

Renewable projects quarterly report

Q2 2024



**CLEAN
ENERGY
COUNCIL**



About this report

The Clean Energy Council's quarterly investment report tracks projects from the financial investment commitment stage through to the completion and operation of the plant. The financial investment commitment stage – in which projects receive agreement for access to debt and equity, based on the necessary project development and connection approvals and contracting arrangements being in place – is considered a crucial lead indicator for new capacity build. Once projects have received a financial investment commitment, they are considered likely to proceed.

The Clean Energy Council is aware that variations exist in development stage definitions across the industry, and as such the Clean Energy Council's data may differ from other datasets for the same period.

It should be noted that the Clean Energy Council's project data is retrospective, and so is subject to change depending on updated public information.

All investment figures within the report are expressed in nominal terms (not adjusted for inflation).

← Cover image:
Golden Plains West, TagEnergy
Rokewood, VIC
Wadawurrung and Gulidjan Country
(Emma Liepa)

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Highlights

- New large-scale energy storage projects continue to lead the way in investment, with four of the last five quarters adding **over 2 GWh of newly financially committed projects**.
- The capacity of financially committed renewable electricity generation **projects in 2024 (1.6 GW) has now surpassed the total for 2023 (1.3 GW)**.
- Onshore wind increased, with another 577 MW reaching financial commitment in the quarter. **This comes after no onshore wind projects reached financial commitment in 2023**.
- A big acceleration in financial commitments for generation projects will be required in the second half of the 2024 calendar year in order to achieve an **annual run rate of 6–7 GW per annum of financial commitments for large-scale generation projects** – the rate required in order to set Australia on the path to the target of 82 per cent renewable energy generation by the end of 2030.

Storage continues to lead the charge

Large-scale energy storage continued its strong run in the second quarter of 2024, with six projects representing 573 MW (capacity) / 2,047 MWh (energy output), reaching financial commitment.

The largest of these projects was the four-hour Stanwell Big Battery in Queensland at 300 MW / 1,200 MWh.

Of these six projects, five are storage components as part of an overall hybrid generation/storage project.

The rolling 12-month quarterly average for energy storage of 2,745 MWh for Q2 2024 was 14 per cent lower than in Q1, though this average remains strong in the context of historical trends.

By state, the Stanwell Big Battery alone gave Queensland the largest share of financially committed storage projects in both capacity and energy. New South Wales, meanwhile, saw the most projects (four) reaching this stage.

New generation projects continue to lag

Three projects totalling 662 MW achieved financial commitment in Q2. The largest project by a considerable margin was Stage 2 of the Golden Plains Wind Farm in Victoria, at a capacity of 577 MW. It also commenced construction in the same quarter.

Financial commitments in the second quarter were slightly lower than in the first, but the 12-month average continues to gradually trend upwards to now sit at 616 MW.

From an investment perspective, Q2 recorded \$2.2 billion* worth of financially committed large-scale renewable energy generation projects – a strong result, largely attributed to the second stage of the Golden Plains Wind Farm with a value of \$2 billion for this single project. As a result, the rolling 12-month quarterly average for investment of financially committed renewable generation projects has increased to \$1.1 billion.

Investment activity in new electricity generation projects is trending up from recent lows, highlighting the challenging project development conditions that are the legacy of a decade of under-investment in

our transmission network, the higher financing and supply chain costs being experienced by projects, and the complex planning and environmental assessment processes in some jurisdictions. In addition, many investors are also awaiting the outcomes of the first competitive tender round of the extended Capacity Investment Scheme.

Varied results seen along construction stages of project pipeline

Construction commenced for 1.1 GW of generation projects, including the aforementioned Stage 2 of the Golden Plains Wind Farm, the Aldoga Solar Farm (380 MW) and Gunsynd Solar Farm (94 MW) in Queensland, and the Nhill Renewable Energy Facility (5 MW) in Victoria. This was approximately 105 per cent higher than the updated 12-month rolling average of 516 MW of generation projects which have commenced construction.

Meanwhile five storage projects, all of which were battery energy storage systems, totalling 373 MW / 817 MWh, also commenced construction.

Two projects connected to the grid

One renewable electricity generation project, the Kathleen Valley Hybrid Power Station in Western Australia, was commissioned in Q2 2024, representing 46 MW of new installed capacity in the grid. Meanwhile, one storage project, New South Wales' 50 MW / 100 MWh Broken Hill Battery, reached commissioning.

CEC definitions

Financial commitment: publicly available information stating that a project's financing agreements have been signed and the owner can begin drawing on the financing to commence work on the project.

Under construction: publicly available information that a project has started construction work.

Commissioned: publicly available information that a project is fully completed and operational (a project that is currently operational but not commissioned falls under the category under construction).

*Figure most likely higher as not all projects provide publicly available capital investment data

Q2 2024

Project tracker

Generation and storage projects reaching financial commitment

Name	Owner	Type	State	MW (MWh)
Generation				
Quorn Park Hybrid Project	Enel Green Power Australia	Solar	NSW	80
Storage				
Limondale Battery Energy Storage System	RWE Renewables Australia	Storage	NSW	50 (400)
Quorn Park Hybrid Project (Battery Energy Storage System)	Enel Green Power Australia	Storage	NSW	20 (40)
Stanwell Big Battery	Stanwell Corporation	Storage	QLD	300 (1,200)

Generation and storage projects commencing construction

Name	Owner	Type	State	MW (MWh)
Generation				
Aldoga Solar Farm	Acciona/Stanwell Corporation	Solar	QLD	380
Golden Plains Wind Farm – Stage 2	TagEnergy	Onshore wind	QLD	577
Gunsynd Solar Farm	Metis Energy	Solar	QLD	94
Nhill Renewable Energy Facility	Vibe Energy / GWMWater	Solar	VIC	5

Project tracker

Name	Owner	Type	State	MW (MWh)
Storage				
Clements Gap Battery	Pacific Blue	Storage	SA	60 (130)
New England Solar Farm Battery Energy Storage System – Stage 1	ACEN Corporation	Storage	NSW	50 (100)
New England Solar Farm Battery Energy Storage System – Stage 2	ACEN Corporation	Storage	NSW	150 (300)
Nhill Renewable Energy Facility Battery Energy Storage System	Vibe Energy / GWMWater	Storage	VIC	3 (6.7)
Templers Battery Energy Storage System	Zenith Energy	Storage	SA	110 (290)

Generation and storage projects reaching commissioning

Name	Owner	Type	State	MW (MWh)
Generation				
Kathleen Valley Hybrid Power Station	Zenith Energy	Hybrid (solar, onshore wind & storage)	WA	95 (19)
Storage				
Broken Hill Battery	AGL Energy	Storage	NSW	50 (100)

View our [project tracker](#) for further details on all projects.

Note: Projects which have reached multiple stages in the same quarter have only been included in the latest stage.

