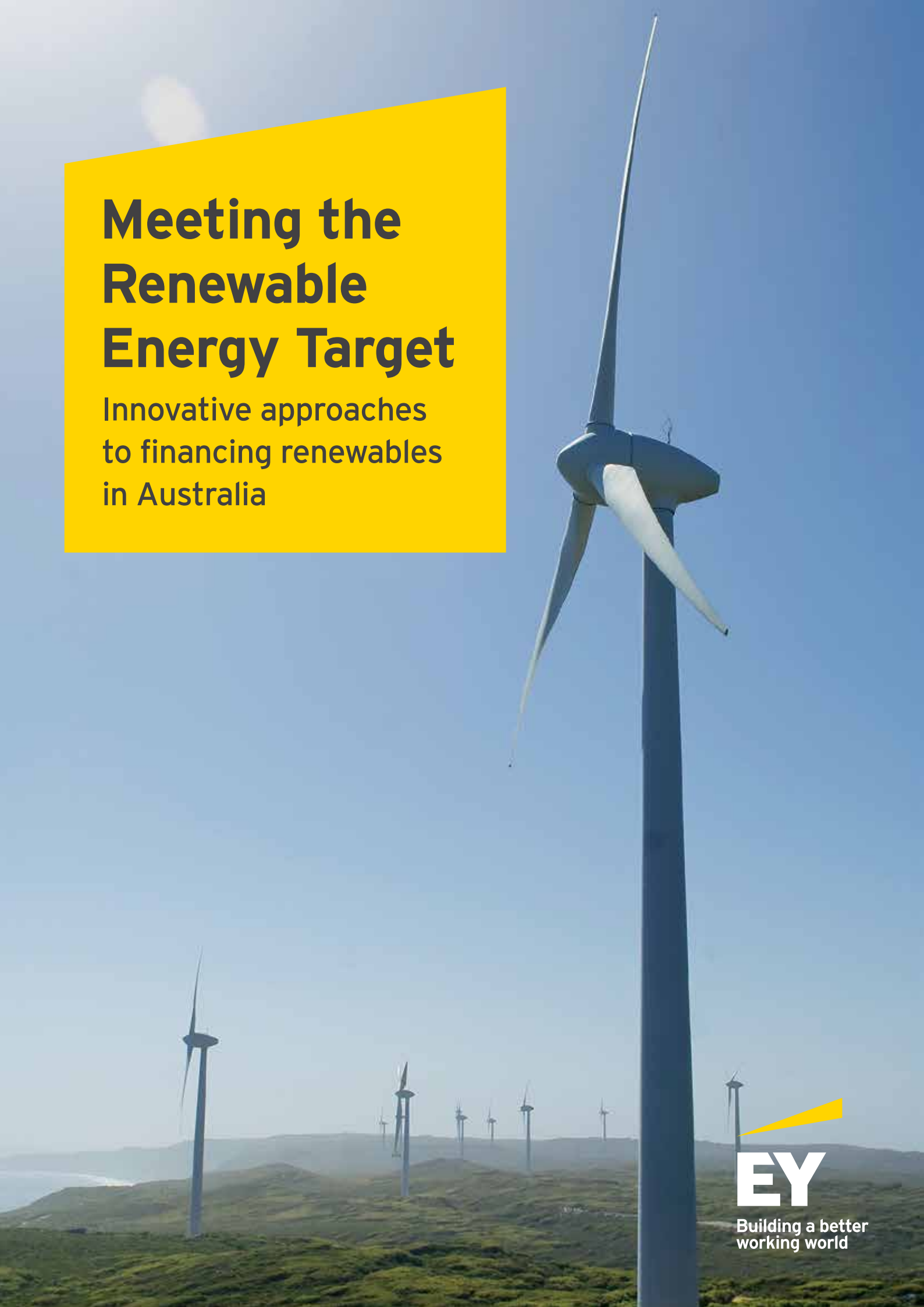
Meeting the Renewable Energy Target

Innovative approaches to financing renewables in Australia



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Foreword

In June 2015, the Parliament of Australia passed legislation to lock in an amended 2020 Renewable Energy Target. This closed the chapter on the Expert Panel Review that had been initiated some eighteen months earlier. With policy certainty restored, the large-scale Renewable Energy Target creates an immediate opportunity for renewable energy developers, investors and financiers to contribute to the achievement of Australia's energy and climate change objectives.

The Clean Energy Regulator reports annually to Parliament on the overall performance of the scheme. For the 2015 calendar year our report included for the first time a statement on progress towards the target. We concluded that 'in 2015 progress was adequate under the circumstances and that the large-scale Renewable Energy Target in 2020 is achievable'. We also commented that this will require approximately 6,000 megawatts of new large-scale renewable energy capacity to be built and that 'financing is the key determinant of the pace of future construction'.

Against this backdrop, the Clean Energy Regulator commissioned EY to comprehensively examine the market context for investment in renewables in Australia. Their report, *Meeting the Renewable Energy Target: Innovative approaches to financing renewables in Australia,* assesses current market constraints and new ways to secure finance for large-scale renewable energy projects in Australia.

Meeting the Renewable Energy Target: Innovative approaches to financing renewables in Australia explores a range of financial instruments and structures which may assist the renewables industry to bring projects through to financial close. The report includes international case studies and examines the options to apply similar models in the Australian market.

EY consulted a wide range of participants in the renewable energy market in the preparation of this report, including project sponsors, debt providers, energy retailers, and government agencies. The report identifies constraints, but also provides reasons for optimism. There are promising signs that an innovative market is finding new ways to support Australia's renewable energy industry. I am encouraged by the recent increase in committed projects and in funding, the use of non-traditional financial structures by projects already in construction, and the new financial products and procurement processes which have come onto the market.

Most pleasingly, the report notes Australia has been returned to the top 10 most attractive countries to invest in new renewable projects. This is reflective of policy certainty and the opportunities that exist to achieve the 2020 target.

I thank EY for their work to produce *Meeting the Renewable Energy Target: Innovative approaches to financing renewables in Australia*. I hope this report will reinvigorate the conversation about how large-scale renewable energy projects can be financed. The projects are there and the money is there; all that is needed is innovation to bring both together successfully. As this report underscores, the target is there to be met and the time for action is now.

Chloe Munro
Chair and Chief Executive Officer
of the Clean Energy Regulator

Executive summary

Now that the Renewable Energy Target (RET) is legislated, with federal bipartisan support, the foundation exists for a supportive environment for long-term investment in Australia's renewable energy market. The Clean Energy Regulator Annual Statement[1] suggests that, by 2020, circa 6,000 MW of new large-scale generation capacity will be needed to supply the required large-scale generation certificates (LGCs) to meet both statutory and voluntary sources of demand.[2] This will require the total renewable capacity installed since 2001 to double in the next four and a half years.

Currently, the bundled price of electricity and LGCs, estimated as the average spot LGC price plus the average wholesale electricity price, across Australia appears to be high enough to make new build financially viable.[3] The spot LGC price rose strongly before and since the revised target was legislated in mid-2015, reaching a record high of A$85.50 per certificate at the date of this report.[4] The recent increase in activity at this price level over a sustained period suggests that the market has confidence in the regulatory framework governing the sector. Notwithstanding this, market participants believe that if new supply does not come online, liquidity will tighten during 2017 as banked LGCs are used up.

There is no shortage of shovel-ready projects to invest in. Approximately 9,000 MW of new large-scale renewable energy projects have all the necessary development approvals to begin construction.[5] Promising evidence of 'green shoots' in the industry have also appeared, including a small number of new projects reaching financial close, Power Purchase Agreements (PPAs)[6] being signed, and a range of financing vehicles being created to underpin new developments.[7]

Despite these promising indicators, the level of firmly committed new build in 2016 to date[8] is well below the 3,000 MW the Clean Energy Regulator has estimated needs to be financed this year to ensure an adequate level of future supply to the LGC market. Few projects have achieved financial close in the last 12 months. Of those doing so since the bipartisan deal on the RET in May 2015[9] half (by capacity) are a result of an offtake agreement with government or a state-owned company.

The Clean Energy Regulator commissioned EY to identify the constraints to financing large-scale renewable energy projects and highlight opportunities to overcome them. To ensure this Report reflects market sentiment, EY conducted market consultations with participants across the large-scale renewable energy sector, including project sponsors (developers and equity investors), debt providers (banks and government agencies) and energy retailers.

This suggests that, despite the RET's stability, financing for greenfield projects is being constrained.

The Clean Energy Regulator commissioned EY to identify the constraints to financing large-scale renewable energy projects and highlight opportunities to overcome them. To ensure this Report reflects market sentiment, EY conducted market consultations with participants across the large-scale renewable energy sector, including project sponsors (developers and equity investors), debt providers (banks and government agencies) and energy retailers.

Overall, market participants consulted as part of this report attribute delayed market activity to challenges stemming from the interaction between project sponsors, debt providers and energy retailers in the renewable energy delivery chain – in the context of a volatile electricity market. These constraints include:

- A mismatch between different parties' expectations of the term of offtake agreements and debt
- Debt sizing requirements of banks
- Concerns around longevity of the RET and policy stability
- LGC acquisition strategies of energy retailers– with non-rated retailers[10] largely unable to participate in financing greenfield large-scale renewable energy projects

In response, the market is actively pursuing solutions to overcome these challenges, leading to some positive signs, including:

- Retailers reiterating their intentions to comply with the RET and notable PPA announcements in 2016
- The Clean Energy Finance Corporation's long-term fixed-rate loans for large-scale projects and its Large-Scale Solar program
- New investment funds emerging to facilitate project finance
- Non-traditional retail structures providing opportunities for large buyers, grouped buyers and non-rated retailers to directly participate in the financing of projects
- Numerous state and territory based procurement processes focused on obtaining energy from greenfield renewable energy projects
- Corporates beginning to consider how they can support renewable developments by directly procuring energy from those developments

These activities have a potential to create confidence in the market's ability to meet the RET, providing alternative offtake arrangements and increasing liquidity in financing markets.

