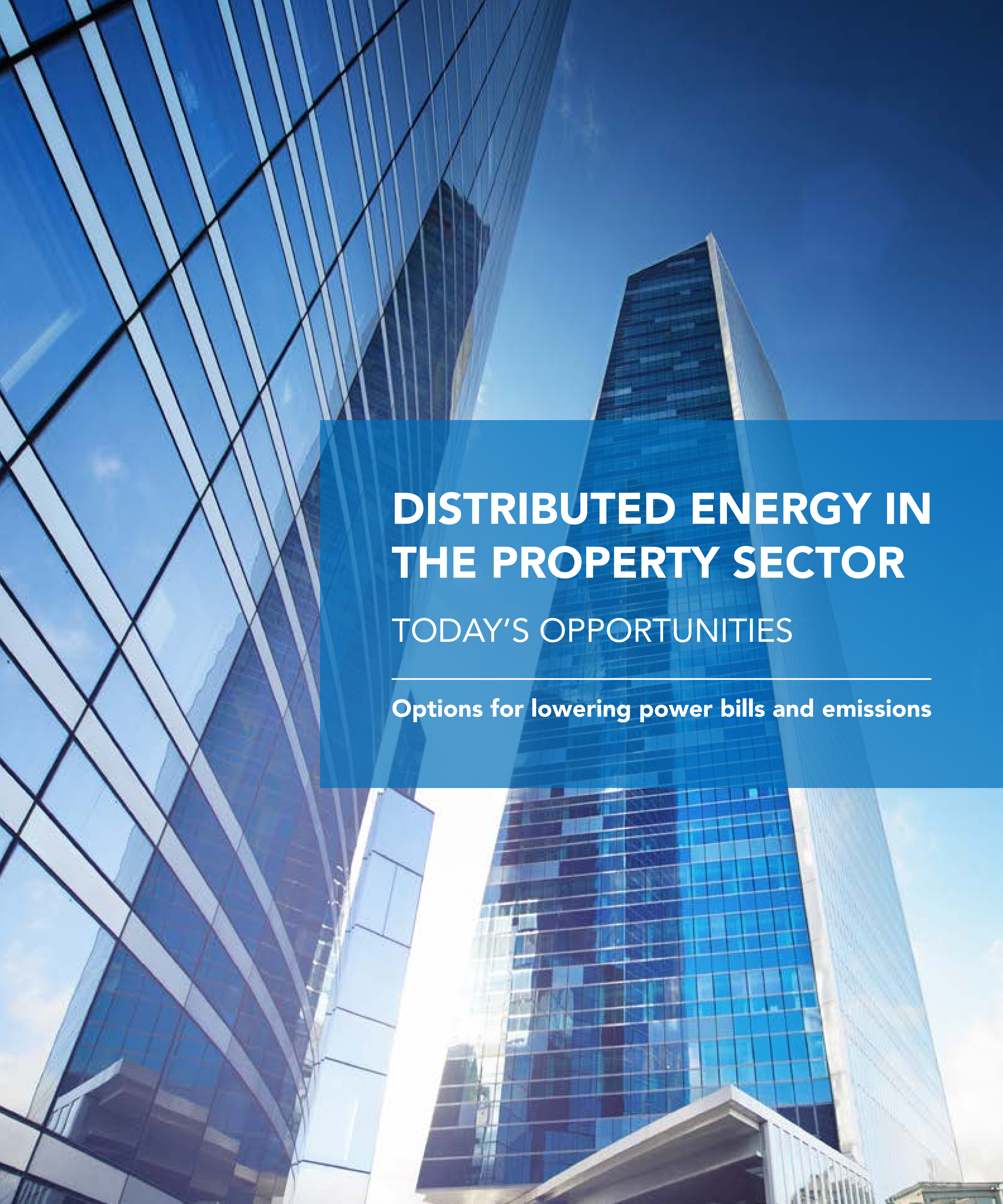

DISTRIBUTED ENERGY IN THE PROPERTY SECTOR

TODAY'S OPPORTUNITIES

Options for lowering power bills and emissions

CEFC
CLEAN ENERGY FINANCE CORP

PROPERTY COUNCIL *of Australia*

ACKNOWLEDGEMENTS

Prepared by Energetics for the Clean Energy Finance Corporation ("CEFC") and the Property Council of Australia.

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- Sydney Markets
- Woolworths
- Domino's
- Stucco
- City of Sydney
- Broadcast Australia
- IKEA
- James Cook University
- International Convention Centre Sydney
- Prestons Lodge Aged Care
- Monash University
- Frasers Property Australia
- Melbourne Renewable Energy Project (MREP)

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About this guide

More and more large energy users across Australia are exploring distributed energy solutions to reduce costs, lower their exposure to volatile energy markets and drive down carbon emissions. With opportunities such as generating electricity on site using solar PV and load management through the use of batteries, corporates can take a far more active and strategic role in energy management.

Distributed energy in the property sector – today's opportunities (the 'guide') has been developed to provide useful and up to date information on clean energy technology options for different building types, locations and loads. Presenting the critical elements in a business case for each of the major distributed energy technologies on the market, the Guide addresses information barriers and provides an approach to assessing the opportunities for your business.

This guide includes:

- Technology options
- Estimated payback times and capital costs for different locations and building types
- Case studies highlighting examples of each technology
- Implementation considerations
- A guide for investigating offsite renewable energy options (corporate PPAs)


CONTENTS

CEO remarks

There are compelling reasons to improve the energy efficiency and utilisation of clean energy technologies in Australia's built environment.

Energy efficient buildings using clean energy technology reduce stress on the electricity network, lower electricity consumption, and support a least-cost pathway to a net zero carbon built environment, improving health and resilience outcomes for households and businesses.

Australia's property sector has traditionally been a more passive participant in energy markets. However, rising wholesale energy costs and uncertainty regarding policy and market settings has resulted in unprecedented cost pressures for households and business.

Our industry leaders have shown they can deliver rapid improvements in the quality and performance of buildings and have taken action to mitigate against rising electricity prices and reduce emissions by investing in clean energy technology.

The cost of electricity from renewable resources has declined significantly over recent years and continues to fall. This is leading to a growing uptake of clean energy generation in the Australian market. While many leading companies have led the way in adopting these technologies, there is still a lack of information or awareness about these technologies more broadly in the property sector.

The Property Council of Australia and the Clean Energy Finance Corporation (CEFC) have collaborated to produce this guide as a practical resource for property owners and managers. We hope this will lead to greater awareness of the opportunity to use clean energy technologies across the property industry to reduce costs and emissions.

The CEFC and the Property Council of Australia have a shared commitment to creating a cleaner, more efficient, more sustainable built environment for Australians. We are delighted to work together on this project in the interests of a broader conversation about the exciting role the built environment can play in supporting distributed energy to reduce energy costs and address Australia's emissions challenge.

Ian Learmonth
CEO, Clean Energy Finance Corporation

Ken Morrison
CEO, Property Council of Australia

Executive summary

A clean energy transformation is taking place in Australia and across the world. For more than a decade, billions of dollars have been invested into research and development for different forms of low emissions electricity generation and associated technologies. As the community focuses on dramatic increases in the cost of grid-supplied electricity, distributed energy solution providers are offering innovative supply and management options that can drive down costs, reduce greenhouse gas emissions and provide greater certainty for energy budgets.

While exciting, this is new territory for the property sector, which has benefited from relatively benign energy market conditions for some time. Unlocking the value presented by opportunities such as on-site solar, batteries and metering technologies requires businesses to take a long term, strategic and active role in the management of their energy needs.

Perhaps unsurprisingly, the pursuit of new distributed energy technology options has been uneven. For Australia's property sector, factors such as the evolving nature of clean energy technologies, a lack of understanding of their features, and split incentives between owners and tenants have presented barriers.

Distributed energy in the property sector – today's opportunities is designed to help property investors, owners and managers navigate the clean energy market. The guide steps through the technology options and the business case considerations that apply to the different property sub-sectors, factoring in the electricity price differences across Australia's states.

What we see are varying financial opportunities across the technology options, highlighting the need to understand how the solution can support the specific goals of a property. When investigating distributed energy technologies, each building type presents different opportunities and a case by case assessment is needed. The guide also steps through the range of financing options that are available to support implementation.

Finally, the guide looks at corporate renewable power purchase agreements (PPAs). These deals with offsite renewable energy generators have grown dramatically in Australia since 2016. We present the features offered under different PPA structures and describe the steps energy users in the property sector should take when exploring this opportunity.

