USDN Social Housing project

Project Report

Pingala Community Energy Incorporated

Version: 1

Date: Jan, 7th. 2025

Authors

Nigel Hancock

Acknowledgement of Country:

Pingala Community Energy acknowledges the Traditional Owners of Country throughout Australia, and the people on lands that we live and work; the Gadigal people of the Eora Nation and the Darkinjung people. We pay our respects to Elders past, present, and emerging.

1. Executive Summary

This project aimed to provide meaningful relief to community and low-income housing residents by installing solar systems. The installations at Roscoe St and Emoh Rou have been completed, and both sites are now generating and saving money on bills. Additionally, Pingala has committed to several new sites for installation of solar in the new year.

1.1. Key Achievements

Installed capacity	A total of **61.65kW** of solar capacity has been installed at Roscoe St and Emoh Rou.
Committed Capacity	An additional **39.52kW** of solar capacity has been committed for installation in the new year.
Total Capacity	The combined total of installed and committed solar capacity is **101.17kW**.
Total Cost	The total cost for the installed and committed solar systems is **$211,465** AUD.
Benefit to future projects	Demonstrated a method for installing shared solar systems on community-owned housing and social housing.
Benefit to residents	Reduced electricity bills for residents.

2. Project Scope and Deliverables

2.1. Scope

The project involved assessing, managing, and installing a target of 150kW of solar PV for community housing families. This was then broken down into 3 sections: the apartment block at Roscoe Street, the community housing block at Emoh Rou, and the homes of families participating in the Glebe Youth Services.

2.2. Deliverables

2.2.1. Site criteria and project management plan - provided 2nd of Aug. 2023

The project management plan, aimed at assessing, managing, and installing a minimum of 150kW of solar PV for community housing families, has been successfully delivered. This plan outlines four key activities, each with specific deliverables and timelines. These activities include the development and delivery of site criteria and a project management plan by July 31, 2023; the assessment and results of submissions from potential sites by September 25, 2023; the installation of solar PV on one identified site with evidence provided by February 26, 2024; and the installation of solar PV at an additional 2-3 sites with evidence by October 28, 2024. Additionally, project participants are tasked with producing a written case study, a final report, and potentially participating in presentations to the Urban Sustainability Directors Network (USDN). The comprehensive approach encompasses site identification, assessment for solar suitability and returns, business model development, and the organization and funding of solar system installations. The project also includes a detailed strategy for reporting and knowledge sharing, ensuring transparency and community engagement throughout the project's lifecycle.

2.2.2. Assessment of potential sites - provided on 26th of Sept. 2023

A total of 28 sites have been submitted by various community housing providers (CHPs) for consideration. Out of these, 5 sites have been identified as potential first sites for solar PV installation, with initial solar quotes underway. The remaining sites are either outside the initial target area of the Sydney metro area or require further business model development and have been put on hold. These sites will be revisited once closer sites have been assessed or business models can be developed. Additionally, communal living buildings in the Sydney central or Inner-west regions without independent meters for residents will need unique business models for equitable sharing of savings. One site was deemed unsuitable due to extensive shading.

An assessment was a useful step in not only providing a comprehensive overview of potential sites, identifies key risks, and outlines mitigation strategies; it also helps us understand the key challenges and to align better with the project's scope. The assessment put the project's on track to manage and install 150kW of solar PV. However, due to challenges and cost increases, many of the identified sites became unviable.

2.2.3. Installation of solar PV systems - provided 3rd of Sept. 2024

Please see Results and Outcomes for details.
This deliverable required multiple extensions due to challenges around approvals and installation dates, see Challenges and Solutions.

2.2.4. Quarterly progress updates - provided quarterly

The project updates report on several key themes and topics, including the transition from planning to delivery, minor adjustments to the project plan, and ongoing budgeting considerations. Engagement with housing providers has been robust, though there is a noted need for increased focus on target areas to meet project goals. Site assessments and selection processes have been thorough, with specific attention given to addressing potential risks and mitigation strategies, such as unforeseen costs and delays in approvals. Significant progress has been made on key sites like Emoh Rou and 31 Roscoe St, with challenges related to landlord approvals and infrastructure upgrades being actively managed. The project also emphasizes the importance of community engagement, detailed planning, and collaboration with stakeholders to ensure successful implementation and long-term benefits for residents. Overall, the updates highlight a proactive approach to overcoming obstacles and maintaining project momentum.

