

# Overview of the Australian renewables market

November 2022



# Summary

## The Australian renewables market has been volatile but there are positive developments ahead

The renewable development market in Australia has historically been unpredictable with changes in government and regulations along with structural issues leading to investor uncertainty. However, recent activities show current structural tailwinds are supporting the sector.

1.		<h3>Market structure</h3> <p>The structure of the Australian market plays an important role in assessing the opportunity set and the historical issues.</p>
2.		<h3>Generation growth</h3> <p>Significant growth in intermittent renewable generation – surpassing initial targets, thus creating electricity market issues.</p>
3.		<h3>The market has changed over time</h3> <p>The evolution of the Australian electricity market has made the investment landscape challenging to navigate.</p>
4.		<h3>Opportunities</h3> <p>With political and renewed regulatory support for renewables, the investment landscape is expected to improve.</p>

# An overview of the Australian National Electricity Market (NEM)

## The Australian energy market is an 'energy only' market

Since its introduction, the NEM has provided high levels of price competition between generators, however, pricing, certainty of supply, and stability of the electricity grid have been challenged by increasing share of renewable generation, which is adding intermittent generation to the system.



### Energy only market

Generators are paid for output into the NEM, rather than for availability or capacity.



### Volatile spot price

-\$1,000 to \$15,000 per MWh of late, following greater share of renewables in the NEM.



### Transmission infrastructure

The NEM covers the eastern states of Queensland, New South Wales, South Australia, Victoria and Tasmania. Western Australia and the Northern Territory have their own separate electricity markets.

## Did you know?

The NEM began operation as a wholesale electricity spot market in 1998.

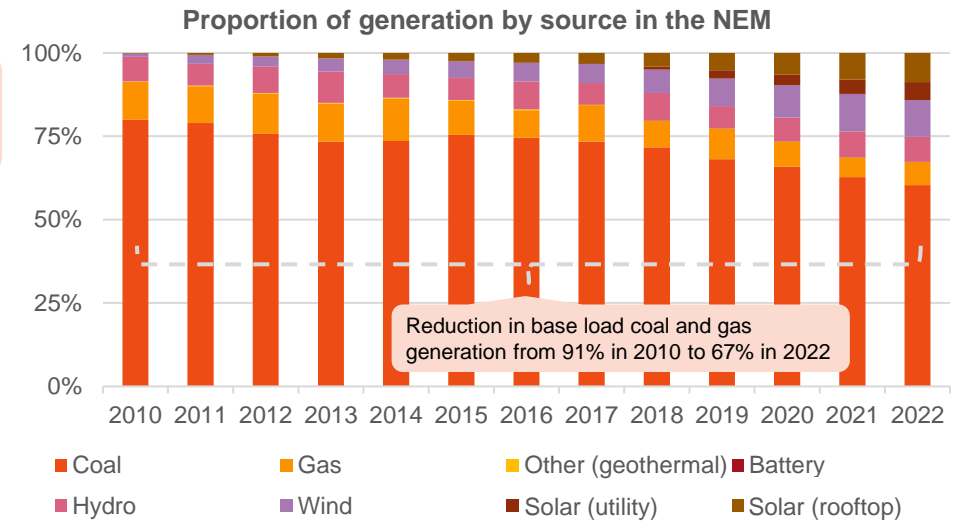
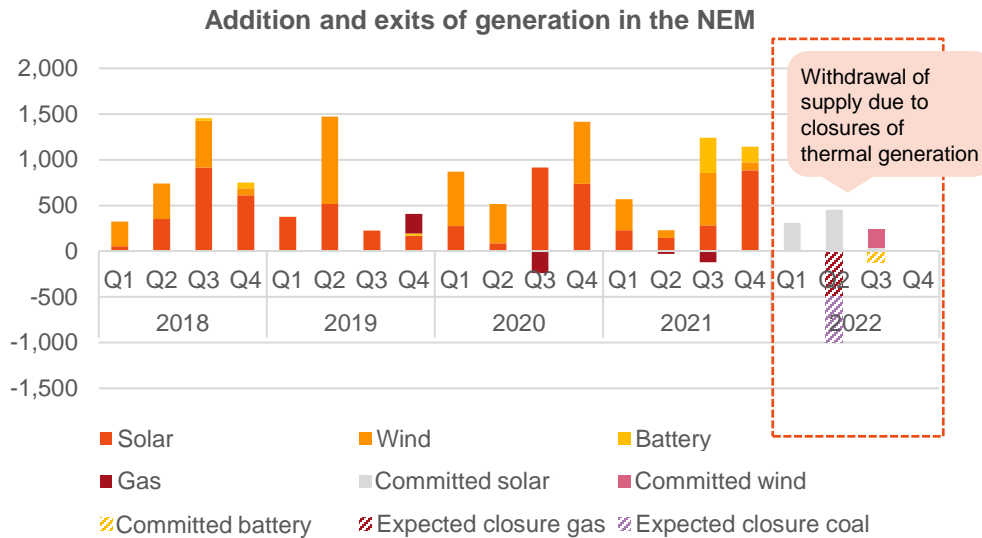
It has 40,000km of transmission and cables, supplying 204 terawatt hours of electricity.

