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SOLAR FOR RENTAL PROPERTIES – CASE STUDY REPORT

September 2017

INTRODUCTION

Geelong Sustainability is a not-for-profit community organisation working towards a more sustainable future for our region. Our CORE Geelong task group has been established to facilitate the transition to a sustainable energy system. We're enabling community investment in renewable energy projects that are financially self-supporting, and return economic as well as social benefits to the community. We are particularly interested in making renewable energy accessible to all low-income households and rental property tenants.

This case study into the feasibility of solar for rental properties was commissioned primarily to determine if a landlord and tenant could come to an arrangement to have solar installed on the rental property where the economic benefit from the solar system is shared between both parties. Additionally, Geelong Sustainability is investigating the possibility of offer a free Solar Brokering service to Landlords and Tenants. The service would aim to make getting solar on rental properties easy and affordable.

This study assessed four rental households with the following attributes.

#	Suburb	Residents	Electricity Usage Profile	Main Appliances
1	Thomson	Twin Share	Low: 10kWh/day	All Gas with Electric A/C
2	Ocean Grove	Couple	Low: 4.36kWh/day	All Gas
3	Belmont	Couple with infant	Low: 11.47kWh/day	All Gas with Electric A/C cooling only
4	Frankston	Single (Retired)	Low: 9.5kWh/day	All Electric

EXECUTIVE OVERVIEW

The four households participating in the case study were all found to have relatively low electricity energy usage but despite this the installation of solar power was found to still greatly benefit all rental households with expected electricity bill savings from 33% to 78%.

The case for a shared benefit between landlord and tenant was found to be marginal due to the low energy usage profiles. For the households participating in the case study it appears unlikely that a non-environmentally minded landlord would be willing to invest in solar at the returns modelled.

Our findings indicate that achieving a return on investment of 5% for a landlord and a positive benefit for the tenant is certainly possible, and would be achievable for rental properties with higher energy usage profiles. Further investigation is required prior to offering a brokering service.

BACKGROUND

Extract from 'Rental properties - it's finally time to go solar!' by Chris Cooper.

What's stopping solar on rentals?

Typically, it is the split incentive problem that's blamed as the culprit for rentals not going solar - i.e. the landlord doesn't invest because the tenant get's the bill savings; and the flip side, the tenant doesn't invest as they have no guarantee of staying in the house long enough to get a viable return on their investment.

But is this really still the case?

The split incentive problem is, of course, real. But the costs of solar has dropped dramatically in recent years, and electricity prices and solar feed-in-tariffs have substantially increased. This has meant that the benefits of going solar i.e. the 'economic pie' - has been never been so attractive. As a result, there is now sufficient economic incentive for landlords and tenants to get together and equally split this 'economic pie' and create a win-win outcome for both parties!

However, despite these positive developments, we still don't see much landlord-tenant solar going up on roofs. Why? Because deeper 'human' barriers are still getting in the way, namely:

Cultural barriers: because landlords and tenants don't generally talk to one another - and they aren't aware that they can actually go solar together - landlord-tenant solar simply doesn't happen.

Information barriers: There is so much uncertainty and misinformation about the benefits of going solar that even if the landlord and tenant knew it was possible, they still struggle to find the confidence to mutually proceed.

RENTAL BROKERING SERVICE

Geelong Sustainability is investigating the potential for offering a free brokerage service to increase the uptake of solar on rental properties.

The program could facilitate an agreement between landlord and tenant where the landlord will purchase the solar system and the tenant makes repayments via a fixed increased of the weekly rent.

Geelong Sustainability would assess the economic benefits of the solar installation and ensure the benefits are split between both parties.

Benefit for the Tenant – The tenant saves more money on their electricity bills than the additional rental charges and gain access to clean energy technology.

Benefit for the Landlord – The landlord can earn a return on their investment, receive a tax-break to pay for the solar system, and increase their property's value.

This case study will inform Geelong Sustainability's decision to offer a rental brokering service.

METHODOLOGY

This Solar for Rental Case Study was developed by way of the following:

- A call out for interested landlords and tenants to participate in the case study via social media and events.
- Requested electricity usage data from participating rental households including:
    - Electricity Bills
    - Smart Meter Interval Data
    - Information about usage habits, household type, appliance types etc.
- Conducted Solar Feasibility Assessment
    - Desktop audit of electricity bills, solar potential and approximate system payback.
    - Desktop survey of the site using Nearmap satellite imagery.
    - Detailed analysis of electricity consumption using smart meter interval data.
    - Detailed simulation and economic modelling of energy usage and potential solar scenarios using the Alternative Technologies Association's (ATA) Sunulator solar and battery feasibility software. *Currently the most capable economic analysis tool for grid-connected solar and solar battery systems in Australia.*
    - Solar system prices were based on Solar Choice residential price index September 2017, (average of medium and high prices.)
- Rental Shared Benefit Assessment
    - Detailed assessment of shared benefit scenarios and economic returns for rental properties.
    - Identification of landlord investment returns and tenant energy bill savings.
    - Modelling and reporting of shared benefit assessment.

