

Renewable projects quarterly report

Q1 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 a range of different definitions are used for the various project development stages and, as such, there may be slight variations within the industry. While quarterly results may be similar across the board, they are not necessarily going to be in perfect alignment.

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

Acknowledgement of Country

We respect and acknowledge the diversity of communities, identities, and clan groups for all First Nations peoples throughout Australia and recognise the continuing connection to lands, waters and communities. We pay our respect to Aboriginal and Torres Strait Islander cultures; and to Elders past and present.

As a collective of diverse businesses operating on a national scale, we understand that the success of our endeavours is intrinsically linked to the wellbeing and prosperity of the communities we operate within. We acknowledge that Aboriginal and Torres Strait Islander communities are rich and diverse, reflecting a tapestry of cultures and backgrounds. This diversity underscores the importance of embracing a range of holistic solutions to address the unique challenges and opportunities that lie ahead.

We recognise the impact of human activity on the cultural landscape of Australia. We understand that these practices have not always been in harmony with the profound attachment and cultural custodianship that First Nations peoples have with the land.

We are committed to forging strong relationships with First Nations communities and stakeholders, recognising their unique perspectives and aspirations. We strive to engage in genuine, meaningful partnerships that honour their rights, culture and self-determination.

← Cover image:
Clarke Creek Wind Farm, Squadron Energy
Clarke Creek, QLD
Barada Kabalbara Yetimarala Country

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Highlights

- Investment in new large-scale energy storage projects continues to power ahead, with Q1 2024 marking the fourth consecutive quarter in which **energy storage projects secured financial investment commitments over \$1 billion for the quarter.**
- It was the best quarter for electricity generation projects reaching financial commitment since the end of 2022, with **five projects totalling 895 MW being financially committed** in Q1 2024.
- Investment levels in generation projects will need to significantly improve with **financial commitments of at least 6-7 GW of new large-scale generation projects needed this year** (and in successive years) for investment to get back on track to meet the Federal Government's target of 82 per cent renewables by the end of 2030.

Storage enjoys another strong quarter, records broken again

Large-scale energy storage projects had another strong quarter in Q1 with four projects, representing 760 MW (capacity) / 1,640 MWh (energy output), financially committed for the first calendar quarter.

The largest of these projects was the Mortlake Power Station Battery in Victoria, with a size of 300 MW / 650 MWh. Total investment for storage projects in Q1 passed \$1 billion for the fourth quarter in a row at \$1.1 billion. Queensland's Swanbank Battery, with a size of 250 MW / 500 MWh, commenced construction in the same period.

The newly revised rolling 12-month quarterly energy storage average of 3,084 MWh for Q1 2024 passed the 3,000 MWh mark for the first time ever, setting a new record. This average has increased by 308 per cent when compared to the same quarter in 2023. The rolling average for investment continued to increase to \$1.8 billion, also a new record, and more than a 300 per cent increase when compared to Q1 2023.

By state, the Mortlake Power Station Battery gave Victoria the largest share of financially committed storage projects in terms of energy at 300 MW / 650 MWh during Q1. South Australia meanwhile had the most projects (two) reaching this stage.

An uptick in new generation projects, but more work is needed

Large-scale renewable energy generation projects in Q1 recorded their best quarterly return since Q4 2022, with five projects totalling 895 MW achieving financial commitment over the three months. The largest project publicly announced as financially committed was Squadron Energy's Uungula Wind Farm in New South Wales, contributing 414 MW of capacity.

The quarterly results for capacity of generation projects have now improved for two quarters in a row. As a result, the rolling 12-month quarterly average for financially committed generation projects increased to 539 MW. Whilst this is a welcome improvement, this is still the fourth-lowest average since the CEC began tracking project capacity in 2017, and remains well-below the needed investment levels in order to be on track to meet 82 per cent renewables by 2030. This was also a drop of 22 per cent when compared to the rolling average of Q1 2023.

From an investment perspective, Q1 recorded \$1.1 billion¹ worth of financially committed large-scale renewable energy projects – a result which is on par with the previous quarter. As a result, the rolling 12-month quarterly average for investment of financially committed renewable generation projects rose by 73 per cent to \$659 million.

The sluggish investment activity in new electricity generation projects highlights the challenging project development conditions including higher financing and supply chain costs, drawn-out planning and environmental assessment processes in some jurisdictions and the legacies of a decade of under-investment in our transmission network. In addition, many investors are now also awaiting the final scheme design details, and ultimately the outcomes, of Capacity Investment Scheme competitive tender rounds.

Varied results seen along construction stages of project pipeline

Construction began on 470 MW of generation projects, with building commencing at Mokoan Solar Farm (56 MW) and the Uungula Wind Farm (414 MW). This was around 40 per cent lower than the generation capacity which commenced construction in the same quarter 12-months ago.



¹ Figure most likely higher as not all projects provide publicly available capital investment data

Meanwhile, two energy storage projects worth 750 MW / 2,500 MWh also commenced construction.

Two projects connected to the grid

Two renewable electricity generation projects were commissioned in Q1 2024, representing 255 MW of new installed capacity in the grid, and \$800 million worth of investment. These were the Amazon Solar Project (Wandoan), and the Glenrowan Solar Farm in Victoria. Meanwhile, one storage project, the Bouldercombe Battery Project, worth 50 MW / 100 MWh, reached commissioning.

A large pipeline of generation and storage projects are under development

There are currently 121 generation and storage projects which have either reached financial commitment or are under construction. This equates to 12.3 GW of electricity generation project capacity, as well as 8.4 GW / 18.8 GWh of energy storage projects. Overall, 212 generation and storage projects have now been commissioned since 2017, representing 16.2 GW in new electricity generation capacity and 1.8 GW / 2.4 GWh of storage projects.

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 construction work has commenced on a project.

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



Note: Project data is retrospective, and so is subject to change depending on updated public information.

