Solar Feasibility Assessment

Prepared For: **Traralgon Neighbourhood Learning House**

Prepared by: **Rhys Freeman**

Energy Innovation Co-operative Ltd

Energy Innovation Co-operative
ABN 18807187154
PO Box 111, Inverloch, VIC 3996
www.eico-op.org.au

CONTENTS

Acknowledgment:
The Energy Innovation Co-operative acknowledges the
generous assistance of the Geelong Sustainability group
who created the initial templates on which this document is based.

DISCLAIMER

All due care has been applied to the preparation of this report. We aim to provide the best estimate of solar and economic results over time based on the information supplied.

The estimated energy generation does not take into account any shading of the solar array. The performance of the system may be affected by the actions of third parties and environmental conditions including, without limitation, the number of hours of sunlight, cloud cover, weather patterns, the location of the System and the location of surrounding structures and flora.

Economic projects are general in nature and do not take into account any particular person's objectives, financial situation or needs. Before acting on this information, users should consider its appropriateness having regard to their personal situation. We advise that users obtain financial advice specific to their situation before making any investment.

The Energy Innovation Co-operative and the author take no responsibility for variations between these estimates and actual results experienced under any circumstances and shall not be held liable for any loss or damages arising from the use of this report.

SITE DETAILS

Organisation:	Traralgon Neighbourhood Learning House		
Address:	11-13 Breed Street, Traralgon. Vic 3844		
Contact Name:	Liz Dorsett		
Position:	Manager		
Email:	tnh@wideband.net.au		
Phone:	03 51746199	**Mobile:**	0400773481

INTRODUCTION

An energy audit and feasibility assessment, including analysis of the interval data showed potential for the installation of renewable energy at this site.

This report was produced by the Energy Innovation Co-operative. It will provide recommendations from the energy audit, outline future possibilities for installing renewables and provide financial projections based on the information provided. It will also suggest ways in which the Southern CORE fund may provide assistance.

SUMMARY

a. Energy Audit, retail tariff and potential savings:

Provide summary of energy audit findings (detailed later), competitiveness of current retail tariff and potential savings.

b. Solar system sizing:

We have assessed the energy consumption at 160 kW daily and performed detailed economic modelling to determine the optimal solar system size for the facilities.

A 32.4 kW solar system is recommended for the facility at an estimated cost of $36,000 including GST (inc. $15,640 STC Credit).

c. Renewable energy benefits:

The solar system would supply 49% of the facilities electricity consumption and reduce greenhouse gas emissions by 56 Tonnes of CO2 per year.

d. Financial payback:

The system would save an estimated $13,631 in electricity charges in the first year and provide a payback period of 2 years, 9 months.

6. Southern CORE fund:

A few options for how the EI Co-op and Southern CORE fund could assist may be with:

a. Assistance with obtaining a grant for all or some of the PV installation cost.
b. No interest loan with all assets owned by the organization (TNLH)
c. Leasing arrangement (where EICo-op purchases, arranges installation, and owns the panels until they are paid off and ownership is then handed over to the organisation).

NOTE: A Guarantor or other form of financial security is preferred. The building is Council owned and a written statement has been requested from Council.

FEASIBILITY PROCESS

This Solar Feasibility Assessment report has been developed by way of the following:

This F**easibility Assessment** was conducted by a contracted energy auditor/assessor who conducted an energy assessment to outline any additional works required to reduce energy consumption and improve energy efficiency. The Assessor also gathered further information to enable preparation of this Feasibility report such as:

i. Electricity bills, tariff plan details
ii. Identified potential issues with Ausnet grid connection approval
iii. Location of switchboard, metering, extra expenses (eg: upgrade switchboard)
iv. Location of inverters, meters and distance to switchboard
v. Building ownership, authorization and permits required (Heritage, Planning, Building)
vi. Photos taken as required for this report

FEASIBILITY RESULTS (DETAILED)

a. Energy Assessment, retail tariff and potential savings:

An energy assessment was conducted as part of this Solar Feasibility Assessment.