As at December 2021:

- Total electricity generation capacity of 65 GW.
- Total of circa 16.7GW of distributed solar capacity.
- Total installed wind capacity is circa 9.1 GW.

# Renewable generation over time

From a slow start, renewable generation in Australia has grown significantly



Source: Australian Energy Regulator (AER)

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- Significant growth in renewable generation has been experienced, beginning from a standing start in the early 2010s once an initial Renewable Energy Target (RET) of 33TWhr by 2020 was established. Australia met the target in 2019, ahead of schedule.
- Grid-scale solar generation, which significantly lags wind generation, is growing quickly.
- Given the need for climate change mitigation, net zero ambitions and electrification, growth in grid-scale renewable generation is expected to continue. This may potentially require policy support. Importantly, the level of renewables growth also requires policy intervention.
- The additional level of intermittent generation, in conjunction with the continual reduction in coal-fired baseload generation (retirement of coal-fired plants) has elevated the role of battery energy storage systems (BESS) in the renewable energy thematic. However, this sector is still nascent requiring government funding to be economically feasible.

# Structure of the renewables market over time

The renewable development landscape is evolving for the better, however, investors are still willing to pay a premium for operating assets with PPAs given the risks associated with developing and connecting new renewable generation.

- The renewables market in Australia is relatively new and has changed consistently over time as market participants have become more sophisticated.
- Market developments have pushed returns down over time as the sector has matured.

Project and contractual structures have evolved over time and will continue to do so

	First generation	Second generation	Third/current generation	Next generation?
<b>PPA</b>	<ul style="list-style-type: none"> <li>• PPA executed prior to financing and construction</li> <li>• Asset fully contracted over its useful life</li> </ul>	<ul style="list-style-type: none"> <li>• Majority of asset fully contracted over its useful life</li> <li>• Increasing PPA prices</li> </ul>	<ul style="list-style-type: none"> <li>• Decline in demand for 'long-term contracted' generation</li> <li>• Potentially shorter-term PPAs</li> </ul>	<ul style="list-style-type: none"> <li>• Demand from corporates, with varying credit quality to increase</li> <li>• Potentially shorter term PPAs</li> <li>• PPA price normalising</li> </ul>
<b>Off-takers</b>	<ul style="list-style-type: none"> <li>• Off-taker contracted all generation</li> <li>• Predominant off-taker, vertically integrated utilities i.e. AGL/Origin</li> </ul>	<ul style="list-style-type: none"> <li>• Off-takers only contract generation on pre-agreed profile</li> <li>• Developers take some merchant price exposure</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in PPA prices, forced by sophisticated off-takers</li> <li>• Developers taking greater merchant price exposure</li> </ul>	<ul style="list-style-type: none"> <li>• Greater merchant price exposure</li> <li>• Off-take agreements to require firm power via battery storage</li> </ul>
<b>Gearing</b>	<ul style="list-style-type: none"> <li>• High levels of gearing</li> </ul>	<ul style="list-style-type: none"> <li>• High levels of gearing</li> </ul>	<ul style="list-style-type: none"> <li>• Lower level of gearing and more restrictive debt covenants</li> </ul>	<ul style="list-style-type: none"> <li>• Lower levels of gearing and more restrictive debt covenants</li> </ul>
<b>O&amp;M contracts</b>	<ul style="list-style-type: none"> <li>• Shorter-term contracts due to lower profitability of services</li> <li>• Higher level of equity risk</li> </ul>	<ul style="list-style-type: none"> <li>• Longer-term as OEMs see more value in longer term contracting</li> <li>• Reduction in equity risk for O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Longer-term as OEMs see more value in longer term contracting</li> <li>• Reduction in equity risk for O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Longer-term as OEMs see more value in longer term contracting</li> <li>• Reduction in equity risk for O&amp;M</li> </ul>
<b>Returns</b>	<ul style="list-style-type: none"> <li>• <b>Equity IRR: 10-14% p.a.</b> - dependent on technology</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Equity IRR: 8-12% p.a.</b> - dependent on technology</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Equity IRR: 6-9% p.a.</b> - utility scale solar at low end of range</li> </ul>	<ul style="list-style-type: none"> <li>• Returns are likely to normalise given changes to policy and forward guidance</li> </ul>