Q1 2024

Project tracker

Generation and storage projects reaching financial commitment

Name	Owner	Type	State	MW (MWh)
Generation				
Gunsynd Solar Farm	Metis Energy	Solar	QLD	94
St Ives Renewables Project	Gold Fields	Hybrid (solar, wind)	WA	77
Wambo Wind Farm - Stage 2	Cubico Sustainable Investments/Stanwell Corporation	Onshore wind	QLD	254
Storage				
Mannum Battery Energy Storage System	Epic Energy	Storage	SA	100 (200)
Mortlake Power Station Battery	Origin Energy	Storage	VIC	300 (650)
Templers Battery Energy Storage System	ZEN Energy	Storage	SA	110 (290)

Generation and storage projects commencing construction

Name	Owner	Type	State	MW (MWh)
Generation				
Mokoan Solar Farm	European Energy	Solar	VIC	56
Uungula Wind Farm	Squadron Energy Group	Onshore wind	NSW	414
Storage				
Collie Battery Energy Storage System	Synergy	Storage	WA	500 (2,000)
Swanbank Battery	CleanCo	Storage	QLD	250 (500)

Generation and storage projects reaching commissioning

Name	Owner	Type	State	MW (MWh)
Generation				
Amazon Solar Project Australia - Wandoan	Vena Energy	Solar	QLD	125
Glenrowan Solar Farm	CIMIC Group	Solar	VIC	130
Storage				
Bouldercombe Battery Project	Genex Power	Storage	QLD	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.

Q1 2024

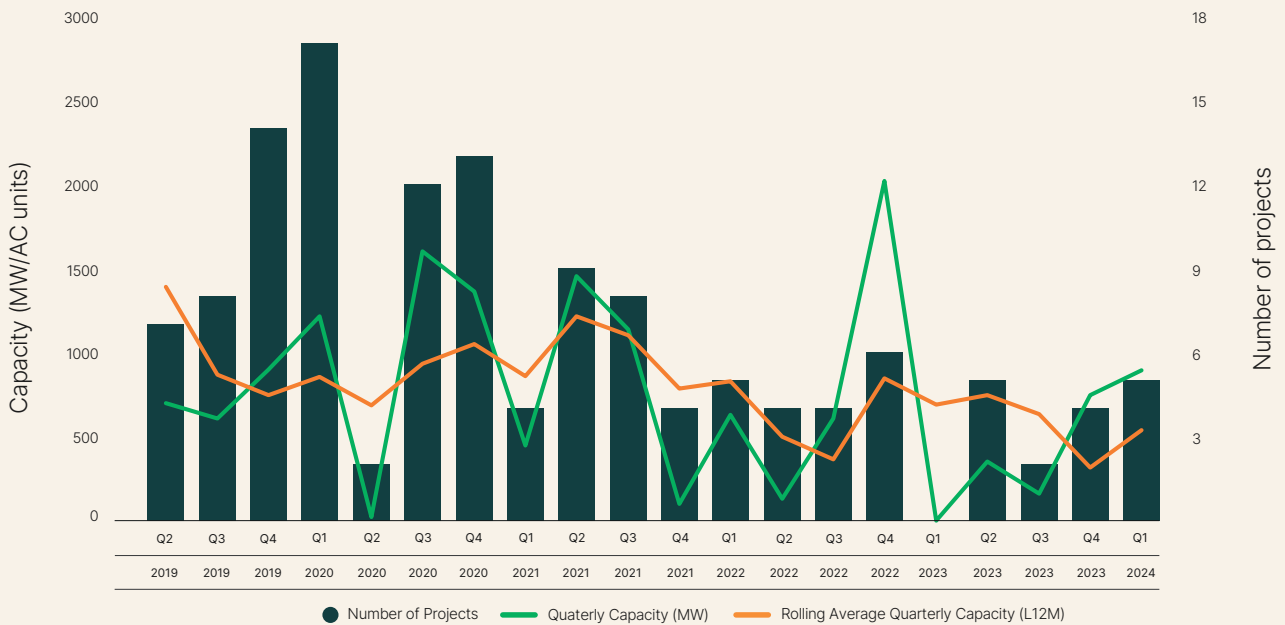
Generation projects

Generation project capacity

Two onshore wind projects reached financial commitment in Q1 2024: Cubico and Stanwell's Wambo Wind Farm – Stage 2, with 254 MW of capacity, and Squadron Energy's Ungula Wind Farm at 414 MW. These wind projects are the first to have reached financial commitment since Q4 of 2022.