3. Project Activities and Timeline

Activity	Details	Completion Date	Delivery Date
Project Initiation and MOU		June 5, 2023	
Site Criteria and Project Management Plan	Developed criteria for site selection and a comprehensive project management plan.	July 31, 2023	August 2, 2023
Site Submissions and Assessments	Assessed submissions from 28 potential sites and selected 5 for installation	September 25, 2023	September 26, 2023
Installation 1: 31 Roscoe Street		February 26, 2024	August 13, 2024
Installation 2: Emoh Rou, Erskinville		February 26, 2024	August 21, 2024
Additional Solar PV Installations		February 26, 2024	TBC

4. Results and Outcomes

4.1. Installed Capacity

4.1.1. Roscoe Street

The project at 31 Roscoe Street saw 25.65 kW of solar installed on the NW and SE-facing roofs, directing energy to 6 apartment units via Allume's innovative solar splitting device, SolShare. SolShare divides a rooftop solar array to individual meters based on a percentage allocation and real-time monitoring data to ensure that most of the energy can be utilised on site. The below SolShare data shows a positive solar generation curve (light green), however indicates an error in the energy demand curve (dark green), which is currently directly proportional to the generation. This is likely a data cable issue and has been identified with the installer to fix in January 2025. With this error, it isn't yet possible to accurately project the annual savings for each unit.