A range of opportunities and innovations, commonly used in other jurisdictions, could also facilitate the financing of large-scale renewable energy projects in Australia. These include:

- Corporate support structures (e.g. purchasing power directly from an off-site project), including aggregated end user procurement models
- Merchant financing
- Financial instruments for managing merchant risk (e.g. synthetic PPAs)
- Structures to address debt volume and term (e.g. hedging instruments and insurance products)
- New approaches to appraising equity risks (e.g. taking RET risk, or viewing equity risks on a portfolio basis as opposed to specific project basis)

These approaches have already been implemented in international markets and could be instrumental in raising finance for greenfield renewable energy projects in Australia.

In light of favourable certificate prices, reductions in equipment costs and technology improvements, the legislated RET and the pipeline of "shovel ready" projects, Australia has re-gained its place in the top 10 most attractive countries to invest in new renewable projects.[13] There may be considerable commercial opportunities over the coming year and even potential early mover advantages given the short runway to 2020.

01

The state of renewable energy development in Australia

1.1 Certainty around Renewable Energy Target drives project investment

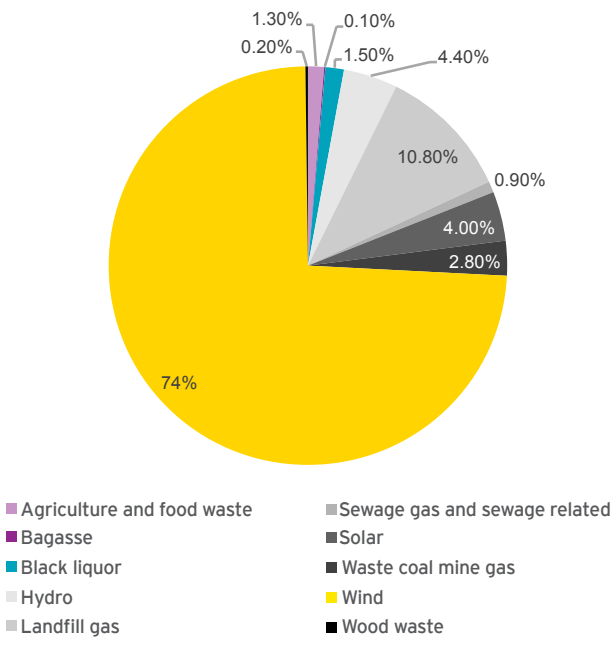
Renewed certainty around the Commonwealth's Renewable Energy Target (RET) is creating opportunities for investment in Australia's large-scale greenfield renewable energy projects. The RET creates demand for LGCs, requiring around 6,000 MW of new renewable energy capacity to be constructed by 2020. Certainty also facilitates secondary trading in the LGC market between generators, liable entities and speculators.

In recent years, investment in renewable projects has been hampered by political uncertainty around the RET. But now the policy environment surrounding the RET has stabilised. Australia has a mature capital market and the RET is considered to be an efficient policy mechanism for delivering projects by many market participants. Federal bipartisan agreement for the revised target in mid-2015 contributed to A$1.18 billion being invested in large-scale renewable energy last year.[14] Since June 2015, around 760 MW of large-scale renewable energy capacity has been committed or started construction, approximately 460 MW of which will contribute toward the RET scheme.[15]

Solar joins wind in the mix

Historically, most of Australia's large-scale renewable energy developments have used onshore wind generation technology (see Figure 1), with more than 4,500 MW of wind generation capacity developed since the RET scheme began. Today, large-scale solar generation projects are also emerging. While large-scale solar is not expected to eclipse onshore wind in the near future, the recent trend is worth noting with off takers using solar to diversify their renewable generation portfolio. By December 2015, the Clean Energy Regulator had accredited 37 solar power stations, including the two largest in Australia: Broken Hill Solar Plant (53 MW) and Nyngan Solar Plant (102 MW). The Clean Energy Regulator also expects that the 6,000 MW of new capacity will be delivered through a mix of approximately 25% solar and 75% wind. Given the short runway to 2020, solar might make a larger contribution to the RET because of its shorter construction period and improving cost competitiveness with wind technology.

Figure 1 – 2015 Fuel source of accredited large-scale generation projects by MW (Source: Clean Energy Regulator)



1.2 Development pipeline suggests 2020 target is within reach

Given the current 9,000 MW of large-scale renewable projects with development approval, the 6,000 MW target appears within reach. Reaching the target depends on projects reaching financial close during 2016 and 2017 and proceeding to construction in time for the 2020 target to be delivered.[16] Reaching financial close takes 1-2 years assuming development approval has been received, during which time project sponsors will be required to:

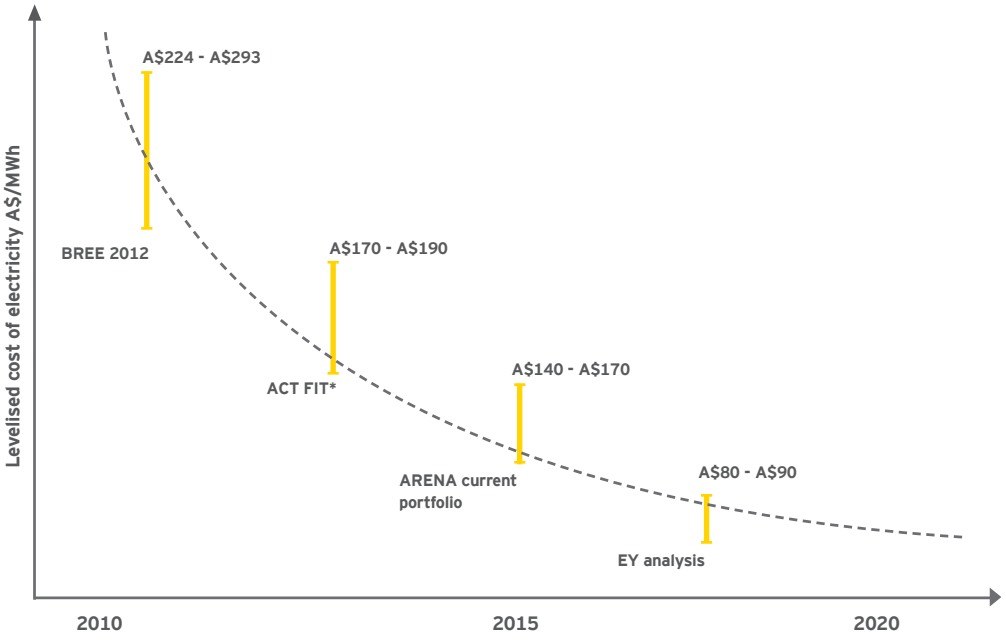
- Sign a grid connection agreement
- Source an offtake agreement[17]
- Negotiate engineering procurement and construction agreements (including equipment supply) and operations and maintenance agreements
- Arrange finance

Reasons for optimism

EY believes the following may contribute towards the industry efforts to meet the RET:

- **Healthy pricing** – The combination of the high LGC spot price (recently seen at A$85.50 per certificate) and the average wholesale market price of electricity appears to make new build projects financially viable.[18] We've already seen two ACT renewables wind auctions yield prices ranging from A$77-92/MWh.
- **Viable solar** – The falling costs of developing solar energy is building financiers' confidence in new large-scale solar projects as it approaches parity with wind projects (see Figure 2). The challenge for solar and its ability to compete with wind will depend on whether it can meet the time of use demands of end users. The advent of battery storage technology and its ability to complement solar in servicing end users will be key in solar joining the generation mix. Large grid-connected battery storage could also become a credible alternative for alleviating congestion in areas with low network capacity.[19] Co-location of solar with wind could address intermittency issues and lower grid connection costs.

Figure 2 – Historical Levelised Cost of Energy for Australian large-scale solar



*Normalised for capital structure advantages associated with 20 year feed in tariff
Source: Australian Renewable Energy Agency (ARENA), The Bureau of Resources and Energy Economics, Australian Energy Technology Assessment 2015, EY analysis

1.3 Momentum grows for the next wave of development

The shortening runway creates a window of opportunity for developers to benefit before the RET ends in 2030. Already, we can see signs of the market responding, with new investment funds emerging, greenfield project PPAs being struck and interest from corporates. These activities have a potential to create confidence in the market's ability to meet the RET, providing alternative offtake arrangements and increasing liquidity in financing markets.

