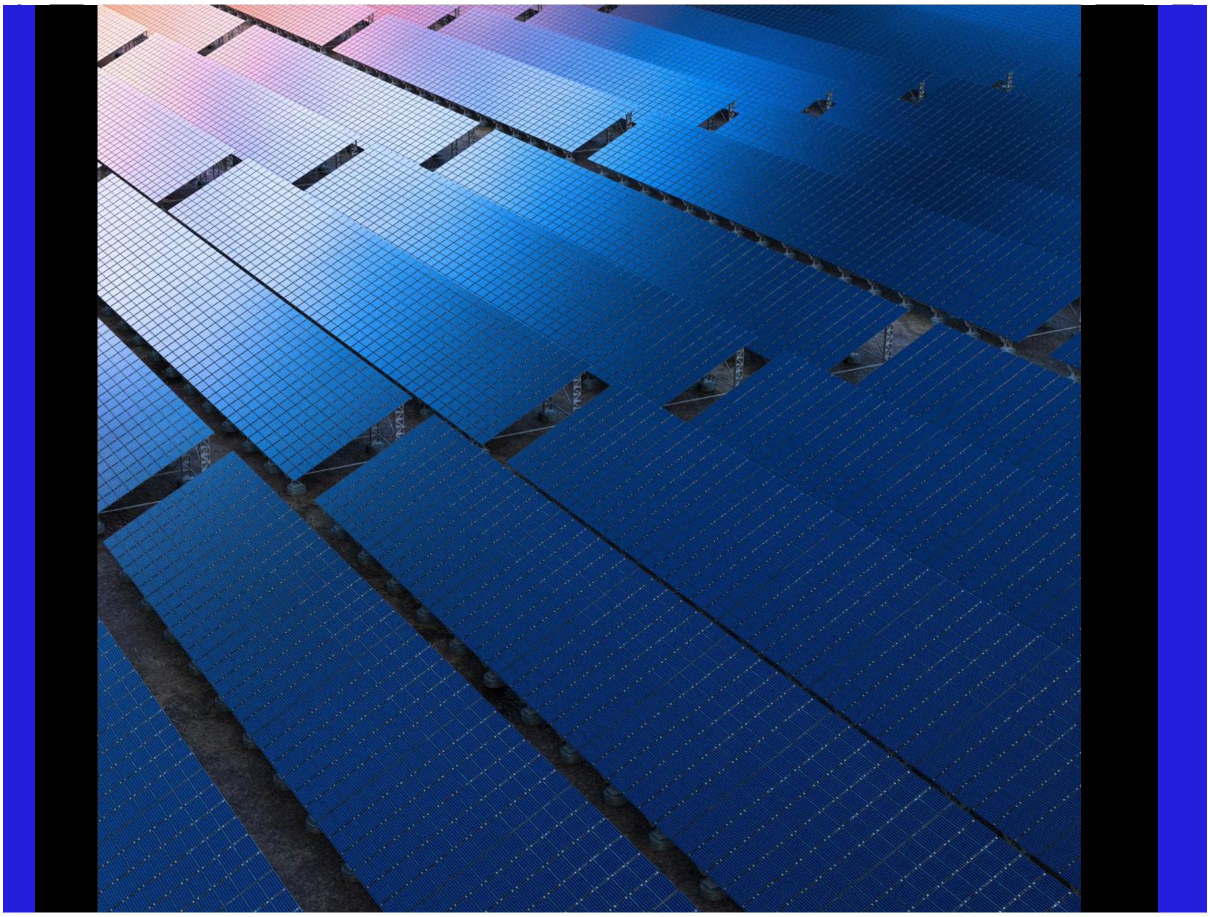
Mid-scale Solar PV System Projections

Document no: 1
Revision: 2

Clean Energy Regulator
RFQ ID 23652

CER DER projections
18 July 2025



Mid-scale Solar PV System Projections

Client name:	Clean Energy Regulator		
Project name:	CER DER projections		
Client reference:	RFQ ID 23652	**Project no:**	IS530300
Document no:	1	**Project manager:**	Hana Ramli
Revision:	2	**Prepared by:**	Paul Nidras, Isabel Neilson, Hana Ramli
Date:	18 July 2025	**File name:**	Jacobs_IS530300CER_Mid-scalePVSystemProjections_Final 1.0
Document status:	DRAFT		

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1	27/6/2025	Draft	Paul Nidras, Isabel Neilson, Hana Ramli	Liisa Parisot	Liisa Parisot	Liisa Parisot
2	18/7/2025	Final	Paul Nidras, Isabel Neilson, Hana Ramli	Liisa Parisot	Liisa Parisot	Liisa Parisot

Jacobs Group (Australia) Pty Ltd

Floor 13, 452 Flinders Street
Melbourne, VIC 3000
PO Box 312, Flinders Lane
Melbourne, VIC 8009
Australia

T +61 3 8668 3000
F +61 3 8668 3001
www.jacobs.com

Executive summary

This report contains projections by Jacobs for the Clean Energy Regulator (CER) of the capacity and number of mid-scale solar photovoltaic (PV) installations for the calendar years 2025 up to and including 2035. Mid-scale PV systems are defined as having a capacity range of greater than 100 kilowatts (kW) and less than or equal to 30 MW. Large-scale Generation Certificates (LGCs) may be created by these systems, which may then be sold to market participants – typically retailers who are required to surrender a determined number of LGCs to the CER. In recent years there has been an increasing trend of voluntary surrender of certificates, typically by corporations, to meet their emission reduction pledges. This has provided a financial incentive for the installation of these systems.

Historical trends

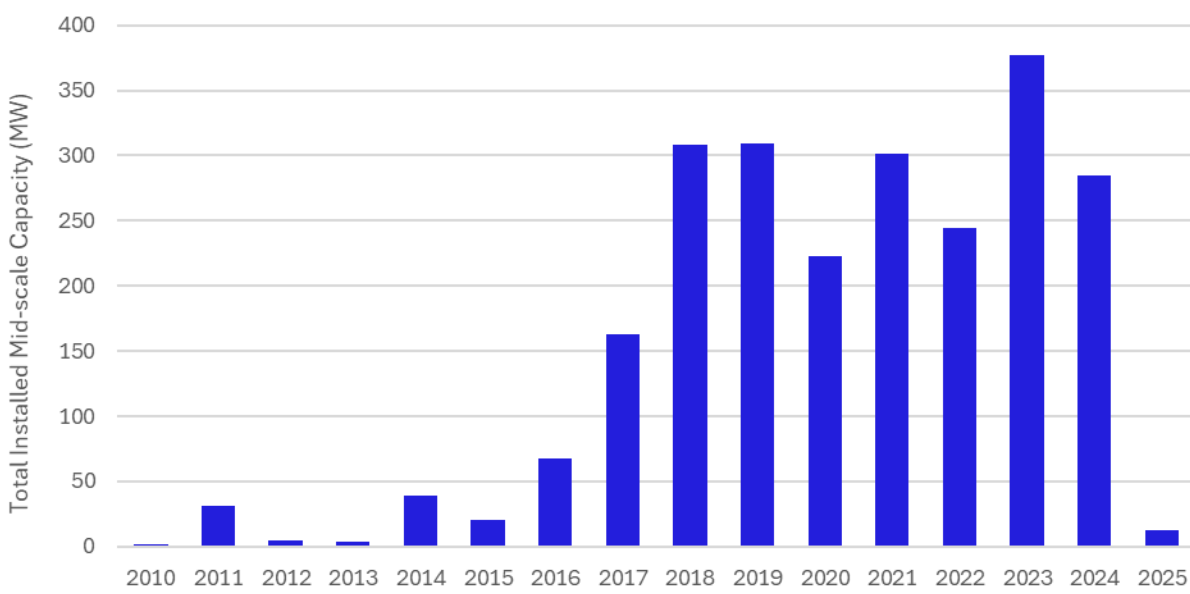
Figure 1 shows the total installed mid-scale capacity up to April 2025.

Mid-scale PV installations surged in 2018, doubling 2017 levels, driven by high retail electricity prices, falling PV installation costs, and strong LGC prices. Growth steadied in 2019 but slowed in 2020 due to the COVID-19 pandemic.

In 2021, growth resumed across both behind-the-meter and front-of-meter systems. However, uptake softened in 2022, particularly for front-of-meter systems. A sharp rise in electricity prices in mid-2022—triggered by the war in Ukraine—spurred record growth in 2023, with 378 MW installed, mostly in front-of-meter systems.

In 2024, installations declined but remained above 250 MW, ranking fifth historically. As of April 2025, only 12 MW have been installed, though this may be understated due to registration delays. Current indicators suggest 2025 installations may return to levels seen in 2020 and 2022.

Figure 1: Trend in installations of mid-scale PV systems, Australia, 100-kW to 30 MW systems



Source CER dataset, 2025 incomplete dataset, estimate for full-year 2025 is 225 MW. Dates based on first generation or application date.

Projections

This study bases projections primarily on the estimated economic benefit and capability of uptake in the various market segments and an underlying assumption that there is no constraint to additional investment in PV capacity.

Mid-scale PV systems cover a broad range of applications. The majority of these are rooftop systems to help meet the energy requirements of business enterprises and government agencies. In addition, single axis tracking systems[1] supply energy to the wholesale market.

Incentives to take up mid-scale solar PV vary. A key incentive stems from a net financial benefit by replacing grid-sourced electricity with on-site PV generated electricity. Other incentives flow from state-based programs that encourage uptake in specific sectors and communities.

The approach adopted to project uptake was based on segmentation and market sizing, based on recent trends. The dataset supplied by the CER containing current and proposed mid-scale installations was segmented based primarily on the type of commercial organisation at which the system is installed. Net present value (NPV) and payback periods of various cases were also calculated and factored into the projections. The payback period for behind-the-meter installations is expected to reduce further for the remainder of the projection period and the economic benefit of installing mid-scale systems for behind-the-meter applications continues to improve.

The case for front-of-meter systems is also improving in the longer term, although is still not strong in the short to medium term. The Federal Government's expansion to the Capacity Investment Scheme, which seeks to install 23 GW of new renewable capacity across Australia by 2030, is expected to make investment in mid-scale front-of-meter systems less attractive. The economics are expected to improve over the longer term.

Key findings

The key findings of this report are as follows:

- The CER has 2,528 mid-scale PV installations in Australia to date, representing a total capacity of 2,395 megawatts (MW) as of April 2025. These figures include installations with applications for accreditation which are currently under assessment, but Jacobs have assumed that all these applications will be approved. More than 90% of installations have occurred since 2014. The top five sectors installing mid-scale solar PV are: electricity supply, commercial, retail, logistics and industrial.
- For the period 2020 to (April) 2025, across all sectors the annual average:
    - Number of new installations was 236.
    - Installed capacity was 241 MW.
    - Installed capacity per site was 1.0 MW.
- Jacobs has projected installed capacity of mid-scale systems to increase by 225 MW in 2025 (full year estimate) climbing to an increase of 288 MW in 2030 and continuing to 338 MW by 2035. This is driven by the economic benefits, particularly for behind-the-meter systems, relatively low market saturation, the practical application of energy production and consumption at the same site, utilisation of excess rooftop space and recent announcements of new government programs.

Table 1 summarises the annual installations of capacity projected for mid-scale PV systems across Australia from 2025 to 2035, inclusive. It divides the data into behind-the-meter systems, and front-of-meter systems of varying capacities.

[1] Single axis solar tracking tracks the sun on one axis only, being east to west.

Table 1: Summary of incremental projected capacity of mid-scale PV installations 2024-2030, MW

Segment	2025	2026	2027	2028	2029	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**
Behind-the-meter systems	195	198	213	227	241	255	266	277	287	295	302
Aged Care	11	12	14	15	16	17	18	19	21	23	25
Agriculture	18	20	22	23	24	26	27	29	31	34	36
Airports	13	-	1	-	-	-	-	-	-	-	-
Commercial	87	96	104	112	120	128	137	146	160	173	189
Education	3	3	2	3	2	3	2	3	2	2	2
Government	3	4	4	3	3	2	2	2	2	2	1
Hospitality	-	-	-	-	-	-	-	-	-	-	-
Hospitals	6	7	8	9	10	11	13	14	15	16	15
Logistics/ Warehousing	18	20	23	26	29	32	35	37	37	35	31
Manufacturing	109	119	126	133	139	145	152	159	167	177	187
Mining	2	2	3	3	3	3	3	4	4	4	4
Recreation	6	7	8	9	10	11	12	13	15	16	16
Retail	50	55	63	71	80	86	88	87	81	72	62
Water Treatment	5	6	6	5	5	4	4	3	3	2	2
Other	13	15	16	17	18	19	19	21	22	24	25
Front-of-meter systems	30	36	4	33	32	33	34	35	36	36	36
0.1-5 MW Systems	3	12	4	6	4	4	4	4	3	3	3
5-10 MW Systems	27	-	-	6	6	7	7	7	7	7	7
10-30 MW Systems	-	24	-	21	22	23	24	25	25	26	26
Total	225	234	217	260	273	288	301	313	322	331	338

Note: 2025 total is estimated, actual is 12 MW as of April 2025
Source: Jacobs' analysis

Contents

Appendices

Tables

Figures

Acronyms and abbreviations

ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
ANZSIC	Australian and New Zealand Standard Industrial Classification
BESS	Battery energy storage system
CBD	Central business district
CER	Clean Energy Regulator
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DC	Direct current
ESG	Environmental and social governance
IRR	Internal rate of return
kW	Kilowatt
kWh	Kilowatt-hour
LGA	Local government authority
LGC	Large-scale Generation Certificate
LRET	Large-scale Renewable Energy Target
MLF	Marginal loss factor
MW	Megawatt
MWh	Megawatt-hour
NEM	National Electricity Market
NPV	Net present value
NSW	New South Wales
PPA	Power purchase agreement
RAES	Remote Areas Energy Supplies (Scheme)
REC	Renewable Energy Certificate
REGO	Renewable Energy Guarantee of Origin
SETuP	Solar Energy Transformation Program
SME	Small-to-medium sized enterprise
SRES	Small-scale Renewable Energy Scheme

STC	Small-scale Technology Certificate
WACC	Weighted average cost of capital

1. Introduction

The CER has engaged Jacobs to provide projections of the uptake of mid-scale solar PV systems across Australia for 2025 to 2035 (inclusive).

The projection of mid-scale PV uptake was based on:

- Projecting historical trends of mid-scale PV systems over the eleven calendar years from 2025 to 2035. These included projections for PV installations and installed capacity for commercial and industrial systems by various categories (including behind-the-meter, front-of-meter, and off-grid) and capacity bands for each state and territory in Australia. Historical data has been supplied by the CER containing detailed information on mid-scale system installations to April 2025.

- A review of the mid-scale solar PV market to identify key factors influencing the demand for and supply of mid-scale solar PV systems.

- A bottom-up analysis of known pipelines and announcements of mid-scale PV systems.

- Establishing a relationship between historical uptake and payback periods, which has been used to inform the longer-term front-of-meter projections.

The findings presented in this report must be interpreted with an understanding of the limitations of projections that are about future market conditions. Perceptions of these parameters may change over short timeframes as wider economic, social, and technological trends evolve. Events can also occur for reasons not considered in the modelling process, such as changes to regulations affecting the use of mid-scale PVs or the development of alternative market arrangements for the output of PV systems.