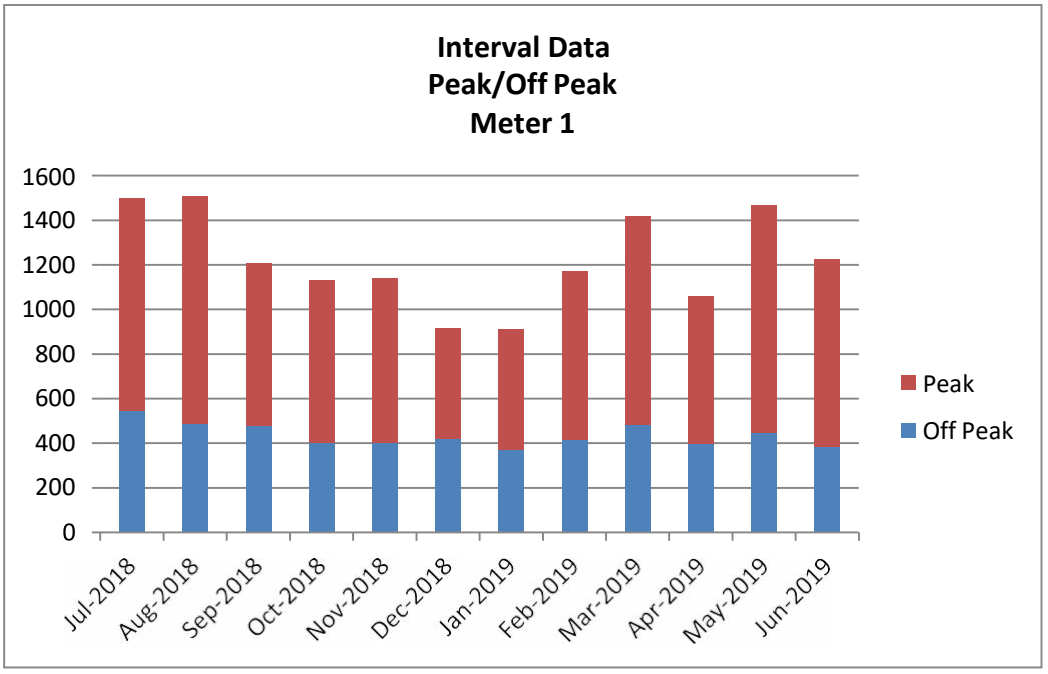
Results of energy audit with short and long term recommendations, benefits and benchmark costs.

1. **Quantitative overview of site energy performance and opportunities for improvement**
   Traralgon Neighbourhood Learning House is part of the Kath Teychenne Centre, a complex site with multiple purposes and different organisations.

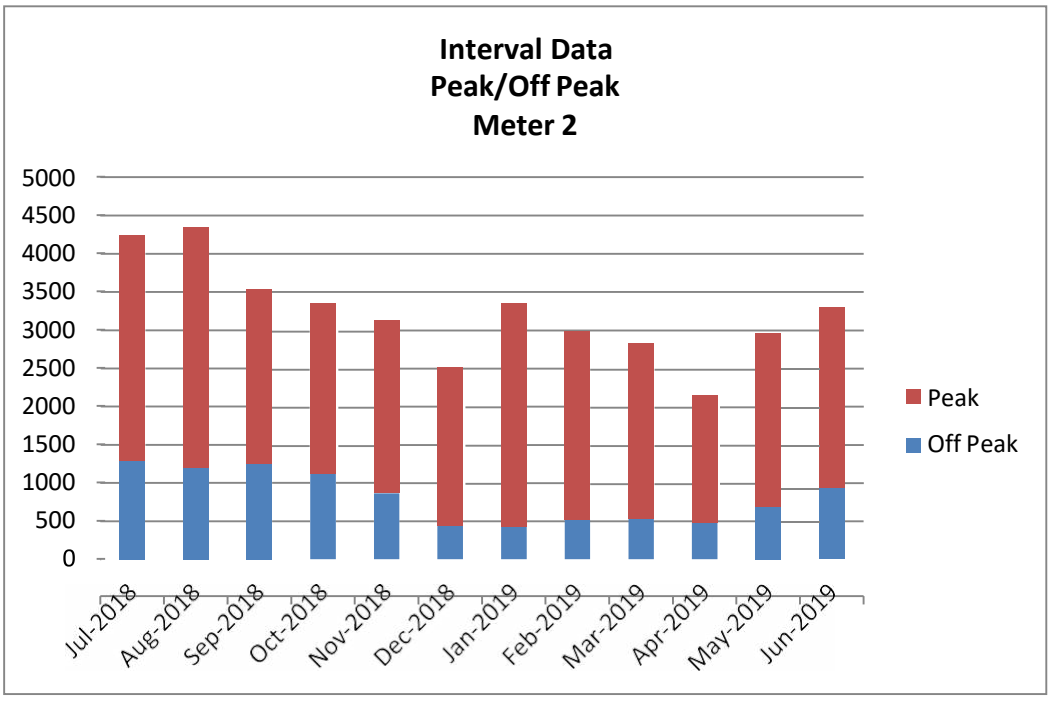
   The Neighbourhood Learning House is the largest activity within the Kath Teychenne Centre. The energy bills are paid by Council then charged back to the tenants according to estimates of usage and ability to pay. TNLH pays 50% of the energy bills for the entire building.