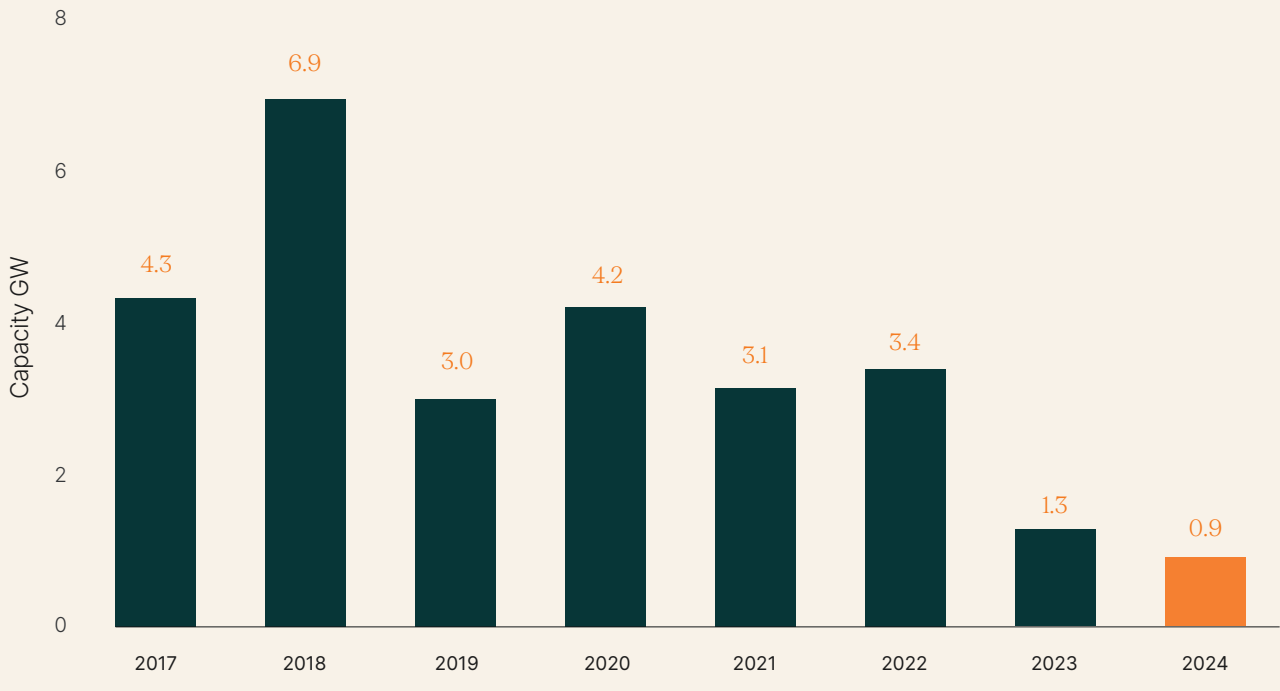
The chart below shows the rolling average of quarterly capacity rebounding above 500 MW to 539 MW. The 895 MW of financially committed generation projects added in Q1 is 66 per cent greater than the revised average.

Financially committed generation projects and megawatt capacity (by quarter)

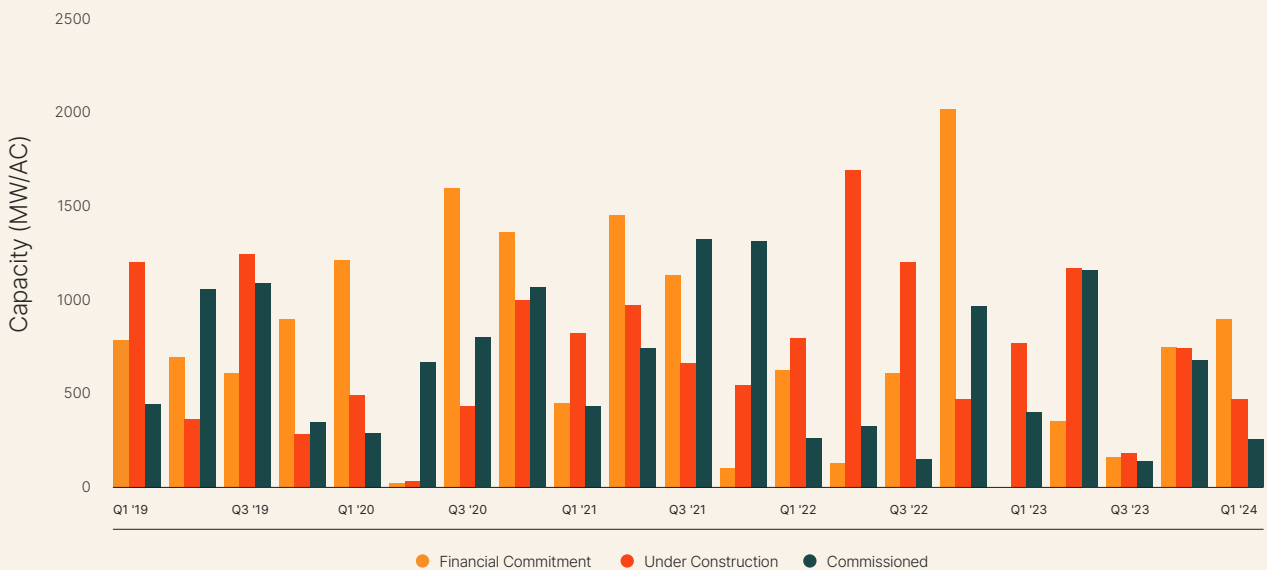


Generation projects

Total annual capacity of financially committed generation projects (GW)