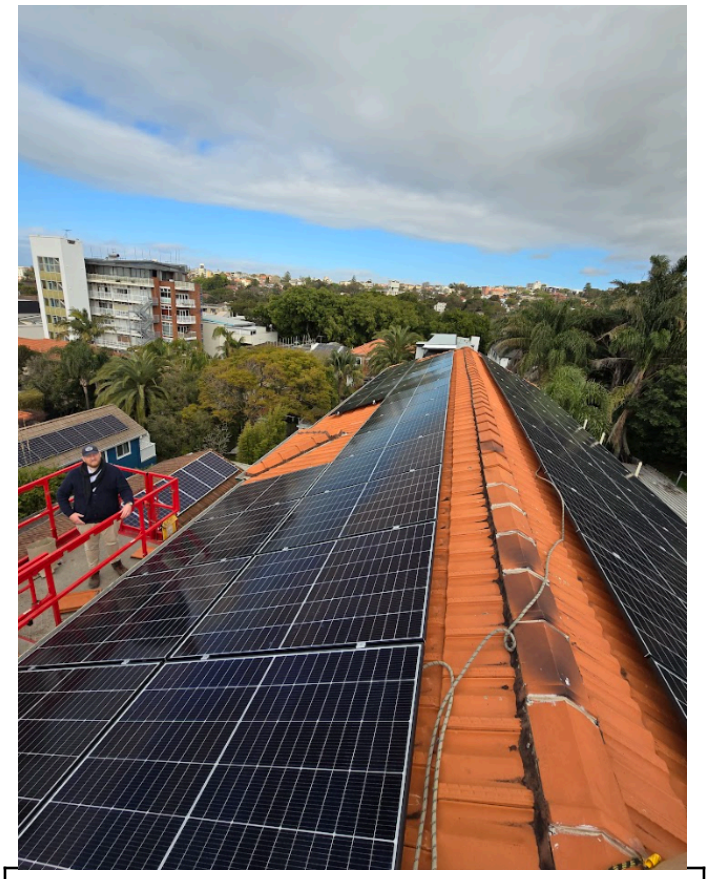

Figure 1. Solar panels installed at 31 Roscoe Street

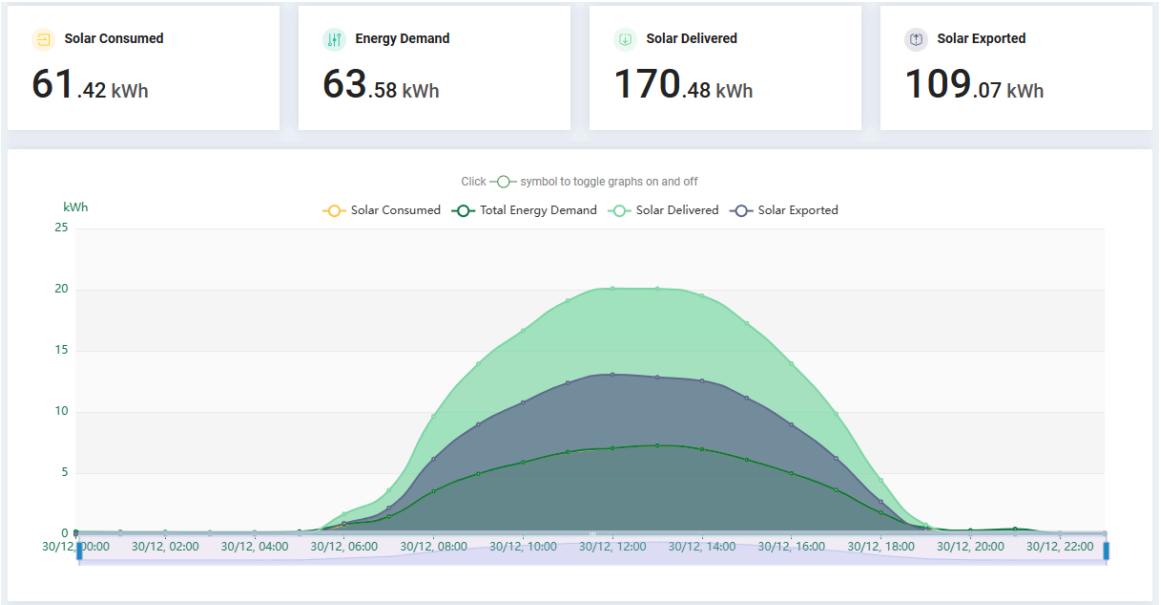

Figure 2. SolShare data on 30/12/2024 showing an error in incoming data

Whilst the energy demand of the residents is yet unknown, the average solar generation of 28kWh per unit means it is safe to assume there will be sufficient solar excess to warrant the installation of a battery as costs decrease.

4.1.2. Emoh Rou

The project at Emoh Rou saw 36 kW of solar installed on the north-facing roof, directing energy to 12 apartment units via a SolShare device.

The below actual data was recorded during a recent sunny Summer day. With a total of 151.56 kWh generated, 20% of the total energy was used onsite and the remaining 80% exported to the grid. During Summer, there is a large excess of solar, with the large majority of generation being sent to the grid. During days with intermittent sunshine and in other seasons, more solar will remain used on-site, ensuring residents maintain the highest usage of solar energy.