2. Federal Government incentives

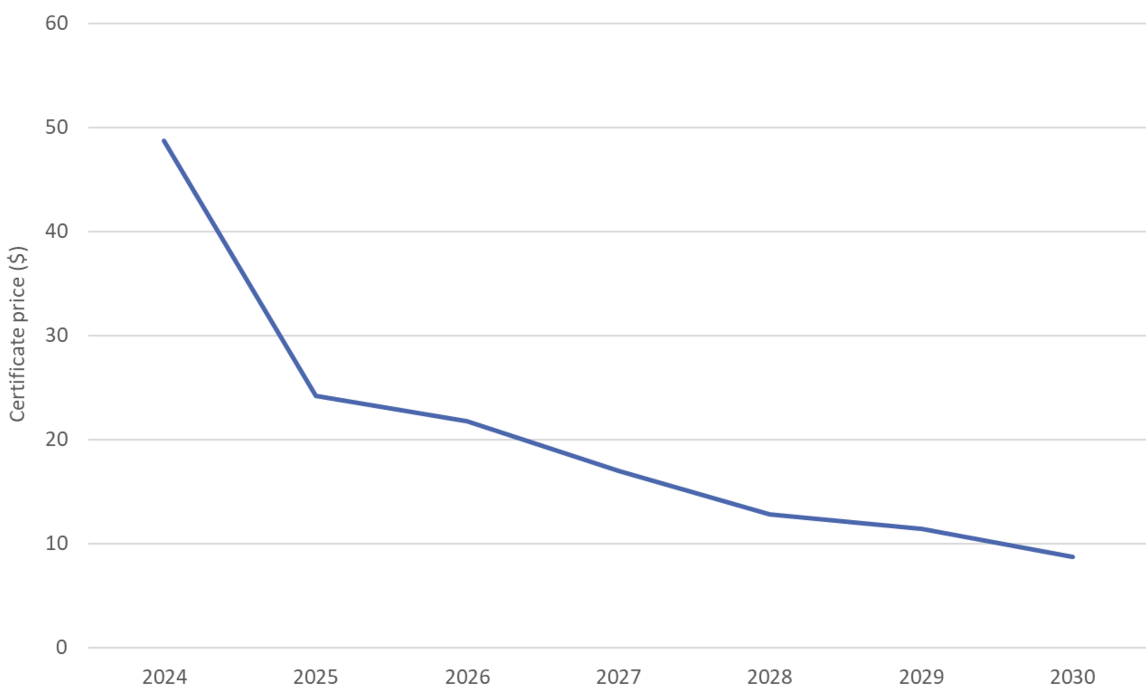
2.1 LRET

The Large-scale Renewable Energy Target (LRET)[2] is designed to incentivise the development of large-scale renewable power generation in Australia through a market for the creation and sale of LGCs. Solar PV installations accredited under the LRET can create LGCs equivalent to the amount of renewable electricity they generate. One LGC is created for each megawatt-hour (MWh) deemed generated by a renewable resource. Liable entities (usually energy retailers) are required to acquire and surrender LGCs to the CER by creating them directly or purchasing them from the market.

While the LRET of 33,000 GWh of renewable energy generation has now been met, the scheme is legislated to continue until 2030 with the target remaining at that level.

Figure 2 shows the current and predicted LGC prices through to 2030[3]. The price of LGCs is expected to decline throughout the 2020s and has already declined substantially in 2025, currently trading under $20 per certificate, which is less than half the value it had in 2024. The price decline is expected to continue for the remainder of the 2020s, reaching an average price of less than $10 by 2030.

Figure 2: Current and projected LGC prices



Source: Jacobs' analysis

Historically LGCs have held their price at higher than anticipated levels mainly due to strong corporate and government demand, which is still trending positively[4]. Despite the positive demand outlook, supply growth in the LGC market

---

[2] See: https://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/How-the-scheme-works/Large-scale-Renewable-Energy-Target

[3] Predicted LGC prices are based on Jacobs' analysis of forward curves sourced from various websites.

[4] The CER's latest data release on voluntary surrender shows a growing trend – see Figure 2.6 in Q2 2025 QCMR data workbook available now | Clean Energy Regulator.

continues to outpace demand growth, with record LGC creation expected in 2024 and further growth anticipated, spurred by the recent commissioning of major wind and solar projects. Increases in supply are expected to continue into the medium term, fuelled by the expanded federal Capacity Investment Scheme (CIS). Moreover, there is a current carryover of 12 million LGCs from past compliance years, which represents a floating source of supply that effectively caps any upside in pricing.

2.2 REGO

The Renewable Energy Guarantee of Origin (REGO) scheme is a voluntary scheme that was legislated in December 2024. It is based on the LGC framework of the LRET but is now extended to include storage capacity and generation of existing generators below their current baselines[5]. Under the scheme, each accredited generator receives one certificate for each megawatt-hour of electricity it generates. The REGO scheme is expected to become active in mid-2025 and will sit alongside the LRET scheme until it ends in 2030. Eligible generators will be free to choose which of the two schemes they participate in until 2030 and below-baseline generators will be able to create REGOs for all of their output. Post 2030, renewable generators will be able to create certificates under the REGO scheme, until its proposed end date in 2050.

In this study we assume the impact of the REGO scheme to be minimal in relation to the development of mid-scale solar PV systems, especially post 2030. The following are the key reasons for this assumption:

- The impact of the REGO scheme from 2025 until 2030 will be to reduce the value of LGC certificates. This impact has already been captured in the modelling through lower forward curve prices, which is the basis of our LGC price forecast. The REGO scheme will lower the value of LGCs in two ways:
    - it introduces a second market through which corporate and government demand for green electricity can be sourced, thereby reducing demand for LGC certificates.
    - its accreditation of below-baseline hydro supply creates a large pool of cheap, new renewable supply which will result in lower certificate prices.
- The scheme is voluntary, which makes it difficult to predict aggregate demand. Furthermore, there is no guarantee that demand from one year will automatically pass through to a subsequent year.
- Supply for the scheme post 2030 is likely to be very high relative to demand given the large, expected influx of renewable energy, driven by the expanded 32 GW CIS and the various legislated state-based targets. The inclusion of below-baseline renewable generation also adds to the supply pool for the REGO.

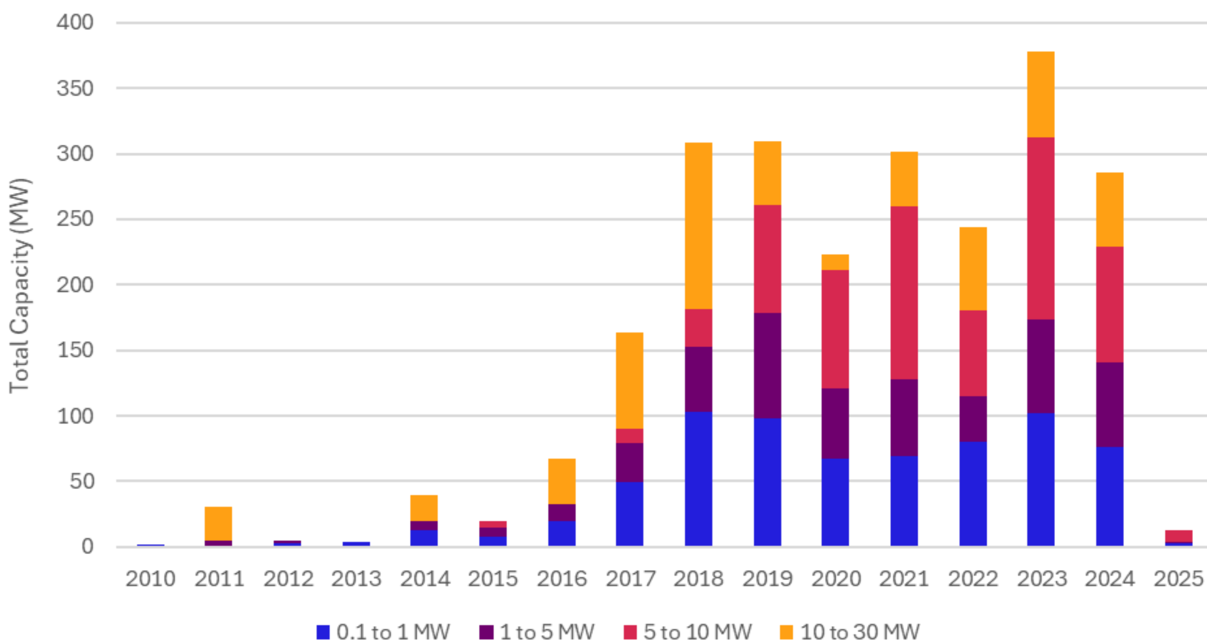
For these reasons we have not considered the REGO scheme as a source of material value to drive uptake of mid-scale solar PV installations over the forecast period.

[5] Renewable generators participating in the LRET scheme that were generating electricity prior to 1997 were set a baseline based on their average historical output. These were primarily hydro units located in Tasmania and the mainland.

3. Trends in uptake

Mid-scale PV installations of 100-kW to 30 MW in size have experienced strong growth in installation rates since 2016 in both quantity and scale, driven by the rapid decline in capital costs of solar PV. Figure 3 highlights the trends for the installed capacity of these mid-scale systems categorised by capacity.

Figure 3: Trend in installed capacity of mid-scale PV systems, Australia, 100-kW to 30 MW systems



Source CER dataset, 2025 incomplete dataset, estimate for full-year 2025 is 225 MW.

The years indicate primarily first-generation date of the plants installed, but if first generation date for a plant was denoted as not applicable, then the initial application date was used. For entries with an “not applicable” generation date their application dates fall almost exclusively between 2015-2018, so it was assumed there was an issue with generation date data capture for these sites.

Projects that are “under assessment” are included, but they are all assumed to be already generating, and their application capacity are assumed to be relatively accurate.

Across these categories:

1. Systems between 100-kW and 5 MW will predominantly include rooftop systems for behind-the-meter purposes.
2. Systems greater than 5 MW will predominantly be ground-mounted systems. With exception of large-scale industries (e.g., airports), it is likely that these systems will have a high share of their energy exported to the grid.

Table 2 shows the history indicating a trend increase across new installations and average capacity per installation.

Table 2: New installations and average capacity

Year	New installations (number)	Capacity installed (MW)	Average capacity (MW per installation)
2004	1	0.1	0.1
2009	4	3	0.7
2010	5	1	0.3
2011	6	31	5.2
2012	10	5	0.5
2013	11	4	0.4
2014	44	40	0.9
2015	28	20	0.7
2016	81	67	0.8
2017	191	163	0.9
2018	364	308	0.8
2019	367	309	0.8
2020	241	223	0.9
2021	250	302	1.2
2022	264	244	0.9
2023	366	378	1.0
2024	284	285	1.0
2025*	11	12	1.1
Summary	2,528	2,395	0.9
2020-2025	1,416	1,444	1.0
Average per year	236	241	

Note. 2025 is the year-to-date actual. Estimated total expected by year end is greater than the actual.
Source: CER database and Jacobs' analysis

4. Method

There are a range of factors affecting mid-scale PV uptake that need to be considered when doing projections.

A significant constraint in projecting PV uptake is the available land or rooftop area suitable for large commercial and industrial building sites, which will grow as suitable sites decrease in number.[6] However, even if there is sufficient roof area, other factors may impede or diminish uptake such as shading from surrounding trees and buildings.

The primary incentive to uptake solar PV in the mid-scale range is a potential financial saving. The size of the financial saving depends on a range of assumptions for any prospective site:

- The magnitude of saving from partly supplying electricity on-site, resulting in avoided expenditure associated with sourcing electricity from the grid.
- The magnitude of revenue derived from creating LGC certificates.

Other motivations for installing mid-scale PV systems include:

- Behind-the-meter reductions in rates of energy use through self-generation of solar power.
- Export of electricity to the grid for trade in a wholesale market such as the NEM, or electricity sales through PPAs (front-of-meter systems only).
- Desire to directly reduce on-site greenhouse gas emissions.

The difference between commercial and industrial retail pricing is also a key factor, with industrial rates generally based on high voltage loads and baseline consumption patterns, and almost half of the rates expected by commercial and small-to-medium enterprise (SME) organisations.

For expansive ground-mounted systems within the metropolitan area, land value and other opportunity costs associated with land utilisation may outweigh the benefits of installing a mid-scale ground-mounted system.

Other factors that may affect uptake are:

- The size of the PV installation industry and its ability to meet the demand for installations. Over time, the industry is growing which yields benefits such as increasing technical proficiency, the amount of knowledge that can be shared with prospective clients, and scale benefits in sourcing supplies upstream. This dynamic engenders confidence among prospective clients, lowering the threshold to committing to install a new system.
- Alternative technologies (for example, thermal energy storage as an alternative to on-site electricity generation for space heating and cooling) and the rate of obsolescence of existing technologies.
- Property tenure. For tenant businesses, lease contracts may be too short in duration to guarantee recovery of an investment in on-site PV capacity.
- The relative simplicity of the Small-scale Renewable Energy Scheme (SRES) may dissuade companies from installing systems just above the capacity limit of SRES. The Small-scale Technology Certificate (STC) scheme may create an incentive for companies to install systems with capacity less than the 100-kW threshold, even if they could install

[6] This is dependent on construction activity with new building design likely to integrate PV systems

larger systems above the 100-kW range. This constraint no longer applies post 2030 after the expiry of the SRES scheme.

The range of factors meant it was difficult to develop a single, relatively simple model that would capture all aspects in a way that provides credible projections. Instead, we opted to develop projections by taking a bottom-up approach that:

- Classified each installation by industry using the Australian and New Zealand Standard Industrial Classification (ANZSIC) classification system (of the Australian Bureau of Statistics) as a guide, including:
  - classifying installations using the ANZSIC four-, three- or two-digit levels; and
  - grouping the classified industries to create economic segments to relate installations more clearly to news and announcements of plans for future installations.
- Developed estimates of market size by segment, with judgemental adjustment based on received information informing the likely rate of installations over the next five to ten years.
- Fitted a mathematical function (the generalised Gompertz[7] function), using the established historic trend for each segment and the estimated market size likely to be achieved over the ten-year horizon.
- In the case of larger front-of-meter systems, we have used a hybrid approach as follows:
  - Conducted a bottom-up forecast over the short-term, as per analysis from previous iterations of this study.
  - Derived a relationship between historical payback and uptake to model the benefit of shorter expected payback periods over the ten-year horizon for front-of-meter systems (see section 6.2.3).
  - This approach is considered more suitable for a longer-term forecast spanning ten years.

4.1 Segmentation and market sizing

For this study, installed PV systems were categorised into segments. Market segments were identified by matching descriptors available in the ‘Power Station Name’ field of the dataset provided by the CER to the ANZSIC classification descriptors. Details are provided in Appendix A.

The market size of the 10 largest segments was estimated based on relevant market information, as documented in Section 5. The 10 largest segments formed 90% of the total mid-scale capacity currently installed. These segments, listed in descending order of installed solar PV capacity, are:

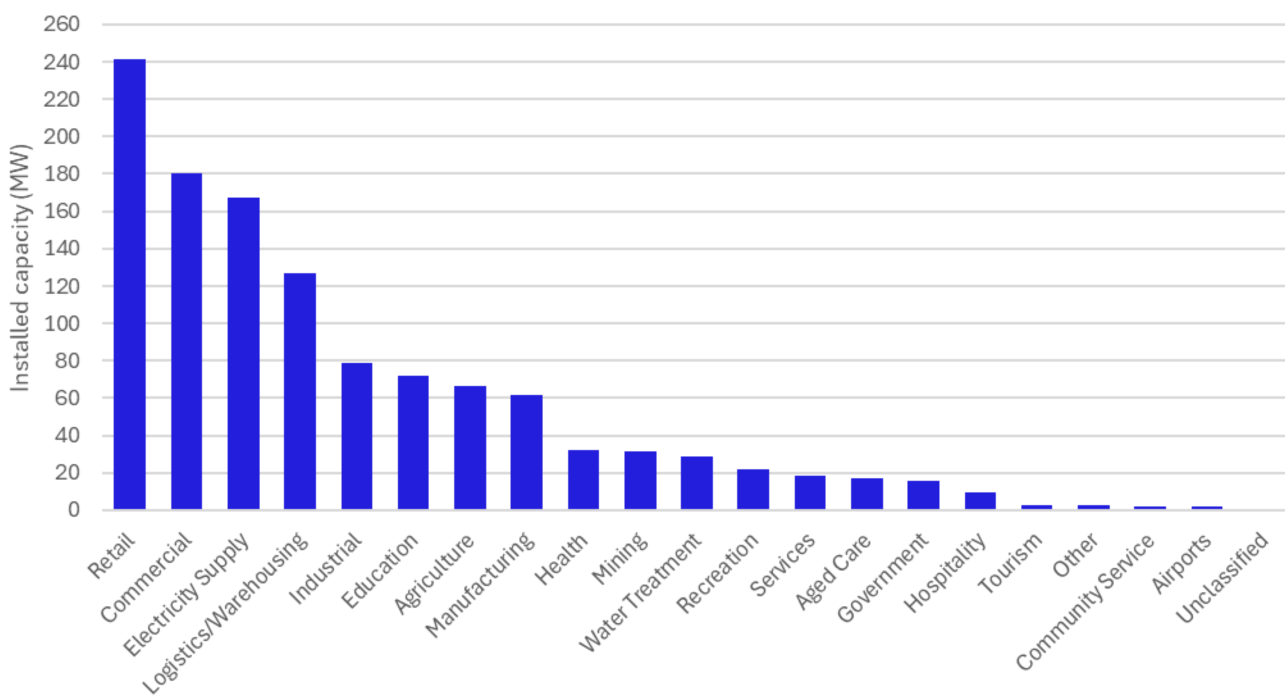
1. Electricity Supply
2. Commercial
3. Retail sector
4. Mining

[7] A type of mathematical model for a time series, based on a sigmoid function that describes growth as being slowest at the start and end of a given period.