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



Generation projects

Generation projects by development stage

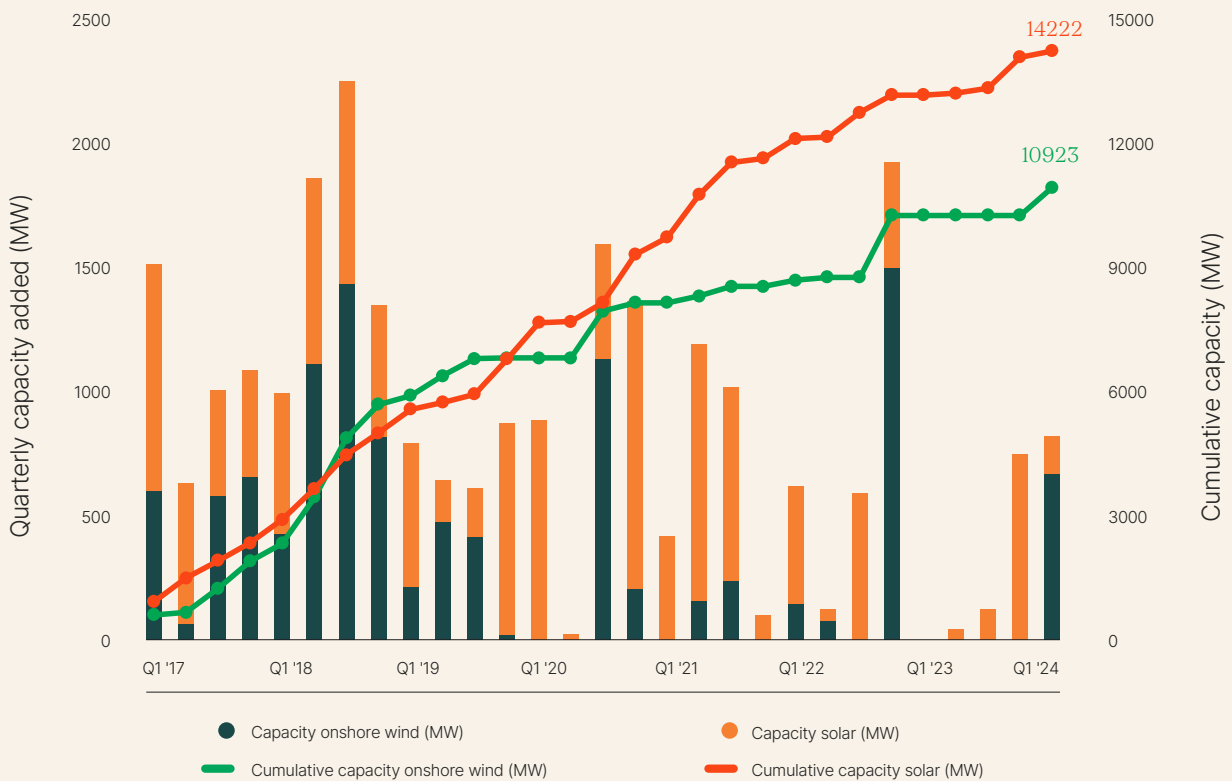
		Financially committed	Under construction	Commissioned
Generation projects Q1 results	Projects	5	2	2
	Total capacity	895MW	470 MW	255MW

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

Solar and onshore wind capacity

Since late 2020, large-scale solar has continued to pull away from onshore wind in terms of cumulative capacity added, with totals of 14.2 GW and 10.9 GW added respectively since 2017.

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



There are many implications for system and market operation that may flow from this divergence of wind and solar investment. Wind and solar are natural complements in terms of how they operate. A balanced mix of both types of technology supports more stable operation of the power system and is key to keeping costs down for consumers.

There are a number of factors likely impacting wind generation investment relative to solar, including technical connection issues and planning and environment considerations. It is critical that these specific issues are addressed in order to support balanced investment across both forms of renewable generation technology.

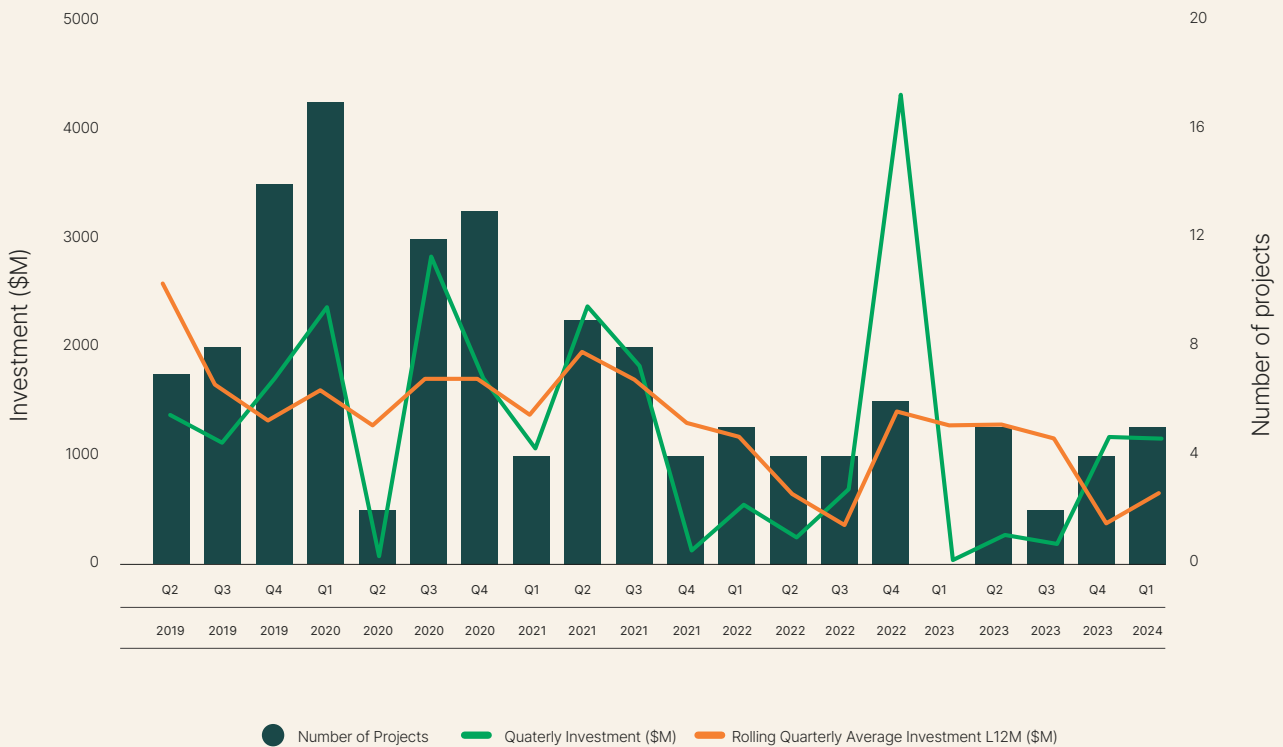
Generation projects

Generation project investment

Investment in new large-scale renewable generation projects reaching financial commitment in Q1 reached \$1.1 billion for the second quarter in a row. This is a marked improvement when compared to the same quarter last year when not a single generation project reached financial commitment.