CASE STUDY RESULTS

Solar Feasibility Assessment

The electricity usage data for each rental property was used to conduct a solar feasibility assessment. The recommended solar system sizes were chosen to provide the optimal cost to benefit ratio and were modelled using detailed energy usage data (electricity meter interval data) overlayed with estimated solar generation data and electricity tariffs provided.

Summary details of the electrical usage profiles and solar system recommendations can be found in Tables 1 & 2.

Electricity Usage & Tariff

Table 1 outlines the energy usage and electricity tariffs for each rental tenant.

Table 1. Energy Usage & Tariff Summary

#	Suburb	Residents	Average Daily Usage (kWh/day)	Usage Profile	Electricity Tariff (c/kWh inc GST)	Daily Connection Charges (c/kWh inc GST)	Annual Electricity Bill ($ inc GST)
1	Thomson	Twin Share	9.26	Evening Peak	31.075	170.555	$1666
2	Ocean Grove	Couple	4.36	Evening Peak	26.15	144.09	$942
3	Belmont	Couple with infant	11.47	High Day, Higher Evening	18.15	93.50	$1191
4	Frankston	Single (Retired)	9.50	Evening Peak	27.01	106.42	$1290

Solar System Recommendations

The recommended solar system for each rental property and the associated savings are shown in Table 2. The payback period is the simple calculation of the time it would take to payback the cost of the solar system from the savings in electricity, if the system was purchased outright by the tenant. The payback figure was used as a comparative reference only.

Table 2. Solar System Recommendations

#	Average Daily Usage (kWh/day)	Recommended Solar PV System (kW)	Estimated System Cost (inc GST)	Estimated Savings to Tenant (Year 1)	Annual Electricity Bill After Solar ($ inc GST)	Electricity Bill Savings (%)	Payback Period* (Years)
1	9.26	3	$4860	$690	$976	41%	7
2	4.36	4*	$5720	$735	$207	78%	8
3	11.47	2**	$4180	$398	$794	33%	11
4	9.5	3	$4860	$618	$673	48%	8

** A 4kW solar system was found to provided far greater economic benefit and paid back quicker then smaller system sizes. This is due to that fact that large residential solar systems, per panel, are now cheaper than small ones, and the recent rise in the solar feed-in-tariff. Even with low household energy usage we found if roof space allows bigger systems are better. Read more: Solar Sizing: Bigger is Better report, ATA.*

*** A 2kW Solar system was recommended due to limitation of roof space.*

The solar feasibility results indicate that solar is feasible for each of the tenants and would result in varying levels of savings per year which reduced electricity bill cost by 33% to 78%. The majority of tenants where low energy users, which results in a relatively modest bill savings compared to households with higher energy usage. The economic benefit provided from the solar system increased for households with higher energy tariff and tenants who used more electricity during the daytime.

Rental Shared Benefit Assessment

A shared benefit assessment tool was developed to accurately model scenarios of shared economic benefit for the Landlord and Tenant.

The assessment is based on an arrangement were the landlord will purchase the solar system and the tenant would make repayments via a fixed increase in the rent. We have modelled the economic benefits of the solar installation to ensure the benefits are split between both parties.

The landlord will receive a return on investment via the additional rental income, receive a tax benefit, and increase the property's value by up to 3%[1].

The tenant will benefit through reduced electricity bills, our modelling ensures that the money saved on bills outweighs the additional rent repayments. A safety margin of 25% has also been included to account for any future changes to the energy usage habits of the tenant. If the assessment fell below this

[1] According to research from the University of Western Australia. http://dx.doi.org/10.1111/1467-8489.12126

margin the project was deemed not viable. In this case the scenario was remodelled at a lower interest rate.

It is anticipated that the rental increase be set as an addendum to the lease agreement. This would be transferable to new tenants and would also include a clause to cover solar system underperformance.

If the solar system failed to meet expected energy outputs by 15% the landlord would be required to reimburse the tenant a set amount until the system fault is rectified. Each party would have access to online monitoring of the solar system for performance checking.

