Electricity Commission |
| Meleseini Folau | General Administrator, Tonga Electricity Commission |
| Asita Langi | Technical Manager, Tonga Electricity Commission |
| Distaquaine Tu'ihalamaka | CEO for Ministry Of Trade & Economic Development |
| Ilaissane Tu'itupou | Senior Business Development Officer, Ministry of Trade and Development |
| Isileli Finau | Enforcement Officer, Ministry of Trade and Development |
| Seti Chen | Manager, OIREP Project Management Unit |
| Kaione Loumoli | Safeguard Specialist, OIREP Project Management Unit |
| Simon Wilson | Manager, TREP Project Management Unit |

DFAT

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| Erin Gleeson | Deputy High Commissioner; Australian High Commission in Tonga |
| 'Aulola 'Ake | Senior Program Manager; Australian High Commission in Tonga |
| Edwina Tangitau | Program Manager; Australian High Commission in Tonga |
| Cassie Cohen | First Secretary, Australian High Commission |

ADB

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| Grace King | Senior Project Officer, ADB |
| Lavenia Uruvaru | Associate Project Analyst, ADB |
| Beatrice Olsson | Program Specialist, ADB |

Other Tongan based key informants

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| Finau Moa | Acting CEO, Tonga Power Limited |
| Andrew Kautoke | Major Projects Department, Tonga Power Limited |
| Makalita Fane Hoeft | Acting Chief Financial Officer, Tonga Power Limited |
| Paul Ika | Power Station Manager – Ha'apai, Tonga Power Limited |
| Naita Fe'ao | Branch Manager – 'Eua, Tonga Power Limited |
| Malakai Kivalu | Power Station Manager – 'Eua, Tonga Power Limited |

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| Vahid Fifita | OIREP contact, Phase 3 – Vava’u; Tonga Power Limited |
| Solomone Fifita | Manager, Pacific Centre for Renewable Energy and Energy Efficiency |
| Sosefo Tofu | Energy Specialist, Pacific Centre for Renewable Energy and Energy Efficiency |
| Solomone Latu | Operations and Maintenance Consultant |
| Sioufa Tuitupou | Maka District officer and Chair of ECOS, Ha’ano Island, Ha’apai |
| Simote Langipiu | Manager of Powerhouse and ECOS member, Uiha Island, Ha’apai |
| Filia Vave | Business owner, ‘Eua |
| Neisha Rosic | Business owner, Vava’u |

Other key informants

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| Simon Wilson | Australian Pacific Climate Partnership |
| Julia McDonald | Senior Engineer; ITP Renewables |
| Tina Best | Previously, Australian High Commission, Tonga |
| Geoff Stapleton | Director International Training Sustainable Energy Industry Association of Pacific Islands |

| Assessment Criteria | Key Evaluation Question and Sub-Questions |
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| Relevance | <p>1. To what extent was the project relevant appropriate to the needs of people living on outer islands of Tonga? (10%)</p> <ul style="list-style-type: none"> a. How relevant and appropriate were OIREP’s objectives in the context of climate action, renewable energy, and power connectivity in Tonga? b. To what extent did OIREP contribute to the Australian Government’s broader aid and diplomacy objectives in Tonga? |
| Effectiveness | <p>2. How effective was OIREP in achieving its objectives? (30%)</p> <ul style="list-style-type: none"> a. Were the project’s intended outputs and outcomes clearly defined? To what extent did the OIREP meet these outcomes? What were the enablers and barriers to success? b. What evidence is there of impact? <ul style="list-style-type: none"> i. At the household level (economically, socially and environmentally), particularly cost and access to power ii. At the organisational level for TPL iii. At the national level for energy generation c. What were the most significant results achieved by the project? Did these meet expectations and were they adequately captured in partner and project reporting? d. How well did partnerships and policy dialogues support outcomes? |
| Efficiency | <p>3. How efficient was program delivery? (10%)</p> <ul style="list-style-type: none"> a. Did the implementation of the project make efficient use of DFAT and partner time and resources to achieve outcomes? b. Was the monitoring and evaluation framework used to efficiently to measure implementation progress, and progress towards meeting expected outcomes? c. Was the project aligned with Government of Tonga and Government of Australia priorities and well-coordinated and harmonised with other donor partners? d. To what extent were implementing partners sufficiently accountable to, and engaged with, affected communities? Is there evidence of OIREP having been influenced by effective communication, participation and feedback?? |

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| Localisation | <p>4. Was the project effective in ensuring required local capacity? (10%)</p> <p>a. To what extent did Australia’s support strengthen skills, capacity, and leadership with implementing agencies, particularly TPL, and in the community?</p> |
| Safeguards | <p>5. Were safeguarding and broader inclusion issues sufficiently integrated with project implementation? (20%)</p> <p>a. Was there active and sufficient management of risks to achievement of the intended outcomes? Were they actively managed to avoid negative impacts on the environment, people, and resources?</p> <p>b. To what extent did Australia actively monitor identified risks throughout the project period?</p> <p>c. To what degree did OIREP make a difference to gender equality and the empowerment of women and girls? How did the program engage and benefit persons with disabilities? How effectively did Australia influence and inform partner programming with respect to meeting protection, gender and disability inclusion commitments?</p> |
| Sustainability | <p>6. Have sufficient efforts been made to ensure sustainability of the DFAT (and broader donor coalition) investment? (15%)</p> <p>a. Is there a clear indication of an exit and handover plan for the project and sustainability of maintenance and upgrade of the project’s funded utilities?</p> <p>b. To what extent are the project outcomes sustainable beyond the life of the project (people’s capacity, community ownership and hard infrastructure)? What is enabling and hindering this?</p> |
| Learning and Future activities | <p>7. Have lessons been learnt through OIREP implementation of relevance to future programming considerations of DFAT in Tonga and the broader Pacific?</p> <p>a. What lessons from OIREP can be applied to the design of longer-term assistance to Tonga’s energy sector?</p> <p>b. Based on a review of OIREP, and considering the renewable energy sector, are there any specific activities or areas that possible future support should focus on?</p> |