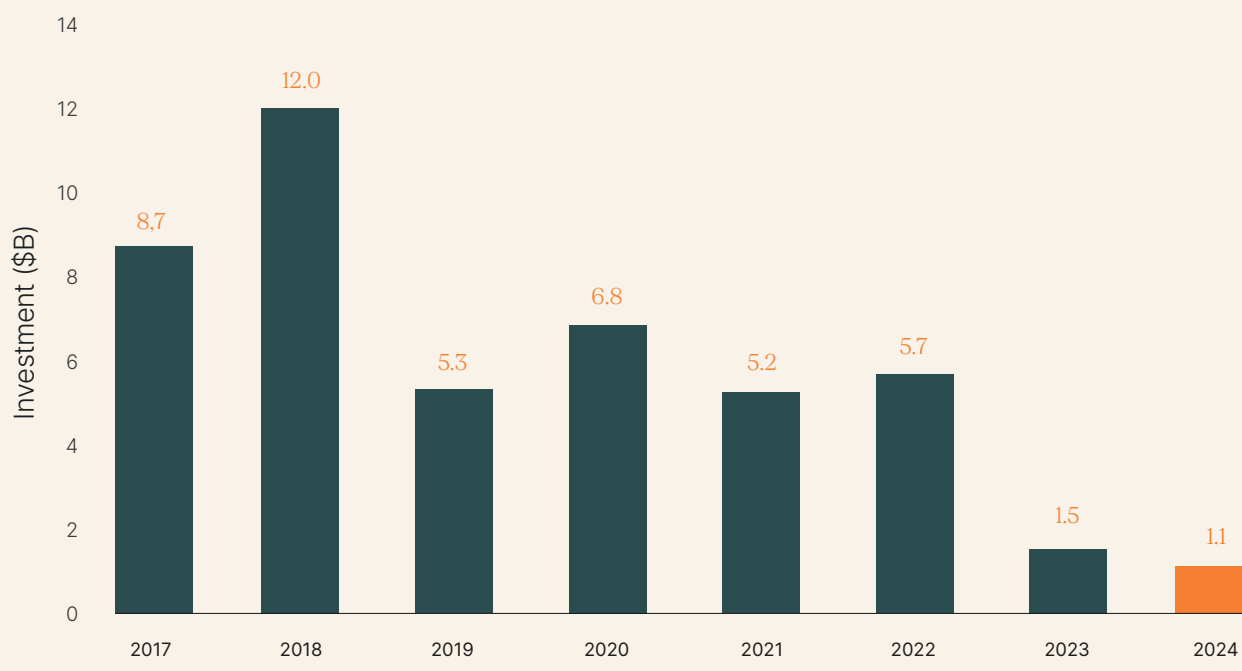
As a result, the rolling-12 month quarterly average for investment of generation projects increased by 79 per cent to \$659 million. As indicated in earlier sections of this report, much greater levels of investment are still required in order to get back on track to 82 per cent renewables by 2030.

Financially committed generation projects and investment, by quarter



Generation projects

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



Breakdown of generation project investment by development stage

		Financially committed	Under construction	Commissioned
Generation projects Q1 results	Investment	\$1.1 billion	\$820 million	\$800 million

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

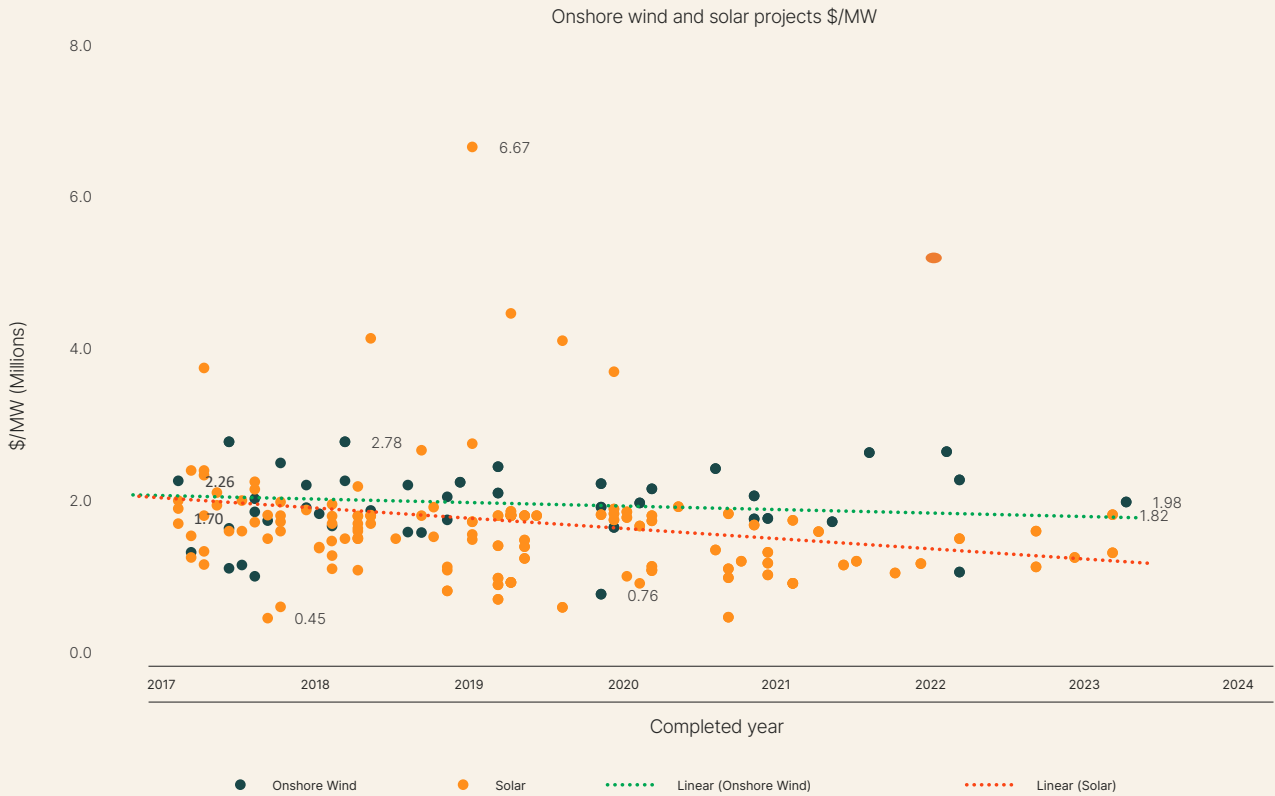
Generation project capital investment spend per MW

The below chart shows the relationship between the amount of capital investment required for each MW of capacity of generation projects. Expressed in terms of millions, all solar and onshore wind projects which 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 this is reflected in the downward trend seen for both these technology types. Ultimately a continuation of this trend will place further downward pressure on the cost of delivering energy for consumers.