5. Water Treatment
6. Logistics/Warehousing
7. Education
8. Industrial
9. Agriculture
10. Services

Table 3 and Figure 4 show the breakdown in installed capacity across various identified segments in the 100-kW to 5 MW range.

Figure 4: Total installed mid-scale PV capacity in identified market segments, 100-kW – 5 MW capacity



Source: Jacobs' analysis

Table 4 provides information on the potential site count for all mid-scale PV for each sector, as counted from the mesh blocks[8] data from the Australian Bureau of Statistics. The underlying assumption with respect to the site count is one potential mid-scale PV site per mesh block.

[8] Mesh blocks are the smallest geographical units defined by the Australian Bureau of Statistics.

Table 3: Installed capacity between 100-kW and 5 MW per category

Category	Installed capacity, in MW (100-kW to 5 MW installations)
Retail	242
Commercial	180
Electricity Supply	167
Logistics/Warehousing	127
Industrial	79
Education	72
Agriculture	66
Manufacturing	62
Health	32
Mining	32
Water Treatment	29
Recreation	22
Services	19
Aged Care	17
Government	15
Hospitality	9
Tourism	3
Other	2
Community Service	2
Airports	2
Unclassified	0
Total	1,179

Source: CER database and Jacobs' analysis

Table 4: Land classification by designated use[9]

Designated land use type	Site count
Commercial (including Retail)	15,124
Education	8,484
Hospital/Medical	1,244
Industrial	7,701
Other	5,254
Primary Production	19,429
Shipping	83
Transport	1,655
Total	58,974

Source: Australian Bureau of Statistics, Australian Statistical Geography, Edition 3. Note: data is a simple count of mesh blocks by category. Residential and Parkland categories available in the mesh block data is omitted from this table.

As can be seen in Figure 4 and Table 3, Retail, Commercial and Electricity Supply are the three largest segments contributing to PV installations in the mid-scale category under 5 MW, with a combined capacity of 589 MW accounting for 50% of total capacity in this category. Commercial and Retail sites also have the highest site count. Logistics and Warehousing and Industrial are the next two biggest segments in terms of installations, with 127 MW and 79 MW mid-scale PV capacity installed across Australia, respectively. For Education, the data indicates that there are many potential sites available, although fewer than for Commercial. Logistics and Warehousing is not as well-defined in the statistical geography data, so the numbers for Industrial, Shipping and Other classifications could include Logistics & Warehousing usage.

By inspection of Table 4, the apparent anomaly is Primary Production, which is the category with the greatest number of sites but has little solar PV uptake. However, larger power stations (>100 MW) tend to be situated on agricultural land, which is counted in this mesh blocks category. Furthermore, power stations, small or large, tend to cover multiple mesh blocks, making the data more difficult to interpret. Additionally, many sites in this category may have opted for small-scale PV (<100-kW) systems.

There are many other relatively smaller industries that have embraced solar PV technology. Those with particularly high energy demands such as sports and recreation facilities that host a swimming pool, airports, water treatment plants, cool storage warehouses, and hospitals have all entered the market. Over the last two years, the mining, and manufacturing industries have also shown an increase in uptake of behind-the-meter systems.

4.1.1 Additional considerations

For any time-series analysis, it is important to evaluate the available data with the following questions in mind:

- Is there a pattern driving installations?
- What kind of pattern is it?
- Will the pattern persist over time?

[9] Note that these categories are the ABS mesh block categories, not the ABS ANZSIC categories.

There are several underlying drivers impacting installations:

- Government policy favouring direct action interventions at government sites, which is being expressed in part by installing PV systems on buildings related to administration, health and recreation or other community sites.
- Energy intensive processes such as water treatment and refrigeration.
- The environmental and social governance (ESG) in mining action, which is helping to drive PV and other renewable energy installations at mine sites.

These drivers are likely to persist over several years but will reduce in intensity as the number of suitable sites remaining dwindles.

These considerations are factored into the projections using a mix of quantitative and judgement-based methods.

4.2 Assessment of economic benefit

To form a view on the economic benefit over the life of a PV system, Jacobs has developed a model to project the annual cash flows that are derived from the value of expected savings of electricity not required to be purchased from the grid and/or the amount of energy exported back into the grid. When levelised, these cash flows can be used to assess the life-long benefit of a rooftop PV system or a ground-mounted grid scale PV system by comparing them to the estimated upfront cost of installing the system such that comparisons can be made on the actual net benefit and the payback period.

Critical inputs and assumptions in assessing future cash flows, and thereby net benefit, and which were factored into the analysis include expected electricity cost, capital cost of the system, projected energy consumption and consumption patterns. Other important factors include the expected annual output of a PV system, considering solar insolation levels, and degradation.

To determine the average net export of electricity to the grid for rooftop systems, a reference profile of daily commercial consumption published by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) [10] was utilised with 12 reference profiles of rooftop solar generation (also published by CSIRO) to represent each month of the year. The difference between the generation and consumption patterns was then taken to calculate the expected reduction in demand and thereby the expected energy savings for each of the twelve months. This figure was then annualised to represent the yearly energy savings.

4.3 Estimating uptake

The projections by segment were created by fitting a generalised Gompertz function to the time series of installations by segment. The generalised Gompertz function imposes an ‘s’-shaped curve that assumes an initial accelerating growth phase followed by a phase of decelerating growth.

A generalised Gompertz distribution is a continuous probability distribution function using three independent parameters (A, b, c) that allow it to take various shapes as outlined below:

$$G(t) = A.c.exp(-ct - b.exp(-ct)).[1+b.(1-exp(-ct))]$$

The total market size of all segments is considered as an input to the model as the asymptote constant (the coefficient *A* in the generalised Gompertz function), and the other two parameters *b* (x-axis displacement) and *c* (growth rate or y-axis

[10] *CSIRO technical report: Load and solar modelling for the NFTS feeders, 2015*

scaling) were selected based upon fitting the trend of PV installations via the sum of least squares. All mid-scale installations with exception of the education sector, airports, and front-of-meter systems were trended by month to allow the function to be fitted. The average system size for these systems was then calculated and applied to the estimated number of monthly installations to produce the capacity of mid-scale installations.

The optimised solution[11] for the generalised Gompertz distribution is as follows:

A = 29,300[12]

b = 7.723

c = 49.227

With a suite of government incentives targeting the education sector and many remote communities, the uptake of mid-scale solar PV for these segments was estimated using the bottom-up approach described in the introduction to Section 4. Similarly, the segments involving ground-mounted systems for the purpose of selling energy to the grid was estimated with a hybrid approach, combining a bottom-up approach with payback analysis, due to the different incentives compared to the behind-the-meter categories. A search of news and announcements of intended installations was conducted to identify the current motivations, likelihood, and capabilities of businesses and industries to install such systems to arrive at estimates of future capacity.[13] Information on developing uptake constraint assumptions is provided in Appendix C.

4.4 Summary of forecast methods

Table 5 presents a summary of the various forecast methods used for each of the categories that are analysed in this report.

Table 5: Summary of methods used for forecast

Category	Forecast method	Notes
Behind the meter		
Aged Care	Gompertz distribution	
Agriculture	Gompertz distribution	
Airports	Bottom-up	Based on announced projects
Commercial	Gompertz distribution	
Education	Bottom-up	Mainly based on current rates of uptake in the private school sector (see section 7.2)
Government	Gompertz distribution	
Hospitality	None	We assume very little uptake given the headwinds faced by this industry (see section 5.1.9)
Hospitals	Gompertz distribution	

[11] Based on least sum of squared errors model fitting approach

[12] As per the total in Table 6. Please note in last year's calculation the number of education sites was incorrectly included in the market sizing analysis. The impact of using this in last year's estimate, rather than the correct market sizing, was less than 0.4% across the whole five-year projection horizon. The optimised parameters for last year's analysis, which are comparable to this year's forecast are: A=28,979; b=7.138 and c=45.093.

[13] See section 5 for details.

Category	Forecast method	Notes
Logistics/ Warehousing	Gompertz distribution	
Manufacturing	Gompertz distribution	
Mining	Gompertz distribution	
Recreation	Gompertz distribution	
Retail	Gompertz distribution	
Water Treatment	Gompertz distribution	
Front of meter		
Remote communities	Bottom-up and trend analysis	Up to 2030 is based on bottom-up approach referencing current programs and post-2030 is based on a simple 4-year trend
5 – 30 MW	Bottom-up and payback period analysis	Up to 2027 is based on current reported projects and 33% of AEMO's visible pipeline of projects; post 2027 is based on payback period analysis

5. Market sizing of behind-the-meter systems

To project the number of mid-scale size PV installations that will occur, an evaluation of the potential market size was conducted. This is important as it not only provides boundaries for the projections but also allows for an indication of the saturation of the sector and any potential for growth.

To conduct this evaluation, every installation in the top 10 behind-the-meter categories by installed capacity was matched to a mesh block category, whereas all remaining installations were grouped in the "other" category. The installations contained in these top 10 behind-the-meter categories represent approximately 92% of the installed behind-the-meter capacity within the mid-scale PV system range. Table 6 summarises the estimates of number of suitable locations for these mesh block categories (where the Services category is included in Commercial), along with an indication of the current level of uptake within each segment.

Table 6: Potential market for mid-scale rooftop installations and current installations

Category	Market size, as number of sites	Number of installations
Commercial (including Services)	11,419*	772
Industrial	7,701	206
Manufacturing	5,495	128
Retail	1,786	518
Agriculture	1,821	123
Logistics/Warehousing/Transport	754	192
Water Treatment	121	62
Mining	203	16
Total	**29,300**	**2,017**

** Estimated from cross-matching mesh block data with other sources. Total number of commercial sites as defined in the mesh block data equals the sum of Commercial, Retail, Hospitality, Services, Aged Care and Government.*
Source: ABS mesh block data and Jacobs' analysis

5.1 Background and assumptions

This section provides the background and assumptions used in the market sizing calculations. In short, the Gompertz projection requires a market saturation level, which represents a constraint that eventually binds, forcing the growth of PV installations to decelerate. The maximum market size is typically modelled as proportional to the total number of available sites. This maximum should be considered as an imposed sensibility assumption since the number of installations cannot exceed the number of available sites.[14]

Much of the following information is qualitative and independent of the Gompertz projections. However, in constructing the projections, judgement was informed by the information provided, allowing for adjustments that deviate from a straight-line extrapolation of historical trends. It is presented here largely to assist readers' evaluation of the projections.

[14] According to Australian Bureau of Statistics mesh block data there is a total of 58,974 potential sites for mid-scale solar. See Table 4 for a breakdown by broad type.

5.1.1 Commercial sector

This segment spans a range of economic activities such as commercial property management, parts distributors, as well as a variety of professional service providers. This sector is also one the largest potential market for non-residential behind-the-meter installations.

Given the risk of conflating commercial activities with retail activities, the distinction was based on segment allocation based on the ANZSIC coder.[15]

5.1.2 Retail sector

The Retail sector is one of the large segments of mid-scale installations. The retail industry continues to play a significant role in the uptake of rooftop PV systems, with their opening hours matching well to solar PV generation. To install a rooftop solar system greater than 100-kW, the roof space required is at least 550 m^2, which limits suitable sites in this category to retailers covering large floor spaces such as supermarkets, homemaker centres, hardware warehouses, department stores, and shopping centres.

Several such companies have begun initiatives to roll out rooftop solar PV as a part of their economic and sustainability objectives. For example, Aldi has announced a commitment to source 100% of its electricity from renewables by the end of 2021, and Coles, Woolworths, Bunnings and IKEA Australia have announced 100% renewable targets by 2025. Aldi, Bunnings and Woolworths have already installed a substantial number of rooftop PV systems on their supermarkets across Australia.

According to the Urbis Australian Shopping Centre Industry report by Baker Consulting[16] (2018), there were 1,630 shopping centres in Australia that exceeded 1,000 square metres of gross lettable areas. These include:

- 78 regional shopping centres with at least one department store.
- 291 sub-regional centres that include at least one discount department store.
- 1,120 neighbourhood or supermarket-based shopping centres that include at least one supermarket as the major anchor.
- 96 central business district (CBD) centres.

The CBD centres were not considered to be suitable for a mid-scale PV installation since rooftops are highly constrained and there are shading issues which would materially reduce the electricity generated. Jacobs also assumed that 'shopping centres' include all suitable supermarkets and therefore additional inclusions for supermarket chains have not been made. In addition, currently there are 297 chain hardware retail outlets in Australia, with all chain hardware stores considered as having the potential to host a mid-scale PV system.

Therefore, this report has assumed the Retail segment comprises:

- Shopping centres.
- Regional centres.

[15] See this web URL for further details: https://www.abs.gov.au/statistics/classifications/australian-and-new-zealand-standard-industrial-classification-anzsic/2006-revision-2-0/how-search-works#classification-search.

[16] http://www.scca.org.au/wp-content/uploads/2020/01/AUSTR1.pdf

- Supermarket-based shopping centres.
- Chain outlets.

This gave a total of 1,786 retail premises considered suitable for the installation of a mid-scale PV system.

5.1.3 Water treatment plants

Jacobs used several sources to piece together the market share and uptake of solar PV systems at water treatment facilities in Australia. Included in this category were water treatment plants, pumping stations, and desalination plants.

The main data sources used to construct market size and projections for the water treatment sector were:

- CER mid-scale data on accredited and solar PV plants under application.
- Australian Bureau of Statistics (ABS) statistical information on the number of water treatment plants in Australia by turnover size.
- Publicly available information from Sydney Water on the number of sites and size.

The CER data includes 68 solar PV entries in the water treatment category[17] and of these 62 are sized between 100-kW and 5 MW. Most of these were installed between 2018 and 2022.

SA Water's 150 MW Zero Cost Energy Future strategy[18] was a $300 million project across 33 sites for SA Water operations to reach net zero emissions. It was completed in 2022, and we have identified all 33 sites in the CER dataset. We have identified several future mid-scale solar PV projects announced by various water authorities, which we have also cross-checked with the CER dataset, but no other systematic plan akin to that of SA Water.

According to the CER data, the average size of the solar PV plants at the water treatment sites is 1.55 MW, although this is skewed by the two largest plants. Excluding these reduces the average size to 920-kW. Plants accredited and under application over the past year (2024) have an average size of approximately 800-kW, indicating that the average size of these projects has stabilised, although it is larger than the study from three years ago[19] when the average size was 594-kW. The largest of these projects are powering the water pumping stations in SA and the SA desalination plant.

Market size of the water treatment sector was estimated using ABS statistical data and information available on the website of Sydney Water[20] about their water, recycled water and wastewater networks.

ABS data shows, there were a total of 616 water treatment sites across Australia, of which 121 sites (20%) had a turnover of more than $2 million. We assume this sets the size of the water treatment market. Over 50% of large water treatment sites are in NSW and Victoria.

To substantiate the above assumptions, Jacobs used some more specific site data from Sydney Water. Sydney Water covers more than 4.3 million people in Sydney, Illawarra, and the Blue Mountains and covers a mix of urban, suburban, and regional/rural coverage that can be considered a suitable representation of Australia's water treatment activities.

[17] Including water pumping and desalination

[18] https://www.sawater.com.au/education-and-community/education/the-well/Resources/Education-Fact-Sheet_Zero-cost-energy-future_Primary.pdf

[19] https://cer.gov.au/document/mid-scale-solar-pv-modelling-report-jacobs-july-2021

[20] Although information is available on water treatment plant for other jurisdictions (e.g. Melbourne Water), Sydney Water provides the most detailed and comprehensive information on their website.

According to the latest Sydney Water website data, the Sydney Water network includes nine water filtration plants, 16 wastewater treatment plants, 14 water recycling plants, and one desalination plant. Jacobs assumed that plants with a discharge of more than 10 million litres per day will be large enough to host mid-scale solar PV plants. All water filtration plants, seven recycling plants, and eight wastewater plants fall into this category. This brings the total suitable sites for Sydney Water to 25 (including the desalination plant).