Refer to Table 3 for a summary of the Shared Benefit Assessment results. **Appendix A** contains more detailed information of the Shared Benefit Assessment results.

Table 3. Shared Benefit Assessment Summary

#	Tenant Electricity Bill Savings (Year 1)	Landlord Increased Rental Return (per year)	Tenant Net Benefit (Year 1)	Tenant Savings over term*	Landlord Initial Investment	Landlord Investment Term (Years)	Landlord Investment Return over term	Landlord Return on Investment (IRR)
1	$690	$518	$172	$2539	$4860	12	$1354	4%
2	$735	$575	$160	$2056	$5720	12	$1176	3%
3	$398	$292	$105	$2450	$4180	17	$792	2%
4	$618	$459	$158	$2208	$4860	12	$654	2%

** Assumes an annual 3% electricity price rise.*

Our results indicated that in most cases the project viability was found to be marginal. This was mainly due to the low energy consumption of the households.

Electricity tariff and day time energy usage were critical factors in being able to achieve an ideal shared benefit scenario. Tenants with higher tariffs and/or higher daytime energy usage will benefit more from the solar system with greater bill savings. The majority of rental properties in this study had low energy usage profiles which resulted in a marginal case for shared benefit.

In all cases the benefit to the tenant was at the safety margin, this meant there was little room to share benefit to the landlord to achieve a rate of return comparable with the investment market.

It was believed that a target return on investment of 5% would be attractive in today's investment environment, however it was not possible to achieve this return and also ensure the tenant would benefit from the arrangement with the included safety margin.

It appears unlikely that a non-environmentally minded landlord would be willing to invest in solar at returns modelled.

Achieving the target return on investment of 5% for a landlord and a positive benefit for the tenant is certainly possible, and would be achievable for rental properties with higher energy usage profiles.

Table 4. shows the results resulting benefits when a 5% return is modelled. Please note that in all cases the benefit to the tenant is below the 25% safety margin.

Table 4. Shared Benefit Assessment – 5% Landlord Return, 12 year term.

#	Tenant Electricity Bill Savings (Year 1)	Landlord Increased Rental Return (per year)	Tenant Net Benefit (Year 1)	Tenant Savings over term*	Landlord Initial Investment	Landlord Investment Term (Years)	Landlord Investment Return over term	Landlord Return on Investment (IRR)
1	$690	$548	$142	$2173	$4860	12	$1720	5%
2	$735	$645	$90	$1207	$5720	12	$2024	5%
3	$398	$472	-$74	-$583	$4180	12	$1479	5%
4	$618	$548	$69	$1143	$4860	12	$1720	5%

** Assumes an annual 3% electricity price rise.*

The results of this case study will be used to begin a conversation with the involved landlords and tenants. Key issues to be identified are:

- The acceptable return on investment for a landlord investing in solar power.
- How much additional rent a tenant would be willing to pay for solar power.
- How energy usage habits can be changed to maximise the benefit from solar power.
- The structure of the agreement and how this could be managed.
- The role of Geelong Sustainability in brokering future rental projects.

FURTHER INVESTIGATION

This case study has focused on the solar feasibility and shared benefit assessment of solar for rental properties. In the process of conducting this case study a number of issues have been raised that were not considered by this report. It is recommended that further investigation into the following issues be undertaken prior to Geelong Sustainability offering a rental brokering service:

- Assessment of higher energy consumption rental households (15kWh+ per day).
- Tax benefits available to the Landlord for investing in Solar.
- The increase in property value resulting from installing Solar.
- Maintenance costs and the effect of landlord return on investment.
- Management of solar system underperformance and ensuring the tenant gets a fair deal.
- Identification of a process for negotiations of an agreement between Landlords and Tenants.
- The potential need for legal templates to help facilitate the landlord and tenant.
- Identification of potential avenues for Geelong Sustainability to cover costs for providing a solar for rental properties brokering service.

- Investigation of other methods for getting solar on rentals, ie. Research into existing solar as a service models.
- Potential partnership with CORENA to offer Interest-free loans to landlords.
- The feasibility and payback for shifting to solar powered all electric appliance rental properties.
- Further assessment of large energy using rental households.

CONTACT

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APPENDIX A: SHARED BENEFIT ASSESSMENT RESULTS

Solar for Rental Properties - Shared Benefit Assessment

Case Study 1

Prepared for -

Landlord:	-
Tenant:	-
Real Estate Agent:	-
Property Address:	Thomson

Comments:

Date: 21/09/2017
Revision: 1.1
Prepared by: Dan Cowdell

Note: Final solar module placement to be recommended by solar installer.