Generation projects

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

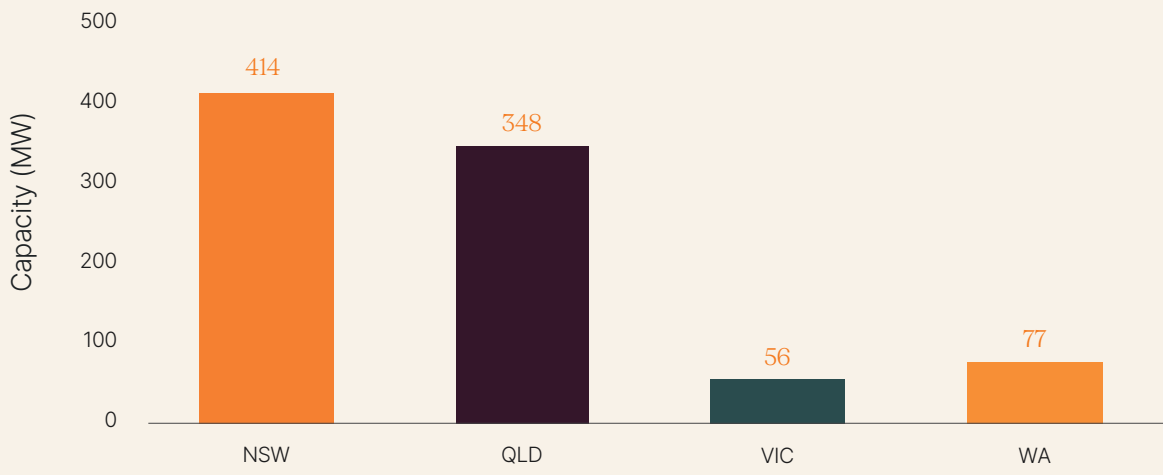


Generation projects by state

On average across Australia, it takes solar projects six months less than wind projects to progress from financial commitment to the final commissioned stage. South

Australia leads all states when it comes to average time progressing through financial commitment, construction and finally commissioning for all technology types.

Total capacity of projects financially committed in 2024, by state



Generation projects

On average across Australia, it takes solar projects six months less than wind projects to progress from financial commitment to the final commissioned stage. South

Australia leads all states when it comes to average time progressing through financial commitment, construction and finally commissioning for all technology types.

Project completion time – from financial commitment to commissioning

Commissioned project duration by state & technology (months)

State	Solar	Onshore wind	Storage
VIC	17	24	19
NSW	20	29	N/A
QLD	22	N/A	N/A
SA	16	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 commission 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.

There are a number of reasons for, and implications of, the divergence in the number of wind versus solar generation projects that are reaching a financial investment commitment. The figures in Table 6 above illustrate that wind projects are tending to take longer to get through the connection and commissioning process relative to solar. Technical issues relevant to wind generation are likely a key culprit here, however construction complexities may also play a role.

The Clean Energy Council is focussed on addressing many of these issues in cooperation with relevant stakeholders through processes such as the Connection Reform Initiative and reforms to the System Strength frameworks.

Q1 2024

Storage projects

The start of 2024 picked up where 2023 left off, with investment continuing strongly. Q1 saw 760 MW / 1,640 MWh and \$1.1 billion worth of investment reach financial commitment.

Records continue to be broken, with the rolling 12-month quarterly averages of both energy generation (3.1GWh) and investment (\$1.8 billion) surpassing the levels seen in the previous quarter. These records have now been broken the last four quarters in a row.

The largest battery reaching financial commitment for the quarter was Victoria's Mortlake Power Station Battery with a size of 300 MW / 650 MWh. South Australia had the most projects coming through with both Mannum Battery Energy Storage System and Templers Battery Energy Storage System both reaching a financial investment decision. Meanwhile, the Swanbank Battery reached financial commitment and commenced construction within the same quarter.

Turning to the latter development stages, the aforementioned Swanbank Battery and the Collie Battery Energy Storage System (500 MW / 2,000 MWh) commenced construction in Q1, which lifted the rolling 12-month quarterly average for construction stage storage projects to 2.2 GWh. Meanwhile, the Bouldercombe Battery (50 MW / 100 MWh) was the one storage project which reached commissioning in Q1.