Project pipeline

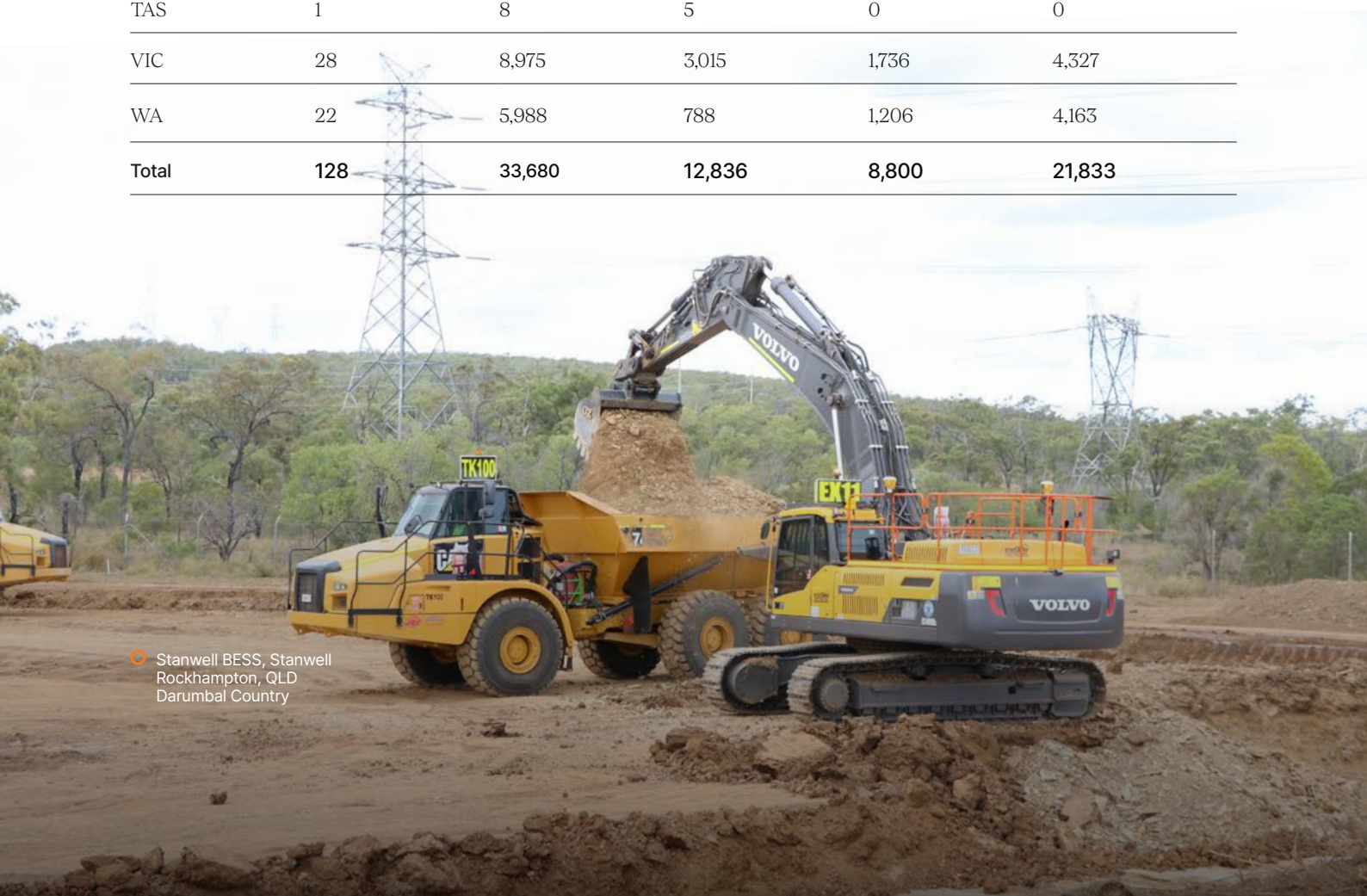
Currently there are 84 renewable electricity generation projects which have either reached financial commitment or are under construction, representing 12.8 GW of capacity in the pipeline. There are also 44 storage projects currently in the pipeline from financial commitment onwards, equivalent to 8.8 GW / 21.8 GWh in capacity/energy output. Since 2017, 215 generation

and storage projects have been commissioned, representing 16.3 GW of installed electricity generation capacity and 1.8 GW / 2.5 GWh of storage.

A breakdown of all projects currently in financial commitment or under construction stages across the states and territories is shown below.

Current generation and storage projects either in financial commitment or under construction

State	Project count	Total project capital investment (\$M)	Generation project capacity (MW)	Storage project capacity (MW)	Storage project energy output (MWh)
ACT	1	71	0	100	100
NSW	31	8,053	4,001	2,895	6,690
NT	5	102	45	41	39
QLD	24	8,233	4,043	1,975	4,550
SA	16	2,250	940	847	1,964
TAS	1	8	5	0	0
VIC	28	8,975	3,015	1,736	4,327
WA	22	5,988	788	1,206	4,163
Total	128	33,680	12,836	8,800	21,833



Project tracker

Current onshore wind projects either in financial commitment or under construction

State	Project count	Total project capital investment (\$M)	Generation project capacity (MW)
ACT	0	0	0
NSW	6	2,522	1,510
NT	0	0	0
QLD	6	4,031	2,369
SA	1	435	412
TAS	0	0	0
VIC	0	4,797	1,873
WA	1	200	76
Total	20	11,985	6,240

Current solar projects either in financial commitment or under construction

State	Project count	Total project capital investment (\$M)	Generation project capacity (MW)
ACT	0	0	0
NSW	12	2,578	2,241
NT	3	49	45
QLD	8	1,549	1,248
SA	8	1,184	528
TAS	1	8	5
VIC	14	1,405	1,137
WA	3	862	312
Total	49	7,634	5,516

Generation projects

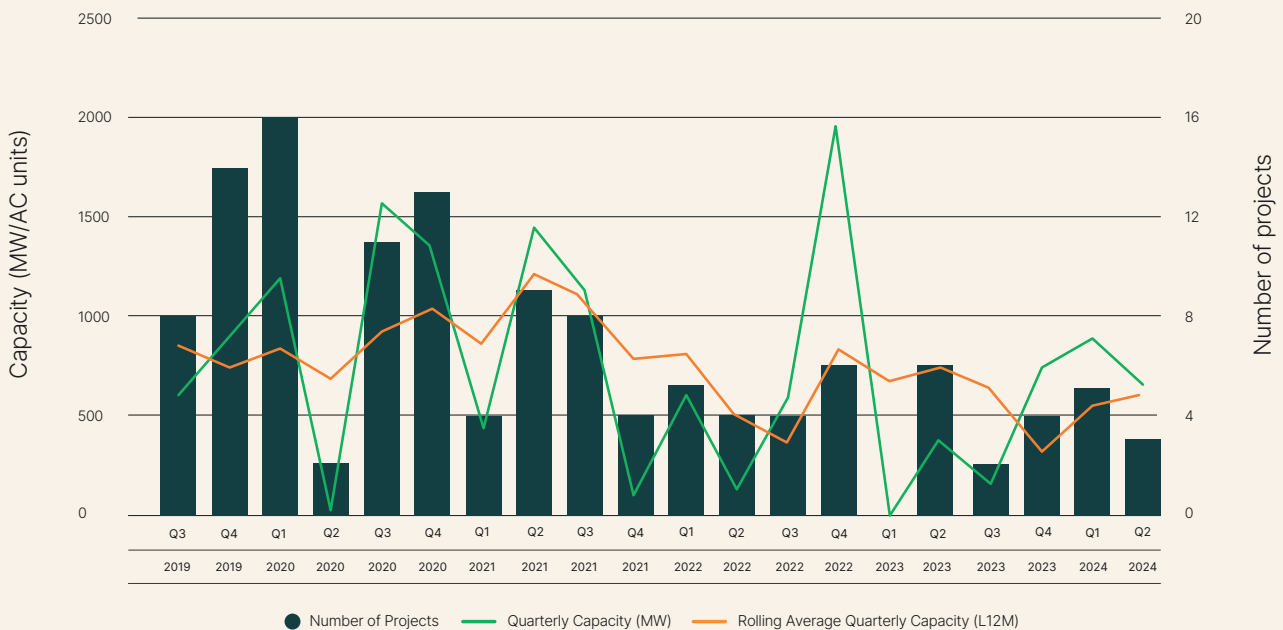
Quarterly generation project performance