1. INTRODUCTION

The role of the property sector in Australia's emissions reduction challenge

For Australia to meet its current commitment under the Paris Agreement, and more importantly our contribution to net zero emissions by 2050, action across all industry sectors is required. With the property sector contributing ~23%[1] of Australia's emissions, and reductions through energy efficiency finite, distributed generation can provide the property sector with a pathway to help meet Australia's targets and form a key part of the journey to zero emissions buildings. The widespread adoption of distributed generation offers an emissions abatement opportunity which does not burden the Australian economy.

Using a mix of existing technologies such as energy efficiency measures, rooftop solar PV, and other renewable energy sources, it is estimated that the Australian property sector can produce net zero emissions by 2050, generating $20 billion in energy savings[2] in the process.

However, the pursuit of distributed energy options has been inconsistent across the property sector. Factors such as evolving nature of clean energy technologies, a lack of clear understanding and split incentives between owners and tenants can present barriers. The CEFC and the Property Council of Australia believe distributed energy offers an immediate opportunity. Considering this, the CEFC and Property Council of Australia engaged Energetics to produce this guide to raise the awareness of the benefits of distributed energy, the key considerations in evaluating the opportunities and steps to implementation.

This guide complements the Energy in Buildings: 50 Best Practice Initiatives report produced by the CEFC, which focuses on a broader range of energy efficiency and clean energy initiatives that can be implemented by building owners, developers and tenants[3].

1. http://www.asbec.asn.au/wordpress/wp-content/uploads/2017/04/170427-ASBEC-Submission-Climate-Change-Policy-Review.pdf
2. https://reneweconomy.com.au/building-sector-could-reach-net-zero-emissions-save-billions-with-solar-efficiency-75364/
3. https://www.cefc.com.au/

How to use this guide

Different sub-sectors, different energy opportunities

Given the diverse range of building types across Australia's property sector, analysis of distributed energy technology opportunities has been based on five sub-sectors to account for varying energy consumption loads and profiles, building use and size.

BUILDING TYPE	DEFINITION
Houses	Individual homes and greenfield (new) residential developments. These are assumed to be constructed by a single developer at a single site, with each property containing the relevant technology. The payback results apply to other low-rise residential sub sectors such as retirement living and community housing.
Apartments	Largely used for residential purposes, it is assumed any other use, such as retail, is such a small proportion of the NLA (Net Lettable Area) and energy load it can be discounted. Residential properties are assumed to be large residential towers with a single owner / operator. The building owners may or may not include the individual apartments and are responsible for the base building such as elevators, space heating and cooling of common areas, and maintenance. The payback results generally apply to other 'high rise' sub-sectors such as hospitality, student accommodation and/or 'vertical' retirement living.
Commercial	*Appendix A: Table 5* provides an overview of the current portfolio of commercial buildings in Australia. It is split between higher grade (Premium, A and B) and lower grade buildings (C and D). This guide focuses primarily on B and C grade buildings which make up approximately 70% of commercial buildings and 50% of the total NLA.
Retail	Defined as buildings for which the primary function is the sale of goods or services. We have assumed more than 50% is used for retail by floor area, with other functions not included.
Industrial	Includes manufacturing, storage, distribution warehouses and other applications. For this guide, data centres and property-related to mining, oil and gas are excluded.

Key elements in the analysis of clean energy technologies

This section outlines the elements necessary for assessing the viability of each clean energy technology opportunity. For each building type, energy load size and usage profile were analysed, noting that the results varied by state according to different electricity costs and climatic conditions. Table 1 provides an explanation of the features. Further information on the inputs can be found in the appendices.

This profile has been applied to each sub-sector in the development of the payback estimates.

Table 1: Technology application profile

FEATURE	RESULT	SCALE
Load size	●○○	Small < 160MWh
	○●○	Medium 160 – 1500MWh
	○○●	Large > 1500MWh
Load profile Time of use	1	Morning and evening peaks
	2	8am – 8pm operation
	3	24/7 flat operation
Net Lettable Area (NLA)/ roof area Indicating roof availability for solar PV	●○○	> 20 (more floors, less roof space)
	●●○	5 – 20
	●●●	< 5 (fewer floors, greater roof space)
Established technology	✓	Yes
	✗	No – additional research may be required
Peak demand offset Does the technology offer relief from peak demand charges?	✓	Yes
	✗	No – consumption-based savings only
Payback Average estimated payback	**Number**	Years
Capex Capital cost of installation following application of rebates or certificates such as Small-scale Technology Certificates (STCs). The $ symbols indicates the size of the investment, it does not indicate the economics, for which the payback numbers should be used.	**$**	Low ($0 - $25,000)
	$$	Medium ($25,001 - $100,000)
	$$$	High ($100,001 - $500,000)
	$$$$	Very high ($500,001 +)

Figure 1 shows an example of the information presented in Table 1 for a technology type when considered for use across the five property sub-sectors.

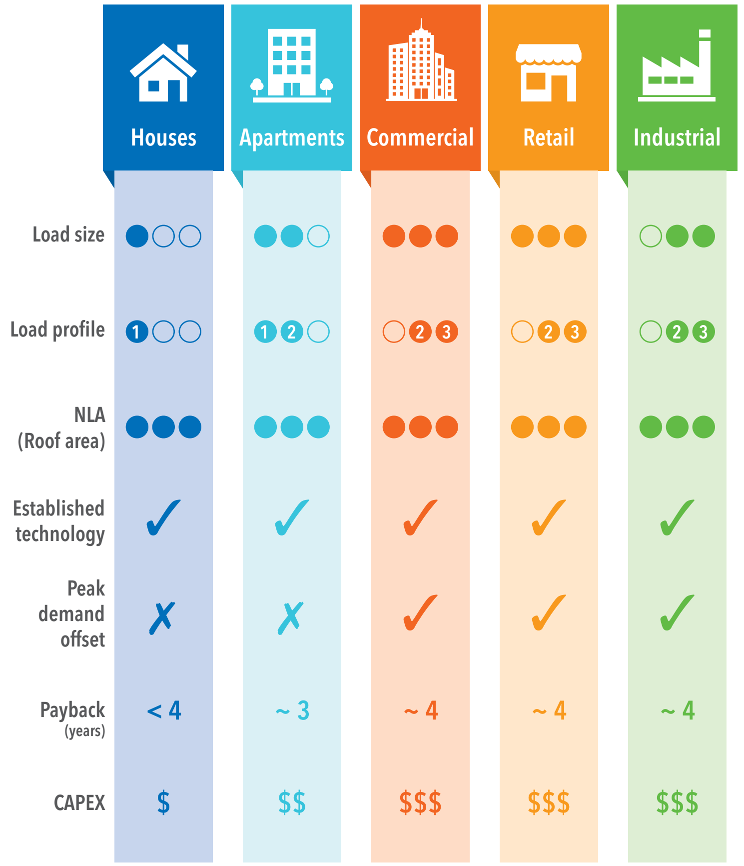


Figure 1: Example of technology application analysis and results by sub-sector

A payback period has been calculated for each state accounting for the differences in electricity prices. The payback presented is the average of the five sub-sectors. An example can be seen below in Figure 2.

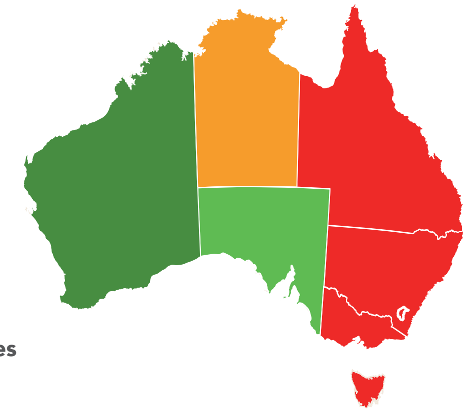


Figure 2: Example of payback results across states

The business cases modelled in this report assume that all power generated from the technology is consumed on site (i.e. behind the meter). No export of power is included in the analysis and no feed-in tariff is modelled. It should be noted that oversizing systems to export power needs to be carefully considered on a case by case basis. This is subject to an evolving regulatory and tariff arrangement and may significantly affect the financial results.

2.

DISTRIBUTED ENERGY TECHNOLOGY REVIEWS

On-site, low emissions energy technologies offer opportunities for businesses to take control of their energy usage and spend. This section reviews the major technologies available in the market, and the factors that inform the development of a business case.