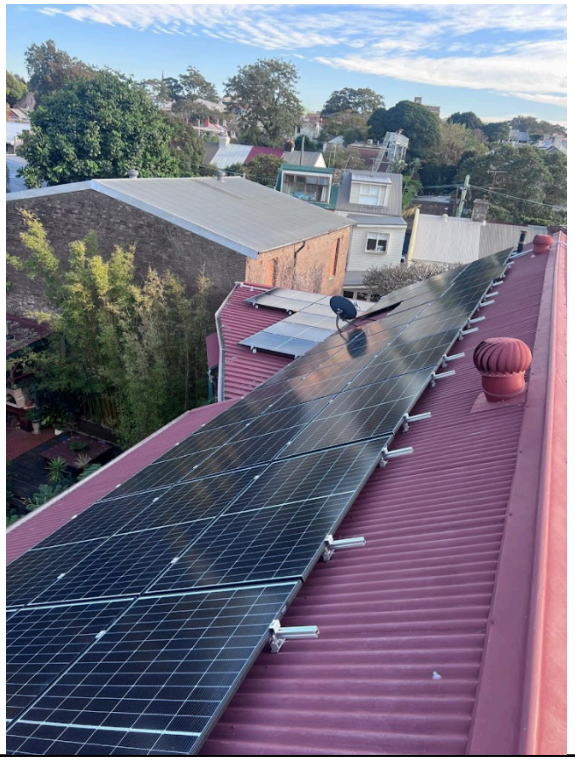

Figure 3. Solar panels installed on Emoh Rou

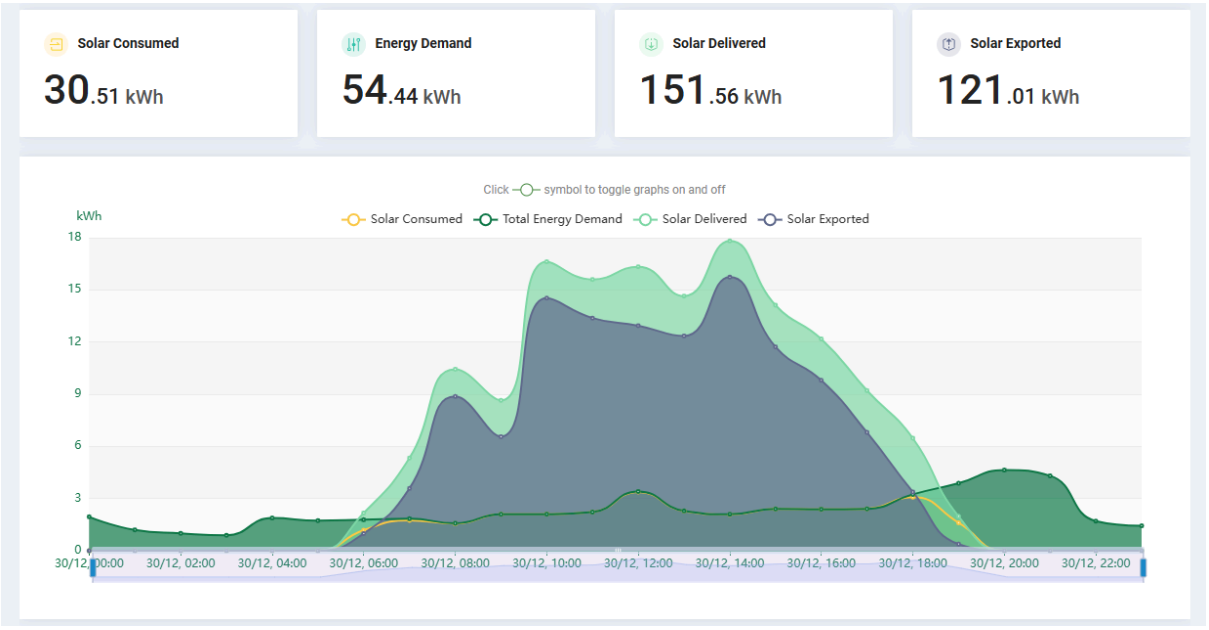

Figure 4. SolShare data during 30/12/2024 showing solar generation (light green), total energy demand (dark green), solar consumed (yellow), solar exported to the grid (gray)

There is potential for a battery to be added in 2025 or beyond that would allow excess solar to instead power Emoh Rou with solar at night.

Initial data date	21/08/2024	
Most recent data date	31/12/2024	
Days of data	132	
Total Solar Consumed	2093.55	kWh
Total Solar Exported	7062.12	kWh
Estimated energy price*	0.333	$/kWh
Average solar feed in tariff	0.06	$/kWh
Number of units	12	
Average savings per unit	**$258.28**	
*https://www.canstarblue.com.au/electricity/electricity-costs-kwh/		
**assumption based on current December 2024 available feed-in tariffs		

Figure 5. Estimates for resident savings, based on 132 days of data since 21/08/2024

The above spreadsheet projects estimated annual savings for each unit within Emoh Rou. If each unit is paying the average energy price of 33.3 cents per kilowatt-hour and has applied for a solar feed-in tariff of 6 cents per kilowatt-hour with their energy retailer, they should reduce their bills by approximately $258.28 one year after the solar has been installed. This includes 35 days where an inverter error halted the delivery of solar energy to the units (see below).