TagEnergy's Stage 2 of the Golden Plains Wind Farm was the largest generation project reaching financial commitment in Q2 2024, with a capacity of 577 MW. As it stands, this second stage of the Golden Plains Wind Farm is the third-largest onshore wind project that has reached financial commitment in the country, behind only the MacIntyre Wind Farm (1,026 MW) and Golden Plains Wind Farm Stage 1 (756 MW). Onshore wind as a technology has now committed over 1.2 GW of newly financed capacity so far in 2024. Meanwhile, 161 MW of solar projects reached financial commitment over the same period, as well as four hybrid projects totalling 193 MW. The first half of 2024 has already overtaken the entirety of 2023 in terms of generation projects reaching financial commitment, with 1.6 GW added compared to 1.3 GW last year.

New large-scale renewable generation projects reaching financial commitment in Q2 spiked to \$2.2 billion for the quarter. This was largely thanks to the Stage 2 of the Golden Plains Wind Farm, and as a result, the rolling-12 month quarterly average for investment of generation projects increased by 74 per cent to \$1.1 billion. While this was a welcome increase, much greater levels of investment are still required in order to get back on track to 82 per cent renewables by 2030.

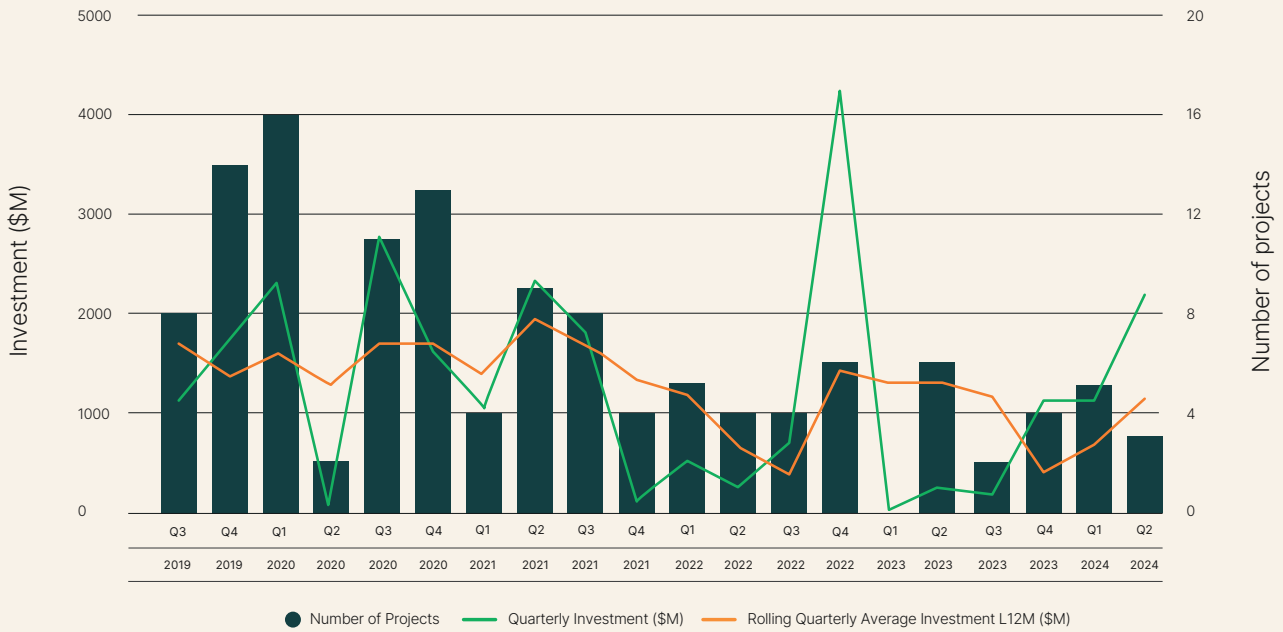
The chart below shows the rolling average of quarterly capacity rising to 616 MW, slightly below the 662 MW of financially committed generation projects added in this quarter.

Financially committed generation projects and megawatt capacity (by quarter)