# PPA contract considerations

## Investors should consider the structure of any PPAs

- A Power Purchase Agreement (PPA) is the primary contract between the operator and the off-taker, underpinning the primary revenue stream of a renewable generation facility.
- The contracting structure and risk allocation within the PPA is key to a developer's/operator's ability to source external financing.
- PPAs may contain certain some uniform elements, but may differ on others depending on region and technology.
- PPAs can be fraught with complexity – there are numerous elements investors should understand and consider, some of which are outlined in Table 1.

**Table 1: PPA elements investors should consider**

<b>Structure of payment</b>	Are the payments based on plant availability or generation capacity or generation output?
<b>PPA tenor</b>	The length of the PPA should be sufficient to support optimal debt financing, debt amortisation, useful life of the asset, and provide for stable cash distributions and equity payback.
<b>Underperformance</b>	The commercial structure may have liquidated damages provisions enforced upon the operator in the case of underperformance, or in the case of severe underperformance, there may be termination rights.
<b>Commissioning and testing</b>	Should include appropriate risk allocation for commissioning. Contract structure may encompass outcomes for late project delivery/commissioning delays, and the process for testing; these may ultimately result in liquidated damages for delay or future underperformance.
<b>Change of Law</b>	Appropriate risk allocation in the case of a change in law affecting the operations of the asset; typically the developer or operator may seek waiver or pass-through of this risk.
<b>Operating requirements</b>	Operating issues typically include scheduled and maintenance outages, operation and maintenance requirements. These may be in the form of operator obligations for minimum availability of plant or make-good provisions for extended outages.

# Current and historical issues with renewable development

Over the last decade, the experience of investors, developers and the users of renewable generation has been mixed

- Stakeholders have learnt valuable lessons from renewables investing. These lessons and experiences are shaping the market today.
- The Australian electricity system was designed for centralised generation of the 20<sup>th</sup> century. The past decade of renewable investment suggests the electricity market is not fit for purpose for the impending distributed renewables future of the 21<sup>st</sup> century.
- Ultimately, the Australian electricity system needs significant modernisation and new rule settings – much like elsewhere in the world.

Policy	EPC market	Connection	Evolution of PPA market	Transmission investment	Target returns
<ul style="list-style-type: none"><li>• Government policy has created a history of stop-start development.</li><li>• Differing policies instituted by state and federal governments.</li><li>• Policy has been consistently inconsistent.</li></ul>	<ul style="list-style-type: none"><li>• EPC contractors previously bid at very aggressive (low) prices to win contracts.</li><li>• This has led to increased risk for contractors → bankruptcies → reducing the number of contractors.</li></ul>	<ul style="list-style-type: none"><li>• Past grid connection process straightforward and quick.</li><li>• Increasing intermittent generation has increased connection risk for project sponsors (red tape, system stability issues, long duration, additional costs).</li></ul>	<ul style="list-style-type: none"><li>• Beginning with integrated utilities fully underwriting renewable facilities to multiple shorter tenor PPAs to mix of lower credit quality off-takers.</li><li>• Increasing merchant generation as a proportion of total revenues.</li></ul>	<ul style="list-style-type: none"><li>• Growth in intermittent generation. Original electricity grid design is no longer fit for purpose.</li><li>• Underinvestment has led to significant grid instability.</li><li>• Increased curtailment of generation – leading to increasing revenue uncertainty.</li></ul>	<ul style="list-style-type: none"><li>• Reduction in returns with decline in PPA prices.</li><li>• Added pressure on returns from sophisticated corporates seeking load profile solutions.</li></ul>

# Change required in the Australian renewables investment landscape

Governments and regulators are demonstrating strong political will and positive sentiment in order to bring about change to the Australian electricity market

Recent government announcements and commitments toward clean, green energy generation has provided some certainty to investors – this creates opportunities for stable, long-term renewable energy investors.

Renewable energy developers and operators have been impacted by a perfect storm of:

- curtailment of renewable generation (to stabilise electricity network)
- uncertainty for long-term investors (energy policy, investment)
- lack of planning on an electricity network of the future
- new renewable generation developments held up waiting for grid connection.