The ABS data for NSW suggested a total of at least 29 plants with a turnover of more than $2 million, which is consistent with the Sydney Water data. Therefore, the Sydney Water specific data broadly supports the ABS data. Jacobs used the assumption that 121 sites across all of Australia with a turnover of at least $2 million are suitable for mid-scale solar PV. The $2 million threshold was selected because the cost of a 100-kW PV system represents only about 7% of the site's annual turnover, which is likely to be small enough to be absorbed into its annual budget, especially if it is debt financed.

5.1.4 Airports

Appendix B lists the twenty busiest airports in Australia during 2024-2025 and the capacity of solar currently installed at these airports. With over 400,000 passengers per year, we assume these are all potential candidates for mid-scale PV installations. Due to the limited number of premises and high penetration rate, a bottom-up approach to projections will be applied to this segment.

With high electricity utilisation in combination with expansive car parks and terminals, airports are prime candidates for the installation of solar panels. Furthermore, airports around the world are under increasing pressure to reduce their carbon footprint. Many airports in Australia have already installed systems (Darwin, Alice Springs, Brisbane, Adelaide and Melbourne), which indicates that this market may have fewer opportunities going forward, but there are also instances of airports (Melbourne, Adelaide and Brisbane) with existing capacity looking to expand their installed capacity.

Melbourne airport is adding to its existing 12 MW Oaklands Junction solar installation with an additional 7.5 MW development that will be known as the North Airfield solar farm. It will be located next to the existing solar farm and the combined output of both facilities are expected to supply about 40% of the airport's energy demand. North Airfield solar farm is due to be commissioned by mid-2025 and we confirm it is not included in the CER's database.

Adelaide airport has greatly expanded its existing solar arrays, adding 2.3 MW to supplement the pre-existing 1.28 MW installation. The total solar capacity is expected to supply about 15% of the energy needs of the airport complex. The project was reportedly completed in early 2025 and heralded with a media release on 28 March 2025, but it does not appear to be included in the CER database.

Brisbane airport is also in the process of expanding its rooftop solar installations, with the current upgrade adding 5,000 panels, representing roughly 2 MW of additional capacity. This is expected to produce about 3.2 GWh per annum, supplying about 7% of the airport's total energy requirements. The upgrade was expected to be completed by November 2024 but is not currently in the CER's database. We assume that final commissioning will happen sometime in 2025 and have included it as part of the 2025 capacity forecast.

Gold Coast airport has highlighted plans for "procurement of renewable energy and onsite solar" to be implemented for its 100% renewable target by January 2025. The main strategy for reaching its 100% renewable energy ambitions appears to be through contracting with energy providers, but it appears that on-site solar will also play a role, albeit a minor one. For the purposes of this assessment, we have estimated 500-kW of solar panels to be installed, and we assume commissioning in 2027.

Sunshine Coast airport has initiated its push into renewable energy with the installation of 320 solar panel with a capacity of 190.2-kW, recently completed in June 2025. The installation is expected to supply about 17% of the airports energy needs and goes some way to meeting the airport's commitment of sourcing 50% of its energy from renewables by 2030. It is not clear from where Sunshine Coast airport is intending to source its remaining renewable energy supply. For this study, we assume the remainder of its renewable supply will be sourced via PPA contracts with Queensland energy providers.

Launceston airport has announced plans to install a ground-mounted solar array as part of a Renewable Hydrogen Project with developer Countrywide Hydrogen. Initial works were due to start in 2022 but the final investment decision for the project has been deferred to the second half of 2026. Given the recent failure of large hydrogen projects to gain traction across the Australian energy landscape, we assume that this project will not proceed.

Rockhampton airport has received funding from the Rockhampton Regional Council, via the Federal Government's Reef Guardian Councils program, to install a 976-kW solar PV system. This system is currently under construction and is anticipated to be online in mid to late 2025.

5.1.5 Manufacturing, agriculture and logistics

The Australia Energy Statistics 2024 indicated that manufacturing consumes in total 16.9% of total energy from primary energy production[21]. Manufacturing is the third largest electricity usage of all industry sectors in Australia, behind transport and electricity supply. This sector has the potential to increase rooftop PV uptake, as it is highly sensitive to market conditions and are always looking at improving their profitability[22], which includes reducing energy costs.

Manufacturing sectors include activities such as beverages manufacturing, steel processing, sawmilling to pharmaceuticals. There is a large range of energy use and intensity across this segment, and the options to install rooftop PV will depend on their expected future revenue streams.

Table 7 shows the number of industrial and manufacturing businesses in Australian states and territories with a turnover of greater than $5 million. Larger businesses generally have more working capital and factory floorspace and thus more rooftop space. Therefore, Jacobs has assumed these businesses would have both the financial means and rooftop capacity to host a medium-size PV system.

Table 7: Market size assumptions for the manufacturing, agriculture and logistics sectors

	Number of businesses	2020 - 2024 survival rate	Market size assumption
Manufacturing >$5m	5,930	92.7%	5,495
Agricultural >$5m	1,969	92.5%	1,821
Transport (logistics) >$10m	817	92.3%	754

Source: ABS, Jacobs' analysis of Cat. No. 8165.0 Counts of Australian Businesses, including Entries and Exits, June 2020 to June 2024

The agricultural sector uses significant amounts of energy, but the usage of electricity is limited. A large portion is oil and LPG[23], which are mainly use for onsite equipment. Farmers are driven to reduce their energy expenses while retaining sustainability of their practices, which creates the potential to install solar PV for self-use. The data for largest businesses in this sector (with $5 million and above turnover) are assumed to have the space for ground-mounted mid-scale solar PV systems. Therefore, it has been assumed that these agricultural businesses are most likely to host ground-mounted mid-scale PV systems. The number of suitable locations in Australia is 1,821.

[21] Australian Energy Flows: https://www.energy.gov.au/publications/australian-energy-update-2024

[22] Australian Business Conditions April 2025: https://www.westpaciq.com.au/economics/2025/05/australian-business-conditions-april-2025

[23] Australia Energy Update 2024: https://www.energy.gov.au/publications/australian-energy-update-2024/energy-flows

The transport industry energy usage is the highest in Australia when looking at primary energy production[24] consumption, however a large section of this is non-electricity. The logistics sector is assumed to comprise a smaller section of that electricity consumption and is highly cost competitive. The warehousing and logistics enterprises that have already elected to install solar PV are dominated by those providing cold storage and refrigerated transport, which also have large annual turnovers. For these reasons, it has been assumed that transport companies with an annual turnover of greater than $10 million would be suitable for the installation of a PV system.

5.1.6 Mining

Mining consumes approximately 514 petajoules per annum[25], third largest in Australia behind transport and exports on primary energy consumption basis[26]. Most of the energy in this sector is mainly from electricity (approximately 26%). The percentage contribution of grid electricity has steadily increased, consistent with the rise of at 6% per annum of total energy consumption over the last decade driven primarily by increased mining volumes[27]. There is an increase interest in replacing the electricity generation with renewable sources[28], however a significant number of these mines are highly organised underground mechanised operations[29], therefore limiting their ability to install solar PV on site. Some mines are directly connected to smelters that has their own electricity connections points, which again limit their commercial drive to have solar PV on sites.

The average energy intensity is estimated at 50.5 kWh/tonne for coal, 10.7 kWh/ tonne for minerals, and 54.5 kWh/tonne for metal ores, with the majority consumed in diesel equipment and comminution operations[30]. Energy for metal ores with low on-site beneficiation[31], such as bauxite and iron ore, is predominately consumed as diesel for plant involved in extraction and transport. Energy for metal ores with high on-site beneficiation, such as copper and gold, is predominantly consumed as electricity.

Lithium, given its rise in importance in recent years, together with Australia's role as largest producer[32] has been included in this analysis. The energy intensity of producing lithium varies greatly in the industry with the ones produced in Australia is more energy intensive than other competitor countries[33]. It is assumed that given its locations (WA and Northern Territory), there will be a significant commercial drive to install solar PV onsite for these mines.

As the increase in demand is also shown in rare earths minerals[34], Jacobs has included the sites currently listed as rare earths. These mining sites are essential to energy transition and are large in land size, therefore inclusion of sustainable practices such as installing solar panels on sites are expected.

---

[24] Australia Energy Update 2024 Sankey diagram: https://www.energy.gov.au/publications/australian-energy-update-2024/energy-flows

[25] Australia energy flow: https://www.energy.gov.au/publications/australian-energy-update-2024

[26] Mining energy consumption excludes LNG production

[27] https://arena.gov.au/assets/2017/11/renewable-energy-in-the-australian-mining-sector.pdf

[28] ARENA's facts on off-grid renewable interest: https://arena.gov.au/renewable-energy/off-grid/

[29] Jacobs analysis of production of important minerals to Australia such as mineral sands, lead and silver, and the feasibility of the mines installing solar PV: https://www.ga.gov.au/scientific-topics/minerals/mineral-resources-and-advice/australian-resource-reviews/minerals-sands ; https://www.ga.gov.au/education/minerals-energy/australian-mineral-facts/lead ; https://www.ga.gov.au/education/minerals-energy/australian-mineral-facts/silver

[30] Based on DISER (2021), *National Greenhouse Accounts Methods and Factors Workbook*

[31] Beneficiation in metal ore mining refers to a process which removes gangue minerals, resulting in higher grade ore concentrate and tailings byproducts.

[32] Australia's rank in lithium production: https://www.ga.gov.au/scientific-topics/minerals/mineral-resources-and-advice/australian-resource-reviews/lithium

[33] Lithium mining data scarcity flagged in Grattan's recent review: https://grattan.edu.au/wp-content/uploads/2023/02/Critical-minerals-delivering-Australias-opportunity.pdf

[34] Australia identified mineral resources world ranking: https://www.ga.gov.au/digital-publication/aimr2022/world-rankings

According to the Australian Operating Mines Map 2024[35], there are 517 operating mines in Australia, primarily for coal, bauxite, precious metals, base metals, battery/alloy metals, heavy mineral sands, lithium, and fertiliser elements.

For this study, Jacobs considered all copper, gold and lithium mines as having potential to install solar farms, bringing the number of eligible mines to 203.

5.1.7 Government buildings

In the latest CER dataset, there are 40 government buildings identified and approved (one under-assessment) for having mid-scale solar PV installed. Going forward, PV installation is expected to take place as council buildings are generally positioned in suburban or regional areas which is ideal for mid-scale solar PV installation.

There are 537 councils in Australia[36]. It has been assumed that all these councils will have a building suitable for the installation of solar PV.

To obtain an indication of the number of council buildings that would elect to install a mid-scale system, we investigated the current council building installations against the respective population of the local government area (LGA). We then cross check it with the Australian Local Government Association (ALGA) data from 2022 to indicate if the portion of councils that have implemented emissions reduction targets[37] which is 70%.

From this group, it is assumed that around 20% of the councils would elect to install systems that are greater than 100-kW as indicated by the most recent data provided by the commercial installer such as Todae Solar[38]. The final estimate of total market size for council buildings is 75.

5.1.8 Recreation, leisure, sports, and aquatic centres

There are approximately 1,306 public swimming pools in Australia[39]. These are commonly associated with a full leisure centre that includes a gym and other sports facilities. The need for large amounts of pumped water for an aquatic centre means significant consumption of energy, and these centres are therefore considered suitable for the installation of mid-scale PV systems.

According to the ABS, there are approximately 431 sports and leisure centres with an annual turnover greater than $2m[40]. Of these, the four-year survival rate for the period of June 2020 to June 2023 is 86%, which we have applied to the existing facilities. Jacobs has therefore assumed that the total market size for the sports and recreation sector is 371.

5.1.9 Hospitality industry

The hospitality industry is one of the most rapidly declining traditional business sectors in Australia with physical premises as the mass customers continue to increase their activities and engagement online. The downward trend continues post Covid-19, despite alcohol consumption per capita and gambling[41] increasing for the period 2023-2024.

---

[35] https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/150112

[36] Australian Local Government Association: https://alga.com.au/

[37] Australian Local Government Association emission targets: https://alga.com.au/councils-key-to-meeting-emissions-targets/

[38] https://www.todaesolar.com.au/commercial-solar-installations/government-councils-ngos/

[39] RLS_AquaticInfrastructure2022_placemat.pdf (royallifesaving.com.au)

[40] Australian Bureau of Statistics, Counts of Australian Businesses, including Entries and Exits; https://www.abs.gov.au/statistics/economy/business-indicators/counts-australian-businesses-including-entries-and-exits/latest-release#data-downloads

[41] Gambling in Australia's cost of living crisis: https://apo.org.au/node/329917

There are currently 3,483 business that represent gambling, sporting, recreational and social clubs[42.] A key assumption is uptake of solar PV will be limited to businesses with physical premises with a turnover of more than $5 million, an average survival rate of 96.9% and are currently operating in commercial building with enough solar rooftop space[43]. This brings the total to less than 189 available hospitality datapoints.

There are only six recent installations on social clubs that are above 100-kW as well, therefore it is assumed that the sector cannot be considered in the mid-scale market.

5.1.10 Aged care industry

As of June 2024, there are 3,050 residential aged care facilities in Australia[44]. At least 70 of these already have rooftop solar panels of size greater than 100-kW. Of those remaining, it was assumed that an aged-care facility would need to house more than 100 residents to be large enough to consider a mid-scale PV system. The total number of residential aged-care facilities with more than one hundred beds is 917. This number has been taken as the total market size of aged-care facilities suitable to install a mid-scale system.

5.1.11 Hospitals

Hospitals is one of the most energy intensive forms of infrastructure due to the nature of operation and services they provide. A total of 7% of Australia's carbon emissions is estimated to come from the healthcare sector[45], and it has pledged to continue its aspiration to achieve net zero by 2040. While the energy consumption for the sector is significant, not all of it can be satisfied using the rooftop solar PV generation.

Jacobs has assumed that a mid-scale system would power 15% of a facility's total generation requirements, as rooftop solar is not large enough to satisfy the total energy needs[46].

[42] https://www.ibisworld.com/australia/industry/social-clubs/452/#FinancialBenchmarks

[43] Rooftop solar installation availability: https://www.cefc.com.au/media/rcalz41c/isf-rooftop-solar-potential-report-final_.pdf

[44] This estimate excludes Home Care Aged care service list: 30 June 2024 - AIHW Gen (gen-agedcaredata.gov.au)

[45] Doctors for the Environment Australia, Net Zero Carbon Emission report December 2020: https://assets.nationbuilder.com/docsenvaus/pages/390/attachments/original/1709002062/Net_zero_carbon_emissions_responsibilities_pathways_and_opportunities_for_Australias_healthcare_secto.pdf?1709002062

[46] https://assets.nationbuilder.com/docsenvaus/pages/500/attachments/original/1711600850/DEA-all-electric-hospital-guide-v7.pdf?1711600850

Box 1: Case study of energy intensity of Australian Hospital

Hospital is responsible for 44% of total emissions from healthcare sector. Using the most recent data by Medical Journal Australia, a study conducted in 2021 indicated that Australian public hospitals used on average 4.15 TWh of energy per annum between 2016 and 2019. The total number of public hospital beds in Australia on average between the same period was 62,660. This amounts to an average of approximately 66 MWh of energy consumed per hospital bed and 6,019 MWh of electricity consumed per annum per public hospital in Australia.

Table 8: Number of Australian public hospitals by bed size and remoteness

Total hospital energy consumed (TWh)	Total hospital beds	Consumption per bed (MWh) per annum	Minimum total consumption if 15% from rooftop (MWh)	Implied minimum number of beds required
4.15	62,660	66	1,300	20

In 2021, Victoria announced that Government operations, including schools, hospitals, and police stations, will be powered by 100% renewable energy by 2025. Of this around 5% is targeted to be on-site renewables by 2023. Combining the results above, a criterion based on bed size can be formulated, assuming a hospital would need a minimum of 20 beds to consume enough electricity to enable installation of a mid-scale rooftop PV system. Given the absence of similar data for other states, these metrics are applied across Australia to derive a national estimate of the ultimate number of prospective mid-scale solar sites at hospitals across Australia.

Analysis by Jacobs using latest available data by Australian Medical Journal[47] and Australian Government Productivity Commission[48].

According to the Australian Productivity Commission's Report on Government Services 2025, there are 700 public and 647 private hospitals in Australia[49]. Despite large hospitals being a significant consumer of energy, only 68 of the 1,347 public and private hospitals were identified from the list supplied by the CER as having mid-scale systems installed and most of these hospitals are in regional centres. Potential reasons for this limited uptake could be:

- Limited availability of suitable roof space in multi storey hospital complexes.
- Energy contracts arranged via PPA agreements utilising multiple locations some hospitals might have, for example Mercy Health[50] have a portfolio of hospitals, palliative care and residential aged care that are spread across Victoria. Barwon Health is another example of a health provider participating in a PPA with a local renewable generator[51].
- Access to high voltage lines and industrial retail prices reduces the value of a solar PV investment.