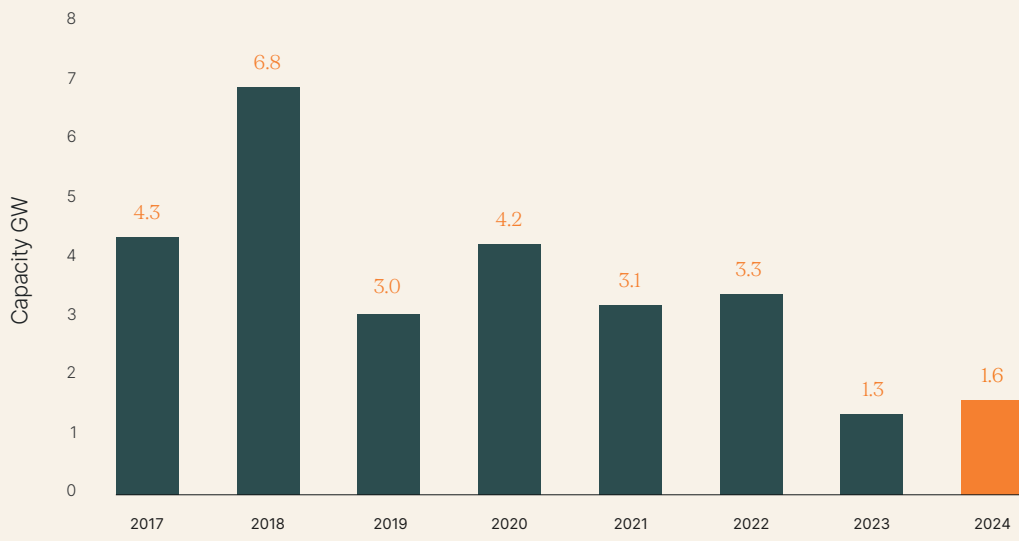


Generation projects

Financially committed generation projects and investment, by quarter

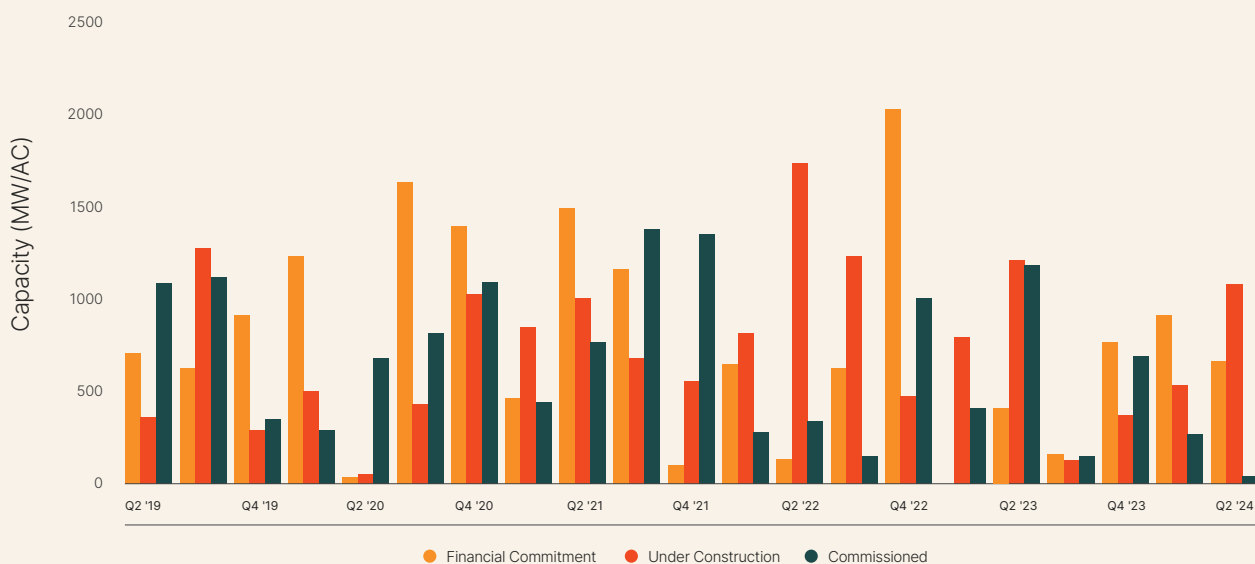


Total annual capacity of financially committed generation projects (GW)



Generation projects

Total capacity of generation projects by development status, by quarter (MW)



Generation projects by development stage reached, Q2

	Financially committed	Under construction	Commissioned
Q2 results			
Projects	3	4	1
Total capacity	662 MW	1,056 MW	46 MW

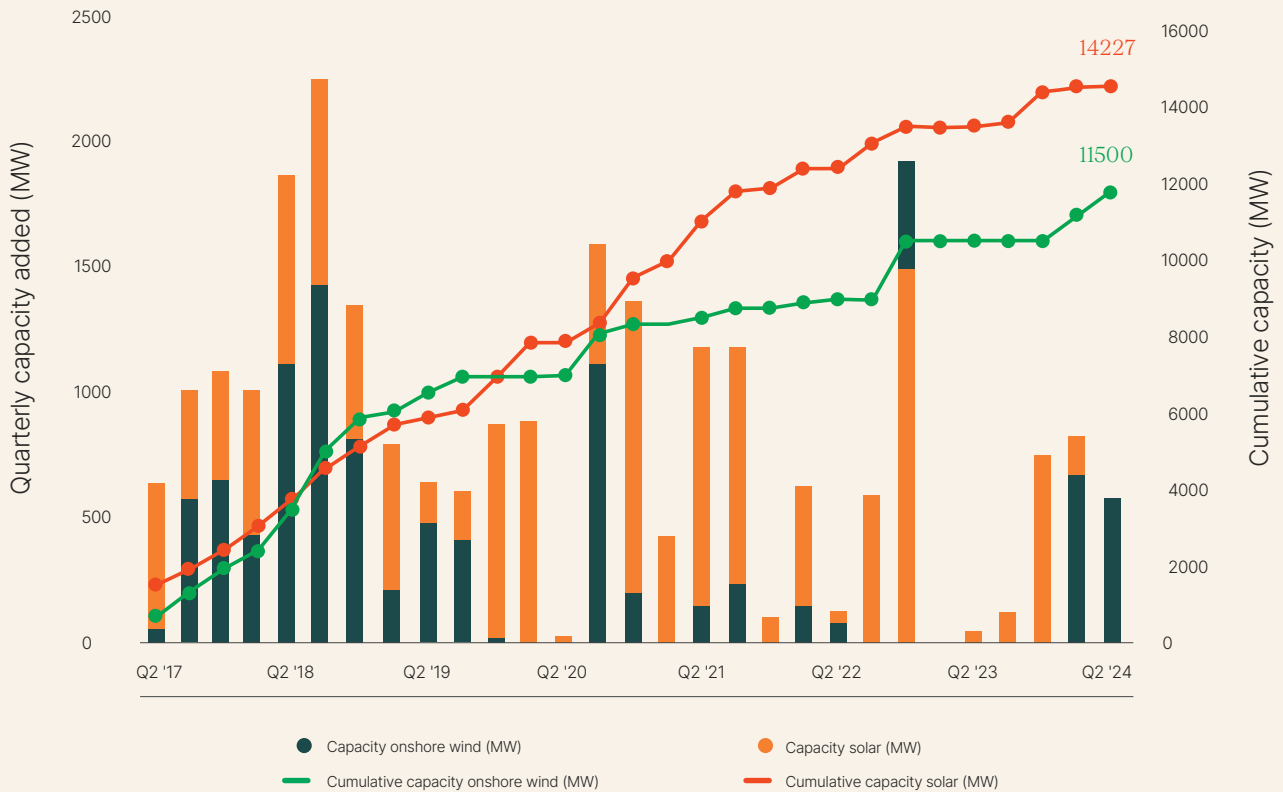
Note - Projects which reach multiple stages have been included in each stage

Generation projects

Solar and onshore wind capacity

After flatlining in 2023, investment in onshore wind generation projects has been gradually making up ground on utility PV in terms of cumulative capacity added, with totals of 11.5 GW and 14.2 GW respectively since 2017.

Cumulative capacity of financially committed wind and solar projects, by quarter



Wind and solar are natural complements in terms of operation and a balanced mix of both technology types supports more stable operation of the power system. A mix of technologies is also key to keeping costs down for consumers.