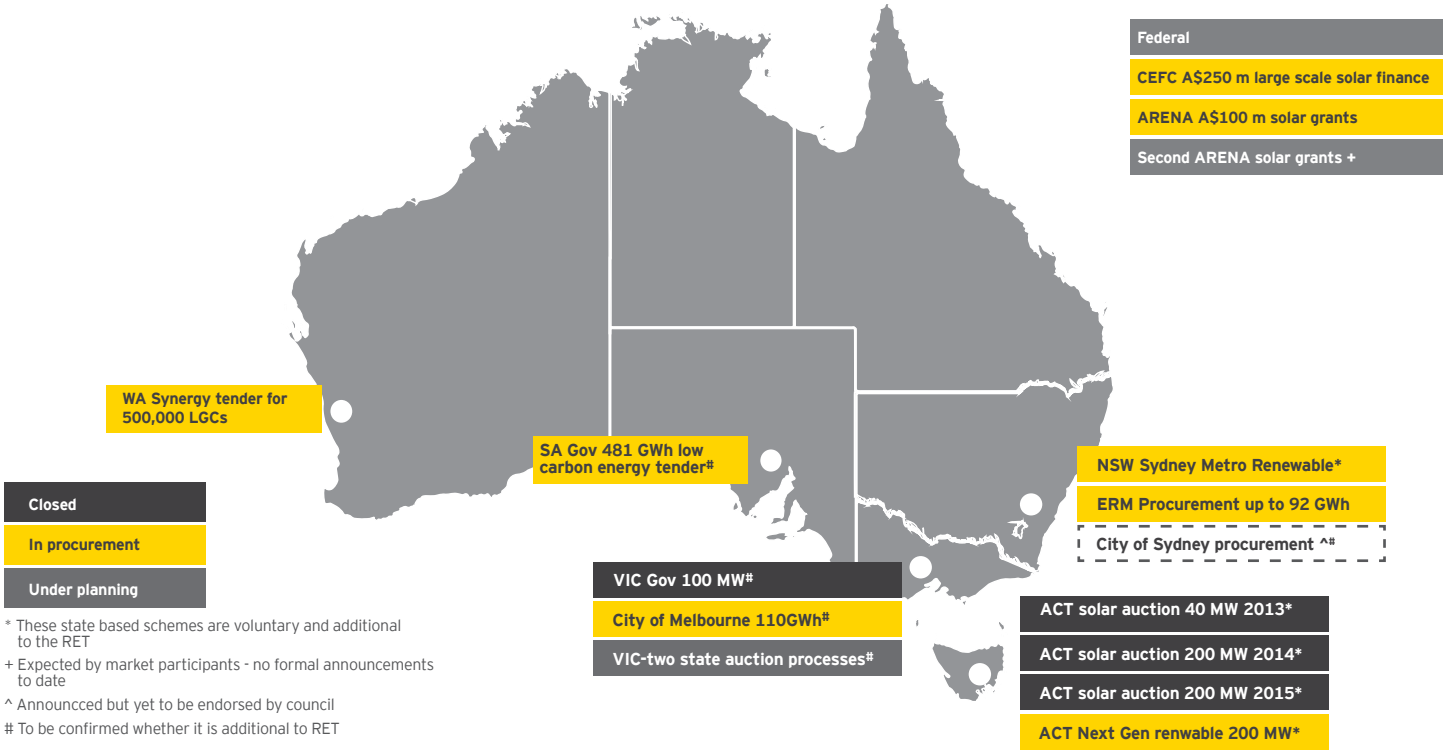
'Green shoots' emerging across the market include:

- Retailers reiterating their intentions to comply with the RET. With banked certificates expected to deplete over the next 1-2 years, they are actively committing to procure power from renewable projects. Origin Energy has committed to purchase 100% of the output of the existing Moree Solar Farm for 15 years and the Clare Solar Farm for 13.5 years.
- **New investment funds emerging, including:**
  - AGL Energy's Powering Australian Renewables Fund (PARF), which will seek investors for up to A$3 billion of large-scale renewables projects, complete with power purchase agreements. The vehicle will also reportedly assist AGL in meeting its legislated obligations under the RET by bringing approximately 1,000 MW of renewable energy capacity on line.[20] QIC on behalf of its managed clients (including the Future Fund) will provide A$800m in equity funding along with A$200m from AGL.[21]
  - The partnership between the Clean Energy Finance Corporation (CEFC) and Palisade Investment Partners to accelerate delivery of A$1 billion of Australian renewable energy projects. This project intends to source institutional investment in renewable energy at an earlier stage of project development.[22]
- Greenfield project PPAs being struck, including Ergon Energy Queensland's recent PPA with Mt Emerald Wind Farm (170 MW) in northern Queensland, which will be Queensland's largest operating wind farm.[23]
- Projects being financed without a PPA to accelerate construction and take advantage of high spot market prices, with Goldwind financing White Rock Wind Farm (175 MW) without a PPA in place.
- Non-traditional retail structures emerging, which may provide the opportunity for large buyers, grouped buyers and non-rated retailers to directly participate in financing RET-driven projects. Examples include the World Wildlife Fund (WWF) Buyers Forum and the Melbourne Renewable Energy Project.
- Corporates and end-users beginning to consider how they can directly procure from renewable projects, such as the Sydney Metro North West Project.
- Investors actively looking for new investment opportunities and increasingly considering opportunities earlier in the project lifecycle.
- Lenders beginning to consider how they are best positioned to participate in the sector. For example, National Australia Bank (NAB) and Commonwealth Bank have announced their commitment to working with the CEFC and Palisade to provide debt financing for renewable energy projects.[24]

Government procurement processes

Numerous procurement processes and ongoing government initiatives focused on energy from greenfield renewable projects are underway or in planning. Various State and Territory governments (see Figure 3) have their own renewable energy policies and have initiated programs to support renewable energy developments. Some programs have provided explicit State credit rating support. Many of these schemes are additional to the RET target, but promote liquidity in the financing market by enabling investors to benefit from the State's credit rating.

Figure 3 – Procurement processes around Australia



* These state based schemes are voluntary and additional to the RET

\+ Expected by market participants - no formal announcements to date

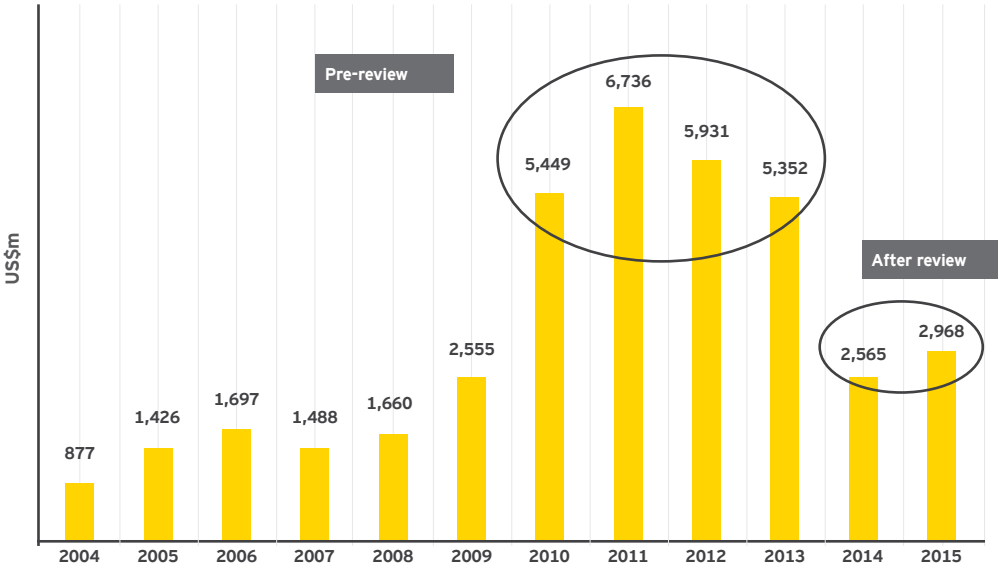
^ Announcced but yet to be endorsed by council

\# To be confirmed whether it is additional to RET

1.4 But transaction activity remains low

Although some projects have received PPAs and reached financial close recently, transaction activity remains below the levels achieved immediately before (2012-2013 – see Appendix C and Figure 4)[25] the Government's review of the RET scheme.[26] In 2016, the level of firmly committed new build to date is well below the 3,000 MW the Clean Energy Regulator estimates is needed to be financed this year to ensure adequate LGC liquidity in the market.[27]

Figure 4 – Total new clean energy investment in Australia (US$m)



Source: Bloomberg New Energy Finance

The volume of projects being financed with commercial offtake agreements is a possible indicator of investment constraints in the market. Projects that relied purely on a commercial PPA represented only 20% of those reaching financial close since May 2015. Half of the projects reaching Financial Close since May 2015[28] (when a bipartisan deal on the RET was achieved) have done so as a result of an offtake agreement with government or a state-owned company.[29] Some also have explicit capital cost support from the government via the ARENA or the CEFC.[29] It is unknown whether these projects would have reached financial close if a government offtake (or government support) was not available to purchase the LGCs and electricity.

Even allowing for transaction activity being a lag indicator, the above suggests that, despite the stability of the RET and the stated intentions of retailers, there are commercial investment constraints which could be creating barriers to funding greenfield projects.

The next chapter examines these constraints.

02

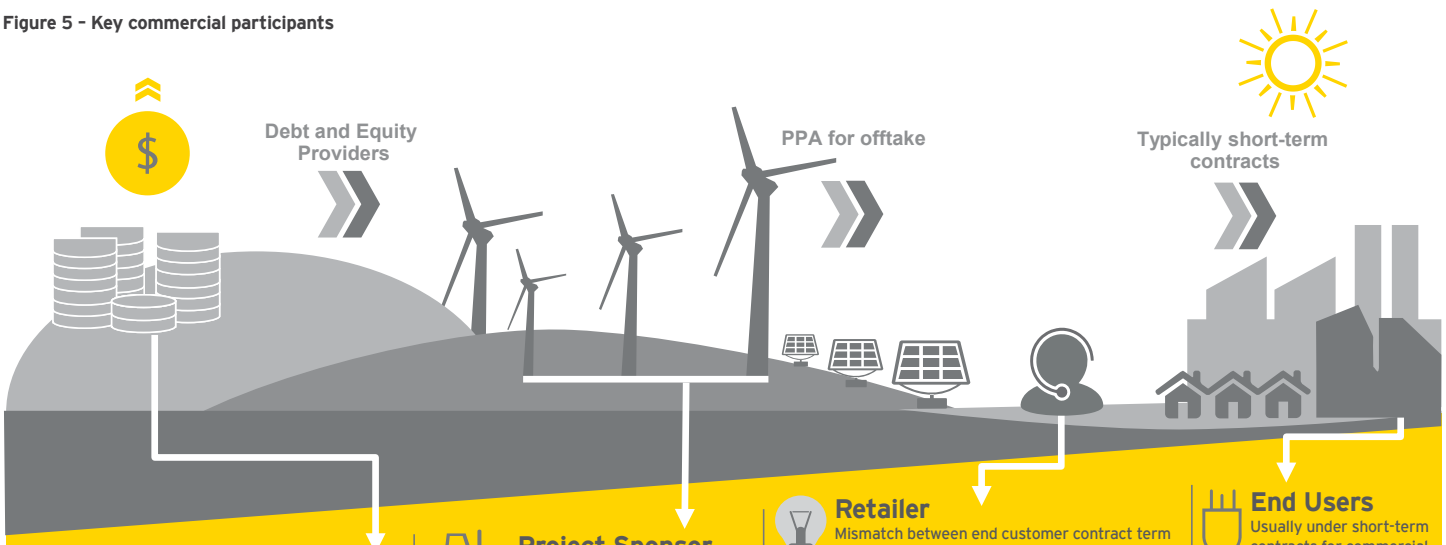
Investment constraints

2.1 Key commercial participants

Most of the challenges outlined in this chapter assume that investments will be financed using non-recourse debt.[30] Understanding the role of project sponsors, debt providers and energy retailers provides insights into some of the challenges projects face (see Figure 5).