SOLAR PHOTOVOLTAICS (PV)

BATTERIES

SOLAR PV + BATTERIES

THERMAL STORAGE

SOLAR HOT WATER

AIR SOURCE HEAT PUMPS

GROUND SOURCE HEAT PUMPS

RENEWABLE ENERGY SUPPLY FROM OFFSITE PROJECTS

OTHER

Smart meters

Building management systems and building energy management systems

SOLAR PHOTOVOLTAIC (PV)

Solar PV converts sunlight directly into electricity using photovoltaic cells. For residential and commercial installations, roof-mounted solar PV systems are the most common. Ground-mounted systems are generally only seen at large-scale generation projects.

Roof-mounted systems have an approximate weight of 15kg/m² and are secured using brackets, avoiding the need to penetrate the roof's surface. Systems are generally sized to meet 10-20% of the site's electricity load or the maximum system size that the roof can accommodate.

ADVANTAGES

- Mature technology that has experienced a significant price reduction over time
- Takes advantage of otherwise unused rooftop area
- Government incentives available (LGCs / STCs)
- Very scalable to rooftop size
- Low maintenance

DISADVANTAGES

- Generation limited to sunshine hours
- May require reinforcements where solar PV weight is greater than the roof's structural strength
- Relatively high upfront cost
- South facing roofs may be unsuitable
- Generation is greatly impacted by shading

CASE STUDIES

Sydney Markets

With Australia's largest private sector rooftop solar arrays on a single site, Sydney Markets has more than 3MW of generation capacity. The total number of panels installed is 8,594 and the system offsets around 11% of their annual power consumption. According to Sydney Markets, there is room to grow. They may look to increase the system's size in order to meet their future energy needs, decrease their carbon footprint and support their sustainability goals.

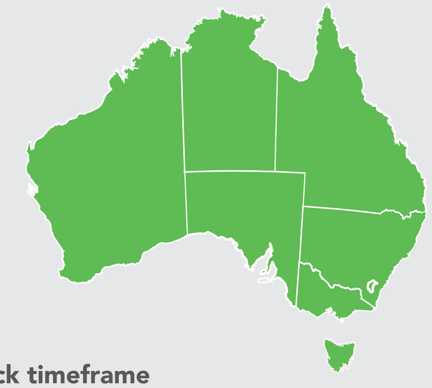
Woolworths

Woolworths has a solar capacity of approximately 7MW across 62 stores and two distribution centres, with another 2MW under construction for six stores. Over FY2019, a further 40-50 supermarket sites with a solar capacity of 6-7MW are planned for construction. The rooftop installations offset around 13% of a store's annual energy consumption. Remote monitoring will assist Woolworths' Energy Management Centre to oversee output and ensure the financial benefits of the solar initiative are realised. Woolworths is also trialling a solar and TESLA 500kWh battery system at their Erskine Park Liquor Distribution Centre.

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	●○○	●●○	●●●	●●●	○●●
Load profile	❶○○	❶❷○	○❷❸	○❷❸	○❷❸
NLA (Roof area)	●●●	●●●	●●●	●●●	●●●
Established technology	✓	✓	✓	✓	✓
Peak demand offset	✗	✗	✓	✓	✓
Payback (years)	< 4	~ 3	~ 4	~ 4	~ 4
CAPEX	$	$$	$$$	$$$	$$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Analyse electricity interval data to understand the size and 'shape' of your site's load.
- Determine available roof area and PV sizing options.
- Read further information on installers and best practice at Clean Energy Council
- Financial assistance for solar PV is available via the renewable energy target as small-scale technology or large-scale generation certificates. For further information consult with your equipment installer.

BATTERIES

An electricity storage technology, the most widely used battery chemistry is lithium-ion. However, other battery chemistries are available to suit applications with atypical requirements. While generation is not possible, the ability to charge and discharge allows electricity to be stored and used when required. The financial benefit lies in the ability to charge when electricity rates are at low off-peak price and discharge at the higher peak price; taking advantage of the arbitrage.

For large retail and industrial building profiles, a battery system integrated with an energy management system can reduce peak demand charges. These buildings incur demand charges that make up between 5-50% of total monthly electricity costs, with the variation depending on the network service provider and the network tariff applied. Given the variability in this charge, the battery opportunity should be assessed on a case by case basis.

Overall, the uptake of battery systems is limited but expected to increase greatly over the next five years as costs fall.

ADVANTAGES

- Ability to store electricity and take advantage of time of use rate arbitrage
- Ability to reduce maximum demand on site and reduce demand charges
- Increased power supply reliability and the ability to ride through brownouts and short blackouts

DISADVANTAGES

- Timing - large reductions in battery costs are expected over the next few years
- Footprint-intensive technology. For larger scale batteries, a 40ft shipping container will house 1MWh of storage
- Added complexity to site electrical system

CASE STUDIES

Domino's Pizza

Faced with an expensive grid upgrade to address a network supply problem, Domino's Plumpton installed a 135kWh lithium-ion battery system to augment supply at approximately half of the cost of the grid upgrade.

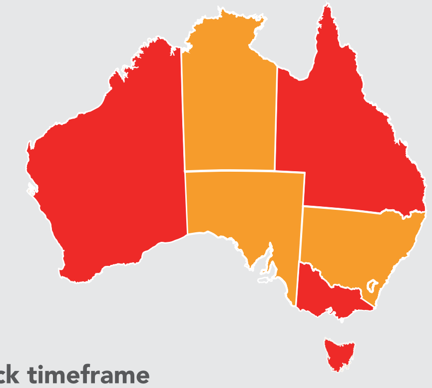
The system works by storing power from the grid overnight, when electricity prices are cheaper, and the store is closed. The stored power is used to cook pizzas during the day.

Domino's

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	●○○	●●○	●●●	●●●	○●●
Load profile	❶○○	❶❷○	○❷❸	○❷❸	○❷❸
NLA (Roof area)	●●●	●●●	●●●	●●●	●●●
Established technology	✓	✓	✓	✓	✓
Peak demand offset	✗	✗	✓	✓	✓
Payback (years)	9	9	10	10	11
CAPEX	$	$$	$$$	$$$	$$$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Analyse electricity interval data and suitable locations for housing a battery system on site.
- Review existing electricity tariffs to understand peak and off-peak arbitrage opportunity.
- Read further information on installers and best practice at Clean Energy Council

SOLAR PV AND BATTERIES

Solar PV and batteries are complementary technologies. Given that solar PV electricity production is variable, batteries provide the ability to store generated electricity and discharge when required. While the uptake of battery-only systems has been limited, the combination of solar PV and batteries is more popular due to the economic benefits created.

ADVANTAGES

- Ability to store electricity
- Ability to manage on site demand and reduce demand charges
- Increased power supply reliability and the ability to ride through brownouts and short blackouts
- Government incentives available (LGCs / STCs) for solar generation

DISADVANTAGES

- Timing - large reductions in battery costs are expected over the next few years
- Footprint intensive technology. For larger scale batteries, a 40ft shipping container will house 1MWh of storage
- Added complexity to site electrical system

CASE STUDIES

Stucco Co-op

In December 2016, the Stucco Student Co-operative in Newtown, Sydney installed 30kW solar PV and 42.3kWh lithium-ion batteries in the apartment building which houses 40 people. While deemed financially viable with an expected six to seven year payback, the core motivation was to be self-sustainable and reduce reliance on fossil-fuel based electricity.

CASE STUDIES

City of Sydney

In June 2018 the City of Sydney launched its first large-scale solar PV and battery storage facility at its Alexandra Canal depot. 1,600 solar panels are supported by an industrial-sized Tesla battery at the new operations and transport depot. The battery can store 500kWh of energy and is run in partnership with TransGrid, the NSW electricity transmission network. The solar PV and battery reduces demand on the grid during peak times, cuts energy costs and supports the City of Sydney's target for 50% of its electricity needs met by renewable sources by 2030.

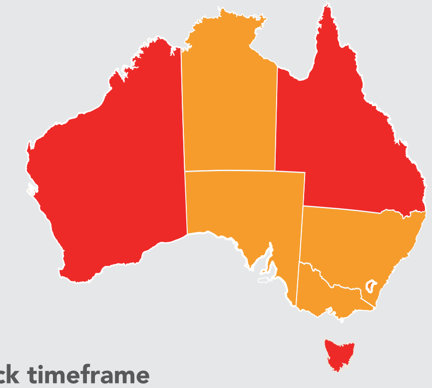
Broadcast Australia

In 2015, Photon Energy commissioned a solar storage system to supply a radio broadcast site operated by Broadcast Australia in Muswellbrook, NSW. Developed with German energy agency 'dena', the 39kWp solar array was installed at 40 degrees to maximise yield in winter. The panels feed 216kWh of solar batteries and three inverters regulate energy to the broadcast tower. In an emergency the system has double energy supply redundancy and can use mains or generator power.