Storage projects by development stage, Q1

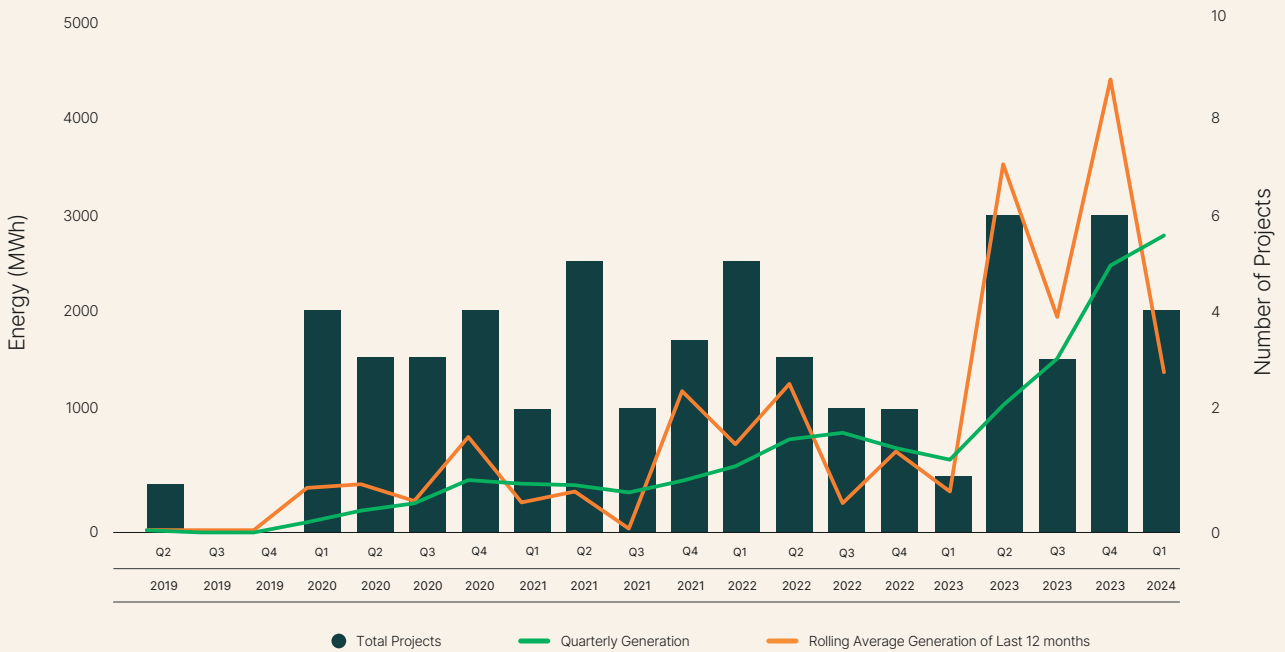
	Financially committed	Under construction	Commissioned	
	Project count	4	2	1
Storage projects Q1 results	Project energy generation	1,640 MWh	2,500 MWh	100 MWh
	Project investment	\$1.1 billion	\$1.9 billion	\$35 million

Notes - Includes hybrid projects with a storage component

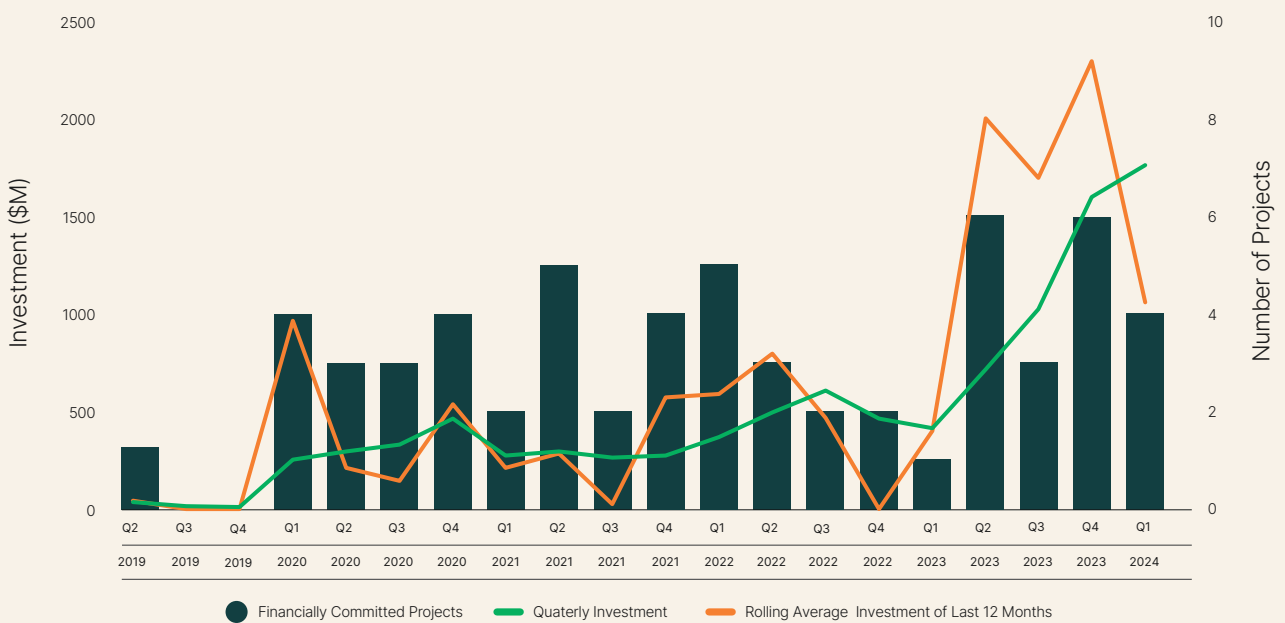
Projects which reach multiple stages have been included in each stage