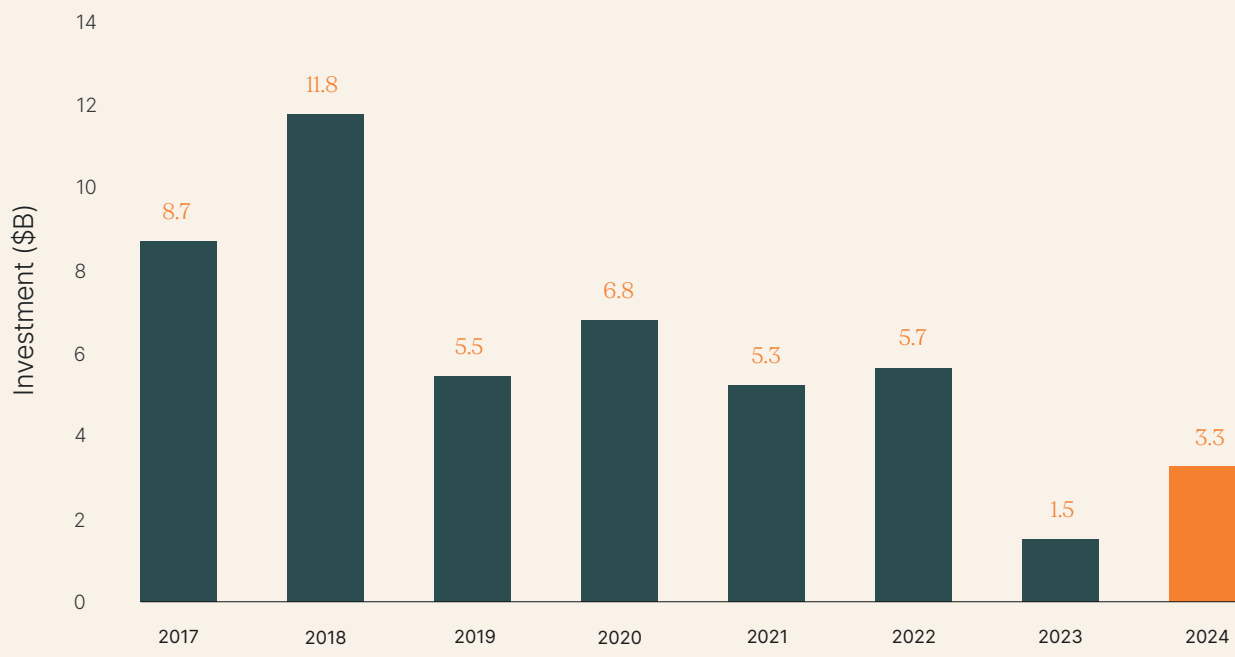
It is critical that specific issues relating to sluggish investment, such as technical connection issues and planning and environment considerations, are addressed in order to continue these upwards investment trends for both forms of technology.

Onshore wind has recently shown a promising upward trend to draw closer to solar projects around the country.

Generation projects

Generation project investment

Total annual investment (\$B) of financially committed generation projects



Breakdown of generation project investment by development stage reached, Q2

		Financially committed	Under construction	Commissioned
Q2 results	Investment	\$2.2 billion	\$2.5 billion	N/A

Note - Projects which reach multiple stages have been included in each stage

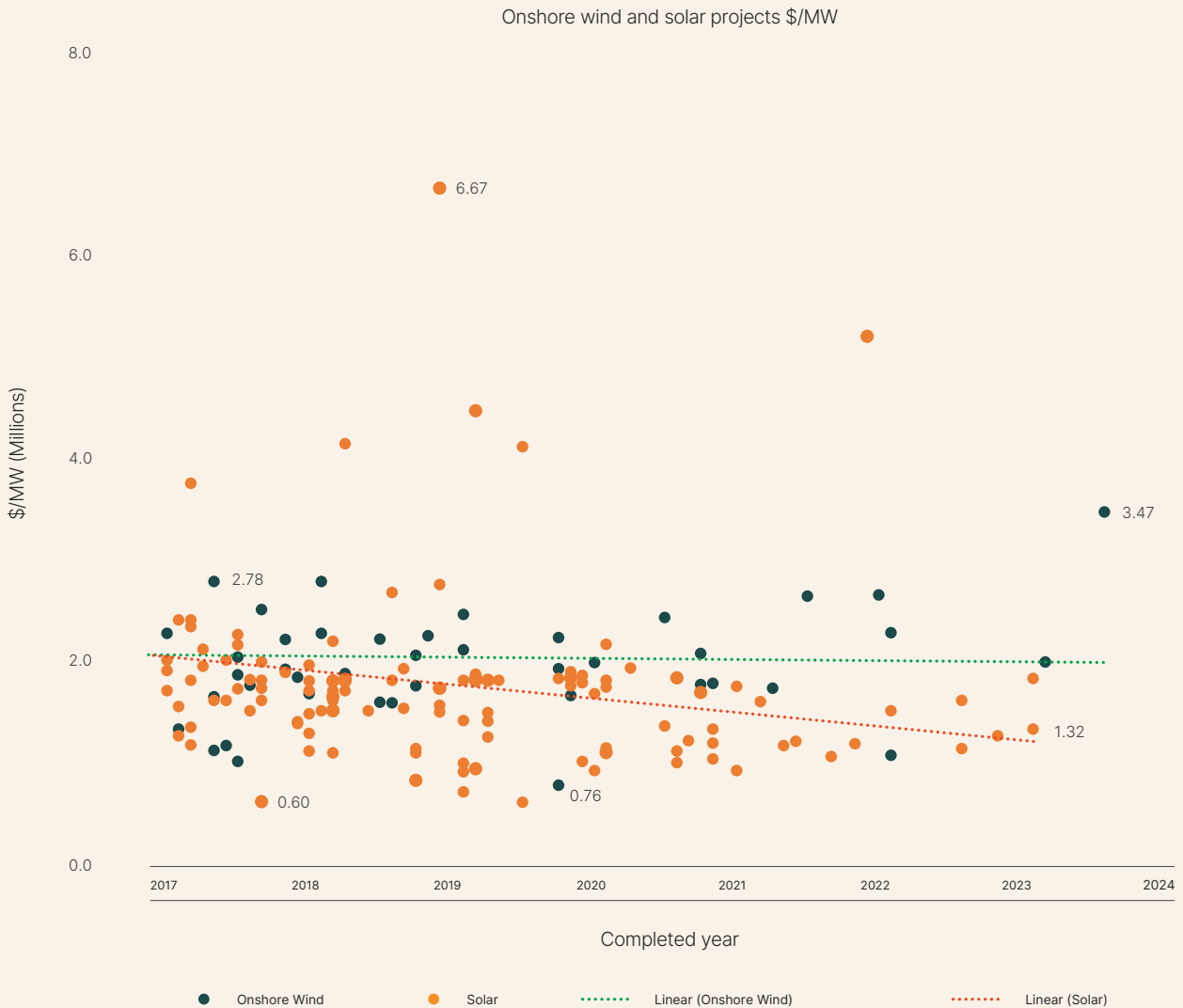
Generation projects

Generation project capital investment spend per MW

The below chart shows the relationship between the amount of capital investment required for each MW of capacity of generation projects. Expressed in millions of dollars, all solar and onshore wind projects that reached financial commitment from 2017 onwards have been included to view the trend over time. It is typically

expected that as technologies and project delivery systems mature, costs will decrease, and while this is reflected in utility PV and its downward trend, onshore wind has remained constant over the same period.