Federal and state governments and regulators have acknowledged the issues and are drafting new policies, setting investment plans and creating new rules, respectively, to enable growth in renewable energy investments and generation. Recent announcements include:

- The new Federal Government is reviewing policy to target an increased reduction in greenhouse gas emissions.
- The NSW Government released a long-term investment plan to create fit-for-purpose transmission zones.
- The Victorian Government announced a target of 9GW of offshore wind capacity build-out by 2040.

— The AFR View

## Energy fix must keep the market in the NEM

This week's electric shock had mostly outside causes. But it is a grim warning for the politicians supervising an electricity system with a huge transition in front of it.

## Renewable Energy Zones

The Victorian Government is developing Victoria's Renewable Energy Zones (REZs), supported by a \$540 million REZ Fund to invest in needed REZ network infrastructure.

## Albanese to outline climate plan at summit

## Victoria announces 9GW offshore wind target by 2040

## CIP partners with Cbus in the Australian offshore wind project, Star of the South

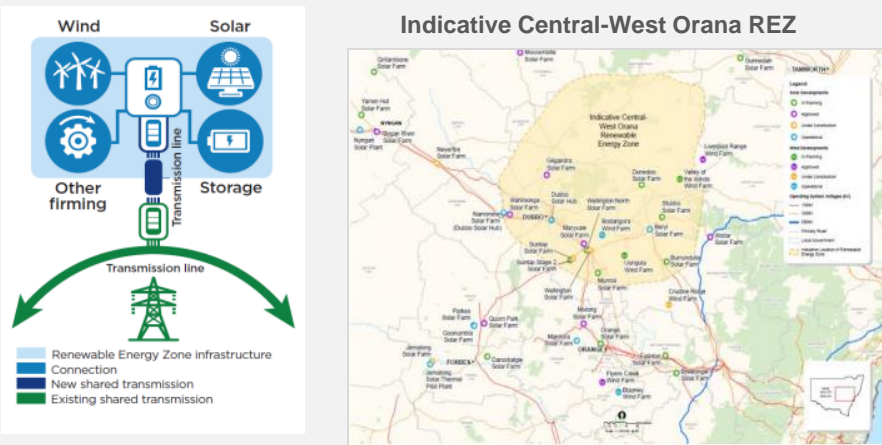


# New opportunities

Energy security and planned coal plant retirements have led state governments to push ahead with new renewable development initiatives

The NSW and Victorian state government initiatives provide certainty and opportunities to institutional investors who are already sizing up long-term development and investment opportunities.

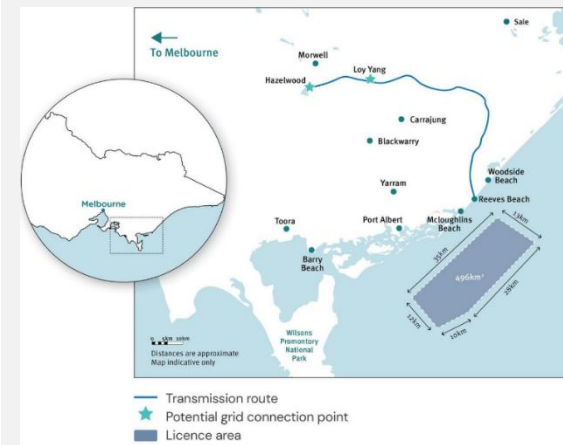
## New South Wales – Renewable energy zones (REZs)



Source: Government of NSW

- The NSW Government is creating site-specific REZs in regional NSW – these are expected to support 34GW of new renewable generation.
- REZs will be supported by significant investment from the NSW Government in the transmission and distribution networks making them ‘fit for purpose’.
- The REZs will allow for the integration of both utility scale wind and solar generation assets, supported by integrated battery energy storage systems.

## Victoria – Offshore wind



Source: Star of the South

- The Victorian Government is also instituting policy, providing a basis for significant off-shore wind developments off the coast of Victoria.
- The Victorian Government has set a target of 9GW of off-shore wind capacity to be built out by 2040.
- Significant transmission capacity already exists in south-eastern Victoria (Latrobe Valley), from the now decommissioned Hazelwood coal power plant.

# Market players

The Australian market is fragmented across integrated utilities, investors and developers

- Market participants and their investments vary depending on their strategy, capability, investment criteria and targeted returns.
- Table 2 highlights some of the active participants in the Australian renewable industry, segmented by their operating focus.

Frontier regularly supports its clients to meet their renewable investment objectives and can facilitate investors' entry into the Australian renewable energy market.