Large-scale greenfield renewable energy projects require coordinated interaction between these key parties, who often have mismatched expectations, priorities and motivations, generating the potential for investment constraints.[31]

Figure 5 – Key commercial participants



Financier

Seeking long term certainty

- Supply debt, typically on a non-recourse basis
- Manage credit risks by securing debt against project assets and contracts or imposing constraints on project sponsor
- Will typically require a range of contracts to be in place to mitigate risk including, PPAs with creditworthy counterparts, O&M and engineering, procurement and construction (EPC) agreements

Project Sponsor

Mismatch of tenor between the requirements of financiers and contracts provided by retailers

- Responsible for project delivery, coordinating funding, development and construction activities
- Arrange project financing using debt and equity capital
- Project sponsors may contribute equity funding and construction (EPC) agreements

Retailer

Mismatch between end customer contract term and needs of project sponsors

- Purchase output from the projects as well as purchase electricity from the spot market, to on-sell to electricity workers
- Manage risk exposure by:
  - Balancing spot market exposure with long and short-term contracts to purchase electricity from suppliers
  - Utilising hedging instruments
- Are the most natural counterparty to offtake agreements with projects as they have a regulatory requirement to obtain and surrender LGCs
- Can serve different customers:
  - Residential
  - Commercial and industrial

End Users

Usually under short-term contracts for commercial and industrial customers

2.2 Market constraints

Our market consultation process revealed four main constraints hampering investment funding in renewable projects.

2.2.1 Term

Securing a long-term offtake commitment provides revenue certainty and minimises demand and refinancing risk. Traditionally, this was an essential precondition for renewable energy projects to reach financial close – often imposed by lenders and some investment committees, who prefer minimal exposure to fluctuating spot market prices. Projects with short-term offtake agreements also raise concerns about whether project sponsors will be able to recontract to secure the long-term financial viability of the project for sponsors and equity and debt providers.

An energy retailer's willingness to enter into a long-term energy procurement contract depends on its customer mix. Long-term contracts are appropriate for residential customers due to their relative 'stickiness' at a portfolio level. The reverse is true for commercial and industrial (C&I) customers, who are more price sensitive and rarely purchase under long-term contracts.

The mismatch between different parties' expectations of the term is arguably one of the most significant financing hurdles in the renewable energy market. As discussed in the next chapter, the growth of corporate support structures and merchant financing offers promising potential to overcome this problem.

2.2.2 The longevity of the RET and policy stability

Participants remain cautious about the stability of the government's policy position, affecting the way risk is allocated in contractual arrangements. They also question the longevity of the RET and what this implies for their return requirements.

- What will happen between 2020 and the RET ceasing in 2030? Future LGC market prices are extremely difficult to forecast. Some project sponsors are concerned the price of LGCs could collapse or remain volatile once the 33,000 GWh target is achieved. Retailers are typically not willing to contract for long term PPAs because of this future price uncertainty. Project sponsors investing without a PPA face the risk of not earning an appropriate return on their investment for a sufficiently long period (typically at least 10 years).
- What will happen post 2030 for investments made around and also before 2020? The shorter investment horizon reduces the amount of time required to appropriately amortise the initial capital outlay. Cost reductions from advances in technology could potentially make projects viable without government support after 2030.

2.2.3 Debt sizing requirements and balance sheet treatment

The ability to secure sufficient debt capital depends on the lender's view of the project's risk profile, which can be affected by exposure to merchant spot price volatility and the offtaker's credit rating. Project sponsors face limited options in securing an offtake agreement with only three non-government retailers capable of securing the required level of finance to build large-scale projects.[32]

For retailers, an offtake agreement's structure can result in it being considered a lease of the underlying facility, and therefore affect the retailer's balance sheet treatment and credit rating. Some of the parameters that can influence this balance sheet treatment include:

- **Term:** The longer the term, the greater the possibility of the offtake agreement being considered a finance lease, and the retailer having to recognise a liability on its balance sheet.
- **Volume risk from intermittent generation:** If retained by retailers, is potentially an indicator of a finance lease requiring the recognition of a liability which affects how rating agencies view offtake agreements.
- **Pricing structure:** Agreements to take substantially all of a facility's output can result in classification as a lease if the pricing is neither fixed per unit of output, nor equal to market price per unit of output.

The classification of an offtake agreement as a lease does not necessarily mean that a retailer would recognise a liability, if it can be demonstrated that the lease is an operating lease (for example, if its term is not significant compared to the useful life of the underlying assets). However, from 1 January 2019, a revised accounting standard will remove the distinction between operating and finance leases, and require the recognition of a liability for all contracts that are considered to be leases.

2.2.4 Retailer LGC acquisition strategy

Retailer demand for PPAs depends on the relative cost of acquiring LGCs under those PPAs versus transacting on the LGC spot market. Non-rated retailers, whose credit quality excludes them from long-term offtake agreements, generally have to acquire LGCs on the spot market. Any tightening of liquidity in the market for LGCs and high spot market prices will make it increasingly difficult for non-rated retailers to meet their obligations by acquiring LGCs on the spot market.

Many rated energy retailers currently have high levels of banked LGCs which were, at least in part, acquired in more uncertain times when spot prices were as low as A$33/MWh. The Clean Energy Regulator estimates that, by 2017, most of these banked LGCs will be surrendered,[33] which may partially explain why energy retailers have hesitated to provide offtake agreements over recent years. However, at the time of this report, the LGC price had consistently been above A$81/MWh for 12 weeks.[34] At that pricing level, it will be more attractive for retailers to procure LGCs under long-term PPAs.

The next chapter explores how the market is responding to these constraints and outlines a range of financing opportunities and innovations being used in other markets to address similar challenges.

03

Potential opportunities and innovations in financing large-scale renewable energy projects

This chapter explores potential opportunities and innovations that could support the future investment and financing of large-scale renewable energy projects in Australia. It presents alternative financing solutions adopted in other jurisdictions which may be helpful when considering the constraints in the Australian market (see Chapter 2), and in supporting the ultimate achievement of the RET.

Market participants are working to overcome current constraints, using various financing innovations. These innovations often involve reallocating (to other parties) the price and volume risks that energy retailers have traditionally managed through PPAs. These new financing models provide each party with the opportunity to re-evaluate the level of risk they are comfortable with.

Table 1 outlines these opportunities, which are broadly grouped into three categories, being dealing with offtake contract constraints, addressing debt volume and terms constraints and challenging the appraisal of equity finance. This chapter then describes each innovation and discusses their potential for application in Australia.

Table 1 – Opportunities provided by/innovations identified

Financing constraints					
	1	2	3	4	
Financing opportunities and innovations	Term	Longevity of the RET	Debt sizing requirements by banks	Retailer LGC acquisition strategy	Description
Dealing with offtake contract constraints					
Corporate support structures ▸ Purchasing power directly from an off-site project ▸ Direct equity investment in an offsite project ▸ Energy purchased from an on-site or adjacent project	●	●	●	●	These innovations offer the greatest potential for the market to overcome key financing constraints. By offering an alternative to the traditional retailer-led PPA, they could provide further liquidity in the PPA market, giving financiers the certainty they need to deploy their capital.
Aggregate procurement models	●	●	●	●	
Merchant financing	●	●	●	●	
Financial instruments for managing merchant risk ▸ Synthetic PPAs ▸ Insurance and hedging products to mitigate price and volume variability	●		●		Some overseas markets have developed hedging and financial products in response to a shortage of longer-term bankable offtake agreements. These products help project sponsors to achieve price certainty over the project cash flows, supporting their efforts to raise finance.
Addressing debt volume and term constraints					
Export credit			●		These innovations are very focused on the debt market and as such offer some benefits to parties seeking finance. The limiting factor for these innovations is their reliance on an offtake agreement.
Utilising debt capital markets			●		
Challenging the appraisal of equity finance					
Attracting new types of equity investors	●	●			Accepting key risks such as RET risk and merchant risk offers investors real opportunities to advance their projects; however, as has been noted by many market consultation participants, these remain key obstacles for many investment committees.

3.1.1 Corporate support structures

Market consultation participants noted that large corporates are emerging as a driving force for developing renewable energy projects around the world, particularly in the UK and US. Corporates are looking to access energy from renewable projects as a means to: increase energy efficiency and security; improve energy price predictability; and switch to low-carbon energy sources to enhance reputation and brand by meeting the sustainability expectations of customers, investors and other stakeholders.

This commercial arrangement has the potential to address all four major financing constraints in renewable energy projects (see Table 3).

Table 2 – Different approaches for corporates accessing energy from renewable projects

Approach 1: Purchasing power directly from an off-site project

In this case, the PPA involves a direct, long-term contract between corporate end-users and power generators for the power produced from the facility. The term of the contract is sufficient for the generation project to obtain financing.

The advantage for the corporate is that it controls the power-pricing relationship with the renewable generation asset, rather than paying a retail grid tariff for all the electricity consumed from the retailer.