   There were two meters supplying the whole building, and there was no firm method of precisely outlining which organisation fell under which meter.

   Energy Use



Above is Meter 1, which has a lower usage profile. In general, this meter is presumed to mostly cover the other residents of the site.



For both meters, consumption is higher in winter, which indicates air conditioning use. With respect to Meter 2, off peak use (11:00pm-7:00am) is low, especially after about November 2018. This may be due to a reduction in the urn/hot water boiler use. A suggestion was made to use the timer during the initial visit.

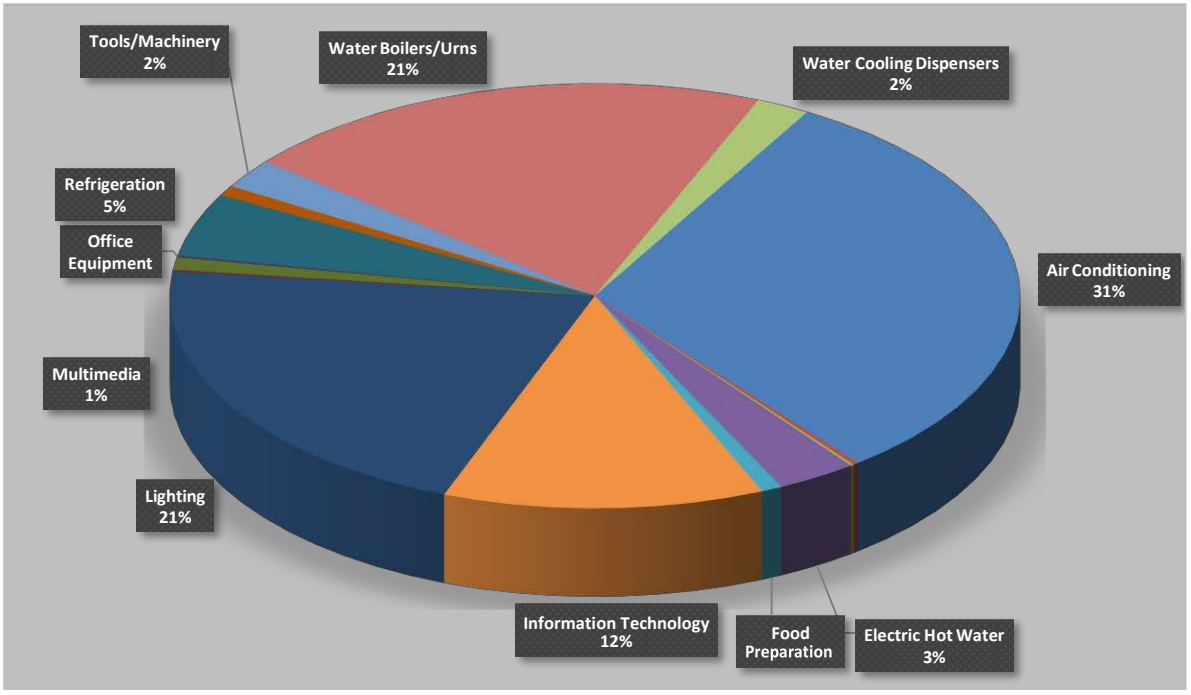
Estimates for the total kWh across the 2018-2019 year for both Meter 1 and Meter 2 total around 53,300 kWh. The daily use fell between 120 and 190 kWh/day.