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	●○○	●●○	●●●	●●●	○●●
Load profile	❶○○	❶❷○	○❷❸	○❷❸	○❷❸
NLA (Roof area)	●●●	●●●	●●●	●●●	●●●
Established technology	✓	✓	✓	✓	✓
Peak demand offset	✗	✗	✓	✓	✓
Payback (years)	~8	~9	~10	~10	~12
CAPEX	$	$$$	$$$	$$$	$$$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Analyse electricity interval data to understand the size and 'shape' of your site's load
- Determine available roof area and PV sizing options
- Assess locations suitable for housing a battery system
- Read further information on installers and best practice at Clean Energy Council

THERMAL STORAGE

Thermal energy storage is the temporary storage of a high or low temperature medium[4]. Temperatures vary depending on the application but are typically 60°C plus for hot water storage, below 7°C for chilled water (CHW) and below 0°C for storage of ice. Buildings in Australia usually produce chilled water with off peak electricity and store it for use when electricity prices are at peak tariffs. This provides the benefit of lower off peak electricity costs and less energy use as the system is more efficient at cooler, night time temperatures. Suitable for use at commercial, retail and industrial sites which use CHW and possess sufficient space. A standard system consists of large, insulated storage tanks and additional pipework and pumps. If space is a limiting factor, ice storage is an alternative to CHW storage. Please see below for indicative sizes.

In assessing the opportunity for thermal storage, we have considered a load levelling approach. Load levelling aims to average the building's chilled water requirements[5] whereas load shifting aims to fully shift the building's chilled water requirements to off peak times.

ADVANTAGES

- Reduced costs due to electricity being used at off-peak tariffs
- Potential reduction in electrical peak demand charge
- Reduced chiller size, resulting in reduced capital costs
- Potential reduction in electricity usage due to improved system efficiency during night time operation
- Potential reduction in maintenance costs if centralised system introduced[6]
- Established technology
- Excellent in large campus facilities with centralised energy system

DISADVANTAGES

- Large area required for CHW storage tank, which could be difficult to incorporate
- More system elements to maintain
- More advanced controls needed
- Relatively large upfront costs

4. http://orbit.dtu.dk/fedora/objects/orbit:72784/datastreams/file_6383088/content
5. https://www.environment.gov.au/system/files/energy/files/hvac-factsheet-thermal-storage.pdf
6. https://www.airah.org.au/Content_Files/HVACRNation/2008/September2008/HVACRNation_2008-09-F02.pdf

CASE STUDIES

IKEA

In 2011 IKEA installed 2,000kL chilled water storage and combined fire tanks at their Springvale store, Melbourne. The system was coupled with high efficiency chillers to use lower, off peak tariffs and store the thermal energy for use through a chilled beam system in the ceiling of the retail areas. Since opening, IKEA has retrofitted 2MW of solar panels and 100% LED lighting, allowing them to chill the water in the tanks with excess PV power during the day effectively providing an alternative energy storage system for the solar array. IKEA has undertaken similar projects in Perth, Sydney and Brisbane.

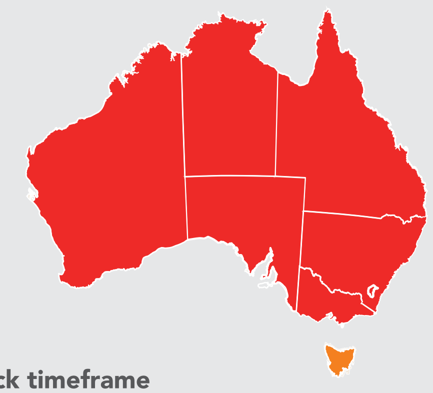
James Cook University

In 2008, energy demand was close to available supply at JCU's Townsville Campus. Rather than upgrade electricity infrastructure, energy efficiency was pursued. As air conditioning accounts for up to 60% total energy consumed, a Campus District Cooling system was installed to provide chilled water (4°C) via underground pipes. The water is cooled at night and stored in a 12mL tank for distribution around the campus as highly efficient air conditioning. A 9mL tank/central cooling system was installed in Cairns in 2012. These systems have helped reduce JCU's electricity costs by over $3 million per year.

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	NA	NA	○●●	○●●	○●●
Load profile	NA	NA	❶❷❸	❶❷❸	❶❷❸
NLA (Roof area)	NA	NA	●●●	●●●	●●●
Established technology	NA	NA	✓	✓	✓
Peak demand offset	NA	NA	✓	✓	✓
Payback (years)	NA	NA	~15	~15	~15
CAPEX	NA	NA	$$$$	$$$$	$$$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Undertake analysis of the building's chilled water requirements
- Investigate suitability of site for storage tanks. Typical sizes are presented in Appendix D.
- For information on installers and best practice refer to **Clean Energy Council** or **Energy Efficiency Council**

SOLAR HOT WATER

A correctly sized solar system can meet between 50-90% of the hot water needs of a building, depending on available roof area and overall load requirements. Two types of solar hot water systems are commercially available: flat plate and evacuated tube. The systems operate on similar principles. While flat plate collectors cost less (up to 40%[7]), they are less efficient (around 50%[8]) than evacuated tube systems. Both systems are typically installed on the building roof. Water is stored in tanks with either electric or gas boosters used to meet the required temperature. For this guide, we have considered evacuated tubes as these offer lower payback periods (11 vs 14 years) and have smaller roof area requirements[9].

ADVANTAGES

- Reduced operating costs for hot water
- Reduced emissions compared to traditional hot water systems
- Evacuated tubes work in cooler climates but have higher install costs
- Suitable for generating Small-scale Technology Certificates (STCs) if approved systems are installed
- Established technology

DISADVANTAGES

- Increased upfront costs with varying payback periods
- A difficult installation process may make it unsuitable for existing buildings.
- Shading will limit the effectiveness of the system
- North-facing roofs are required to maximise the output
- Gas or electricity is needed to increase water temperature to required level i.e. from 60°C solar thermal system output to 80°C required temperature. Therefore, it does not offset 100% of the costs.
- No tangible cost reduction for increased system sizing
- Increased maintenance costs
- Site-specific payback considerations are required

7. http://www.solarpanelsplus.com/all-about-solar/evacuated-tubes-or-flat-plates/
8. https://www.energymatters.com.au/solar-hot-water/flat-vs-evacuated/
9. http://yourenergysavings.gov.au/energy/hot-water/solar-hot-water

CASE STUDIES

International Convention Centre Sydney

The ICC Sydney hosts a 520kW photovoltaic (PV) array owned by the community fund Sydney Renewable Solar. The PV array produces 545MWh/year which provides approximately 5% of ICC Sydney's energy demand. Sydney Renewable Solar is a community fund that allows locals to invest in renewable energy. The hot water system consists of seven continuous hot water heaters and a commercial solar pre-heat system. The installation can provide more than 60,000L of water heated to 65°C over a one-hour peak period.

Prestons Lodge Aged Care

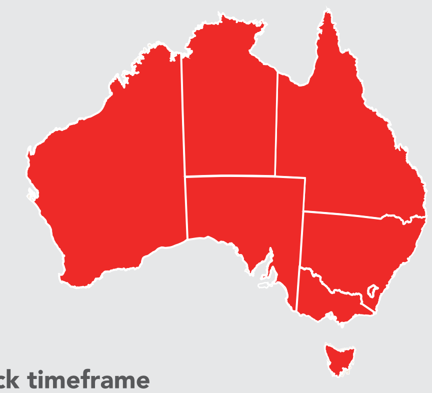
Prestons Lodge is a 132 bed aged care facility built in 2016 by Advantaged Care. During the design stage it was decided to use an energy efficient solar and warm water system. With a daily hot water load of 9,175L, 38 solar collectors would provide 50% of the total hot water load in December and 37% over the full year.