As is illustrated in Figure 6, differences between a corporate's load profile and the contracted output is managed or "sleeved" by a third party energy utility. Major energy intensive consumers (such as aluminum smelters) with in-house energy trading functions may also take responsibility for managing the balancing, transmission and other risks of the physical power.

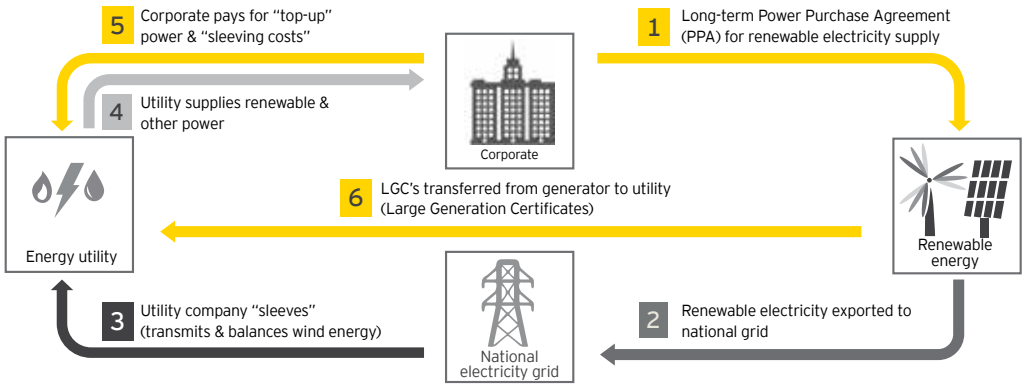


Figure 6 – Purchasing power directly from an off-site project

Approach 2: Direct equity investment in an offsite project (with or without PPA)

As well as agreeing to take some or all of the power (and green certificates) from an off-site generator via a PPA, some companies also invest directly in the generator before construction begins. The level of investment usually provides a degree of control over the terms of the PPA.

Conversely, in an off-site investment without a PPA option, the corporate invests in a renewable asset, but the PPA contracting takes place between the project and a third party offtaker. This option is typically adopted where PPA "sleeving" is not achievable through local or regional electricity transmission networks.

In this scenario, the corporate still gains price security from the "natural hedge" between the market power price changes and project level equity dividends. If power prices rise, the corporate, as a consumer of electricity, pays more for the power it buys from the market. But this extra cost is offset by higher dividends from the project, which is receiving greater revenues from selling power into the market.

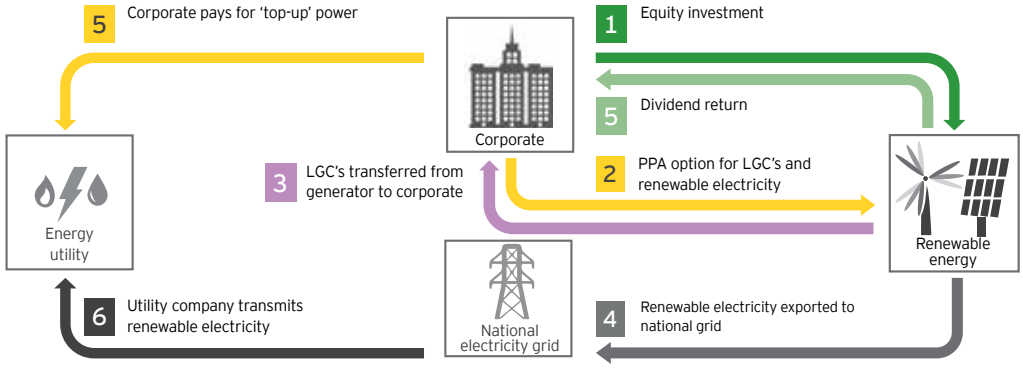


Figure 7 – Direct equity investment in an offsite project

Approach 3: Energy purchased from an on-site or adjacent project (with third party design, build, finance and operate)

Corporates commission the construction of a renewable energy generation plant on or near one or more of their sites. Project development can occur in-house or via a joint venture with a developer.

This option sees the corporate undertaking the project facilitation work and procuring a developer through a competitive process, bidding back the power. The developer remains responsible for designing, building, financing and operating the facility.

This option outsources key risks to parties with core competence. A special project vehicle structure uses third party debt to reduce the weighted average cost of capital and third party equity to reduce the sponsor's financial burden.

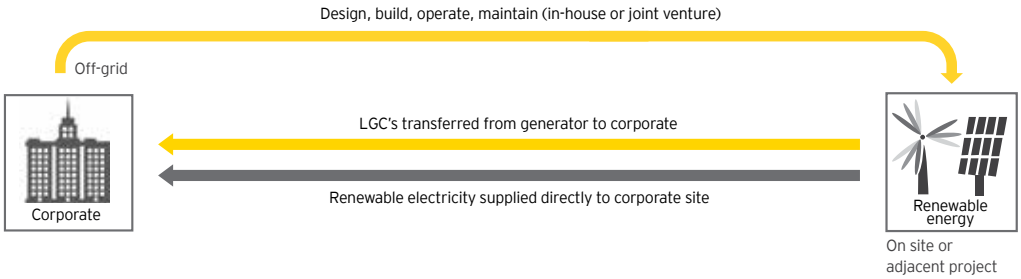


Figure 8 – Energy purchased from an on-site or adjacent project

Table 3 – Opportunities provided by Corporate support structures

Opportunities		Description
✓	Tenor	The corporate provides a long term offtake agreement to the renewable energy generator enabling the generator to use the long term price certainty to raise finance.
✓	Longevity of the RET	Corporate takes on RET risk through the acquisition of LGCs.
✓	Debt sizing requirements	For approaches 1 and 3, with tenor and the removal of RET risk, banks will feel more comfortable providing greater volumes of debt to the project. It is possible that the credit risk of the corporate may be lower than that of the major energy retailers, which would also enhance the ability of the bank to lend funds to the project. For approach 2, however the benefits of improved debt sizing requirements could be offset by a potential conflict of interest with the corporate being the beneficiary of the PPA and an equity sponsor for the project.
✓	Retailer LGC acquisition strategy	All three approaches require the corporate to acquire LGCs from the project to meet their environmental objectives mitigating the impact of any retailer LGC acquisition strategy on the availability of PPAs.

Potential for application in Australia

Already, the Australian corporate PPA market is starting to take shape, with early projects showing how these commercial structures can be applied locally. The Clean Energy Regulator notes that, to date in 2016, 36 corporate solar projects have added approximately 8.2 MW of new generation capacity, which has contributed to meeting the RET. Although small, this new capacity indicates that corporates are willing to look at new forms of procurement for their electricity. At the larger end of the market, the Sydney Metro North West Project, while a government procurement, may also provide a precedent for how large corporates use renewable energy to procure electricity.

Looking at the well-developed corporate PPA markets in the US and UK – markets with some similarity to ours – EY and our market consultation participants see, strong potential for this market to develop in Australia.

The US in particular has seen significant growth since 2008 when SC Johnson and Walmart initially entered the market. This has built to a point where, in 2015, around 1.6 GW of renewable energy capacity was contracted by corporates, compared to the total of 650 MW that was contracted between 2008 and 2012.[35]

The analysis in Appendix B summarises the similarities and differences between the renewable energy sectors between the three geographies and demonstrates why corporate PPAs could be a significant driver for projects in Australia.[36]

Aggregate procurement models

Aggregate procurement models enable several energy buyers or end users to combine their energy procurement into one transaction, aiming to: achieve economies of scale; reduce transaction costs; and attract the best projects and the lowest electricity cost while reducing carbon emissions.[37]In other jurisdictions, this method has been used to combine demand, and to support renewable energy from on-site installations or offsite renewable energy projects.

Aggregated procurement also uses the non-traditional retail structures (described in section 3.1.1) where the retailers main function is to manage the difference between the buyers' load profile and the contracted output of the generation project. In this instance, the retailer would not necessarily take on key project risks, which would be transferred to the buyer group.

Importantly, this may create the opportunity for non-rated retailers to become involved in offtake agreements, broadening the options for project sponsors if the:

- Buying group's credit quality is higher than that of the non-rated retailer
- Commercial structure of the offtake agreement gives financiers exposure to the credit quality of the buying group – instead of the credit quality of the energy retailer.