General Recommendations

- The target temperature for the air conditioners should be monitored. Setting the temperature too low in summer and too high in winter uses excessive energy, which could be a problem. It might be worth monitoring this.
  As a template – set the temperature in summer between 25-27C (no lower than 23C), and in winter, 18-20C.

- Keep the air conditioner filters clean, this will help to maintain efficiency and reduce power consumption. Standard maintenance programs should keep your air conditioner units running well.

2. Low cost opportunities



Financial Suggestions

- It was suggested that the zip boiler should be put on a timing schedule. This will significantly reduce energy consumption. Fortunately a timer is built in to the zip boiler. A similar suggestion was also made for the water cooler/dispenser, however a power timer will have to be purchased for this device (approx. $20).

- Some of the fridges are not very efficient.

  In particular, the bar fridges should be consolidated. Bar fridges tend to be quite poor for energy consumption (they use as much as a standard sized fridge). Placing a timer on the drinks fridge is worthwhile, as it doesn't matter if a drinks fridge is turned off at night, or during cooler weather. (If drinks fridges contain wine, it is not advisable to switch them off.)

  When purchasing a new fridge, aim for a fridge with a high star rating, at least 4 stars.

- The lighting is relatively efficient, these are mostly fluorescents. Where lighting is on for long periods without staff presence, a motion sensor would be useful. This is particularly important in toilets and corridors. If lights switch on and off regularly, it might be worth upgrading them to LEDs, which tend to last longer in those conditions. These are also more efficient than fluorescent lights.

- Standby loads can be removed by adding power timers. I suggest that power timers be installed in the computer lab. Another option is to organise a switch to turn all the computers off at the power points, when they are not used.

- If you install a solar panel system, it is advisable to upgrade your gas hot water unit to a heat pump system. This will reduce your gas bills, and your electrical power requirements should be compensated by use of the panels.

- Insulation was not observed (due to logistics of entering ceiling), but was reported to be present.

3. Payback Schedule (excluding motion sensor suggestion, which is hard to model)

Item to be examined	Suggestion	Cost	Energy Savings/year (kWh)	Savings ($) per year	Simple Payback Time	Priority
Zip Boiler	Implement timer system	$0	3,504	$841	Immediate	1
Fridges	Consolidate and remove one fridge	$0	400	$132	Immediate	2
Water chiller	Implement timer system	$20	438	$105	2 months	3
Standby Loads	Install standby power timers	$260	342	$82	3 years 3 months	4
Drinks fridge	Implement timer system	$20	250	$60	4 months	5
Gas Hot Water system	Heat Pump hot water	$4,000	-	$500	8 years	6

The cost of all the above measures total $4,300. Totals savings are $1,720 per year. These measures will pay for themselves in 2 years, 6 months.

Some links

Power timer : https://reductionrevolution.com.au/products/digital-plug-in-mains-timer-switch?variant=13832164606054&currency=AUD&gclid=CjwKCAjw67XpBRBqEiwA5RCocfP6fGbpsoJGUupHjyxcSOTCYeZhXKR7EIMzl3XCUpZ7DhqIPid7HxoCucwQAvD_BwE

Heat pumps : https://www.sanden-hot-water.com.au/

Assessment of current retail electricity tariff

Electricity Bill Analysis

Retailer: AGL **Retail Plan:** **Freedom 43%** **Customer Number: 64619448**

NMI: 63050067373 **Meter No:** 4526086, 4526088 **Distributor:** Ausnet

Contract term: **Description: (include discounts if applicable)**

Solar Feed-In-Tariff: Assumed to be $12cents/kWh

Maximum Demand Charges:

Key Electricity Charges

Peak Energy Charge: $0.38 / kWh including GST

Daily supply charge: $1.65/ Day including GST

b. Solar system sizing:

A 32.4 kW solar system is recommended for the facility at an estimated cost of $51,640 including GST (modelled through Sunulator). The cost is reduced by $15,640 to $36,000 via a STC Credit.