ADVANTAGED CARE
ENJOY THE EXCELLENCE

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	●○○	●●○	●●●	●●●	○●●
Load profile	1 ○ ○	1 2 ○	1 2 3	1 2 3	○ 2 3
NLA (Roof area)	●●●	●●●	●●●	●●●	●●●
Established technology	✓	✓	✓	✓	✓
Peak demand offset	✗	✗	✗	✗	✗
Payback (years)	~9	~10	~10	~11	~12
CAPEX	$	$	$$	$$	$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Analyse hot water consumption profile to understand storage requirements.
- Calculate roof area to determine total hot water production availability.
- For information on installers and best practice refer to Clean Energy Council or Energy Efficiency Council
- Financial assistance is available via the RET as STCs or LGCs. Consult your equipment installer.

AIR SOURCE HEAT PUMPS

Heat pumps transfer thermal energy from the air, ground or water to a working fluid for use within the building. These are highly efficient systems and there are several commercially available technologies.

Air sourced heat pumps (ASHPs) are the most common and absorb thermal energy from the air and transfer it through to the domestic hot water system and space heating. Heat pumps are significantly more efficient than traditional electric / gas water heaters and use electricity to drive system operation[10]. This report considers heat pump technology offsetting electricity from traditional hot water heaters.

ADVANTAGES

- Applicable to all hot water services
- Suitable where solar hot water is not an option for domestic hot water or space heating due to limited roof access, lack of sunlight or poor orientation
- Suitable for generating Small-scale Technology Certificates (STCs) offering capital cost reductions
- Up to three times more efficient than traditional technologies
- Similar install to electric heater systems
- Can be installed when natural gas is not available
- Defrost cycle available for cold climates

DISADVANTAGES

- Work most effectively in warm, dry climates but still suitable in cold climates
- Produce noise similar to air conditioning units, so installation location should be considered
- May require an electric booster in cold climates

10. http://yourenergysavings.gov.au/energy/hot-water/heat-pump-hot-water

CASE STUDIES

Monash University

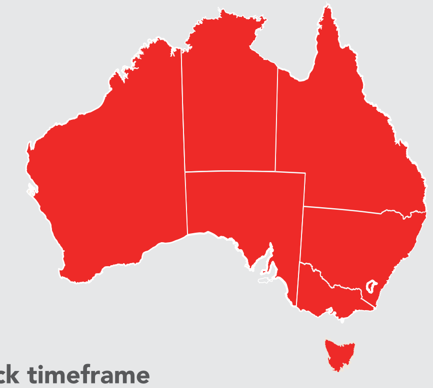
In 2015, Monash introduced a strategy to construct precinct based cooling solutions across the University, identifying better life cycle outcomes, significant energy savings in low cooling load periods and maintenance costs as key benefits. Monash also committed to achieving net zero emissions on its Australian campuses by 2030, requiring it to be 100% renewables powered and end its dependence on natural gas by fully electrifying its campuses.

Approximately 30% of Monash's emissions are from natural gas, primarily used for heating. This includes a centralised high temperature heating water network (HTHW) of 20MW capacity plus localised natural gas heaters located across outer buildings. Under winter warm up conditions, the system demands approximately 16MW of heating, while in summer demand falls to around 1.5MW. This prompted consideration of heat pump technology. The Biomedical Learning and Teaching Building, due for completion at the end of 2018, is the University's first all electric heating and cooling application and will serve as the hub for the precinct. The total cooling and heating design load were 4000 and 3200MW respectively. This all electric solution is estimated to save 3200MW of natural gas fuel energy (once connected across the complete precinct) and reduce low load power consumption by 30%.

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	●○○	●●○	●●●	●●●	○●●
Load profile	①○○	①②○	①②③	①②③	○②③
NLA (Roof area)	●●●	●●●	●●●	●●●	●●●
Established technology	✓	✓	✓	✓	✓
Peak demand offset	✗	✗	✗	✗	✗
Payback (years)	~6	~15	~17	~17	~18
CAPEX	$	$	$$	$$	$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Assess local ambient conditions to suitability for heat pump technology and if frost cycle is required.
- For information on installers and best practice refer to Clean Energy Council or Energy Efficiency Council
- Financial assistance may be obtained in some states through energy efficiency programs. Consult your equipment installer.

GROUND SOURCE HEAT PUMPS

Ground source heat pumps (GSHPs) are heat pumps which use the relatively stable thermal mass of the earth, rather than the air, to absorb or release the thermal energy from a building. GSHPs move a working fluid, often water, through the ground and then around the building to provide hot water at taps, in underfloor heating or for use in reverse cycle air-conditioning. These loops can be buried a few metres to several hundred metres below the surface in a horizontal or vertical position[11].

GSHPs are common in domestic, industrial and commercial applications around the world, particularly in the USA and Europe[12]. GSHPs are best suited to climates with hot summers and cold winters. Generally, Australia does not get cold enough to make the systems financially effective, however the ACT, Victoria and Tasmania may offer opportunities[13].

ADVANTAGES

- Traditional heating and cooling plant equipment can be removed from roof area as these systems are typically installed at ground or basement level
- Not exposed to extreme weather events such as cyclones[14]
- Reduce reliance on electricity and gas which can fluctuate in price
- Requires limited above ground room for install
- Very scalable
- Roughly twice as efficient as air sourced heat pumps

DISADVANTAGES

- Some systems and sites require bore holes, which can be costly
- Specialised install with increased initial cost compared to ASHPs
- More suitable to greenfield than brownfield in built up areas
- Less established industry in Australia

11. http://www.publish.csiro.au/pv/pdf/pvv2011n153p29
12. https://www.researchgate.net/publication/288938651_The_advance_of_geothermal_heat_pumps_world-wide
13. http://www.abc.net.au/news/specials/curious-canberra/2017-07-31/curious-canberra-geothermal-heating-energy/8723048
14. https://www.airah.org.au/Content_Files/EcoLibrium/2014/Feb14/02-14-Eco-003.pdf

CASE STUDIES

Frasers Property Australia

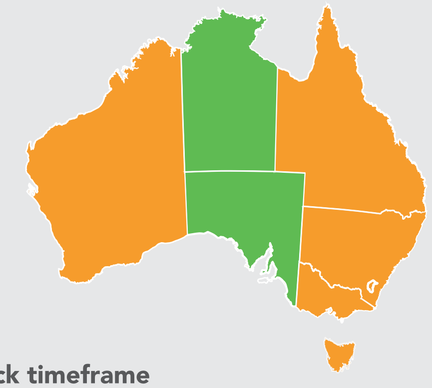
The Fairwater estate in Blacktown, Western Sydney was the first large-scale residential development in the southern hemisphere to adopt geothermal heating and cooling technology in each of the 800 homes.
The fully-ducted reverse-cycle air-conditioning system can save residents up to 60% on their air-conditioning energy costs compared to a standard air-conditioned home.

FRASERS PROPERTY

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	●○○	●●○	●●●	●●●	○●●
Load profile	1 ○ ○	1 2 ○	○ 2 ○	○ 2 ○	○ 2 3
NLA (Roof area)	●●●	●●○	●○○	●●●	●●●
Established technology	✓	✓	✓	✗	✓
Peak demand offset	✓	✓	✓	✓	✓
Payback (years)	~5	~5	~6	~6	~6
CAPEX	$	$$	$$$	$$$	$$$

PAYBACK PERIODS BY STATE



Payback timeframe

- + 10 years
- 5 - 10 years
- 2 - 5 years
- < 2 years

NEXT STEPS

- Analyse conductivity of soils, conduct geotechnical analysis for the feasibility of bore holes or trenches.
- Investigate building suitability for geothermal system water heating, underfloor heating and/or reverse cycle air conditioning.
- For information on installers and best practice refer to Clean Energy Council or Energy Efficiency Council
- Financial assistance may be obtained in some states through energy efficiency programs. Consult your equipment installer.

RENEWABLE ENERGY SUPPLY FROM OFFSITE PROJECTS

Corporate power purchase agreements (PPAs) are long term procurement deals (typically 7-20 years) secured between a renewable energy generator and a consumer. They can be for the value of power, Large-scale Generation Certificates (LGCs) or both.

Since 2016, the number and size of these deals has grown rapidly[15] in Australia. While PPAs are attracting the interest of organisations using over 50GWh pa, we also see customers with smaller loads combining to form buying groups as seen with the landmark 14-member Melbourne Renewable Energy Project[16].

What makes corporate renewable PPAs so attractive? For a large commercial energy user, the cost of electricity consumed is 50% to 60% of a bill, depending on organisation type and location. The cost of LGCs needed to comply with the Renewable Energy Target constitutes a further 8% to 10% of the electricity bill. With competitive long term prices on offer, corporate PPAs provide the opportunity to manage and reduce around 65% of total electricity and LGC costs. Below is a broad outline of advantages and disadvantages.