The largest consumers of energy for hospitals are probably the ones located in major, of which there are 189 as indicated by the most recent hospital resource data[52]. However, these hospitals will most likely have unsuitable roof space for rooftop solar PV.

---

[47] Australia Medical Journal, Hospital Sustainability Tracker: https://www.dea.org.au/hospital_sustainability_project_tracker

[48] Productivity Commission Report on Government Services 2025: https://www.pc.gov.au/ongoing/report-on-government-services/2025/health

[49] Private hospital count: https://www.health.gov.au/sites/default/files/2024-11/private-hospital-financial-viability-health-check-summary.pdf

[50] MercyHealth portfolio: https://www.mercyhealth.com.au/

[51] Barwon Renewable Energy Partnership secures wind power agreement - Barwon Water

[52] https://www.aihw.gov.au/hospitals/overview/hospitals-at-a-glance

Therefore, Jacobs has limited the potential market size of hospital installations to the percentage of hospitals that are in regional or remote areas with greater than 20 beds. There are 73% of public hospitals located in the remote and regional areas. Out of this, 98.4% have greater than 10 beds (by approximation of published data) but only 33% of the total available beds are in the same area. This brings the assumed market size of the public hospital sector to 24% of the total number, or 165 of the 700 premises. Similar information is not available for the other 647 private hospitals. Therefore, we used the same approach to estimate the market size as we did for the public hospitals. The market size for private hospitals will then be 24% of 647 private hospitals or a total of 153 private hospitals.

The total potential market size for public and private hospitals all together in Australia used in the modelling was 319.

6. Economic benefit

Given the relatively simple Gompertz projections, it is useful to develop an independent way of assessing the likelihood of installations. This is implemented by estimating the net economic benefit and payback period of the installation of mid-scale PV systems.

In comparing the two methods, there are following logical outcomes:

- Both the Gompertz and net economic benefit estimate indicate growth or consolidation (i.e. either no growth or decelerating growth).
- The Gompertz and net economic benefit estimate indicate a contradiction with one method indicating growth and the other indicating consolidation.
    - In the case where the Gompertz projection indicates growth and the net economic benefit indicates consolidation; there may be a non-financial motivation driving uptake.
    - The reverse case might be indicating a trend change.

In evaluating the projections, it is worth bearing in mind the inherent uncertainty in projecting the future. There are typically surprise events that can occur. Some examples of surprise events are:

- An unanticipated change in government incentive or regulation.
- A shift in the LGC forward curve, possibly reflecting a market-wide shift in preference for self-creation of LGC certificates.

Due to the wide variety of segments within the market for a mid-scale solar PV system, an estimate of economic benefits was run across three different scenarios as outlined below:

- Commercial 250-kW rooftop systems (e.g., most manufacturing, retail, educational, aged care).
- Industrial 850-kW rooftop systems (e.g., large-scale manufacturing, hospitals, and large universities).
- Ground-mounted front-of-meter fixed angle 1,000-kW systems.

Table 9 outlines the parameters and key assumptions used for the net economic benefit calculations. It was assumed that commercial and industrial PV installations are not entitled to receive feed-in-tariffs and therefore PV installations are sized appropriately so that all electricity generated is used by the enterprise or traded in the NEM. The capacity factor of the commercial installations is assumed to be 16%, which is typical of rooftop installations in the New South Wales region. It was assumed that the industrial sized installations would undertake an east-west configuration on the rooftop and a 17% capacity factor was allowed. In the case of ground-mounted single-axis tracking systems this figure was 23%, due to the superior ability of tracking systems to capture solar irradiation.

Net present value (NPV) calculations for rooftop systems are based upon 10 years of future cash flows, due to the potential shorter life cycle of the business hosting the system compared to the expected 25-year productive life of the PV system. For ground-mounted systems and industrial systems, the NPV is based upon 15 years of future cash flows. Cash flows from energy savings or sale of electricity to the grid were discounted at a real rate of 7.5%[53].

[53] As used in the AEMO Final Integrated System Plan 2022 (July 2022).

Table 9: Summary of assumptions utilised for net economic benefit calculations

	Commercial	Industrial	Ground-mounted
Capacity	250 kW	850 kW	1,000 kW
Solar profile	NSW rooftop	NSW rooftop	NSW rooftop
Capacity factor	16%	17%	23%
Demand profile	Commercial demand	Industrial demand	N/A
Real WACC[54]	7.5	7.5	7.5
NPV time	10 years	15 years	15 years
Electricity price	Commercial	Industrial	Wholesale

Note: Weighted Average Cost of Capital (WACC) is a proxy for the required return on capital investment and is used as the discount rate in this financial evaluation.
Source: Jacobs' analysis

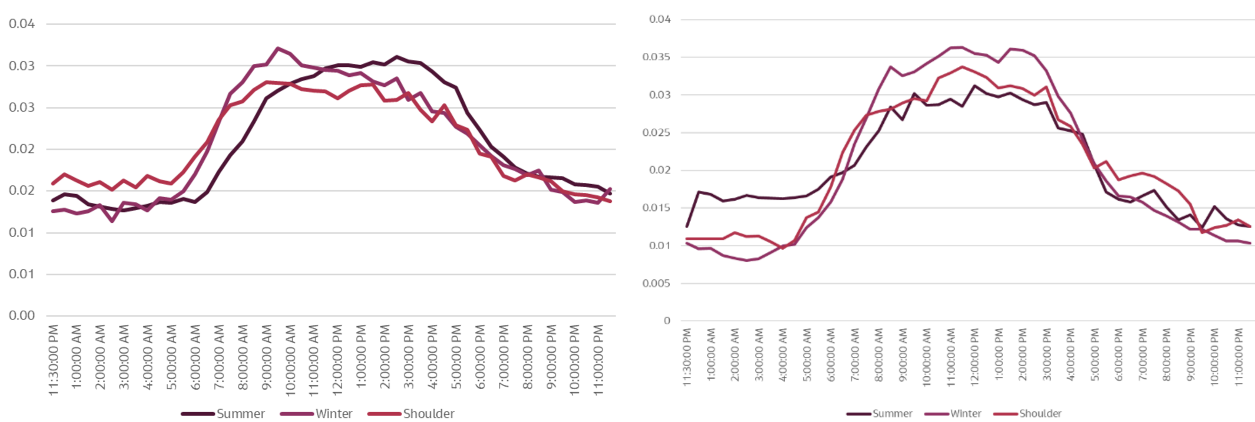
6.1 Assumptions

This section presents further assumptions used in the process of assessing economic benefit that relate to electricity consumption, electricity prices, and government schemes.

6.1.1 Electricity consumption

Industrial and commercial electricity consumption (load) shapes were obtained from a study conducted by CSIRO and are illustrated in Figure 5. These were measured and normalised over different periods of the year including summer, winter, and shoulder periods.

Figure 5: Normalised average daily load profiles for commercial customers (LHS), industrial customers (RHS), kWh/kW$_p$



Source: CSIRO technical report: Load and solar modelling for the NFTS feeders, 2015

[54] Weighted average cost of capital

The CSIRO study was used for this analysis as it applies a credible approach, and it is the only public source of information of this type known to Jacobs. Further, our analysis seeks to understand demand for power prior to significant penetration of rooftop PV, so an analysis from 2015 suits that purpose.

It was assumed for both the commercial and industrial cases, that the PV system size is optimised so that all solar generation output is consumed, and that no generation is exported.

However, there is a need for better information for industrial and commercial market sectors, as there remains a doubt that recent trends toward increasing electrification and improved energy efficiency in building may impact the demand profiles applicable to these customers. Further, weather differences across the states will impact demand profiles in these market sectors across Australia.

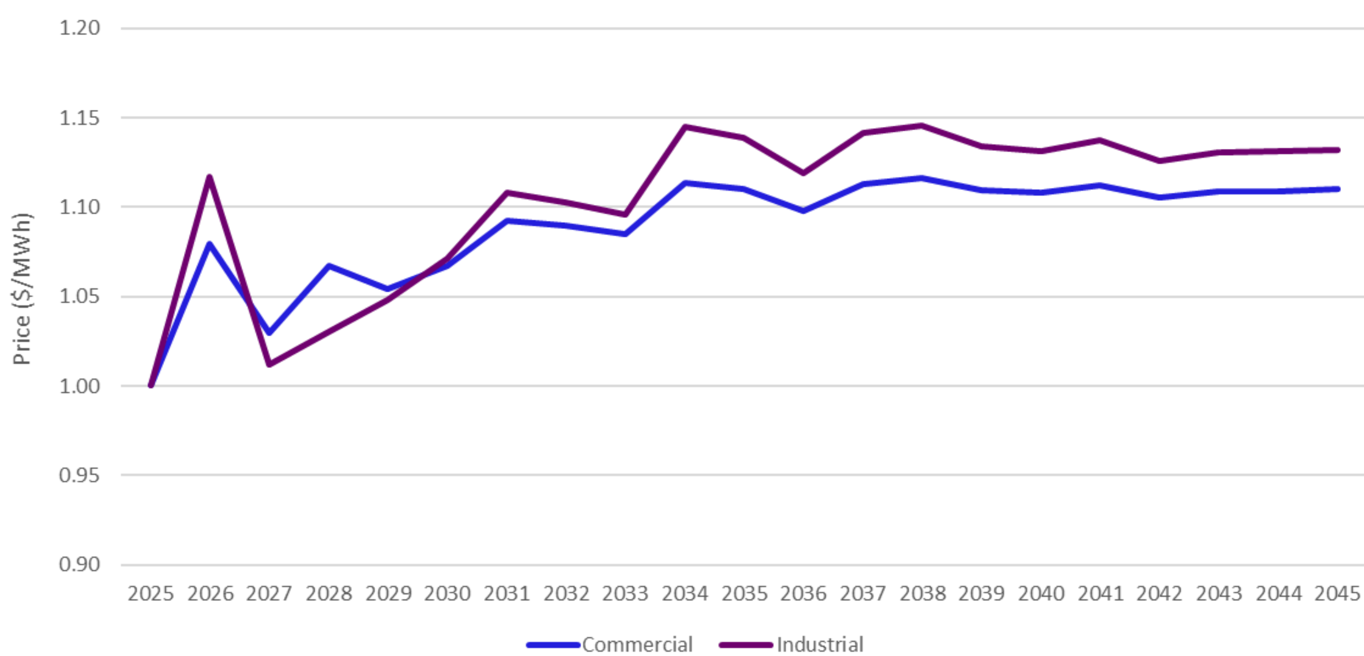
6.1.2 Retail electricity prices

Retail electricity prices play a significant role in shaping customer decisions, and with growing concerns about the cost of living, increases in these prices have become a prominent issue.

Figure 6 shows the forecast retail electricity price index for the commercial sector relative to 2025 utilised in analysing the payback of commercial and industrial rooftop PV systems. The commercial prices are used for most enterprises including the retail, agricultural and manufacturing sectors. Industrial prices are only considered applicable to major energy consumers connected to a high voltage line such as large hospitals, very large manufacturing plant and major university campuses.

The relativity of commercial retail prices to industrial prices is important with respect to the conclusions we reach in the ensuing analysis. In 2025 (i.e. index value =1), the commercial retail price is 92% higher than the industrial price in the same year.

Figure 6: Forecast retail electricity price index by customer class for New South Wales (2025=1)



Source: Jacobs' analysis

6.1.3 LGC and STC schemes

Table 10 shows the averaged LGC price per calendar year used by Jacobs to estimate the annual benefits provided to mid-scale systems from the generation of renewable energy.

To calculate the benefits of mid-scale system, the marginal loss factor (MLF) for commercial and industrial mid-scale systems was assumed to be 1 (one).

Annual benefits for mid-scale systems were calculated by the following equation:

Annual benefits = capacity of system x capacity factor x 24 hours/day x 365 days/year x LGC price

Table 10: Historical and forecast annual LGC prices

Year	LGC price
2017	83.3
2018	76.8
2019	42.1
2020	37.8
2021	36.7
2022	53.6
2023	51.5
2024	48.8
2025	24.2
2026	21.8
2027	17.0
2028	12.8
2029	11.4
2030	8.7

Source: Historical LGC prices obtained from Certificate Prices - Demand Manager; forecast LGC prices are from Jacobs' analysis

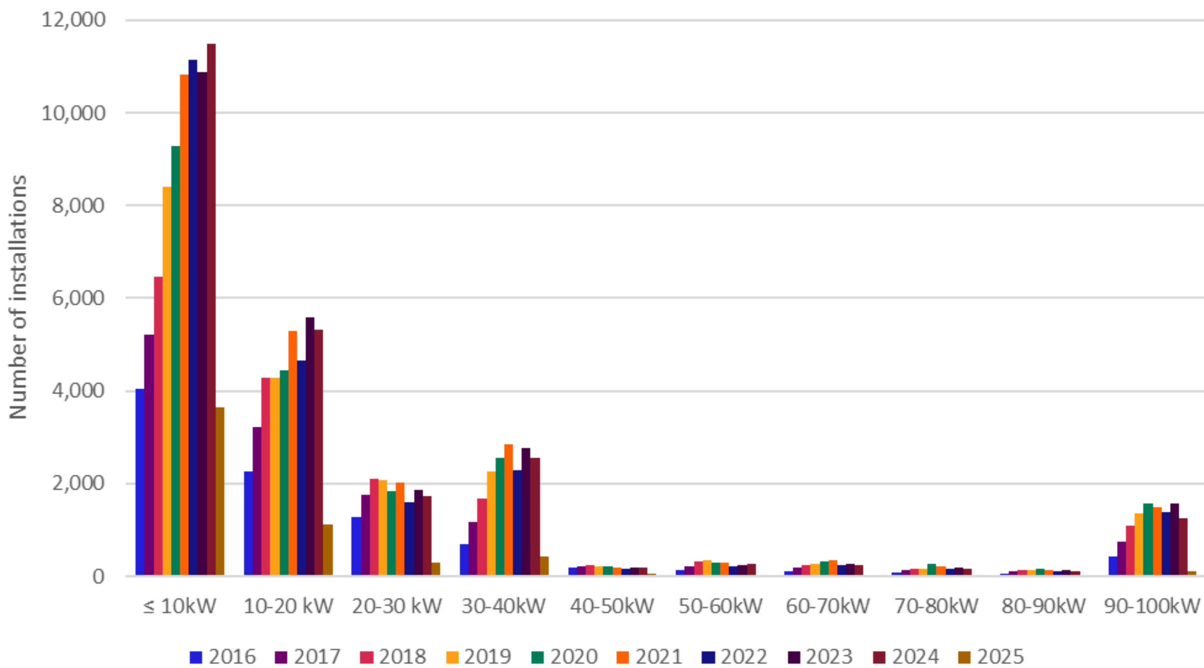
Figure 7 shows the number of commercial small-scale PV installations by size bracket. From 2023 until 2024 there were more than 1,200 behind-the-meter installations in the 90-100 kW bracket per annum, and more than the entire number of behind-the-meter mid-scale (100-kW to 30 MW) PV systems recorded in the 2010 to 2025 period. This is explained by the 100-kW boundary that lies between certificate creation for the LRET scheme and the SRES scheme. Solar PV systems up to 100-kW are able to claim all of their output under the SRES scheme, whereas systems above 100-kW are only able to claim the first 100-kW under the SRES scheme.

It is possible for companies to undertake a second installation later, to optimise a system size for their energy requirements, while still obtaining the once-off STC rebate. The implication of this is that it may be attractive for some firms who wish to install systems larger than 100-kW to install two smaller systems consecutively. To explore this, Jacobs compared the financial impact of the two schemes by levelising higher future LGC payments against the upfront lump sum STC payment.

From this comparison Jacobs observed that:

- The STC rebates have a clear economic advantage for a 100-kW system over the LGC certificates that persists until 2030.
- The difference between these benefits is relatively consistent across reference cases (i.e. commercial, industrial systems less than 100-kW).

Figure 7: Number of commercial small-scale installations by capacity bracket, 2016 to 2025



Source: Jacobs' analysis of CER data. 2025 data is incomplete.