The system would save an estimated $13,631 in electricity charges in the first year and provide a payback period of 2 years, 9 months. The solar system would supply 49% of the site's electricity consumption and reduce the sites greenhouse gas emissions by 56 Tonnes of CO2 per year.

NOTE: Maximum financial benefit (and shorter payback period) for a solar system is obtained when the system is sized so the energy produced from the solar system is directly consumed onsite and export of solar energy to the grid is minimised.

The solar system sizes were chosen to provide the optimal cost to benefit ratio and were modelled using detailed energy usage data (twelve months of electricity meter data at 30min intervals) overlayed with estimated solar generation data and electricity tariffs provided.

Consumption and generation

Electricity Consumption:	160 kWh/day
Estimated Solar System Generation:	134 kWh/day
Estimated Solar Consumption on Site:	79 kWh/day
Net Electricity Consumption:	81 kWh/day

Electricity Consumption Met by Solar: 49%

Recommended System Details

Recommended Solar PV System:32.4 kW

Number of Solar Panels: **108 x 300W Modules**

Recommended Warranty: **Modules: Min 10 year manufacture, 25 year performance**

Inverter: 12 years

c. Renewable energy benefits:

The solar system would supply 49% of the facilities electricity consumption and reduce greenhouse gas emissions by 56 Tonnes of CO2 per year.

d. Financial payback (detailed Financial Assessment)

Estimated System Price: *Including GST and after STC rebates*	$36,000
Annual Electricity Costs Without Solar:	$21,700 (estimated)
Annual Electricity Costs With Solar: *(Year 1)*	$8,069
Annual Savings *(Year 1):*	$13,631
Percentage Cost Saving:	63%
Payback Period:	2 years, 9 months
Return on Investment (IRR): *25 year horizon*	30.9%

6. Southern CORE fund:

Benefits to the Host Site Include:

- No upfront capital required;
- Immediate benefit of having a solar system installed on site;
- Reduced and predictable energy charges enabling better budgeting;
- Reduced carbon emissions;
- Solar system owned at end of project term;
- Environmental and social benefits;
- Enabling community investment in renewable energy.

Recommendation for this site

Based on building ownership, organisation history, financial capacity and analysis of existing electricity usage we believe the best way to fund the installation of solar panels at this site may be:

a. Obtaining a grant to provide all or part of the cost of the PV installation.
b. A No interest loan from the CORE fund with all assets owned by the TNLH. The term and amount of the loan would need to be negotiated.
c. Securing the building owner as a guarantor of any loan is highly desirable.

7. Next Steps

Second meeting between Traralgon Neighbourhood Learning House and Energy Innovation Co-op.
This meeting will discuss the results of the feasibility assessment, energy efficiency measures, suitability for PV and how the CORE fund might assist.

a. Discuss Solar Feasibility Assessment report
Talk through the key findings of the assessment report.

b. Discuss Energy Audit report
Discuss recommendations from energy audit

c. Discuss how a solar project can work at the host site
i. Clarify the benefits of the project, financial, environmental, social.

d. Financial model
ii. Provide an overview of the financial model, no interest loan, guarantor, component of other funds available?

e. Steps required to confirm commitment from host site to proceed
i. Normally this will require approval by the governing body, committee, landowner.

f. Negotiate draft terms of agreement, present draft legal agreements, project costs
Feasibility assessment project costs (including this report) have been covered by a the Latrobe Valley Community Energy Hub.

g. Obtain 2 quotes for works required/solar installation
Depending on the agreed funding model, representatives of *Traralgon Neighbourhood Learning Centre* Fund should obtain quotes from at least 2 local installers based on the technical specifications provided.

h. Appraisal of quotes for works required/solar installation
The quotes (and referees if required) will be considered by the Southern CORE Public Fund Management Committee and compared against the solar feasibility report.
Note: It is important that only reputable installers and equipment are used to reduce risk of loan default and/or damage to EICo-op reputation from sub-standard installations.

i. Approval required by Energy Innovation Co-operative board
j. Legal documents prepared and signed. Funds transferred.