ADVANTAGES	DISADVANTAGES
Can reduce electricity costs	Increased contractual requirements based on the contract model selected
Can include procurement of LGCs to meet indirect RET compliance obligation; as well as carbon reduction benefits	Increased contractual complexity and due diligence requirements
LGCs can be used to improve NABERS ratings	Will not benefit from a drop in wholesale electricity prices if the market price realised by the project falls below the PPA price
Long-term hedge approach could provide greater budget certainty in a volatile market	Suitable for sophisticated customers only, unless a retailer is engaged
Can be scaled to any percentage of load	A retailer is required to supply power to the site, which would typically include providing power to fill in any shortfalls in the output from the renewable energy project to meet demand
No capital costs, unlike onsite generation	Renewable energy generation project size is often limited by state-based load
Can choose your renewable energy project	Not all retailers participate in this market, whilst others may require a longer term commitment
Different contracting models enable CPPA to be specific to your requirements	

15. https://www.energetics.com.au/insights/knowledge-centres/corporate-renewable-ppa-deal-tracker/
16. To read more on MREP: https://www.melbourne.vic.gov.au/business/sustainable-business/mrep/Pages/melbourne-renewable-energy-project.aspx

CASE STUDIES

Melbourne Renewable Energy Project (MREP)

A corporate buying group led by the City of Melbourne has committed to buying 88GWh of electricity per year from the Crowlands Wind Farm; a new development that will be located twenty kilometres north of Ararat in Victoria. The Pacific Hydro owned wind farm will consist of 39 wind turbines able to produce 80MW of power.

The buying group consisted of 14 companies including banks, city councils, Australia Post, Universities, zoos and convention centres. The PPA is estimated to save over 96,800 tonnes of greenhouse emissions over a 10 year period.

CITY OF MELBOURNE

Monash University

There are four parts to Monash's sustainability and energy plan: energy efficiency, renewable energy supply, electrification and addressing residual emissions through offsets. For renewable energy supply, Monash adopted a two-part approach: the installation of solar PV across their facilities and securing an electricity contract with an offsite generation project to meet their remaining supply needs. In June 2018, Monash announced that it joined the Telstra led consortium which includes ANZ, Coca-Cola Amatil and the University of Melbourne to secure a corporate renewable PPA from the Murra Warra 1 wind farm in Victoria. Under this deal Monash will purchase both electricity and large-scale generation certificates (LGCs).

MONASH University

RESULTS BY SUB-SECTOR

	Houses	Apartments	Commercial	Retail	Industrial
Load size	○○○	○○○	○●●	○○●	○○●
Load profile	○○○	○○○	①②③	①②③	①②③
NLA (Roof area)	NA	NA	NA	NA	NA
Established technology	✓	✓	✓	✓	✓
Peak demand offset	NA	NA	NA	NA	NA
CAPEX	NA	NA	NA	NA	NA

RESULTS BY STATE

PPAs are applicable to all states, however only energy users with strategic view of energy and an appetite for sophisticated procurement activities can access these savings readily. PPAs are often used as risk management instrument as they could provide greater budget certainty over a long period of time; as well as to reduce exposure to high electricity prices. They are complex to implement, and careful consideration of the agreement's design elements is required.

NEXT STEPS

Corporate PPAs must be assessed in context of other available electricity procurements strategies to manage price risk exposure in volatile markets. An options paper is a first step to understanding the role of a corporate PPA as part of your procurement mix. An understanding of state and national policies and LGC requirements is required. See section 4 for more detailed information on corporate PPAs.

SMART METERS

These meters offer significantly more information than just kWh consumed. Reducing emissions and costs in a building requires a detailed understanding of consumption patterns. Smart meters offer improved visibility of load profile, maximum demand and total energy use which can inform decisions to increase the take-up of distributed energy measures. This assists in targeting projects and technologies that reduce energy costs.

All households and small businesses in Victoria have had their meters upgraded to smart meters. All other states[17], excluding Western Australia and the Northern Territory[18] have a directive that all new and replacement meters will be smart meters.

ADVANTAGES

- Provides accurate real-time data
- Up to date, two-way, digital communication systems that record electricity usage every 30 minutes
- Reduce the requirement for estimated bills and manual meter readings
- Cheaper and easier connection, disconnection and retailer switching
- Suitable for feed-in tariff calculations for solar PV
- Can provide access to flexible electricity pricing rather than a flat rate
- Can connect to web-enabled devices and web-portals

DISADVANTAGES

- Only assists with energy efficiency and emissions reductions if the user reduces their demand
- Non-billing meters require additional accuracy verification
- Cost of installation or replacement of existing meters

NEXT STEPS

Contact your retailer to check if you are eligible for a smart meter install / replacement or when they intend to roll out a replacement meter to your property.

17. http://www.smartmeters.vic.gov.au/__data/assets/pdf_file/0004/1176637/About_smart_meters.pdf
18. http://www.abc.net.au/news/2018-02-27/australian-power-prices-smart-meters-energy-retailer-electricity/9488542

BUILDING MANAGEMENT SYSTEMS AND BUILDING ENERGY MANAGEMENT SYSTEMS

A Building Management System (BMS) is an electronic control system typically used in commercial, retail and residential buildings. A Supervisory Control and Data Acquisition (SCADA) system is more common in industrial sites. For this report, we have used the term BMS to refer to both systems. A BMS normally comprises sensors, control systems and databanks.

A Building Energy Management System (BEMS) is a sophisticated technology application that sits either within the BMS or as a standalone system. It monitors and controls a building's energy consumption. A BEMS can assist with building optimisation and energy reduction, remote monitoring of the system, monitoring of environmental conditions and energy management information.

BMS ADVANTAGES

- Increased visibility of operations
- Enables identification of operational issues
- Reduced manual operation tasks
- Can improve equipment life by reducing start/stop operations

BMS DISADVANTAGES

- Increased capital cost for installation
- Continuous maintenance of system normally involves long contracts with installers
- Older systems are less efficient and precise than current installations

BEMS ADVANTAGES[19]

- Can improve energy efficiency and identify opportunities for distributed energy
- Improved environmental conditions
- Improvement building management
- Improved visibility of energy data

BEMS DISADVANTAGES

- Higher installation costs than standalone BMS
- Higher operation and maintenance costs
- Requires commitment at the building manager level to implement efficiency saving opportunities

NEXT STEPS

BMS are common in large buildings. If your building does not have a BMS the next step would be to engage a BMS designer and installer to understand the benefits for your operation.

19. http://www.climatetechwiki.org/technology/jiqweb-bems

3.

FINANCING OPTIONS

Financing options

For the purchase of distributed energy solutions, there are a number of financing options available as described in Table 2.

Table 2: Features of the four major sources of finance

FINANCE OPTION	ADVANTAGES	DISADVANTAGES
Self-funded through existing cashflows and/or existing debt facilities	• Suitable if the investment is smaller, or cashflows are sufficient to support the expenditure • May be simpler to organise • No ongoing repayment costs directly related to the project	• Less capital for investment in core business activities • For solar/battery solutions where power is provided to tenants, consideration of potential tax consequences • Owner retains installation and operating risk
Equipment / asset finance for a specific project or piece of equipment which could be part of broader financing and/or separate unsecured financing	• Reduced or no upfront costs for the project • Loans are generally secured against the equipment • Repayments are generally fixed and known in advance and can be tailored to cashflows • Ability to access equipment financing specifically tailored for clean energy programs (See CEFC financing on page 37)	• If financing is unsecured or secured against equipment only, interest rates can be higher than a loan secured against the whole property • As building owner retains ownership of solar/battery where power is provided to tenants, consideration of potential tax consequences • Owner retains installation and operating risk
Environmental/ building Upgrade Agreements (EUAs) are a state government arrangement for financing property upgrades, secured and tied to the property rather than an owner	• No upfront costs for the project • Loan repayments made through a local council charge on the land (paid via council rates) • Can allow owners to use energy savings to pay back project costs or reduce energy bills for tenants • No mortgage security required	• Currently available in selected local council regions across New South Wales, Victoria and South Australia • Limited to existing, non-residential commercial buildings only
Energy Service Agreements (ESAs) in which the provider finances, constructs, generally operates and maintains equipment for a corporate PPA	• Reduced or no upfront costs • As equipment not owned, reduces potential tax consequences • Implementation and operating risks are generally borne by the ESA provider	• Can potentially be higher cost than other financing options, due to transfer of risks to the ESA provider • 'Bundled' nature can reduce potential transparency of individual components

CEFC financing arrangements

The CEFC has established a number of financing programs for projects or installations related to distributed energy such as solar and batteries, in addition to equipment financing and energy efficiency projects.