Despite the projected decline in the deemed creation of STCs, the benefits from STCs are expected to be greater than those from LGCs over the projection period (as LGC prices are expected to decline and they also cannot be created after 2030). Therefore, Jacobs has assumed that companies will continue to install systems just shy of 100-kW at the current increasing trend (estimated in Jacobs' Small-scale Technology Certificate Projections report), and that the effect of LGC price decreases will not have a substantial impact on mid-scale PV uptake.[55]

6.2 Economic benefits

To estimate the economic benefits of mid-scale solar PV installation, the NPV is calculated as:

NPV = 1st year LGC payment + 1st year energy savings cash flow + NPV (9/14 years cash flows) – capital cost

The payback period is calculated as:

Payback Period = (capital cost x real WACC) / (average annual energy savings + average annual LGC payment)

[55] Note that this is subject to periodic reviews conducted by the Climate Change Authority

The economic benefits of PV installations where the PV generation matches well with typical daily demand results in a continuing high uptake rate for mid-scale PV for such enterprises. The results for commercial and industrial systems are presented in the following sub-sections.

6.2.1 Commercial 250-kW behind-the-meter system

Commercial rooftop systems (250-850 kW) are assumed to operate at a capacity factor[56] of 16%. For a 250-kW system, this would lead to output of approximately 350 MWh per year. We have assumed a 10-year economic life for these assets.

Based on the assumed parameters, the payback period for a commercial 250-kW rooftop system is outlined in Table 11. Payback periods have dropped steadily since 2012, driven by a continual drop in capital cost and high LGC prices. The payback period has reduced markedly over the last three years driven by high wholesale prices as well as increasing network tariffs. It is projected to continue to decline for the remainder of the projection period despite the reduction in the LGC price and the end of the RET in 2030.

Table 11: Payback period of 250-kW commercial PV systems

Year	Capital cost ($)	NPV cash flows – energy savings ($)	NPV cash flows – LGC revenue ($)	Payback (years)	Internal rate of return (%)
2026	310,500	904,105	20,975	2.5	43%
2027	299,500	904,906	14,912	2.4	44%
2028	290,750	912,785	10,071	2.3	45%
2029	282,750	916,799	6,344	2.2	46%
2030	276,500	922,414	2,833	2.2	48%
2031	268,750	926,768	0	2.1	49%
2032	262,500	928,593	0	2.1	51%
2033	256,750	930,485	0	2.0	52%
2034	254,250	933,247	0	2.0	53%
2035	252,250	932,758	0	2.0	53%

Note: Cashflow captures LGC payments plus reduced grid electricity cost. Average demand is 200-kW, capacity factor = 16%, discount rate is 7.5%
Source: Jacobs' analysis

6.2.2 Industrial 850-kW behind-the-meter system

The key differentiator for the economic analysis of industrial PV systems (850-kW to 30 MW) compared with commercial systems is based on the retail price assumption. The electricity retail price for large industrial customers is generally less than for commercial businesses. We have assumed a 15-year economic life for these assets.

The results of the analysis for industrial PV systems are presented in Table 12. Key assumptions driving the results are:

- Average demand of 850-kW.

[56] Capacity factor is the average output of the generator across all hours of the year.

- No excess electricity generation that is exported to the grid.

The payback period is not as short as that of the commercial PV system presented above, which reflects the lower value of the avoided electricity for an industrial customer relative to a commercial customer[57].

Table 12: Payback period of 850-kW industrial high voltage PV systems

Year	Capital cost ($)	NPV cash flows – energy savings ($)	NPV cash flows – LGC revenue ($)	Payback (years)	Internal rate of return (%)
2026	1,055,700	2,224,671	75,771	4.4	24%
2027	1,018,300	2,222,419	53,871	4.2	24%
2028	988,550	2,243,697	36,380	4.1	25%
2029	961,350	2,262,734	22,919	4.0	26%
2030	940,100	2,279,065	10,233	3.9	27%
2031	913,750	2,291,278	0	3.8	28%
2032	892,500	2,295,869	0	3.7	28%
2033	872,950	2,302,004	0	3.6	29%
2034	864,450	2,310,321	0	3.6	30%
2035	857,650	2,307,740	0	3.5	30%

Note: Assumed average demand is 850-kW, capacity factor =17%, discount rate of 7.5%
Source: Jacobs' analysis

6.2.3 Fixed angle ground-mounted front-of-meter systems

The assumptions for assessing the uptake of ground-mounted systems were that a 1,000-kW ground-mounted system is set with single-axis tracking at a 23% capacity factor in New South Wales, and average annual wholesale solar dispatch-weighted prices reflect those of New South Wales.

An extended period of cash flows of 15 years was considered for ground-mounted systems, under the assumption that these assets are considered a long-term investment and are less dependent on the life of a host business. The NPV was calculated as the present value of 15 years of energy sales plus LGC payments at a real discount factor of 7.5%.

The results of the NPV and payback period are outlined in Table 13. A key assumption was that the systems output was for export-only, so no saving by reducing grid demand.

Table 13: NPV and payback estimates of a 1,000-kW, fixed angle ground-mounted system

Year	Capital cost ($)	NPV cash flows – energy revenue ($)	NPV cash flows – LGC revenue ($)	Payback (years)	Internal rate of return (%)
2026	$1,414,000	933,000	120,604	10.8	5.1%

[57] This is demonstrated in Figure 6, bearing in mind that the commercial price is 92% higher than the industrial price in the 2025 base year.

Mid-scale Solar PV System Projections

Year	Capital cost ($)	NPV cash flows – energy revenue ($)	NPV cash flows – LGC revenue ($)	Payback (years)	Internal rate of return (%)
2027	$1,242,000	967,385	85,747	10.2	5.7%
2028	$1,198,000	1,027,439	57,906	9.6	6.5%
2029	$1,163,000	1,088,969	36,480	9.1	7.4%
2030	$1,131,000	1,162,338	16,287	8.5	8.5%
2031	$1,106,000	1,241,311	0	8.0	9.8%
2032	$1,075,000	1,283,199	0	7.6	10.7%
2033	$1,050,000	1,307,879	0	7.3	11.4%
2034	$1,027,000	1,329,119	0	7.1	11.9%
2035	$1,017,000	1,365,955	0	6.9	12.6%

Source: Jacobs' analysis

The results indicate that these systems are initially not a good investment if cash flows are only dependent upon LGC payments and wholesale energy sales to the market. However, the investment outlook for these systems is projected to improve materially over time, with systems post 2030 providing returns that could be considered commercially acceptable.

The reason for the initial poor performance of these systems is the lower outlook for dispatch-weighted solar prices in the NEM[58], which is influenced by two key factors:

- The continuing pace of small-scale rooftop PV uptake applies downward pressure to dispatch-weighted prices of solar generators.
- The Federal Government's expansion to the Capacity Investment Scheme, which seeks to install 23 GW of new renewable capacity across Australia by 2030, is expected to put downward pressure on wholesale electricity prices including the dispatch-weighted price for a solar generator as it will stimulate uptake of large-scale solar PV.

The reasons for the improving outlook of these systems from the early 2030s are as follows:

- Better dispatch-weighted prices for solar profiles in the NEM. These are due to:
  - Higher loads in the middle of the day due to increasing penetration of flexible loads:
    - both small-scale and large-scale battery energy systems (BESS), including the deployment of more hybrid solar PV/BESS generators.
    - electric vehicle charging.
    - flexible hydrogen production.

[58] The trend in the dispatch-weighted solar price is different to the trend in retail prices displayed in Figure 6 as the retail price trend is more reflective of the trend in the time-weighted price (i.e. the average price across all time periods of the day).

- Higher levels of electrification, driven by the de-carbonisation of the economy, leading to rapid electricity demand growth.

This indicates that for mid-scale ground-mounted single-axis tracking PV arrays to be a reasonable investment, the timing of the investment should be deferred until dispatch-weighted solar energy prices are expected to be higher or they must be installed in behind-the-meter applications and/or have a reasonable PPA arrangement.

The other case where front-of-the-meter systems would be financially beneficial is in the case of remote communities where the solar generation displaces the cost of diesel generators, or in fringe of grid applications where solar generation would replace higher energy costs (due to the high losses incurred in transmitting energy).

7. Projections of uptake

This section presents the results for the uptake of mid-scale PV systems, based on the modelling and analysis described in Sections 4-6.

7.1 Behind the meter systems

A bottom-up approach was utilised to estimate the capacity of installations in the education sector and at airports. For the remaining categories, we fitted a generalised Gompertz curve to the historical installations by utilising sum-of-least squares optimisation. These estimates were then multiplied by the 2025 trend in the annual capacity (493-kW). This was used to calculate the estimated installed capacity of these systems.

Table 14 summarizes our estimates on the projected capacity of solar installations for the identified behind-the-meter sectors. The 2025 estimates are partly sourced from the CER's mid-scale database and the remainder represents a part-year forecast. Projections from 2025 until 2035 are either based on our bottom-up assumptions, which are explained in sections 5.1.4 for airports and 7.2 for the education sector, or they are based on the Gompertz model.

Table 14: Summary of mid-scale solar PV installation capacity projections for behind-the-meter segments, MW

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Education											
Victoria	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
NSW	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Northern Territory	-	-	-	-	-	-	-	-	-	-	-
Queensland	0.52	0.52	-	0.26	-	0.26	-	0.26	-	0.26	-
Western Australia	0.66	0.66	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Tasmania	-	-	-	-	-	-	-	-	-	-	-
ACT	-	-	-	-	-	-	-	-	-	-	-
South Australia	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			
Universities	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Other sectors	179	195	210	225	239	252	264	275	284	293	300
Airports	12.97	-	0.5	-	-	-	-	-	-	-	-
Total	**195**	**198**	**213**	**227**	**241**	**255**	**266**	**277**	**287**	**295**	**302**

Source: Jacobs' analysis

7.2 Education sector

The education sector has seen strong uptake of rooftop PV installations over the past 5-6 years. This is partly attributed to a range of government incentives and programs aimed at state schools. For these reasons, the education sector was analysed separately from most segments and a bottom-up approach to forecasting was utilised.

7.2.1 Schools

The National Solar Schools Program (NSSP) was established in 2007. The NSSP offered primary and secondary schools the opportunity to apply for grants to install solar and a range of energy efficiency measures. A total of 4,897 schools installed solar power under the NSSP until the program ended in June 2013. While the program was successful in delivering solar panels to over 50% of schools in Australia, it occurred at a time when solar PV installations were expensive, and most of the systems installed were less than 10-kW. This accounts for only around 2% of a daily school's requirements[59].

With substantial developments in solar technology and reduction in capital costs over the past decade, there has been a renewed focus by state governments to promote the uptake of solar in schools, with recognition that the currently installed systems are too small.

This section outlines our assumptions on the projection of mid-scale PV capacity in schools, based primarily upon government-based programs and recent trends in uptake.

Table 15 summarises the government-based programs per state and their projected mid-scale additions.

Victoria

The Greener Government School Buildings program was first announced in 2018 in the form of a pilot program, which saw 42 schools receive solar panels in 2019. The full program is now in its fourth round at a total cost of over $20 million with a total of 404 schools participating to receive solar panels.

In 2019, 126 Victorian schools were identified as having small-scale installations and 9 as having mid-scale installations, which indicates that most of these schools receiving solar panels fell into the small-scale category. For the purposes of this study, we assume that most state schools set to benefit from the extension of the program will continue to fall into the small-scale category. The average spend per school up until 2024 was about $72,000 – this also supports that the program on average funds small-scale systems.

We assume that private based schools with an enrolment of over 1,000 students would be suitable for mid-scale installations, and these will continue at the same rate that has occurred for the 4 years prior to 2025, at a rate of 2 schools per year with an average 230-kW system. The reasoning for the persistent trend in uptake is that payback periods for commercial operations are expected to be steady or improve slightly over the forecast horizon (see Table 11).

Table 15: Summary of school mid-scale solar PV installation capacity projections, MW[60]

Program	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
Victoria												

[59] https://www.pv-magazine-australia.com/2019/01/28/tomorrow-back-to-solar-empowered-schools/

[60] Totals in the table may not add up due to rounding

Program	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
Private school investment[61]	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	5.06
NSW												
Private school investment [62]	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	9.57
Queensland												
Private school investment [63]	0.52	0.52		0.26		0.26		0.26		0.26		2.08
Western Australia												
Regional School Rooftop Solar	0.4	0.4										0.8
Private school investment [64]	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	2.86
South Australia												
Sustainable Schools Program	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3				2.4
Total	2.81	2.81	1.89	2.15	1.89	2.15	1.89	2.15	1.59	1.85	1.59	22.77

Source: Jacobs' analysis

New South Wales

The NSW Government's Smart Energy Schools Pilot Project commenced in May 2022, where solar and battery energy storage systems were installed at 24 state schools. Stage 2 of the Project included installations at 29 state schools over 2022 and 2023, along with the use of the solar and battery energy storage systems in a Virtual Power Plant. An additional 18 schools have been selected to participate in the Project, bringing the total number of schools to 79.

Once completed it is anticipated that the Smart Energy Schools Pilot Project will have installed approximately 7,488 solar panels across the 79 schools, which averages to 95 panels per school, or an installed capacity ranging in the 10s of kilowatts (unlikely to exceed 60-kW). It is therefore expected that schools selected as part of this Project will have PV installations in the small-scale category.

For private based schools we expect the current trend of installations to continue of approximately 3 schools per year at 290-kW.

[61] The Victorian Government's Greener Government School Building program has primarily resulted in installation of small-scale PV systems.

[62] The NSW Government's Smart Energy Schools Pilot Project is focussed on installation of small-scale PV systems.

[63] The Queensland Government's Advancing Clean Energy Schools program has mainly resulted in the installation of small-scale PV systems.

[64] The Western Australian Government's Schools Clean Energy Technology Fund has not resulted in uptake of mid-scale solar systems at state schools. We assume this trend continues into the future and only consider future installation by private schools.

Queensland

In 2017, the Queensland Labor government announced a $97 million investment to reduce energy across state schools through solar and energy efficiency measures as part of the Advancing Clean Energy Schools Program[65]. The government acknowledged that most Queensland's 1,241 state schools already offset energy costs with small PV systems installed under the NSSP but noted that more could be achieved because of recent developments in new technologies. Of the total funding, $40 million will be allocated to the installation of 35 MW of PV systems to state schools with the remaining $57 million to be invested in making schools more energy efficient.

In February 2020, the government announced an additional $71.1 million over three years to expand the solar under ACES program, primarily aimed at offsetting the energy needs of new air conditioning installations across the state schools. The program ended in mid-2022 with 80 MW total capacity installed over 912 schools, averaging at approximately 88-kW per school. We therefore assume that the installations under this program have predominantly fallen into the small-scale range.

For this study, we assume that installation of mid-scale solar PV systems will only occur at private schools with over 1,000 students enrolled. Queensland currently has 61 private schools in this category and of these, 43 already have a mid-scale system installed (this represents 70% of this market segment). We note that in 2024 there were no reported installations of mid-scale systems in a Queensland school, which implies this market segment may be reaching saturation.

We assume that over the next two years, installations at suitable Queensland private schools will continue to occur at one third of the rate that has occurred for the past three years (this equates to 2 schools per annum) to reflect market saturation. The size of the installations will be the same as the average installation size over the last three years, which is 260-kW. Beyond this period we assume one installation every two years to represent more pronounced market saturation. This implies that by 2035, 85% of Queensland private schools with more than 1,000 students will have a mid-scale system installed.

Western Australia

As part of its 2021 election promises, the Western Australian government pledged $40 million for the Schools Clean Energy Technology Fund and an additional $4.6 million to roll out rooftop solar at 18 Kimberley and 10 Pilbara schools.

The $4.6 million funding package averages to $164,000 per school, which represents about 100-kW of rooftop PV at that scale in Western Australia. Four of these schools are represented in the CER mid-scale database, with an average installed capacity of 256-kW, with three installed in 2023 and one in 2024. It is assumed that on average one third of the schools fall into the mid-scale category (given that we have 4 schools with installations over roughly two years of implementation of the scheme). For this study, we assume installations averaging
200-kW are being rolled out at an average of two of these schools per year for the next two years, starting in 2025.