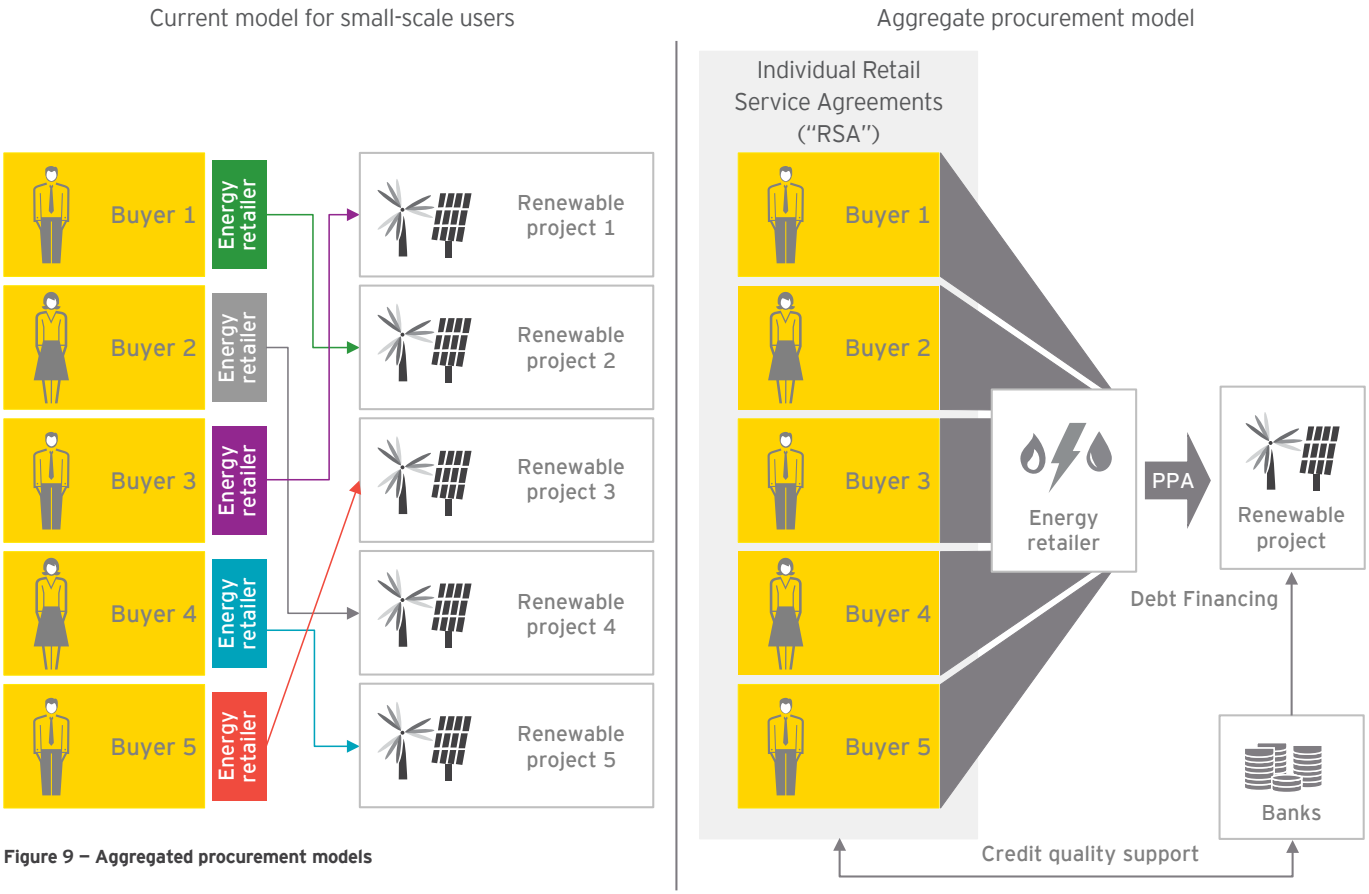


Figure 9 – Aggregated procurement models

Table 4 – Opportunities provided by aggregate procurement models

Opportunities		Description
✓	Tenor	Long term PPA tenors are usually agreed to enable the financing. In the US: ▸ The Silicon Valley Collaborative Renewable Energy Procurement Project requested pricing for 20 years[38] ▸ The Collaborative Solar Project (TCSP) requested pricing for 10 – 15 years[39]
✓	Longevity of the RET	As the buyer group typically takes risk on the any environmental credits .
✓	Debt sizing requirements	Large buyers with good credit ratings, who act as anchor buyers, make financial intuitions' more comfortable and can result in reducing financing costs for the project[40] and potentially providing more favourable gearing ratios. Aggregating across a group of buyers with a similar collective minimum renewable energy demand will negate the risk of project failure from any one individual buyer pulling out of the initiative (i.e. the rest of the buyers in the bundle can purchase the leftover power).[41]
✓	Retailer LGC acquisition strategy	If the retailer is non-rated, buyers would typically acquire LGCs to ensure the project receives the benefit of their higher credit rating. However, the retailer can also acquire LGCs under the scenario on the back of buyer environmental obligations.

Potential for application in Australia

These models are already being used in the Australian market (see Case Studies 1 and 2). If non-rated energy retailers wish to acquire LGCs from projects using this structure, the higher credit risk of these entities will affect the level of debt that financiers are willing to lend. However, as demonstrated by the lessons from India's 2014 Collaborative Solar PV Procurement Project:

- **Large buyers with good credit ratings who act as anchor buyers, make financial institutions more comfortable and can result in reduced financing costs for the project[42]**
- **The benefits of aggregation can be best achieved with a handful of large buyers (whose aggregate demand is at least 1 GWh / annum).[43] This means that, even if a large buyer pulls out of the project, the rest of the buyers can purchase the left over power, reducing financial risk.**

Notwithstanding specific tax-based incentives, Australia shares some of the market characteristics that have supported the development of corporate PPAs in the UK and USA, such as falling costs, reduced retailer tenors and the market relevance of synthetic PPAs.

Case Study 1 – WWF Renewable Energy Buyers Forum

The WWF Renewable Energy Buyers Forum brings together a group of businesses, institutions and governments interested in procuring incremental renewable energy to power their various operations.[44] Recognising the complexity and challenges for businesses acquiring renewable energy at competitive prices, the Forum aims to aggregate a renewable energy purchase with interested companies and large energy users.

As at October 2015, the Forum had received interest from seven of its members for 100 GWh of grid renewable energy each year.

Case Study 2 – Melbourne Renewable Energy Project

Melbourne City Council, several other local councils and cultural institutions, and private sector organisations (including the NAB, the University of Melbourne, RMIT University and Melbourne Convention Centre) have launched a competitive tender to purchase approximately 110 GWh of renewable energy from a greenfield renewable energy project. The organisations intend to jointly purchase the energy for a ten-year term.

The outline contractual structure as indicated at a supplier industry briefing, suggests:

- The retailer will be the primary contracting party
- Each customer will have a separate (largely identical) retail services agreement contract with the retailer
- The retail service agreements underpin a PPA between the retailer and the developer
- The generation asset developer will have supply, auditing, price and certain non-energy related obligations[45]

The objective of this contracting structure is to "unlock investment in a new renewable energy facility by providing developers (and their financiers) with certainty."

3.1.2 Merchant financing

In this case, funding is secured without a PPA, exposing financiers to some form of spot price market volatility in wholesale power and LGCs. Unlike energy retailers, who are well suited to managing market price volatility, some financiers lack sophisticated energy trading functions. To cover the additional risk, financiers typically demand a premium on their capital, with banks in particular imposing more onerous debt service covenants, such as higher Debt Service Coverage Ratio requirements.[46] Merchant financing can benefit smaller, non-rated retailers by making more LGCs available for purchase in the spot market.

Potential for application in Australia

Consultation indicates that market participants may be willing to relax requirements for a PPA over the entire project output as a prerequisite for financial close. As more finance has chased fewer deals in the Australian market, debt and equity financiers are realising that some form of merchant price exposure may be necessary to progress projects.

In lieu of long-term PPAs, a number of Australian projects have already used merchant financing in various forms, including to capture first mover advantage. Most project sponsors are using merchant financing as a bridge to a long-term PPA; a few are using it over the entire capital amortisation period. Table 5 outlines three approaches to merchant financing that project sponsors have used in Australia.

Table 5 – Three approaches to merchant financing

Capturing 'first mover' advantages	Financing projects with a partial merchant exposure	Financing over entire capital amortisation profile
Projects financed on a merchant basis and secured a PPA with an energy retailer once the project has been constructed. Project sponsors typically retain construction risk, whereas energy retailers typically retain construction delay risk. This approach requires a higher level of equity in the initial capital structure, but can improve the project sponsor's negotiating position with energy retailers by having a project that is ready to supply LGCs and power (rather than potentially waiting between 12 and 24 months). On signing a PPA with a retailer, the project sponsor can typically refinance and increase the amount of gearing in the capital structure of the project to improve equity returns.	Some projects can obtain financing despite constraints in offtake volume using a commercial structure that requires the project sponsor to retain some exposure to merchant price volatility. Some financiers, including CEFC, are willing to take some merchant price exposure against their amortisation profile. That said, restrictions on the volume of debt lent to un-contracted revenue mean the additional risk is ultimately borne by equity financiers. In other cases, project sponsors have managed to raise sufficient capital to fund construction where financiers have been willing to provide capital despite shorter (e.g. 5-7 years) offtake contracts.	Unlike their counterparts in other markets, Australian project sponsors rarely raise finance with a view to exposing the entire amortisation profile of the finance raised to merchant price volatility. Feedback from market consultations suggests that equity returns are too low for projects that have a reduced level of gearing such as these. However, some participants also believe the expected demand for LGCs will enable future merchant projects to take advantage of a combined LGC spot price and wholesale spot electricity price that may offer better prospects for higher returns.

Case Study 3 – Examples of projects using various forms of merchant financing

Moree Solar Project
The Moree Solar Project (56 MW) is the first large-scale solar project in Australia to be developed on a merchant basis. The project sponsor, FRV, initially secured a grant of A$101.7m (US$94.78m) from ARENA along with A$47m (US$43.8m) of debt financing from Clean Energy Finance Corporation.[47]
The sponsor initially opted to sell the plant's output into the wholesale electricity market, but subsequently signed a 15 year PPA with Origin Energy.

Ararat Wind Farm
The Ararat Wind Farm (240 MW), which is co-owned by a consortium of Renewable Energy Systems (RES), GE, Partners Group (on behalf of its clients), and OPTrust,[48] was awarded 20 year Feed in tariff by the ACT Government, for 80.5 MW of capacity.
The Project sponsors were able to raise sufficient equity and debt finance to fund the construction of the entire project despite the Feed in Tariff (FiT), covering roughly a third of the project's output. The reported gearing level for the project is 54%,[49] which is lower than the transactions which have closed with offtake agreement over the entire output. Lower gearing level requires more equity contribution, and may result in lower equity return but less financial risk (e.g. less risk of cash flow volatility attributable to debt).

White Rock Wind Farm
Goldwind, a major wind turbine supplier and investor in wind projects in Australia, is another example of a project sponsor who has financed projects on a merchant basis and subsequently signed a PPA. Goldwind, with equity partner China Energy Conservation and Environmental Protection Group (CECEP), is proposing to fund the construction of its White Rock Wind Farm (175 MW) without a PPA or external financing in place. Instead, "it intends to negotiate these as the project moves forward." It took a similar approach in the construction of the Morton's Lane (19.5 MW) and the Gullen Range Wind Farms (165.5 MW).[50]

Case Study 4 – Merchant solar in Chile

In Chile, which has one of the largest solar photovoltaic (PV) markets in Latin America, solar projects are being financed on a purely merchant basis, with financiers willing to take merchant price risk over the entire capital amortisation period. Financiers in Chile have been willing to take this risk based on the underlying demand for power in the country, taking the view that spot prices will remain high enough to amortise capital and provide a sufficient return.