8. About The Energy Innovation Co-operative

The Energy Innovation Co-operative Ltd is a not-for-profit, non- trading Co-operative established in 2009 with the mission “working together towards a zero emissions community”. In 2018 we have over 300 member/ shareholders, an elected board and one part-time paid project officer. Most but

not all activities and members are in and around Bass Coast and South Gippsland Shires, but neither the Co-op nor the Southern CORE (Community Owned Renewable Energy) Fund have geographic limits in the rules. Since 2018, the Co-op's Southern CORE Fund has offered support to groups in the Latrobe Valley as well as within its home region.

A major focus of the Co-operative since 2016 has been building capacity to develop community owned renewable energy projects through a range of sources. A joint project with the Victorian Community Solar Alliance in 2018 built our capacity to manage investment-model projects. In addition, through a Victorian Government NEJF grant, the Co-op in 2019 completed the installation of 92 kW solar PV and 41 kWh battery storage at the State Coal Mine Wonthaggi. This installation is owned by the Co-op. Income earned from sale of clean power to Parks Victoria, is used to support the Southern CORE Fund and its recommended projects.

Southern CORE (Community Owned Renewable Energy) Fund

The Southern CORE Fund is designed as a revolving fund. Community groups can apply for no interest loans to install solar PV or energy efficiency measures onto buildings those groups manage. Repayments are mostly funded through savings, and those funds are then re-used by the next community group. As the Fund builds, the intention is to make grants available as well, to the most-in-need communities.

The Southern CORE Fund operates as a component of the Energy Innovation Co-op's Public Fund which has deductible gift recipient (DGR) status. All donations over $2 are tax-deductible.

Find out more about our Southern CORE fund and Community Owned Renewable Energy go to: https://eico-op.org.au

9. APPENDIX:

1. SITE ANALYSIS AND ROOF ASSESSMENT

Site analysis and Roof Assessment

Site Operation:	24hrs, 7 Days per week
Environment:	No issues
Observations:	Single Story Building
Heritage:	No Heritage Overlay
Electrical Infrastructure:	

Switchboard and Metering Locations:	Switchboard in centre of building, meter boxes towards the rear of the site (east facing).
Sub-boards and Distribution Boards:	*Note: Location of Sub-board building to be determined.*
Electricity Distributor Connection:	Ausnet

NOTE: Pre-approval from Ausnet to connect Solar PV system to the grid will be required.

Roof Assessment

Recommended Solar Array Location:	North facing roof space of building
Roof Details:	
Orientation:	Azimuth: 9.5 degrees (North Facing) Pitch: Approx. 23 degrees
Height:	Approx. 4-5m
Access:	Ladder or scissor lift required.
Recommended Solar Array Orientation and Mounting:	North Roof Mount Frame
Shading:	None
Structure:	The roof appears to be structurally sound but assessment required prior to installation.
Heritage:	No Heritage Overlay
Switchboard and Metering Locations:	Central (switchboard) and eastern end of building (meter)

Solar Module Placement

Note: *Final solar module placement and inverter location to be recommended by the contracted solar installer.*

ENERGY INNOVATION CO-OPERATIVE LTD:

Contact the Energy Innovation Co-operative: Project Officer John Coulter Mob: 0408596052

Email: jaccp@tpg.com.au or info@eico-op.org.au https://eico-op.org.au

Energy Assessment/ feasibility: Rhys Freeman (Grad Dip Sustainable Energy) 0409 536 995

info@rhysfreeman.com.au