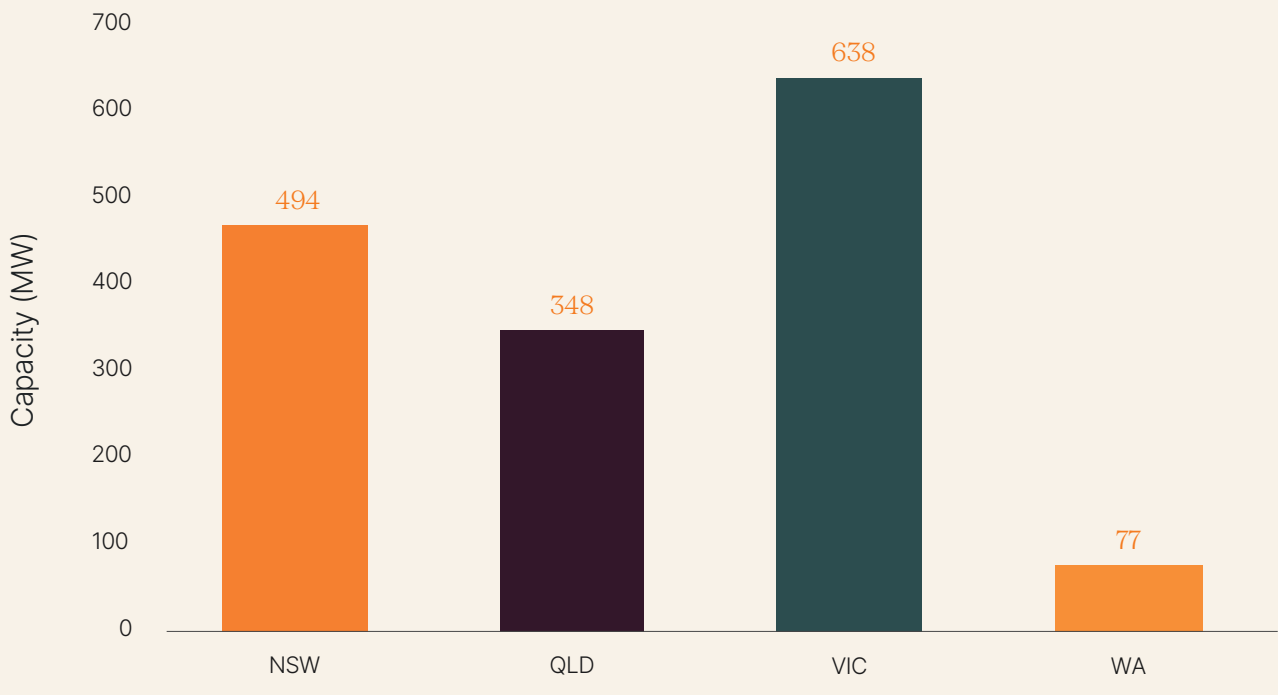
\$/MW for wind and large-scale solar projects



Generation projects

Generation projects by state

Total capacity of projects financially committed in 2024, by state



On average across Australia, it takes solar projects six months fewer than wind projects to progress from financial commitment to construction, then to the final commissioned stage. South Australia leads all states when it comes to average time from financial commitment to commissioning for all technology types.

Generation projects

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Project completion time – from financial commitment to commissioning**

Time from financial commitment to commissioning by state & technology (months)

State	Solar	Onshore wind	Storage
VIC	18	24	19
NSW	20	29	N/A
QLD	22	N/A	N/A
SA	17	21	17
WA	20	N/A	30
Total average by tech:	19	25	22

Notes - Average based on solar, onshore wind and storage projects that have reached commissioning since 2017.

The stated timeframe excludes the project development phases (e.g. Project design, planning & environmental assessments etc.) prior to Financial Commitment.

Each technology type needs to have at least five commissioned projects in a state for the average to be included.

Q2 2024

Storage projects

Investment in energy storage continues to be led by large-scale battery projects, with six new battery systems totalling 573 MW (capacity) / 2,047 MWh (energy generation) reaching financial commitment in Q2.

Investment was slightly down to \$937 million, though it should be noted investment data is not publicly available for all projects. The rolling 12-month average for storage project investment has remained high at nearly \$1.6 billion.

The largest battery reaching financial commitment for the quarter was Queensland's Stanwell Big Battery with a size of 300 MW / 1,200 MWh. New South Wales had the majority of projects reaching financial commitment for the quarter with four.

Turning to the latter development stages, five projects began construction for a total of 373 MW / 817 MWh, which was the lowest amount to reach this stage in a quarter since Q1 2023. Meanwhile, the only storage project to reach commissioning for the quarter was New South Wales' Broken Hill Battery with a size of 50 MW / 100MWh.

Storage projects by development stage reached, Q2

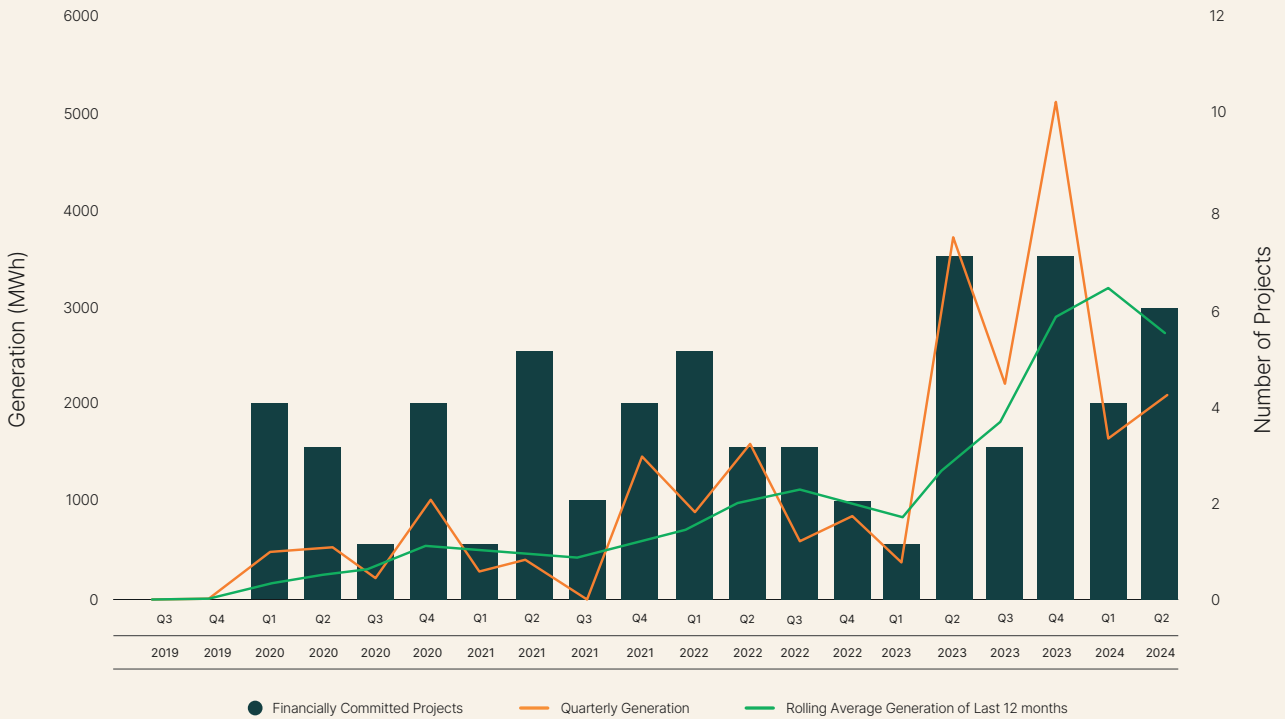
	Financially committed	Under construction	Commissioned
Q2 results			
Project count	6	5	1
Project capacity (MW)	573	373	50
Project energy generation (MWh)	2,047 MWh	817 MWh	100 MWh
Project investment	\$937 million	\$300 million	\$65 million