The $40 million package is more difficult to interpret in terms of rooftop solar potential as the technology mix being rolled out includes energy efficiency measures for lighting and building improvements and the virtual power plants, as well as rooftop solar. Two tiers of funding were available to schools in the first round of funding, where the first tier allowed construction of a virtual power plant and the second tier enabled uptake of clean energy technologies, with a value up to $500,000. The value of the overall package and the second-tier cap suggest that mid-scale rooftop solar installations may occur at participating schools in the round one funding, which totalled 84 schools. The total number of schools to receive solar panels has risen to 180 after round 2 of the funding (60 schools received funding for round 3 but this only provided for LED light installation and the numbers for round 4 funding have not yet been released). It is assumed this is the final number of schools to receive solar panels and given the 96 successful schools from the second round of funding were predominantly primary schools, it is assumed most of the systems installed at these schools would be small scale.

[65] https://www.queenslandlabor.org/media/20293/alpq-powering-queenslands-future-policy-document-final.pdf

In the CER database there are currently no state schools that have a mid-scale solar PV system, which implies that schools participating in the scheme have only installed small-scale systems. We assume this trend continues and no mid-scale systems are installed because of this scheme.

For the private school sector, we assume that installations continue at the historical rate over the last three years and one school per annum, with an average installation size of 260-kW.

Northern Territory

In December 2018, the NT Government initiated a $5 million project to install solar PV at up to 25 schools over a three-year period. In addition, 3 schools have installed solar systems under the Capital Works funding program, and an additional school has installed solar panels with its Building Better Schools funding[66].

Analysis of the small and mid-scale CER databases suggests that most of the Northern Territory school PV systems fall in the small-scale range. No schools in NT were observed to have installed PV since 2018 within the mid-scale category.

For the purposes of this study, we assume that any further installations under the Northern Territory government's Solar for Schools program will not contribute to mid-scale PV installations.

South Australia

The South Australian government announced a $15 million Sustainable Schools Program in 2017 to install rooftop solar systems at 40 schools, which includes both public and private schools. Each of these systems were slated to be at least 100-kW[67]. Between 2017 and 2022 (and excluding 2020) an average of 2 schools per year registered mid-scale systems on the CER database, with a median capacity of 200-kW.

We have confirmed that this program is still live and assume that mid-scale solar PV uptake will occur at this same rate of 2 schools per year, with an average installed capacity of 150-kW each (to better align with the funding scheme). We also assume the scheme will run for a total of 15 years (therefore ending in 2032), at which time the target of 40 schools is expected to be completed.

Tasmania

As part of its election pledges in 2021 the Tasmanian government had promised to invest in rooftop solar for all Tasmanian government schools. This included a $5million fund to deliver solar panels to more than 100 schools over the following four years, which it has labelled as its Renewable Energy Schools program. The funding translates to at most $50,000 per school on average, which suggests that most, if not all, systems will fall in the small-scale category.

Mid-scale rooftop solar has not been installed in any Tasmanian school since 2018. We therefore assume no mid-scale systems will be taken up by any Tasmanian schools over the projection period.

7.2.2 Universities

There are 196 university campuses in Australia, the majority of these are expected to be capable of hosting a mid-scale system. A total of 57 university campuses are identified on the CER database, however only 82% of these have systems greater than 100-kW. For this reason, the assumption is that 82% or a total of 162 university campuses would have the capability of installing a mid-scale solar system. The median size of mid-scale systems installed on university campuses is approximately 280-kW.

[66] https://newsroom.nt.gov.au/mediaRelease/33461

[67] https://www.carbonneutraladelaide.com.au/business/department-for-education

We assume that the historical rate of uptake over the last three years (2 campuses per annum) continues over the projection horizon, with each campus having a 280-kW rooftop installation.

7.3 Front of meter systems

7.3.1 Systems less than 5 megawatts

There are two main categories identified that fall within this front-of-meter capacity segment:

- Solar farms in remote communities to offset diesel consumption.
- Mid-scale solar farms designed to trade electricity in the wholesale market.

The establishment of mid-scale solar farms designed to trade in the NEM is considered to have different economic incentives to commercial behind-the-meter systems.

A bottom-up approach was adopted to project uptake for both these categories of mid-scale solar PV up until 2030. Post 2030 we have applied a simple trendline to the aggregate installation of these systems as the bottom-up approach does not provide adequate visibility over the 11-year forecast timeframe.

This section outlines the assumptions surrounding Jacobs’ estimates of these front-of-meter system projections of less than 5 MW capacity.

7.3.2 Ground-mounted community installations

An increase in mid-scale community based solar systems has been observed over the past few years. The incentive for establishing such units is not only to supply renewable energy to remote communities, but also to offset diesel consumption. Some of the programs that have promoted installations are outlined below.

7.3.2.1 Northern Territory: Remote Power Systems Strategy

The Remote Power Systems Strategy encompasses delivery of an average of 70% renewable energy to the 72 remote communities currently serviced by Indigenous Essential Services (IES), being developed by the Territory government. Completion of the detailed analysis and development of proposed investment framework is anticipated for Q2 2024.

Delivery of the strategy is an action under the government's climate change response and a key pillar of the NT's 50% by 2030 renewable energy target. The strategy aims to reduce energy-related diesel consumption in these communities whilst improving energy security and reducing emissions. The government is progressing detailed analysis of each community to map the optimal renewable energy development pathway. Additionally, the project will involve a process of identifying available land for solar development in each community. Pilot projects and studies to facilitate greater levels of distributed energy supplies and emerging technologies, such as hydrogen, will also be investigated.

To kick start activities, 1.2 MW of ground-mounted additional solar PV has been installed at the Wurrumiyanga community[68] in 2023. In the absence of more detailed information, it is projected that this strategy will fund the installation of 10 MW of mid-scale solar PV in total over the program horizon, which extends until 2030. We assume installations of 1.7 MW per annum starting from 2025 and extending until 2030.

[68] Renewable future one step closer for the Tiwi Islan... | National Indigenous Times

7.3.2.2 Original Power

Original Power is a non-profit project developer founded in 2018 which is a "community focused, Aboriginal organisation" to provide strategic advice, skills-building, campaign support and community connection to resources.

Original Power helped the community in Marlinja, NT, raise funds from benefactors to build a 100-kW ground-mounted solar array, whose construction was completed in mid-2024[69].

The community of Borroloola in the Northern Territory is working with Original Power and renewable energy experts on a feasibility study to design and build their own solar microgrid – the Ngardara 'Sun' Project[70]. The project is currently transitioning from the feasibility stage to the development phase and it will comprise a 2.1 MW solar PV array coupled with a 3.2 MW/6.2 MWh BESS. The project still requires final approvals, financing and detailed design before construction can commence. In the absence of more detailed information, we assume that the project will proceed, and it is anticipated to be commissioned in 2028.

7.3.2.3 Queensland: Energy and Jobs Plan ($28m to Boulia, Burketown, Doomadgee and Windorah PV)

The Ergon Energy Network is planning to install PV and battery energy storage systems alongside several power stations in remote Queensland towns. The project aims to reduce reliance on diesel, save the communities money, and create direct and indirect jobs. The installed solar PV capacity will include 4.5 MW at Doomadgee, 850-kW at Windorah, 1.2 MW at Burketown and 1.7 MW at Boulia[71]. All projects were originally planned for completion in 2025, but we have assumed that completion of Doomadgee, Burketown and Boulia will be deferred to 2026 following project delays.

7.3.2.4 Western Australia: Recovery Plan

In July 2020, the Western Australian Government announced plans to invest $66.3 million in renewable energy, most of which would be spent on solar and battery projects. This formed a part of its $5.5 billion 'Recovery Plan' to combat the economic impacts of COVID-19.

Among other things, the stimulus package has allocated funds to an additional 50 standalone power systems, largely aimed at regional communities and remote indigenous communities. The first 19 of these have been installed in the Beaumont and Mount Ney areas in WA[72]. For the purposes of this study, it is assumed that all these systems will be between 100-150 kW each installed over a five-year period beginning in 2022. For the forecast period we assume 6 systems per annum from 2025 until 2026 with an average size of 125-kW.

There have been media statements for expanding the program to 1,000 sites over 4 years and up to 4,000 sites over the coming decade[73]. Indications are that the typical sizes for these systems are from 10 to 70 kWh per day, which implies solar PV sizes of under 20-kW. We therefore assume that none of these systems will fall in the mid-scale solar capacity range.

---

[69] Future of Marlinja looks bright thanks to solar power - First Nations Clean Energy Network

[70] Ngardara Project

[71] Sunshine to savings: remote Queensland communities to save big with solar - Ministerial Media Statements

[72] https://www.miragenews.com/more-farms-go-off-grid-east-of-esperance-701453/

[73] On the road to 4000 stand-alone power systems

7.3.2.5 ARENA Regional microgrids program

The Australian Renewable Energy Agency (ARENA) is currently accepting applications for the Regional Microgrids program, which is split into two streams:

- The $75 million Regional Australia Microgrids pilots stream, which funds innovative or accelerated solutions that improve reliability of electricity supply; and
- The $50 million First Nations Community Microgrids stream, which supports community-led microgrid initiatives to deliver cheaper, cleaner and more reliable energy in First Nations communities.

It is currently difficult to assess how this funding will drive uptake of mid-scale systems as no details have been released on successful projects. However, given the scope and size of the funding program we consider it likely that it will include funding of some mid-scale solar projects. For this study we assume 10 MW is deployed over five years starting from 2026, which represents less than 10% of the total funding pool.

Table 16 shows the projected installed capacity due to ground-mounted community installations.

Table 16: Projections of capacity by year, mid-scale systems from ground-mounted community installations (MW)

Program	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Northern Territory											
Remote Power Systems Strategy	1.7	1.7	1.7	1.7	1.7	1.7	-	-	-	-	-
Original Power	-	-	-	2.1	-	-	-	-	-	-	-
Queensland											
Energy and Jobs Plan – remote PV	0.85	7.4	-	-	-	-	-	-	-	-	-
Western Australia											
Recovery Plan – solar and battery	0.75	0.75	-	-	-	-	-	-	-	-	-
Australia-wide											
ARENA Regional Microgrids	-	2	2	2	2	2	-	-	-	-	-
Generic post-2030 projection	-	-	-	-	-	-	3.7	3.5	3.3	3.1	2.9
Total	**3.3**	**11.85**	**3.7**	**5.8**	**3.7**	**3.7**	**3.7**	**3.5**	**3.3**	**3.1**	**2.9**

Source: Jacobs' analysis

7.3.3 Systems greater than five megawatts

This section includes a discussion of the mid-scale solar PV projections for systems greater than 5 MW capacity, with references to smaller systems up to 5 MW. These solar PV plants are considered utility scale or community projects, ground-mounted and, in most cases, directly connected to a high-voltage distribution or sub-transmission network.

For PV systems with capacity less than 5 MW, the connection process to the grid is less time-consuming and less costly. Systems of this size can submit a network connection application as an embedded generator under Chapter 5, Part A of the National Electricity Rules. These embedded generators then negotiate a connection agreement with the applicable Network Service Provider, who generally imposes less stringent requirements than for larger systems.

To a lesser degree there are also less strict requirements for the connection application of generators applying under Chapter 5, Part B of the NER for systems with a nameplate capacity larger than 5 MW but not more than 30 MW. These systems are typically considered non-scheduled generating units. Classification of generator size by AEMO is summarised in Table 17.

Table 17: AEMO classification of generators

AEMO classification	Exempt	Non-scheduled	Semi-scheduled	Scheduled
Nameplate capacity	Up to 5 MW	5-30 MW	>30 MW	>30 MW
Note	Free to generate; not curtailed.	Does not participate in central dispatch but can be curtailed.	Participates in central dispatch in specified circumstances.	Participates in central dispatch.

Source: AEMO

As observed over the past few years through anecdotal evidence, there is a tendency for proponents to develop multiple embedded solar farms of 5 MW rather than larger non-scheduled systems up to 30 MW, consequently avoiding the interaction with AEMO.[74] This is mainly due to the challenges of processing high volume of connections in an increasingly constrained network. The market collectively is addressing this issue across multiple parties[75] to ensure faster connections and improved investment certainty.

The CER lists 128 PV system projects between 5-30 MW that are either Approved or Under Assessment as of April 2025. The count of projects by capacity is shown in Table 18. There are significantly more projects with capacity of between 5 MW and 10 MW, which are solar farms servicing the grid and supported by battery energy storage system (BESS) or connected to water pump stations. Many of the sites are also part of larger projects, such as Redmud Green Energy (9 sites), Stanhope Solar Project (5 sites) and SA Water's Morgan to Whyalla pump station (4 sites).

Table 18: CER 5-30 MW project capacity breakdown (project count)

Status	>= 5 MW & <= 10 MW	> 10 MW & <= 20 MW	> 20 MW & <= 30 MW
Approved	92	27	8
Under Assessment	1	0	0

[74] This is supported by several recent publications, including:
https://reneweconomy.com.au/solar-developers-downsize-to-dodge-complex-and-costly-connection-rules-39495/
https://www.pv-magazine-australia.com/2020/02/28/small-scale-utility-solar-thriving-on-path-of-least-resistance/
https://www.cleanenergycouncil.org.au/news/australias-energy-transition-needs-new-rules-for-grid-connections

[75] For example, the Connection Reform Roadmap by Clean Energy Council and AEMO: https://www.cleanenergycouncil.org.au/advocacy-initiatives/energy-transformation/connections-reform-initiative

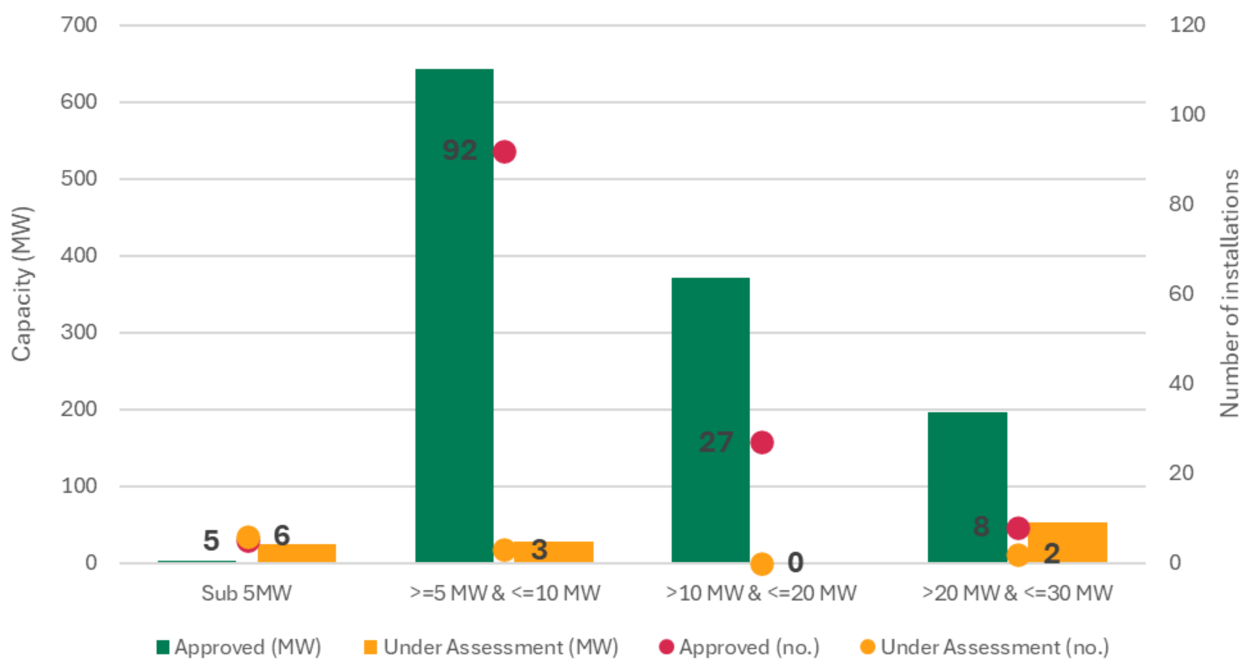
Source: CER database

Jacobs also reviewed AEMO's NEM Generation Information[76] and grouped solar PV generation that is non-scheduled under Proposed and Committed status. There is one 10 MW project under committed status, that is due to be commissioned in 2025. The total list of proposed projects (within the 5-30 MW range) from AEMO is 3 projects with average size of 21 MW for a total of 63 MW.

Several water authorities have also been identified by Jacobs as having assets within the 5-30MW capacity range, which are not captured on either the CER list or AEMO NEM Generation Information. These assets include GWM Water's Nhill Solar Farm[77] (6.5MW) which was commissioned in early 2025, Hunter Water's 450-kW PV systems at Shortland, North Lambton and Dungog, commissioned in early 2025, Karuah WWTW (commissioned in 2024) and Balickera Park (3.1 MW commissioned in September 2024)[78], and Melbourne Water's Eastern Treatment Plant solar farm (18 MW) commissioned in 2023. In addition, Goulburn Valley Water intends to install two 5 MW solar farms at its Seymour and Tatura sites by 2026.