Equipment / asset financing

The CEFC is working with the major banks as well as other financiers across Australia to deliver a range of cost-effective financing solutions to help businesses reduce their energy consumption. These programs offer discounted financing rates to help businesses make renewable energy and energy efficient improvements including solar PV, water and energy efficiency upgrades, as well as electric, hybrid and low emissions vehicles.

CEFC's current equipment finance programs, including links, are provided below:

- Commonwealth Bank *Energy Efficient Equipment Finance*
- NAB *Energy Efficient Bonus*
- Westpac *Energy Efficient Financing Program*
- ANZ *Energy Efficient Asset Finance Program*
- Macquarie Leasing *Energy Efficient Finance*
- RateSetter *Green Loans*

EUA financing

Environmental or Building Upgrade Agreements (EUAs) give commercial building owners the ability to invest in clean energy improvements via competitive finance with long-term repayments.

EUA finance is offered at a fixed interest rate, with no upfront spend and loan terms of up to 10 years. Energy savings can be used to fund the repayments, which are made via fixed, quarterly Council rates, allowing the upgrade costs to be offset against the energy savings.

EUAs bring together building owners, councils and Eureka Funds Management, drawing on finance from the CEFC and NAB, and are available in selected council regions across NSW, Vic and SA.

For further information visit *www.eurekaeuf.com.au*

Direct financing

The CEFC can also provide direct financing for projects which include distributed energy, energy efficiency and low emissions technology equipment. This financing is generally for amounts of $20 million or above and is secured against the underlying property or portfolio of properties.

For more information, please enquire through the address *property@cefc.com.au*

4.

REDUCING EMISSIONS WITH A CORPORATE PPA

Corporate PPAs for the property sector

As introduced in section 2, a corporate PPA with a renewable energy generator can assist a large energy user to reduce exposure to energy market volatility and high costs, while also supporting the achievement of sustainability goals.

Large wind or solar projects produce both electricity and large-scale generation certificates (LGCs). To meet their compliance obligations under the Renewable Energy Target (RET), corporates can choose to self-source LGCs associated with their load and transfer these certificates to their electricity retailer(s). However, a corporate cannot claim these reductions against their own emissions profile as this would be 'double counting[20]'. RET compliance obligations are attributed to the energy retailer, not the corporate. A reduction in emissions for a corporate is only achieved with the purchase of additional LGCs and self-surrendering them to the Clean Energy Regulator (CER).

In this section, we examine the options available to building owners and provide a high level overview of corporate PPAs. For more specific information, contact an energy markets specialist or energy legal advisor about your options.

Determining the best approach for your business

Setting a goal early in the negotiation process will aid decision-making and guide the design of the corporate PPA. Figure 3 provides a series of key questions to help your business determine the optimal approach to securing emissions reductions.

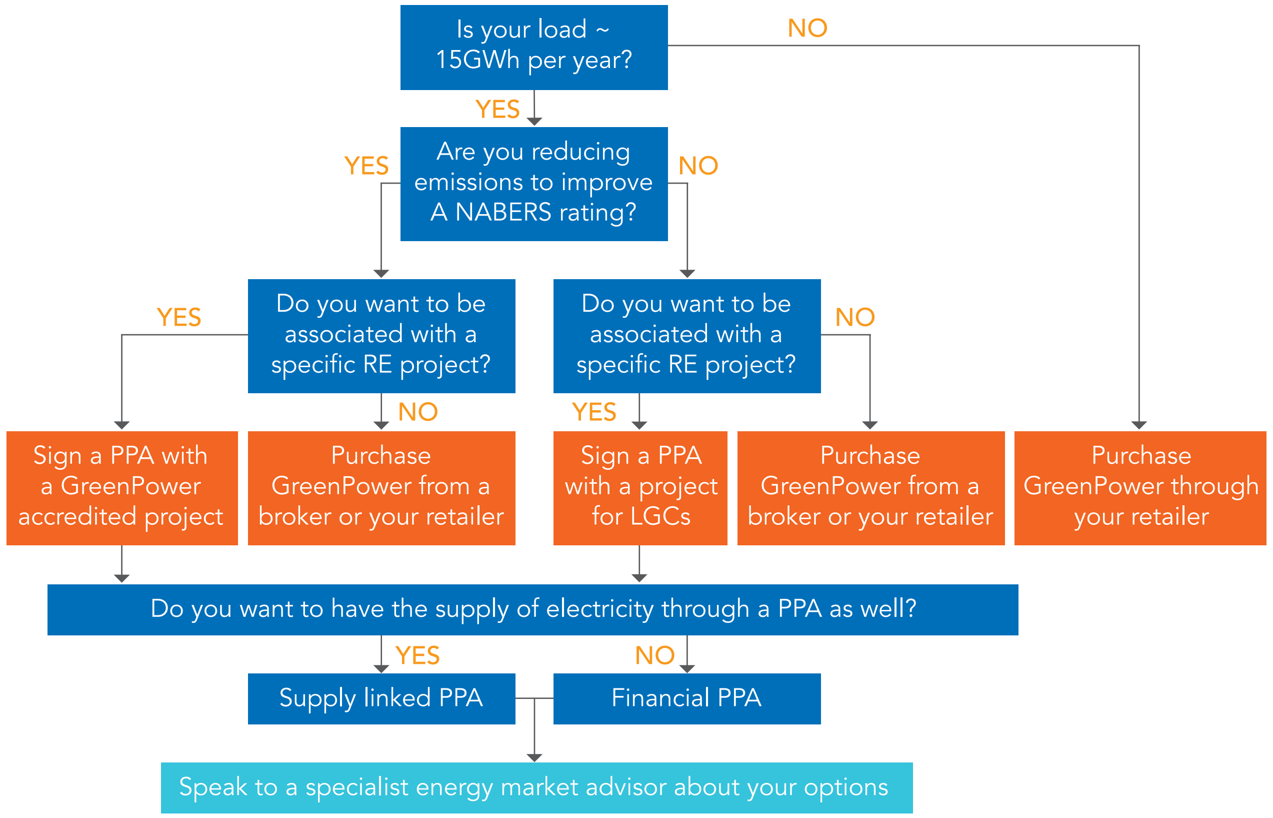


Figure 3: PPA decision making process

20. https://www.environment.gov.au/system/files/pages/47847a64-9680-43a5-988f-5c90bcbb79cf/files/treatment-renewable-energy-certificates-under-ncos.pdf

Options for reducing emissions

GREENPOWER

GreenPower[21] is a nationally recognised scheme increasing the amount of renewable energy available in the grid. This scheme is additional to the RET and therefore those purchasing GreenPower can claim the carbon savings. GreenPower can help you to improve your NABERS rating, Green Star performance rating and achieve carbon neutrality under the National Carbon Offset Standard (NCOS).

There are three options for purchasing and surrendering GreenPower as outlined below.

Option 1: Buy through a retailer

The retailer will typically charge a cost premium to provide these certificates. These do not support a long term renewable energy project as it is an annual certificate purchase. For further details contact your retailer.

Option 2: Buy LGCs only or LGCs and power from an accredited generator

A second option is to sign an agreement with a GreenPower Connect accredited solar or wind farm for either an LGC-only purchase or an agreement that secures both LGCs and power. By entering into an agreement for the supply of LGCs/GreenPower directly with the generator, the corporate benefits from lower prices.

Option 3: Use a broker

Many brokers are available and will offer different prices based on the terms of the agreement, hedge arrangements and market forces.

Speak to a specialist energy market advisor about your options.

SECURING ADDITIONAL LGCS

LGCs purchased from renewable energy projects will reduce your emissions profile, as long as they are surrendered to the Clean Energy Regulator. They must be additional to any LGC obligations under the RET. They do not need to be GreenPower accredited. Note that LGCs cannot be used to improve NABERS rating performance.

21. https://www.greenpower.gov.au/Business/GreenPower-Connect/~/media/Files/Fact%20Sheets/GreenPower%20Connect%20Fact%20Sheet%20and%20FAQs.pdf

Options for electricity supply

There are a range of contract models for the supply of energy generated from a wind or solar project. These arrangements vary in complexity and carry different risks that need to be addressed within the design stage of a deal. Securing expert advice is essential when engaging in this process.