Notes - Includes hybrid projects with a storage component

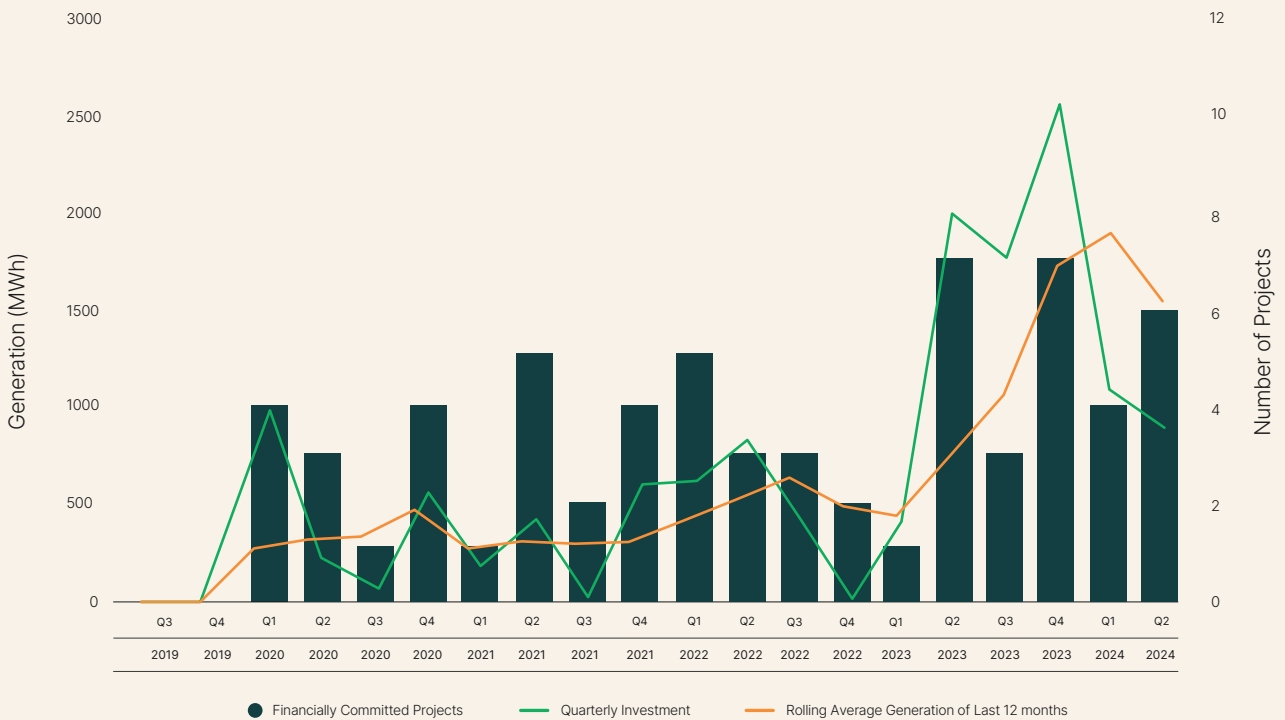
Projects which reach multiple stages have been included in each stage

Storage projects

Financially committed storage projects by energy (MWh), quarterly

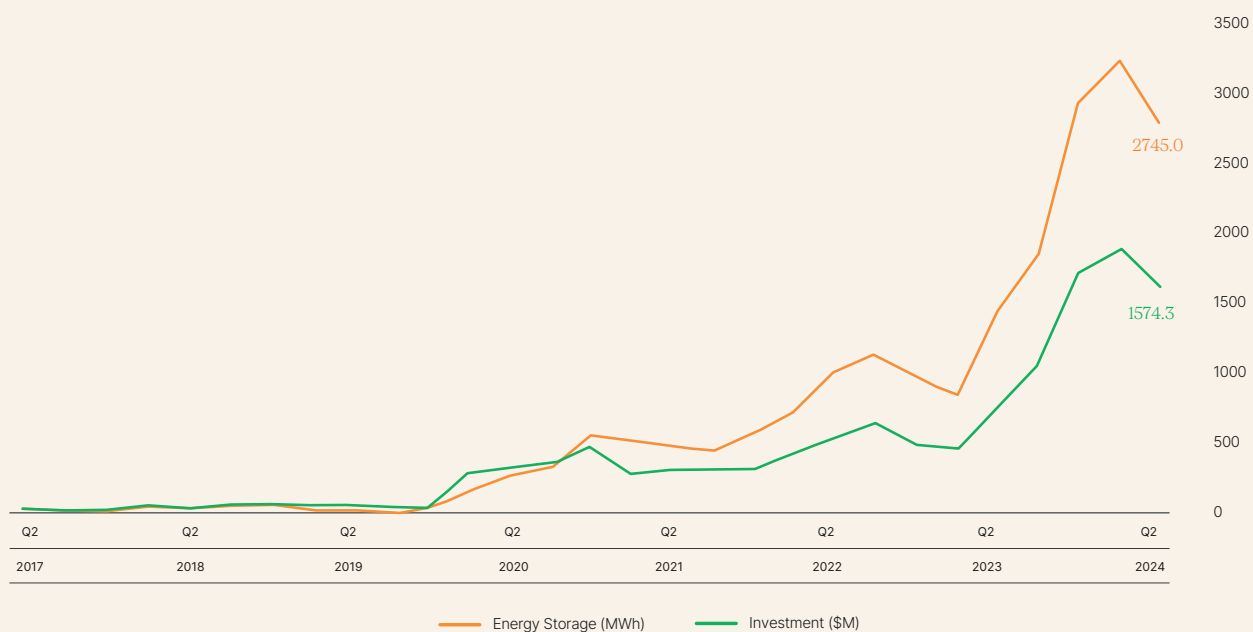


Financially committed storage projects by investment, quarterly



Storage projects

Rolling 12-month quarterly average of energy (MWh) and investment (\$M) of storage projects



Commissioned energy storage projects

	2017	2018	2019	2020	2021	2022	2023	2024
Number of projects	1	3	3	3	4	4	7	2
Investment (A\$m)	90	129	72	132	353	87	960	100
MW	100	90	130	163	426	69	707	100
Average MW	100	30	43	82	107	17	101	50
MWh	129	115	135	198	647	101	928	200
Average MWh	129	38	45	99	162	25	133	100
Average Storage (duration hours)	1,3	1,3	1,0	1,2	1,5	1,5	1,3	2,0