Storage projects

Financially committed storage projects by energy (MWh), quarterly

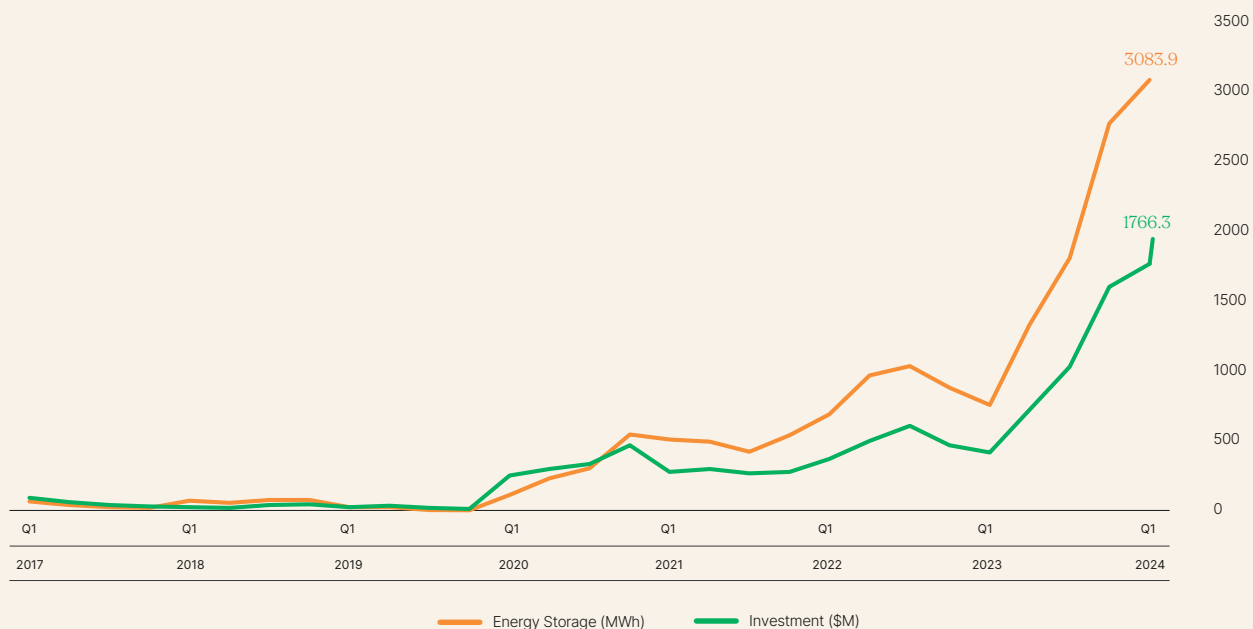


Financially committed storage projects by investment, quarterly



Storage projects

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



Commissioned storage projects by year

Commissioned energy storage projects

	2017	2018	2019	2020	2021	2022	2023	2024
Number of projects	1	3	4	2	5	4	7	1
Investment (A\$m)	90	129	72	132	374	87	960	35
MW	100	90	155	163	432	69	707	50
Average MW	100	30	39	82	86	17	101	-
MWh	129	115	185	198	693	101	928	100
Average MWh	129	38	46	99	139	25	133	-

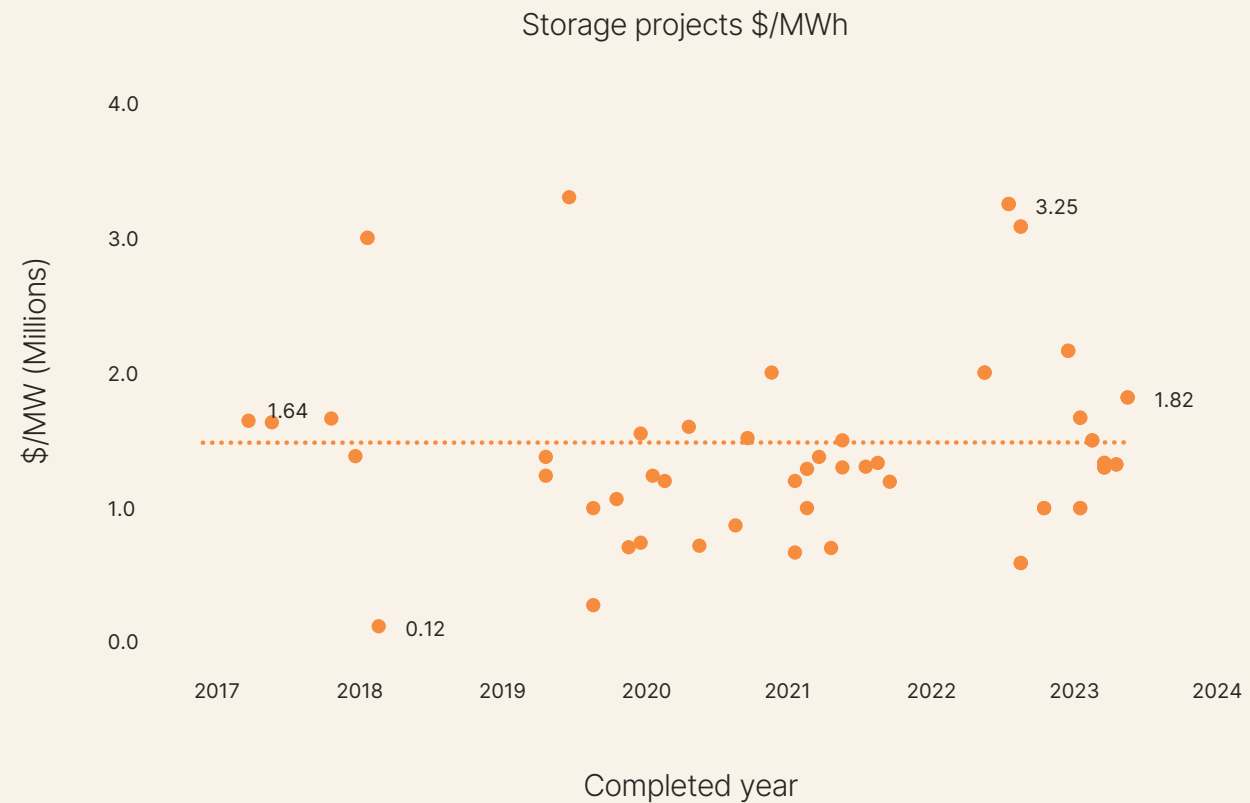
Storage projects

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 terms of millions, all storage projects which reached financial commitment from 2017 onwards have been included to view the trend over time. The chart below indicates BESS costs have remained steady despite moving towards higher energy (MWh) levels.

\$/MWh of storage projects





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