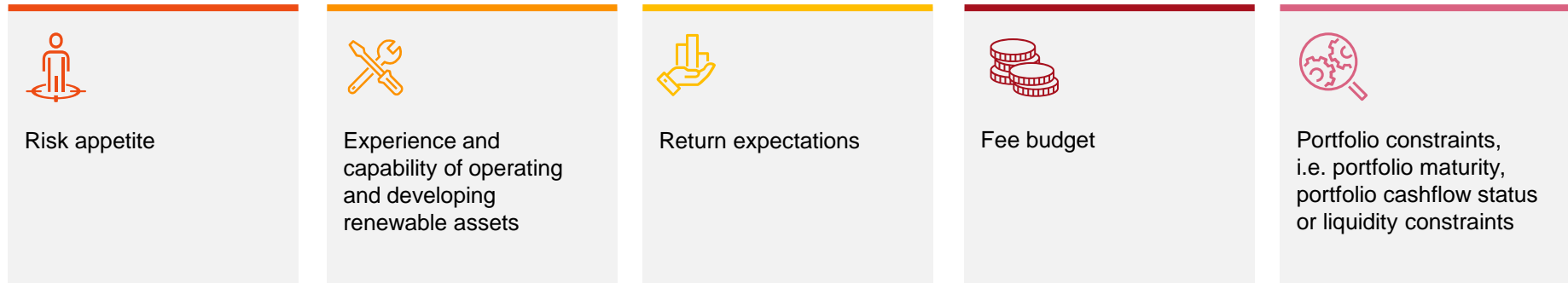
Table 2: Active participants in the Australian renewable industry

Market segment	Integrated utilities							
	Developers and financial investors							
								
Strategic operators								

# Opportunities to invest in Australian renewables

Depending on the investor's size, investors can access the Australian renewables market by acquiring a development business, an operating platform directly, or through co-mingled funds

The method of investor participation will depend on several factors.



- Several of the factors outlined will guide investors as to how market access will be achieved, i.e. an investor with low return expectations and limited sector investment experience is likely to gain sector exposure through a co-mingled fund.
- Notwithstanding the factors outlined, significant opportunities exist for investor participation within the Australian renewable market.
- Investors interested in sector participation should have a good understanding of sector value drivers and a strong underlying reason for segment participation, such as:
  - portfolio net-zero targets
  - thematic exposure
  - initial sector investment to grow sector investment.

**Frontier regularly supports its clients to meet their renewable investment objectives, however, any sector investment should be part of a total portfolio discussion to understand any constraints or limitations.**

# Notable renewable energy infrastructure transactions

The Australian renewable energy market has been very active, driven by significant demand from strategic investors, global infrastructure funds and pension funds.

Renewable deals have traded between A\$1.5 – A\$2.5 million/MW, with pricing dependent on technology, PPAs, tenor, and level of merchant price exposure.

Date	Status	Transaction	Capacity (MW)	Technology	Transaction type (M&A/greenfield)	Acquirer/developer
Sep 22	Live	NSW Electricity Infrastructure Roadmap	12,000	Wind, solar, battery storage, pumped hydro	Greenfield	AEMO
Sep 22	Live	Genex Power	550	Wind, solar, battery storage, pumped hydro	M&A	Stonepeak and Skip Capital
Aug 22	Live	Rio Tinto Wind and Solar Projects	4,000	Wind and solar	Greenfield	Rio Tinto
Aug 22	Live	Partners Group Australian Renewables Asset (CWP Renewables)	-	Wind and solar, etc	M&A	NA
Jul 22	Live	Brendale Hyperscale Data Centres	2,000	Battery storage	Greenfield	Quinbrook
Jun 22	Live	Asian Renewable Energy Hub (40.5% stake)	26,000	Solar, wind, and green hydrogen	M&A	BP (preferred)
Jun 22	Live	Great Eastern Offshore Wind Farm	2,500	Offshore wind	Greenfield	Corio Generation (preferred)
Jun 22	Closed	Star of South Victoria (10% stake)	2,200	Offshore wind	M&A	CBUS Super
May 22	Closed	AGL Energy (11.28% stake)	NA	NA	M&A	Grok Ventures
Dec 21	Closed	Gretel Solar Portfolio (90% stake)	240	Solar	M&A	Atmos Renewables
Jun 21	Closed	Bulli Creek Project (Stage 1)	475	Solar	M&A	NA
Mar 21	Closed	John Laing Portfolio	514	Wind	M&A	First Sentier Investors
Jan 21	Closed	AMP Energy US\$1bn Equity Raise	NA	Solar	M&A	The Carlyle Group
Oct 20	Closed	Engie Renewables Portfolio (75% stake)	285	Wind and solar	M&A	ICG



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