Similarly, some investors in Australia have been willing to invest on a merchant basis as high prices for LGCs and power make merchant financing more attractive. Although financing on a merchant basis over the entire capital amortisation period has been less popular because financiers have been unwilling to retain the risk of the underlying volatility in the Australia electricity market.

In 2013, most of the PV projects financed in Chile, were partially or fully contracted, with only one merchant project, Saferay and Seltec's 29.1 MW La Huayca II, reaching financial close. By contrast, in 2014, most projects financed were relatively large merchant facilities. This suggests that, in Chile, commercial lenders have gained a high degree of confidence in the trajectory of underlying electricity prices. Without the explicit support of an energy retailer, commercial lenders in Australia may need the support of financial products (e.g. swaps and hedges) to gain the same level of confidence as those in Chile, to amortise their capital over the medium and long term. This is further investigated in Section 3.3.

Table 6 – Opportunities provided by merchant financing

Opportunities		Description
✓	Tenor	First mover advantage: Projects financed using the "first mover" advantage method, do not rely on tenor from a retailer to finance construction of the project. However a PPA is required to enable the project to be re-financed. The length of tenor will be a key determinant for the refinancing terms offered. Partial merchant exposure: This is relevant for the portion under an offtake agreement. However, given the reliance which the project sponsor has on the project under offtake, there is some residual reliance on this. Full merchant exposure: No need for offtake tenor as project finance purely on a merchant basis.
✓	Longevity of the RET	First mover advantage: The project sponsor(s) initially takes all RET risk, so the longevity of the RET is taken into account when the final investment decision is made. The longevity of the RET will be a key determinant in the length of the PPA offered, when the project sponsor seeks a PPA. Partial merchant exposure: This is relevant for the portion under an offtake agreement. However, given the reliance which the project sponsor has on the project under offtake, there is some residual reliance on this. Full merchant exposure: RET longevity is taken into account when the final investment decision is made, but as there is no PPA, RET risk resides with the generator.
✓	Debt sizing requirements	First mover advantage: Financiers have indicated that merchant projects attract more stringent debt sizing requirements due to the lack of price certainty. However, if the project is balance sheet financed, debt sizing requirements will not be relevant. Partial merchant exposure: Due to the reliance which the merchant portion has on the non-merchant portion, there will be some residual reliance on the debt sizing requirements that banks have placed on the portion under an offtake agreement. Full merchant exposure: Debt sizing requirements will only be relevant if debt has been used to finance the project. For merchant projects, market consultation indicated that debt sizing requirements would be significantly more stringent than if a PPA with a credit worthy counterparty were in place.
✓	Retailer LGC acquisition strategy	Both partial and full merchant exposure require the corporate to acquire LGCs from the project to meet their environmental objectives.

3.1.3 Financial instruments for managing merchant risk

Some overseas markets have developed hedging and financial products in response to a shortage of longer-term bankable offtake agreements. These products help project sponsors to achieve price certainty over the project cash flows, supporting their efforts to raise finance.

Synthetic PPAs

Synthetic PPAs are becoming increasingly popular in some power markets. Of the 4.8 GW of wind capacity that came online in the US last year, about one-third used a synthetic PPA (see Case Study 5). Projects with synthetic PPAs are merchant projects. The synthetic PPA acts as a hedge against market price volatility, providing price certainty for a negotiated quantity of produced energy (based either on actual output or a fixed output).[51] These structures find a middle ground between the security of a traditional fixed-price PPA and the risks of riding the 'ups and downs' of selling power into volatile, short-term spot markets on a merchant basis.[52] They use a financial fixed-for-floating swap contract that simulates a power purchase but does not involve delivering power. Of the synthetic PPAs struck in the US last year, many involved a financial institution acting as an intermediary between the generator and either an end user or a utility. Banks have the capacity to act as intermediaries in these transactions when they have large, sophisticated commodities or energy trading functions.

Contracts-for-Difference (CfD) can be used within a synthetic PPA structure to provide the price certainty that project sponsors require to raise non-recourse finance. A CfD provides a fixed 'strike' price, giving generators selling onto the open market a hedge against exposure to volatile power prices. If market prices are higher than the agreed fixed price, the CfD counterparty receives a payment. If market prices are lower than the fixed price, the generator receives a payment.

Insurance and hedging products to mitigate price and volume variability

The insurance industry is developing hedging products (see Table 7) to help manage key volume and pricing risks traditionally handled by energy retailers, such as the variability of (weather-contingent) output, pricing risks and policy risks. Such products help to address tenor constraints by providing sufficient price certainty over a sufficient time for project sponsors to raise finance to fund construction.

Swiss Re and Bloomberg New Energy Finance note:

"Insurance companies have begun to offer products that guarantee minimum revenues from power sales in cases where output drops below the stated threshold. In this way the project may be relieved of a large part of its volumetric risk while still taking out a large [quantum of] debt safely. Volumetric risk management products effectively translate into cheaper debt or higher debt to equity ratios."[53]

Case Study 5 – The Kingfisher Wind Farm

The Kingfisher Wind Farm (298 MW) in Oklahoma, USA was developed by Apex Clean Energy, a renewable energy developer based in the US. Morgan Stanley entered into a synthetic PPA structure with the Wind Farm, which required Morgan Stanley to buy all the output from the Kingfisher facility at a fixed volume regardless of intermittency.[54]

The contractual arrangement also required Morgan Stanley to deliver electricity in a shape that suits load requirements of Gulf Power (a utility located in Florida), Essentially, the deal is underpinned by a financial hedge, consisting of a long-term fixed-for-floating swap between Morgan Stanley and Apex, and a 20-year PPA between Morgan Stanley and Gulf Power.[55]

Note: In acting as the intermediary between Apex and Gulf Power, Morgan Stanley is exposed to both price and volumetric risk. Organisations willing to take a similar position in financing arrangements in Australia would need to have a sophisticated energy trading function and the appetite to retain price and volumetric risks on renewable generation projects.

Table 7 – Insurance and hedging products

Insurance / hedging product	Description
Swaps	▸ A base load swap: a contract to trade a fixed amount of electricity for a certain price at all times in a day. ▸ A peaking swap: similar to a base load swap, but applying to trade only during a specific time of the day – for example from 7am to 10pm – and only on working days.
Caps	▸ A flat cap: a contract that gives the holder the option to buy a given amount of electricity at an agreed price. ▸ A peaking cap: similar to a flat cap, but can only be called on during peak hours.
Options	▸ Weather contingent options: that can only be used if a particular weather outcome occurs, such as above average temperatures over a given period. ▸ Asian options: that can be called on if the average price of electricity is high over a predetermined period. ▸ Swaptions: give the holder the right to enter into a swap contract, if they choose to do so.
Other contractual mechanisms	▸ Outage protection contracts: allow generators to protect themselves against the risk of being unable to sell electricity in the spot market. ▸ Load following contracts: hedging products that follow the usage of the electricity consumer. ▸ Price floors: give the holder the option to sell a given amount of electricity at an agreed price. ▸ Collar contracts: combined cap and floor contracts that limit both upwards and downwards price movement.

Table 8 – Opportunities provided by synthetic PPAs, insurance and hedging products

Opportunities		Description
✓	Tenor	▸ Synthetic PPAs: Agreements can be structured where an end user is the counterparty to the project sponsor for the CfD. In such arrangements, the tenor isn't reliant upon an energy retailer and instead is reliant upon the length of the energy contract of the end user. ▸ Insurance and hedging products: There is the potential for options to provide sufficient price certainty over a sufficient time for project sponsors to facilitate the raising of finance to fund construction. However given the volatility in the wholesale electricity market throughout Australia, taking an option on long term price risk is likely to be expensive.
✓	Debt sizing requirements	▸ Synthetic PPAs: The credit quality of the counterparty will be a key determinant of the debt sizing requirements of the bank. The higher the credit quality the more comfortable the bank will be in providingba greater volume of finance.

Potential for application in Australia

Some insurance and hedging products are already being used in the Australian market. For example, Infigen has co-developed and implemented a new wind risk hedging arrangement with Swiss Re to manage cash flow and earnings volatility associated with its Australian wind farms.[56] Under the arrangement, Swiss Re will index the risk to actual energy production across the company's entire portfolio of wind farms in SA, NSW and WA – an excess of 500 MW of capacity – and pay Infigen a fixed amount per megawatt-hour for power not generated due to low wind.

This arrangement is different to traditional hedging in that the hedge is based on actual energy production across multiple sites, unlike traditional wind protection solutions that are tied to single-site modelled wind speed indices. It increases cash flow predictability and reduces earnings volatility by protecting against wind variability.

Market consultation participants recognise the potential for insurance products to achieve greater price certainty. However, many of these products are yet to be deployed in large quantities in the Australian market, suggesting that further product refinement and market analysis may be required. Using these products successfully requires careful market projections, the analytical capability to understand what risks a project faces, and the operational experience to manage the asset in the marketplace so it can meet the hedge requirements – capabilities that are typically associated with energy retailers.

A major consideration that may be constraining the local use of insurance products and synthetic PPAs is the increased volatility of the Australian electricity market, which is set to continue for the foreseeable future. The futures market for electricity in Australia is liquid for up to three forward years.[57] After this period, obtaining options can be very difficult and expensive. This differs from other jurisdictions where demand and supply are more certain, making market participants more willing to take the risk on medium and long-dated options.

3.2 Addressing debt volume and term constraints

In markets similar to Australia, debt and capital market innovations have led to a variety of products to address volume and term challenges. However, these products and innovations offer more opportunity for projects with marginal economics to gain sufficient leverage to meet equity return benchmarks, rather than addressing the difficulty of accessing longer-term debt.