Solar System Details

System Size (kW):	3.00	kW
Estimated System Cost:	$4,860.00	inc GST
Estimated Average Daily Output:	11.64	kWh

Your Energy Usage (Tenant)

Electricity Tariff:	31.08 c/kWh inc GST	Average Daily Electricity Usage:	9.20 kWh
Electricity Supply Charge:	170.56 c/day inc GST	Estimated % of Solar Consumed:	25%
		Feed In Tariff:	11.30 c/kWh inc GST

Investment Details (Landlord)

Initial Investment:	$4,860.00 inc GST	**Return on Investment (IRR):**	**4.0%**
Investment Term:	12 years	Net Present Value (NPV):	$286.04
		Net Present Value (NPV) Discount Rate:	3.0%

Benefits

Tenant

First Year Savings on Electricity Bill	**$690.13** inc GST
Savings on Electricity Bill per week	*$13.27 inc GST*
LESS Increase Rental Charges per year	-$517.84 inc GST
LESS Increase Rental Charges per week	*-$9.96 inc GST*
Total Savings in First Year	**$172.29 inc GST**
Total Savings per week	*$3.31 inc GST*
Estimated Savings Over Project Term	**$2,539.38 inc GST**
Modeling includes electricity price rise of	3.0% per year
Solar Self-sufficiency	32%

Landlord

Increased Rental Return per year	**$517.84** inc GST
Increased Rental Return per week	*$9.96* inc GST
Initial Investment:	$4,860.00 inc GST
PLUS Investment Return:	$1,354.12 inc GST
End Investment Balance:	$6,214.12 inc GST
Return on Investment (IRR):	**4.0%**

Increase the property's resale value by at much as 3%*

Note: Tax benefits have not been assessed

Environmental Benefit

Carbon emission reduction per year	4.2	Tonnes CO2
Equivalent number of cars of the road	1.4	Cars

Disclaimer

Note: Modelling does not include maintenance or inverter replacement costs.

** According to research from the University of Western Australia.*
http://dx.doi.org/10.1111/1467-8489.12126

Solar for Rental Properties - Shared Benefit Assessment

Case Study 2

Prepared for -

Landlord:	-
Tenant:	-
Real Estate Agent:	-
Property Address:	Ocean Grove

Date: 23/09/2017
Revision: 1.1
Prepared by: Dan Cowdell

Comments:
The large 4kW solar system provides greater economic benefit then 2 or 3kW systems.

Note: Final solar module placement to be recommended by solar installer.

Solar System Details

System Size (kW):	4.00	kW
Estimated System Cost:	$5,720.00	inc GST
Estimated Average Daily Output:	15.36	kWh

Your Energy Usage (Tenant)

Electricity Tariff:	26.15 c/kWh inc GST	Average Daily Electricity Usage:	4.36 kWh
Electricity Supply Charge:	144.09 c/day inc GST	Estimated % of Solar Consumed:	12%
		Feed In Tariff:	11.33 c/kWh inc GST

Investment Details (Landlord)

Initial Investment:	$5,720.00 inc GST	**Return on Investment (IRR):**	**3.0%**
Investment Term:	12 years	Net Present Value (NPV):	-$0.00
		Net Present Value (NPV) Discount Rate:	3.0%

Benefits

Tenant

First Year Savings on Electricity Bill	**$734.91** inc GST
Savings on Electricity Bill per week	*$14.13 inc GST*
LESS Increase Rental Charges per year	-$574.64 inc GST
LESS Increase Rental Charges per week	*-$11.05 inc GST*
Total Savings in First Year	**$160.27 inc GST**
Total Savings per week	*$3.08 inc GST*
Estimated Savings Over Project Term	**$2,055.60 inc GST**
Modeling includes electricity price rise of	3.0% per year
Solar Self-sufficiency	42%

Landlord

Increased Rental Return per year	**$574.64** inc GST
Increased Rental Return per week	*$11.05* inc GST
Initial Investment:	$5,720.00 inc GST
PLUS Investment Return:	$1,175.72 inc GST
End Investment Balance:	$6,895.72 inc GST
Return on Investment (IRR):	**3.0%**

Increase the property's resale value by at much as 3%*

Note: Tax benefits have not been assessed

Environmental Benefit

Carbon emission reduction per year	5.6	Tonnes CO2
Equivalent number of cars of the road	1.9	Cars

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. 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 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. Geelong Sustainability Group Incorporated 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.

Note: Modelling does not include maintenance or inverter replacement costs.