We anticipate installations at water treatment plants will increase with population growth as well as a growing need to upgrade ageing infrastructure. Figure 8 shows the total capacity and number of projects for each of the mid-scale categories including both existing and proposed projects as well as the unreported water authority builds. For the forecast, we assume 33% of the proposed projects on AEMO's list make it through to commissioning stage.

Figure 8: Overview of mid-scale projects – existing and pipeline, ground-mounted systems



Source: AEMO NEM Generation information June 2025, and CER database 2025.

Note: "Proposed" does not include predictions for increased PV uptake in water treatment facilities. The uptake function has been scaled down to match expected uptake of mid-scale systems greater than 5 MW. Uptake of systems greater than 5 MW was calculated by escalating the 2028 capacity projection by using the payback time series presented in Table 13 as the independent variable.

---

[76] Data for NEM Generation Information is updated on regular basis. Accessed June 2025: https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information

[77] Accessed June 2025: Victorian water authority taps into large-scale renewable energy market – pv magazine Australia (pv-magazine-australia.com)

[78] Accessed June 2025: Renewable Energy Project - Hunter Water

Table 19 shows the bottom-up forecast of PV systems for the category 5 MW to 30 MW. The forecast until 2027 includes known projects[79] as well as 33% of AEMO's total capacity of proposed projects in this capacity range. In 2028 we assumed one project would be built in the 5 – 10 MW range and one project in the 10 – 30 MW range and this is sized at the average project size in the respective range.

For projecting uptake beyond 2028 we have derived a relationship between historical uptake and the calculated payback period of all mid-scale systems. This relationship has been derived from the CER database but due to the limited dataset of front-of-meter systems greater than 5 MW, we have used the entire database to form this relationship. The uptake function has been scaled down to match expected uptake of mid-scale systems greater than 5 MW. Uptake of systems greater than 5 MW was calculated by escalating the 2028 capacity projection by using the payback time series presented in Table 13 as the independent variable.

Table 19: Projections of capacity by year for systems 5 MW and greater

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
5 – 10 MW	26.5	-	-	6	6.2	6.5	6.8	7	7.2	7.3	7.4
10 – 30 MW	-	24	-	21	21.8	22.8	23.8	24.6	25.1	25.5	25.8

Source: Jacobs' analysis

7.4 Summary

This section presents a summary of the results (in calendar years) of all the mid-scale PV projections. Table 20 summarises Jacobs projected incremental installed capacity of mid-scale systems over the 11-year forecast period by segment. Total uptake until 2030 is projected to be slightly higher than it was in last year's forecast and uptake beyond 2030 is expected to accelerate moderately.Source*: Jacobs' analysis*

Table 21 summarises this incremental installed capacity per state and capacity range.

There is still substantial room for growth in uptake in the mid-scale PV behind-the-meter sector. Projected installations are dominated by systems for commercial use, manufacturing and retail, which is consistent with the large potential market size and economic benefits that these systems bring. The production of energy at the site of consumption and opportunistic utilisation of otherwise unutilised rooftop can be both economic and practical.

With respect to front-of-meter systems, the forecast is slightly lower compared to our previous study. This reflects a lower level of uptake of these systems in the short-term compared to last year's study, which also carries over into the longer-term analysis via the trend of uptake. This is despite the economics of mid-scale front-of-meter systems improving over the longer term.

Table 20: Summary of incremental projected capacity mid-scale PV installations 2025-2035, MW

Segment	2025	2026	2027	2028	2029	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**
Behind-the-meter systems	195	198	213	227	241	255	266	277	287	295	302
Aged Care	11	12	14	15	16	17	18	19	21	23	25
Agriculture	18	20	22	23	24	26	27	29	31	34	36
Airports	13	-	1	-	-	-	-	-	-	-	-

[79] In the case of 2025 this is known projects not already in CER's database.

Segment	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Commercial	87	96	104	112	120	128	137	146	160	173	189
Education	3	3	2	3	2	3	2	3	2	2	2
Government	3	4	4	3	3	2	2	2	2	2	1
Hospitality	0	0	0	0	0	0	0	0	0	0	0
Hospitals	6	7	8	9	10	11	13	14	15	16	15
Logistics/ Warehousing	18	20	23	26	29	32	35	37	37	35	31
Manufacturing	109	119	126	133	139	145	152	159	167	177	187
Mining	2	2	3	3	3	3	3	4	4	4	4
Recreation	6	7	8	9	10	11	12	13	15	16	16
Retail	50	55	63	71	80	86	88	87	81	72	62
Water Treatment	5	6	6	5	5	4	4	3	3	2	2
Other	13	15	16	17	18	19	19	21	22	24	25
Front-of-meter systems	30	36	4	33	32	33	34	35	36	36	36
0.1-5 MW Systems	3	12	4	6	4	4	4	4	3	3	3
5-10 MW Systems	27	-	-	6	6	7	7	7	7	7	7
10-30 MW Systems	-	24	-	21	22	23	24	25	25	26	26
Total	225	234	217	260	273	288	301	313	322	331	338

Source: Jacobs' analysis

Table 21: Incremental projected capacity per state of mid-scale PV installations 2024-2030, MW

State	Capacity range (MW)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ACT	0.1 to 1	2	3	3	3	3	3	4	4	4	4	4
	1 to 5	0	0	0	0	0	0	0	0	0	0	0
	5 to 30	0	0	0	0	0	0	0	0	0	0	0
NSW	0.1 to 1	59	64	69	74	78	83	87	90	94	96	98
	1 to 5	0	0	0	0	0	0	0	0	0	0	0
	5 to 30	10	0	0	6	22	0	0	7	25	0	0
NT	0.1 to 1	5	5	6	6	7	7	8	8	8	8	8
	1 to 5	2	2	2	4	2	2	0	0	0	0	0
	5 to 30	0	0	0	0	0	0	0	0	0	0	0

State	Capacity range (MW)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
QLD	0.1 to 1	40	43	46	49	51	55	57	60	61	64	65
	1 to 5	3	7	0	0	0	0	0	0	0	0	0
	5 to 30	0	24	0	21	0	7	0	25	0	7	0
SA	0.1 to 1	21	23	24	26	27	29	30	32	32	33	34
	1 to 5	2	0	0	0	0	0	0	0	0	0	0
	5 to 30	0	0	0	0	0	0	7	0	0	0	26
TAS	0.1 to 1	2	2	2	2	2	2	2	2	2	3	3
	1 to 5	0	0	0	0	0	0	0	0	0	0	0
	5 to 30	0	0	0	0	0	0	0	0	0	0	0
VIC	0.1 to 1	42	46	50	53	57	60	63	65	67	69	71
	1 to 5	8	0	0	0	0	0	0	0	0	0	0
	5 to 30	17	0	0	0	6	23	0	0	7	26	0
WA	0.1 to 1	14	15	15	16	17	18	19	20	21	21	22
	1 to 5	0	0	0	0	0	0	0	0	0	0	0
	5 to 30	0	0	0	0	0	0	24	0	0	0	7
Total	0.1 to 1	**184**	**201**	**215**	**229**	**243**	**257**	**270**	**281**	**290**	**298**	**305**
	1 to 5	**15**	**9**	**2**	**4**	**2**	**2**	**0**	**0**	**0**	**0**	**0**
	5 to 30	**27**	**24**	**0**	**27**	**28**	**29**	**31**	**32**	**32**	**33**	**33**

Source: Jacobs' analysis

Overall, it appears that the impetus to decarbonise the Australian economy along with the rising costs of electricity will spur continued growth for mid-scale PV systems.

Appendix A. Segment to 2-digit ANZSIC grouping

Table 22 lists the allocation of power stations to Jacobs segments. Ensuring consistency of allocation can be challenging, so an intermediate step is to use the ABS ANZSIC classification system[80]. In some cases, the same 2-digit code appears in more than one segment. These clashes were resolved by searching for additional information and using a 3-digit (or longer code) to determine the allocation. For example, there is ambiguity with respect to distinguishing between Hospitality and Tourism[81].

Table 22: Segmentation breakdown

Segment	2-digit ANZSIC code	ANZSIC Title
Aged Care	86	Residential Care Services
Agriculture	01	Agriculture
Agriculture	05	Agriculture, Forestry and Fishing Support Services
Airports	52	Transport Support Services
Commercial	33	Basic Material Wholesaling
Commercial	35	Motor Vehicle and Motor Vehicle Parts Wholesaling
Commercial	36	Grocery, Liquor and Tobacco Product Wholesaling
Commercial	67	Property Operators and Real Estate Services
Community Service	95	Personal and Other Services
Education	80	Preschool and School Education
Education	81	Tertiary Education
Electricity Supply	26	Electricity Supply
Government	75	Public Administration
Health	85	Medical and Other Health Care Services
Hospitality	45	Food and Beverage Services
Industrial	15	Pulp, Paper and Converted Paper Product Manufacturing
Industrial	19	Polymer Product and Rubber Product Manufacturing
Industrial	21	Primary Metal and Metal Product Manufacturing
Industrial	24	Machinery and Equipment Manufacturing
Industrial	25	Furniture and Other Manufacturing
Industrial	29	Waste Collection, Treatment and Disposal Services
Industrial	31	Heavy and Civil Engineering Construction
Industrial	33	Basic Material Wholesaling
Industrial	36	Grocery, Liquor and Tobacco Product Wholesaling
Industrial	37	Other Goods Wholesaling

[80] for details, see: https://www.abs.gov.au/ausstats/abs@.nsf/0/20C5B5A4F46DF95BCA25711F00146D75

[81] For details, see: https://www.abs.gov.au/methodologies/australian-national-accounts-tourism-satellite-account-methodology/2020-21

Segment	2-digit ANZSIC code	ANZSIC Title
Logistics/Warehousing	53	Warehousing and Storage Services
Manufacturing	11	Food Product Manufacturing
Manufacturing	12	Beverage and Tobacco Product Manufacturing
Manufacturing	13	Textile, Leather, Clothing and Footwear Manufacturing
Manufacturing	14	Wood Product Manufacturing
Manufacturing	19	Polymer Product and Rubber Product Manufacturing
Manufacturing	20	Non-Metallic Mineral Product Manufacturing
Manufacturing	21	Primary Metal and Metal Product Manufacturing
Manufacturing	22	Fabricated Metal Product Manufacturing
Manufacturing	24	Machinery and Equipment Manufacturing
Mining	09	Non-Metallic Mineral Mining and Quarrying
Recreation	44	Accommodation
Recreation	89	Heritage Activities
Recreation	91	Sport and Recreation Activities
Retail	41	Food Retailing
Retail	42	Other Store-Based Retailing
Services	59	Internet Service Providers, Web Search Portals and Data Processing Services
Services	60	Library and Other Information Services
Services	69	Professional, Scientific and Technical Services (Except Computer System Design and Related Services)
Services	95	Personal and Other Services
Tourism	44	Accommodation
Tourism	45	Food and Beverage Services
Water Treatment	28	Water Supply, Sewerage and Drainage Services

Appendix B. 2025 Top Australian Airports by Passenger Number

Total passenger numbers include both domestic and international travellers. In the analysis, we assume that the top 20 airports are suitable for rooftop PV installations, and that increasing air travel after Covid-19 will influence passenger numbers.

Table 23: Airport traffic and capacity summary

Airport Location	Total Passengers for year ended February 2024	Total Passengers for year ended February 2025	Current installed PV capacity
SYDNEY	39,720,817	41,613,453	550 kW
MELBOURNE	34,159,040	35,677,796	12.4 MW + 7.5 MW
BRISBANE	21,632,462	23,533,024	5.7 MW + 2 MW
PERTH	12,400,815	13,827,869	
ADELAIDE	8,156,075	8,360,464	1,283 kW + 2.3 MW
GOLD COAST	6,296,516	6,178,553	
CAIRNS	4,560,336	4,716,710	
CANBERRA	2,798,818	2,828,168	2.4 MW
HOBART	2,661,506	2,772,286	
SUNSHINE COAST	1,937,708	1,665,901	190.2 kW
DARWIN	1,782,955	1,823,280	5.5 MW
TOWNSVILLE	1,699,059	1,667,151	
LAUNCESTON	1,388,820	1,428,545	
NEWCASTLE	1,184,339	1,194,935	
MACKAY	912,954	899,456	
ROCKHAMPTON	649,821	654,993	976 kW
BALLINA	632,855	630,370	~100 kW
KARRATHA	556,948	623,360	1 MW
PROSERPINE	521,357	510,207	400 kW
HAMILTON ISLAND	495,789	488,202	

Source compiled from the Bureau of Infrastructure, Transport and Regional Economics, https://www.bitre.gov.au/publications/ongoing/airport_traffic_data

Appendix C. Developing uptake constraint assumptions

The uptake of solar PV systems is not an instantaneous decision and action. A variety of constraints can impede uptake, such as:

- Available land or roof space
  - Size of land area required to achieve a level of desired output
  - Site difficulty due to the height of buildings or other accessibility issues
  - Land tenure and whether the landowner or tenant has the incentive or right to install a system
  - The number of available sites
- Installing industry capacity to install systems, which may act as an upper limit.
  - For example, the technical capacity to evaluate, design and install systems is relatively scarce.
  - The proximity of prospective sites to installers
  - The extent of marketing and searching required for business development
- Financial benefit, both current and future.
  - Extent of familiarity with photovoltaic technology in the context of realising an ongoing business benefit. For example, word of mouth among fellow business owners or between technical salespeople and prospective buyers.
  - Forward expectations about future return, the immediacy and materiality of the returns.
    - Fluctuating subsidies, rebates, feed-in-tariff and system installation costs complicate the assessment
    - Outlook for the price of electricity tariffs. On-site generation can offer a degree of insurance against future periods of rapid price escalation.
    - The degree of match between business use of electricity and the availability of photovoltaic electricity generation.
  - The primary business operating state (i.e., growth or consolidation). Considerations of photovoltaic installations may be more urgent during periods of consolidation when revenue is slowing or shrinking.

For this report, the above considerations have been split into physical and financial constraints. The physical constraints are reflected in the Gompertz model, which implicitly recognises the past rate of installations as reflecting some of the short-term constraints related to installation and the physical constraints associated with the sales and installation cycle. The Gompertz model also reflects the medium-term relaxation of these constraints as well as the ultimate physical constraint of site availability and suitability.

Assumptions about the availability of suitable sites

There are several underlying assumptions in determining site availability in the following order:

- The number of business sites
- The land area occupied by business
- The proportion of business sites already installed (evaluated across both small and midscale systems)
- The density of installed sites and prospective sites

Number of business sites

The Australian Bureau of Statistics periodically publishes business count data.[82] The most recent data indicates more than 2 million business operating in Australia. Many of these businesses are sharing buildings, which likely substantially limits the number of businesses that could practically consider installation.

Land area occupied by business

Given the many-to-one relationship between business counts and buildings, it is reasonable to examine land parcel data. The Australian Bureau of Statistics publishes geospatial mesh block data containing the categorisation of land by type of use.[83]

The mesh block contains two relevant categories: Commercial; Industrial. These mesh blocks contain both a measurement of area and the location.

Proportion and density of sites already installed compared to potentially available sites

By assuming a given propensity for various industries to install solar systems, the split between commercial, school and residential sites can be estimated.

This split recognises that retail outlets and warehouses have a higher propensity to install systems, the relative land area available between commercial and residential can be estimated from the mesh block data.

Once the number of small-scale commercial sites is estimated for a given post code, the midscale installation location data is added. The remainder is the land area still potentially available for installing photovoltaic systems is calculated. The remaining area also needs to be split between small and midscale, which is based on the estimated ratio of past small to midscale systems.

Constraint assumptions reflected in the financial model

Applying a financial evaluation implicitly captures a range of constraints that directly impact the size of any benefit that might accrue. The key assumptions in this report are:

- Installation cost, both now and in the future
- Large-scale Generation Certificate prices, which can offset the installation cost over time
- The size of likely saving, which is based on the degree of similarity between the load profile and the photovoltaic output profile.

[82] "8165.0 Counts of Australian Businesses, Including Entries and Exits, June 2017 to June 2021."

[83] "Mesh Blocks | Australian Bureau of Statistics."

- The electricity tariff, both current and future.