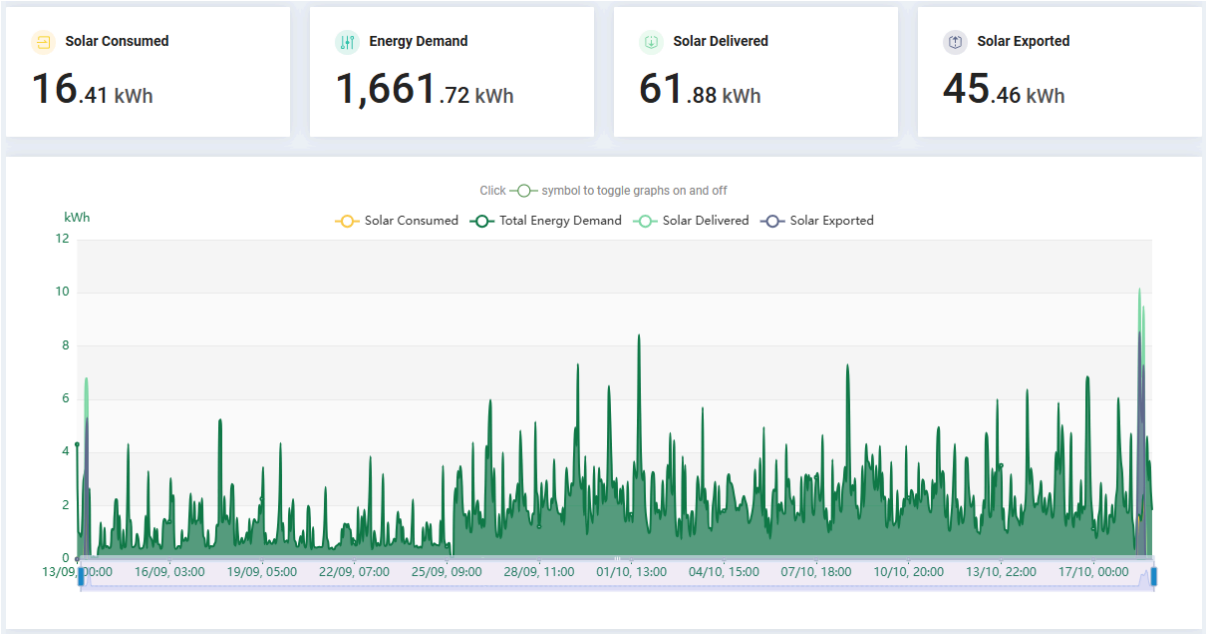

Figure 6. 35 days where an inverter error resulted in no solar energy being delivered to the units

The above issue was identified by the installers and resolved at the first opportunity. There has not been an error since this date, however, any future faults can be identified by either the residents, the installer, Allume, or Pingala. All of whom have access to the above data.

4.2. Business Models

4.2.1 Direct savings

- Case study Emoh Rou

This business model can be implemented if funding matches (or exceeds) the costs of installation and project management. In addition, residents must be responsible for their own energy consumption, and electricity bills to be in the name of individual residents.

Designed to provide an efficient and cost-effective solar energy solution for tenants without any upfront expenses, it delivers direct savings. Funding is used to purchase and install the solar system on site, at no cost to the tenant. These funds must also cover the project management required for the installation process.

The solar system is connected directly to the separate meters as a behind the meter system. Tenants continue to pay their electricity bills as usual, with the savings realized through the reduction in electricity consumption from the grid. Tenants will not see the solar consumption on their bill and savings can only be calculated with generation information and comparisons to previous years' bills. Tenants retain the freedom to choose any electricity provider they prefer, and there are no additional costs imposed on them for using the solar energy system.

However, effective utilization of the solar system may require some changes in tenant behavior to maximize savings. In addition, as the solar system is shared among residents, some management and cooperation are necessary to coordinate the distribution and use of electricity.

4.2.2 Saving providing improved living conditions

- Case study Roscoe St

This business model is only for living arrangements where the tenant is not responsible for their electricity bills. The funding for this model must match or exceed the costs of installation and project management. These dedicated funds are used to purchase and install the solar system directly at the site, at no cost to the tenant or housing provider.

In this model, as residents are not responsible for paying the electricity bills, bill savings are not possible. Instead, tenants see improvements in the property, provided by the housing provider. Because the housing provider pays the electricity bills they will directly benefit from the savings achieved through the use of solar energy. These savings are reinvested to install more efficient and better-quality appliances, providing a double benefit of seeing a carbon intensity reduction as well as a consumption reduction from improved energy efficiency. Additionally, residents are educated and engaged in the journey of living in a lower carbon property, promoting awareness and participation in the energy transition.

The solar system is connected directly to the site's meters (be it single or grouped) as a behind-the-meter system. Savings will be seen by the housing provider via a reduction in their operations costs for that site and can be calculated from the generation data. Although tenants do not see the solar consumption or the savings, they will see improvements to their living spaces as money saved on operations by the housing provider are used to invest in better appliances, improved services or reduced costs for residents in other areas.

Effective utilization of the solar system may require some changes in tenant behavior to maximize savings, this is however hard to manage when the tenants don't see the benefit directly. This can be managed through education and engagement. As the solar system is

sometimes split across multiple meters, it will be up to the housing provider to best manage the distribution of solar generation to best fit the needs of the site and the potential savings.