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http://dx.doi.org/10.1111/1467-8489.12126

Solar for Rental Properties - Shared Benefit Assessment

Case Study 3

Prepared for -

Landlord:	-
Tenant:	-
Real Estate Agent:	-
Property Address:	Belmont

Comments:
Very low electricity tariff

Date: 23/09/2017
Revision: 1.1
Prepared by: Dan Cowdell

Note: Final solar module placement to be recommended by solar installer.

Solar System Details

System Size (kW):	2.00 kW
Estimated System Cost:	$4,180.00 inc GST
Estimated Average Daily Output:	7.76 kWh

Your Energy Usage (Tenant)

Electricity Tariff:	18.15 c/kWh inc GST	Average Daily Electricity Usage:	11.47 kWh
Electricity Supply Charge:	118.25 c/day inc GST	Estimated % of Solar Consumed:	40%
		Feed In Tariff:	11.30 c/kWh inc GST

Investment Details (Landlord)

Initial Investment:	$4,180.00 inc GST	**Return on Investment (IRR):**	**2.0%**
Investment Term:	17 years	Net Present Value (NPV):	-$319.66
		Net Present Value (NPV) Discount Rate:	3.0%

Benefits

Tenant

First Year Savings on Electricity Bill	**$397.67** inc GST
Savings on Electricity Bill per week	*$7.65 inc GST*
LESS Increase Rental Charges per year	-$292.47 inc GST
LESS Increase Rental Charges per week	*-$5.62 inc GST*
Total Savings in First Year	**$105.20 inc GST**
Total Savings per week	*$2.02 inc GST*
Estimated Savings Over Project Term	**$2,450.26 inc GST**
Modeling includes electricity price rise of	3.0% per year
Solar Self-sufficiency	27%

Landlord

Increased Rental Return per year	**$292.47** inc GST
Increased Rental Return per week	*$5.62* inc GST
Initial Investment:	$4,180.00 inc GST
PLUS Investment Return:	$792.06 inc GST
End Investment Balance:	$4,972.06 inc GST
Return on Investment (IRR):	**2.0%**

Increase the property's resale value by at much as 3%*

Note: Tax benefits have not been assessed

Environmental Benefit

Carbon emission reduction per year	2.8 Tonnes CO2
Equivalent number of cars of the road	0.9 Cars

Disclaimer

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http://dx.doi.org/10.1111/1467-8489.12126

Solar for Rental Properties - Shared Benefit Assessment

Case Study 4

Prepared for -

Landlord: -
Tenant: -
Real Estate Agent: -
Property Address: Frankston

Comments:

Date: 23/09/2017
Revision: 1.1
Prepared by: Dan Cowdell

Note: Final solar module placement to be recommended by solar installer.

Solar System Details

System Size (kW):	3.00	kW
Estimated System Cost:	$4,860.00	inc GST
Estimated Average Daily Output:	11.64	kWh

Your Energy Usage (Tenant)

Electricity Tariff:	26.01 c/kWh inc GST	Average Daily Electricity Usage:	9.50 kWh
Electricity Supply Charge:	106.42 c/day inc GST	Estimated % of Solar Consumed:	22%
		Feed In Tariff:	11.30 c/kWh inc GST

Investment Details (Landlord)

Initial Investment:	$4,860.00 inc GST	**Return on Investment (IRR):**	**2.0%**
Investment Term:	12 years	Net Present Value (NPV):	-$277.22
		Net Present Value (NPV) Discount Rate:	3.0%

Benefits

Tenant

First Year Savings on Electricity Bill	**$617.58**	inc GST
Savings on Electricity Bill per week	*$11.88*	*inc GST*
LESS Increase Rental Charges per year	-$459.56	inc GST
LESS Increase Rental Charges per week	*-$8.84*	*inc GST*
Total Savings in First Year	**$158.03**	**inc GST**
Total Savings per week	*$3.04*	*inc GST*
Estimated Savings Over Project Term	**$2,208.45**	**inc GST**
Modeling includes electricity price rise of	3.0%	per year
Solar Self-sufficiency	27%	

Landlord

Increased Rental Return per year	**$459.56**	inc GST
Increased Rental Return per week	*$8.84*	inc GST
Initial Investment:	$4,860.00	inc GST
PLUS Investment Return:	$654.72	inc GST
End Investment Balance:	$5,514.72	inc GST
Return on Investment (IRR):	**2.0%**	

Increase the property's resale value by at much as 3%*

Note: Tax benefits have not been assessed

Environmental Benefit

Carbon emission reduction per year	4.2	Tonnes CO2
Equivalent number of cars of the road	1.4	Cars

Disclaimer

Note: Modelling does not include maintenance or inverter replacement costs.

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