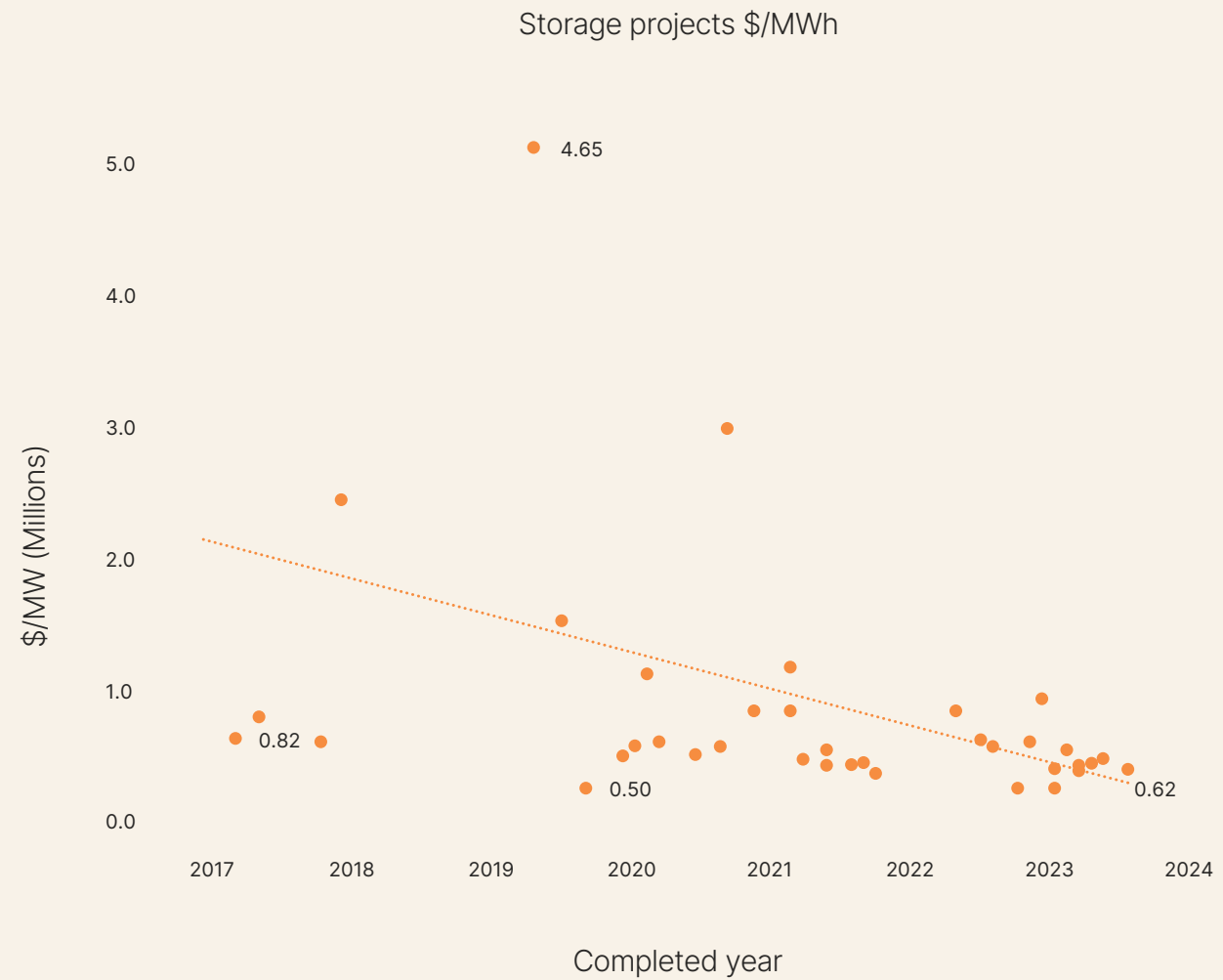
Storage projects

Storage project capital investment spend per MWh

The below chart shows the relationship between the amount of capital investment required for each MWh

of energy for storage projects. Expressed in millions of dollars, all storage projects which reached financial commitment from 2017 onwards have been included to view the trend over time. The chart below indicates battery energy storage system costs have reduced as they move towards higher energy (MWh) levels.

\$/MWh of storage projects



Hybrid projects (NEM only)

Hybrid projects are becoming more prevalent, with systems consisting of solar and storage, wind and storage, solar and pumped hydro (PHES), or a combination of these.

Across the NEM, there are 36 projects at various stages of development. Most of these projects are solar and storage systems. Eight projects have over two-hour durations, including a solar + PHES project with a duration of eight hours.

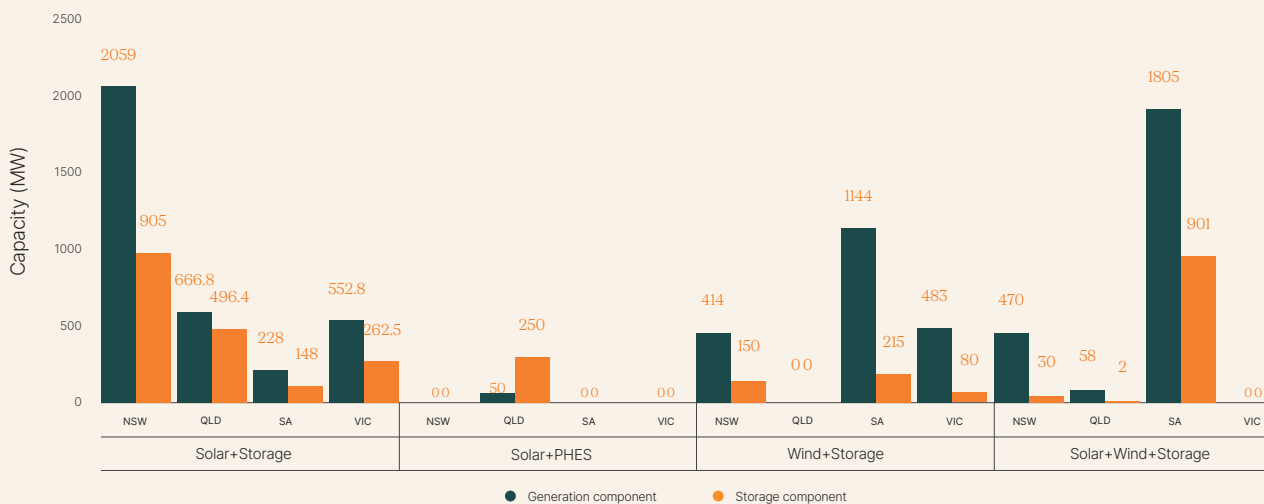
Project breakdown of hybrid projects

	Solar + Storage	Solar + PHES	Wind + Storage	Wind + Solar + Storage
Generation component	Solar capacity	3,477 MW	-	1,219 MW
	Wind capacity	-	-	1,786 MW
	PHES	-	50 MW	-
Storage component	Capacity	1,812 MW	250 MW	933 MW
	Energy	3,428 MWh	2,000 MWh	718 MWh
Average duration (hrs)	1.9 hrs	8 hrs	1.6 hrs	2 hrs
Total number of projects	23	1	7	5
Total build cost	\$5 bn	\$125 mil	\$230 mil	\$1.8 bn

Hybrid projects (NEM only)

Some of the largest projects are in New South Wales, predominantly solar and storage systems, and South Australia, predominantly wind and storage / wind, solar and storage. When storage is attached to solar systems, the assets have a larger capacity compared to wind and storage hybrid systems.

Hybrid project capacity breakdown by state and type



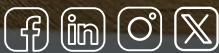


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