4.2.3 Co-funded by Community Energy

- developed, but not implemented

This model was developed for implementation at some sites, but abandoned in those cases due to the increased risk and complexity compared to the two models above.
This model however can be an extension of the models above and provide extra capacity when funding does not match the required amount for the installation of the systems under the previous two business models.

This model is to provide the maximum savings possible to residents and tenants with no upfront cost, but with a minimal ongoing cost. It will be most beneficial where funding is available to provide a subsidy to the overall cost of installation and an upfront payment to cover the remainder is not possible or not preferred. The remaining gap funding (sometime called a co-contribution in grants) can be turned into a recurring, operational payment by community co-funding

Co-funding will be provided by community investment (there are various forms) and requires repayment. Funds are raised by the community and provided to the housing provider or the residents at a low rate of finance. This covers the upfront capital costs of the project and repayments of the Community Co-funding should be less than forecasted savings on the system to provide a net benefit back to the tenants (or the housing provider under model 2).

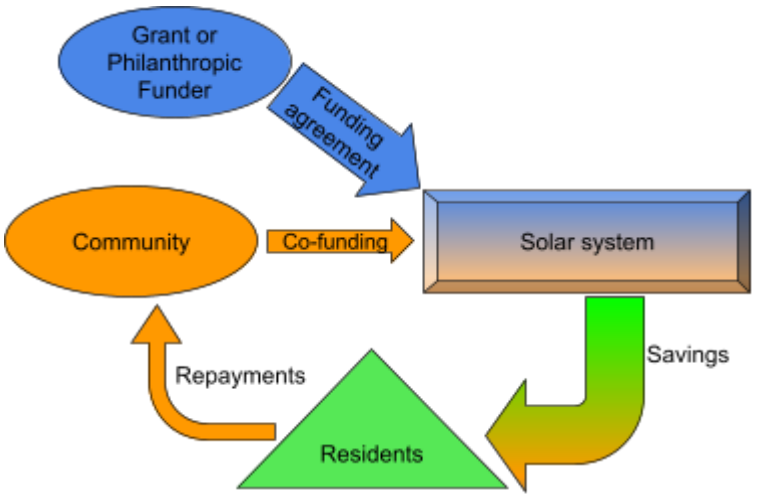

Figure 7. Funding model for co-funded projects

4.3. Household Impact

At 31 Roscoe Street, the residents benefit indirectly from their project, through site upgrades and support services. As they are not the ones paying for electricity themselves, it is their social housing provider who reduces their ongoing costs, which hopefully allow them more financial freedom to improve and maintain their other services and facilities for the residents.

At Emoh Rou, the residents see direct savings on their electricity bills and potential revenue from feed-in tariffs as they the holders of their electricity accounts. They will see hundreds of dollars annually saved on their bills, providing more independence from Australia's volatile energy market and increasing electricity prices. Further, their ability to install a battery in the future gives them even more opportunity to reduce their household bills.

4.3.1. Industry and Government Engagement

Pingala demonstrated the feasibility of large-scale solar installations for community and social housing, engaging with stakeholders to promote replication.

4.4. Committed Sites

After the completion of the two social housing apartment projects, the decision was made to direct efforts towards providing solar to families participating in a local youth services program. This hyper-local, impact-centric focus aimed to be more connected with families and a broader community, providing the most benefit to a group most affected by the current cost of living crisis. Through the Glebe Youth Services, families were chosen who would benefit the most from solar, and discussions occurred between families, the Glebe Youth Services, and Pingala on the process required to navigate the project and adapt to each home's needs.

The suburb of Glebe in Sydney's Inner West is not conducive to installing solar power. An area famous for its historic, century-old terrace homes with steep and narrow roofs and extensive tree coverage doesn't lead to a cheap and easy solar installation. The push to get solar installed here is partially to build solutions to these problems for similar solar projects in the future.