There are three broad categories of models for contracting between corporates and renewable energy generators:

1. Self-sourced LGCs

One option is to only purchase LGCs. These could be sourced to cover all or part of the RET compliance amount (typically transferred to a retailer, as the liable entity, or directly self-surrendered to the Clean Energy Regulator for market customers) or an even larger amount to claim as an emissions reduction in which case they are self-surrendered to the Clean Energy Regulator.

2. Financial PPA

A financial contract for the value of electricity, not for the supply of electricity itself. It can be bundled to include LGCs. The corporate pays a fixed or agreed escalating price to the generator. Such arrangements are attractive to generators because they represent a firm revenue stream from which they can lock-in long-term project financing. For the corporate, if the fixed price paid to the generator is lower than the forward electricity curve, the PPA represents an attractive hedge to mitigate future electricity price risks.

3. Supply linked PPA

Where the output from the renewable energy generator is settled against or linked in some way to the cost of electricity supplied to the corporate (appears on the corporate's electricity bill), supply-linked PPAs typically involve a retailer acting as the intermediary in the arrangement with the renewable energy generator. Broadly, two forms of supply-linked PPAs are available:

i. **Direct supply-linked PPAs** involve two counterparties, the generator and the retailer. Tenure could take the form of a long-term agreement with the generator and possibly a shorter-term retail services agreement, which includes 'sleeving' the generation output from the renewable energy project(s). In this instance a tripartite agreement is typically required between the off-taker, the generator and the lenders.

ii. **Indirect supply-linked PPAs** require a retailer to manage the whole arrangement including the supply of power from the renewable energy project. Through their contractual arrangement the retailer and the generator typically shield the corporate against the volume risks related to the renewable energy project.

Figure 4 outlines the features of the different corporate PPA contract forms.

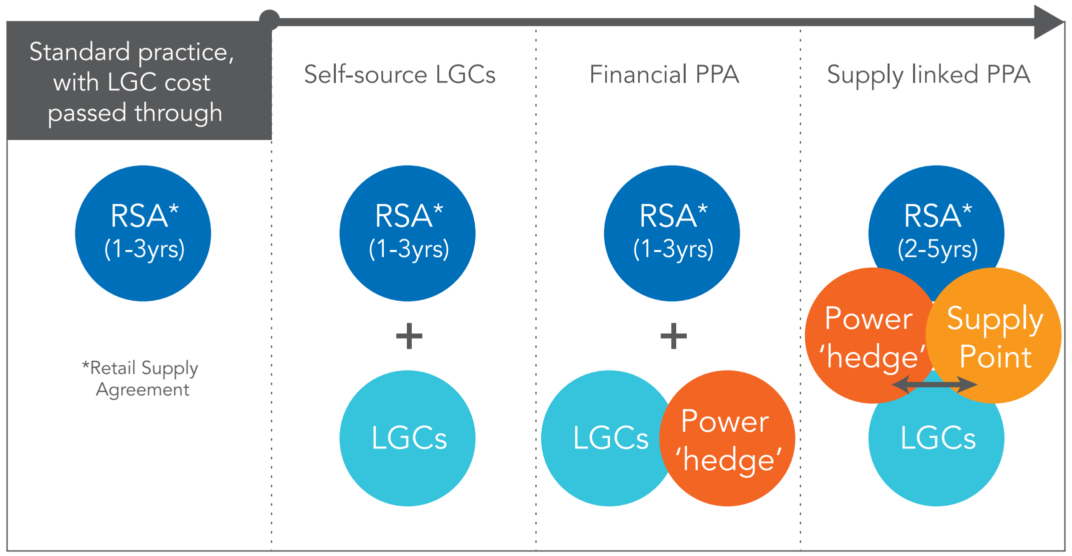


Figure 4: Increasing complexity of electricity and lgc contracting arrangements

Understanding the benefits and addressing the risks

Table 3 provides a high-level overview of the relative benefits and risks of the different corporate PPA models that apply to the supply of power.

Table 3: PPA options summary

CATEGORY	KEY BENEFITS	KEY RISKS
Financial PPA	• Large choice of renewable energy projects • Significant value opportunity, with no "middleman" as retailer is not required avoiding retailer margins and risk premiums • Easier and quicker to set up than a supply-linked PPA • Relatively low transaction costs • Significant interest amongst project developers therefore attractive prices are available	• Direct spot market exposure (under a 'Contract for Difference' arrangement) for duration of the agreement • Potential exposure should the generator under-perform • Exposure to generator's credit risk • Triggers derivative accounting or lease accounting obligations (accounting treatment of contract model should be determined upfront) • Australian Financial Services Licence (AFSL) may be required in some circumstances
Supply-linked PPA	• Large choice of renewable energy projects • Significant interest amongst project developers therefore attractive prices are available • Can transfer some risk to retailer for the duration of the Retail Services Agreement (eg. five year cycles) • Potential to increase the effectiveness of the hedge, with volume offset at retail rates	• Potential exposure should the generator under-perform • Ideally linked to state-based load to limit locational basis risk • Higher administration costs and retailer risk premium • Retailer offers for balancing services currently limited, with some price models including spot market exposure • Increased due diligence requirements • Limited competition amongst reputable retailers may result in a significant risk premium being charged for load balancing and related services • Currently the market for this model is immature • Retailers may be reluctant to accept volume/ operational risk • Contractually complex

Next steps in pursuing the corporate PPA opportunity

- Assess the **benefits and risks** for your business
- **Select an approach** and understand costs
- Decide if you want **to include electricity** as well
- **Evaluate your preferred corporate PPA contract type** ensuring that you consider load profiles, risk appetite, the role on-site renewables could play, and energy contracting approach
- Contact a **specialist energy market, accounting or legal advisor** for insights and support
- Develop a **go-to-market strategy** to determine potential counterparties.

5.

UNLOCKING DISTRIBUTED ENERGY OPPORTUNITIES IN THE PROPERTY SECTOR

Today's opportunities

Distributed energy in the property sector – today's opportunities is designed to help the property sector navigate the array of clean energy technologies available in the market. The analysis shows that across distributed energy options, rooftop solar photovoltaic systems typically offer greater financial benefits, with the return on investment averaging between three and five years. At the other end of the scale, stand-alone batteries that reduce site demand charges have an average return on investment of 10 years. Ground-sourced heat pumps offer wide applications with many benefits, while thermal storage provides moderate financial returns but need large areas of land.

We also see many large energy users investigating corporate renewable PPAs for their cost reduction benefits, ability to reduce exposure to energy market volatility and support sustainability goals with emissions reductions. An arrangement that can be tailored to meet the needs of the energy user, PPAs nonetheless require corporates to take a sophisticated, risk managed approach to energy that sits within the context of a broader energy management strategy.

With significantly varying financial opportunities across the technology options, matching the application to the specific needs of a building type is critical to achieving positive outcomes.

APPENDICES

For more detailed information on the data and modelling please follow this link to our Appendices **(www.cefc.com.au/distributedenergypropertyreport_appendix)**

About us

Clean Energy Finance Corporation

The CEFC is responsible for investing $10 billion in clean energy projects on behalf of the Australian Government. Our goal is to help lower Australia's carbon emissions by investing in renewable energy, energy efficiency and low emissions technologies. We also support innovative start-up companies through the Clean Energy Innovation Fund. Across our portfolio, we deliver a positive return for taxpayers.

www.cefc.com.au

Property Council of Australia

The Property Council of Australia is the voice of the industry that employs 1.4 million Australians and shapes Australia's cities. Property Council members invest in, own, manage, develop and build the things that matter to Australians: homes, shopping centres, office buildings, logistics hubs, retirement villages, schools, health precincts, tourism and hospitality venues and more. Our members are committed to prosperity, jobs and great cities. Together we provide the thought leadership and research that will help decision-makers create those cities: good governance, smarter planning, better infrastructure, sustainability and fewer inefficient property taxes.

www.propertycouncil.com.au

Energetics Pty Ltd

Energetics works with Australia's governments and ASX200 businesses on strategies to address climate change and achieve significant improvements in energy management. Consulting across all sectors of the economy, we provide advice on emissions reduction opportunities, risk-managed energy procurement, clean energy technology investments, and the growing scrutiny of investors into climate-related risk management and reporting.

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