There are also 3-5 sites that have not yet been approved by HomesNSW and cannot be considered 'committed'. However it is likely that a further 15kW can be installed in Glebe. This has been added to an updated budget (7.3) in the budget section

In total, 8 homes were approved by HomesNSW for installation. A summary of the chosen homes are below:

4.4.1. Committed Sites Summary

Address	Works summary	Cost
15 Mount Vernon Street	6kW; 12xTrina Vertex 500W panels; 1xSungrow 5kW inverter; upgrade to smart meter	$9,288
6 Westmoreland Street	6kW; 12xTrina Vertex 500W panels; 1xSungrow 5kW inverter; upgrade to smart meter	$9,288
53 Bellevue Street	4kW; 8xTrina Vertex 500W panels; 1xSungrow 3kW inverter; upgrade to smart meter	$8,635
78 Saint Johns Road	3.5kW; 7xTrina Vertex 500W panels; 1xSungrow 3kW inverter; upgrade to smart meter	$7,367
84 Saint Johns Road	3kW; 6xTrina Vertex 500W panels; 1xSungrow 3kW inverter; upgrade to smart meter	$6,537
37 Mount Vernon Street	7.52kW; 16xAIKO 470W panels; 1xSungrow 8kW inverter; upgrade to smart meter	$8,484
25 Campbell Street	4.75kW; 10xJinko 475W panels; 1xGoodWe 4kW inverter; upgrade to smart meter	$6,929
27 Campbell Street	4.75kW; 10xJinko 475W panels; 1xGoodWe 4kW inverter; upgrade to smart meter	$6,929
	Total installed capacity = 39.52 kW	**$63,457**

5. Challenges and Solutions

5.1. Challenges Faced

Most homes in New South Wales require a change of metering to smart meters, which increases the complexity of many of these projects.

At Emoh Rou, the roof was not in a state that allowed solar panels to be installed without major repairs. Waiting for this to be completed bottlenecked the project somewhat, but ensured the longevity of the solar project and mitigating risks of water leaks.

Some of the homes initially chosen with the Glebe Youth Services weren't eligible for solar, some due to historical zoning of homes, roof repairs that were required or excessively steep roof angles. Alongside the logistical challenge this created in finding replacement homes, it created an unfortunate outcome for those families who were told they would not be able to have solar on their roof.

5.2. Solutions Implemented

Efforts were undertaken to coordinate with network providers to facilitate meter upgrades. This required communication between residents, solar installers and network providers.

Critical roof issues were repaired at the Emoh Rou site, adding $4,500 to the project cost. Contractors were engaged to carry out necessary repairs while maintaining the project timeline.

Comprehensive desktop reviews and site inspections were conducted in collaboration with solar companies to evaluate the suitability of sites for solar installations. Strategies were developed for optimal roof access, efficient wiring configurations, and necessary upgrades to meter boards.

6. Lessons Learned

6.1. Successes

6.1.1. Effective collaboration with housing providers and co-operatives.

By engaging with housing providers and housing operators (a co-operative in the case of Emoh Rou) early, the project was able to quickly identify the areas of need and disadvantage. In Australia, some of the disadvantage lies at the housing provider level, where tier 3 providers do not have access to the same resources and information that larger providers do. Working with the providers to identify possible sites first also allowed the team to only approach residents where there was a high chance of the project being a success. Therefore not over promising to residents where a project would not be feasible.

6.1.2.Successful installation and anticipated savings for residents.

All installations commissioned have been producing power and sites identified for future installation have very low barriers and risk associated with the installation itself. Solar is by

far the most stable renewable energy system currently available. Problems and savings can be identified early through well established checks and industry experience. This means that installations can be planned out with minimal disruption to residents (even when there are faults). Savings that can be expected have some variability, but are similarly forecastable and can be improved on with minor behavioural changes.

6.1.3. Commitment to additional sites, expanding the project's impact.

Success on the first two installations provided the confidence and background for Glebe Youth Services needed to engage Glebe residents for individual installations and for Homes NSW to understand the project (as they also provided consent as landlords for the first two projects) in order to provide the permission to access and install on their managed properties. Without this it is unlikely that multiple sites in Glebe would have been secured.

6.2. Areas for Improvement

6.2.1. Streamlining the process for meter upgrades.

A smart meter is required for any new solar installation, this means they have been required for each site in this project. Despite this being a requirement of the electricity retailer to manage, we contracted the solar installer to speed up the process as installations managed by the electricity retailer have been notoriously slow to take place. This added an extra $600 per meter to the cost of the installation. This cost could be reduced to $150, if sites are identified 3 months in advance and a request made with the electricity retailer. This may however not be practical.

6.2.2. Planning for potential additional costs, such as roof repairs.

Much of the affordable accommodation housing stock in NSW is older and apart from meter upgrades often require building upgrades or maintenance in order to accommodate a solar system, usually with the roof. In the case of Emoh Rou, some of the roofing screws were rusted and needed replacing before a solar system was installed to eliminate the need to take up the solar system in the future (at the residents cost) and perform the maintenance. In the case of some Glebe sites, sites were discounted altogether due to expensive roofing maintenance that would take months to complete. Preparing for delays, additional costs and issues such as this are to be expected.

6.2.3. Addressing site-specific challenges early in the planning process.

Many of the challenges faced in proving solar to affordable accommodation and social housing have unique responses and solutions. Anticipating what challenges will be faced is difficult and often need to be taken on a case by case bases. This makes engaging with sites difficult and engaging with funders even more so. The unique situation of this grant has allowed for the flexibility needed in working in this space.
However, the best solution at a site/resident level is to get a solar expert in as soon as practical to provide an assessment and work with them on issues.

7. Budget

7.1 Initial Budget

The original budget included in funding application and project management plan.

Itemized Cost *List Each Cost Against the Requested Amount Below*	**Requested Amount**	**Other Funding Sources**	**TOTAL in USD**
CAPEX on installations	$168,700	$40,000	**$208,700**
Community events and education	$3,300		**$3,300**
Project manager (19 mths)	$35,000		**$35,000**
Comms manager (12 mths)	$18,000		**$18,000**
TOTAL	***$225,000****	***$40,000***	***$265,000***

*Total in AUD = $332,870 in received funds after FX

7.2 Actuals

Below are the costs of the project to date in Australian Dollars (AUD) including spent and committed funds. These are then calculated into USD for comparison with the original budget. The actuals show that while employment has been on budget, there is some CAPEX on installations and Community Events budget remaining.
Under employment, for the new sites in Glebe, the project found it needed a local project coordinator to manage relationships. Available funds were allocated from the Comms manager role starting later than expected to fund the new position.

Itemized Cost *List Each Cost Against the Requested Amount Below*	**Actuals (AUD)**	**Other Funding (AUD)**	**TOTAL (AUD)**	**Cal. Total in USD***
Roscoe St	$67,244			
Emoh Rou	$80,746			
Committed sites in Glebe	$63,475			
Total CAPEX on installations	**>>>**	**$0**	**$211,465**	**$135,337.6**
Extra video production for Glebe installations	$15,000		**$15,000**	**$9,600**
Community events and education	$3,550		**$3,550**	**$2,272**
Project manager (18 mths)	$56,246		**$56,246**	**$35,997**
Project Coordinator (3 mths)	$9,600		**$9,600**	**$6,144**
Comms manager (8 mths)	$20,400		**$20,400**	**$13,056**
TOTAL to date	***$321,961***	***$0***	***$321,961***	***$202,406***

**Actuals provided in Australian Dollars (AUD) and converted to USD based on $0.64USD to 1 AUD.*

7.3 Final budget with committed funds.

Due to the remaining funds from CAPEX and Community events, and with installations committed to but not complete. A revised budget below will demonstrate how this project will be closed out.
In addition to the new Project Coordinator position to complete the Glebe installations. Budget has also been diverted from CAPEX to do increased video production to capture the inclusion of the Glebe project since they weren't able to be included in the 2024 video of the Roscoe St and Emoh Rou sites.
This reallocation will allow for the project to reach its installation goals and to provide extra community resources to conduct similar projects in the future.

Itemized Cost *List Each Cost Against the Requested Amount Below*	**Budgeted (USD)**	**Actuals (USD)**	**Budget Adjustment**	**Cal. Total in USD***
Roscoe St		$67,244	$0	
Emoh Rou		$80,746	$0	
Committed sites in Glebe		$63,475	$0	
Total CAPEX on installations	$168,700	**$135,337.6**	**- 33,363**	**$135,337.6**
Additional installations in Glebe (approx. 9kW)	$0	**$0**	**+ $15,000**	**$15,000**
Extra video production for Glebe installations	$0	**$9,600**	**+ 9,600**	**$9,600**
Community events and education	$3,300	**$2,272**	**+ 1,000**	**$4,300**
Project manager (Adj. + 3 mths)	$35,000	**$35,997**	**+ 997**	**$35,997**
Project Coordinator (Adj. + 3 mths)	$0	**$6,144**	**+ 11,520**	**$11,520**
Comms manager (+3 mths)	$18,000	**$13,056**	**- 4,752**	**$13,248**
TOTAL		***$202,406.60***	**+ 2.60**	**$225,002.60**