3.2.1 Export credit

An export credit agency (ECA) is typically a government authority with the mandate to provide specific products to secure debt funding for projects that promote exports produced by the home nation. ECAs play a key enabling role in many jurisdictions' renewable energy sectors by providing either debt or guarantees to facilitate a higher volume of debt for greenfield projects. ECAs can lower the cost of financing or increase ease of access to longer-term debt as they can offer an implicit sovereign guarantee to other financiers in the event of default. Prominent ECAs in the renewable energy sector include EKF, the Danish export credit agency that has underwritten significant volumes of debt associated with the export and use of Danish products such as wind turbines produced by Vestas or Siemens.

Table 9 – Opportunities provided by export credit agencies

Opportunities		Description
✓	Debt sizing requirements	Using export credit can lower the debt sizing constraints of projects by providing an implicit sovereign guarantee (usually at a high credit rating) to other financers.

Potential for application in Australia

Export credit is already used widely in Australia as a means for supporting key export products. A number of renewable projects have also had the benefit of ECAs. EKF was part of the international consortium of Australian and overseas lenders that financed the Taralga Wind Farm (107 MW).[58]

More recently, Canada's ECA – Export Development Canada was part of the financing consortium that provided a A$200m debt package for the Ararat Wind Farm (240 MW).[59]

Case Study 6 – 550 MW Topaz Solar Farm – Asset backed bond financing[60]

A notable project financed by a project bond was the Topaz solar farm in the US. It was financed by a US$850m project bond issued by MidAmerican Energy. The project, which was constructed in March 2015, is one of the largest solar PV projects in the world. The bond issuance for this project is widely recognised to be the first time that US capital markets were used to finance a renewable energy project since the end of the financial crisis.[61] The bond was priced at 5.75%[62] (a premium to the US Treasury bills at the time). Pacific Gas & Electric, an investment grade utility, purchased electricity from the project under a 25 year PPA. The project was constructed by First Solar under an EPC arrangement, with financing structured in such a way that bond holders essentially retained claims on all assets through a "full security package."[63] The bonds issued for the project were rated as investment grade by the major ratings agencies at the time.

3.2.2 Utilising debt capital markets

Market consultation participants noted that, although Australia has significant liquidity in bank debt, risk allocation and pricing in this market are strongly influenced by the four large domestic banks. Also, the use of debt capital markets for infrastructure financing has been subdued since the onset of the Global Financial Crisis (GFC). Some market participants suggest that issuing bonds through debt capital markets could be a way to create more competition for traditional bank financiers and address problems with insufficient term and volume. Although this is possible, bonds present different challenges to traditional bank debt:

- Bonds tend to require significant upfront structuring and diligence which can increase transactions costs.
- Depending on the underlying project, credit enhancement or guarantees might be needed to realise the right credit profile for the transactions, again adding to transaction costs.
- The placement of project bonds must match the risk and reward profile to the ticket size of the issuance and the right segment of the debt market.

Given these considerations, bond finance may be a good way of funding large projects (e.g. > A$500m) that would otherwise need large bank clubs. It may also provide refinancing opportunities for short-term debt and equity-funded projects.

Green Bonds

Green bonds offer a means to raise large-scale long-term non-bank financing for borrowers at a lower cost of capital.[64] Similar to a bond raised on the debt capital market, investors are subscribed for fixed income returns. Their investment is used to support the development and construction of renewable energy projects.

Green bonds come in two types with substantially different risk profiles for potential investors:

- Corporate backed bonds – supported by the credit worthiness of the issuer.
- Asset backed bonds – supported only from the revenues generated by the underlying project. As a result, financing tends to be difficult for pre-construction and construction stage projects because investors typically require a few years of operational history from the underlying assets. Instead, these bonds are primarily used as a refinancing option for operative renewable energy assets and asset pools.[65]

Examples of corporate backed green bonds in Australia and include:

- NAB, ANZ Bank and Westpac have all released green bonds for renewable energy projects and other low carbon investments. These bonds were largely for operating projects, with some exposure to greenfield development risks.[66]
- The Victorian government has issued A$300m of green bonds, allowing investors to earn an interest rate in return for funding a range of new and existing projects that deliver environmental benefits. The bonds will go to financing and refinancing state investments in energy efficiency, renewable energy generation, low carbon public transport and water treatment.[67]

Institutional debt financing

Most investments in the power and utilities sector are capital intensive. As a result, institutional financing, from infrastructure funds, pension funds or insurance companies, has always played a major role in developing power assets.

In European and North American markets, these funds have a large amount of capital to deploy in the form of debt investments, often hundreds of millions of dollars per investment. So they are looking for low-risk, stable investment returns. Traditionally, long-term agreements such as PPAs have provided these institutional investors with highly predictable, stable returns on power assets. However, as distinct from equity funds, such as the CEFC and Palisade administered fund, institutional debt financing products for projects are still developing in Australia.

Table 10 – Opportunities provided by utilising debt capital markets

Opportunities		Description
✓	Debt sizing requirements	May be able to address some debt sizing requirements but as has been illustrated from international examples, further work needs to be done to understand how green bonds can finance the construction of renewable energy projects.

Potential for application in Australia

Green bonds are still developing in their application, and the use of project bonds to finance greenfield renewable energy projects may be a number of years away. The challenge in Australia will be to marketise non-bank products that can be deployed for such projects, as has been demonstrated in the US.

Case Study 7 – Jädraås wind farm – Institutional debt financing

The Jädraås wind farm in Sweden is an example of how institutional debt financing could be deployed in Australia.

Jädraås is a largely merchant 200 MW wind farm developed by Platina Partners and Swedish onshore wind developer Arise Windpower AB (Arise). EUR 240m in long-term debt was raised, 50% from the Danish Pension Fund and 50% from two Scandinavian commercial banks.[68]

The project is the first time that a pension fund has been involved in debt financing a renewables development in a merchant power market, creating a template for other wind projects.
It is also a good example of how export credit and institutional debt funding can compete with typical bank finance on greenfield transactions.

Importantly, the institution provided an ECA guarantee over the debt.

3.3 Approaches to challenge the appraisal of equity finance risks

3.3.1 Attracting new types of equity investors

Despite a significant amount of equity looking for renewable energy projects with PPAs from investment-grade retailers, only a handful of investors are willing to provide construction equity to projects without a PPA with an investment-grade counterparty. This may change if different types of equity investors are incentivised to enter the Australian market (see Table 11).

Table 11 – Examples of attracting new types of equity investors

Turbine / Equipment manufacturers	Yield companies	Institutional investors
Equipment manufacturers may have the balance sheets to finance developments on a merchant basis on the expectation of future rising prices. This has been recently demonstrated with Goldwind, a Chinese turbine manufacturer, indicating that it will co-finance the White Rock Wind Farm (175 MW) with CECEP.[69]	Yield companies (yieldcos) are publicly traded companies formed to own de-risked (i.e. operational) assets. They typically produce long-term and stable cash flows, a large proportion of which is then paid out as above-average dividend yields. Typically, listed yieldcos offer a projected 5% - 6% return over 15 or more years. In the UK and US, yieldcos have become a popular route to capital for renewable energy fundraising. However, although yieldcos provide an enticing opportunity to monetise cash-generating assets, they may not be the vehicle necessary to invest in and accelerate the development of greenfield projects due to their risk profile. Additionally, a sizeable portfolio is required to build the cash flows needed to launch such an entity and to justify the transaction costs.	Institutional investors, including superannuation funds, pension funds or life insurers, are typically attracted to infrastructure investments because of their long-term cash flow and risk profile. However, despite trillions of dollars under management, institutional investment in renewables has been relatively limited. This is primarily due to a lack of sufficiently sized deals, suggesting the industry needs to find ways to aggregate assets more effectively. Another barrier has been a lack of an effective route to market for investments. In response, the CEFC and Palisade Investment Partners have launched a new strategy aimed at accelerating the development of Australian renewable energy projects of up to A$1bn using predominately institutional investor capital. The strategy is aimed at attracting investors at an earlier stage of project development to accelerate the construction of commercially viable projects. Palisade is committing up to A$400m of additional equity through a combination of managed funds and its Direct Investment Mandate clients.[70]

Potential for application in Australia

Although greater use of yieldcos and institutional investors would increase the availability of capital for stable cash flow operating assets, significant capital is already available for investments with this cash flow characteristic. The issue is that investors are reticent to take on wholesale electricity or LGC price risks. Although some investors have invested in greenfield renewable energy developments without immediate revenue certainty (as described in Merchant Financing, section 3.1.1), the sector needs a greater volume of capital to be willing to price these risks appropriately. Investors willing to evaluate and price these risks, and overcome the financing constraints described in Chapter 2, will find greenfield renewable energy projects available in Australia.

Table 12 – Opportunities provided by attracting new types of equity investors

Opportunities		Description
✓	Tenor	Equity investors are willing to invest on a merchant basis or on a portfolio basis where there portfolio might be weighted towards projects that have offtake agreements and some that don't.
✓	Longevity of the RET	Equity investors are willing to take RET risk and, as such, the benefit of any green products that replace the RET and therefore can take a view on the longevity of the RET post 2030.

Conclusion

The key feature which has historically underpinned the financing and construction of large scale commercial renewable energy projects in Australia has been the presence of a long term offtake contract usually with an energy retailer. However, with some energy retailers less willing or able to provide long term offtake contracts, the market is increasingly embracing other commercial structures to facilitate the financing and construction of their projects. This is a trend which has developed around the world, particularly in Europe and North America.

There are a range of opportunities and innovations that could facilitate the financing of large-scale renewable energy projects in Australia and support meeting the RET. The experience of project sponsors in the UK and USA provides a useful counterpoint when considering how the opportunities may be exploited in the Australian market.

The common theme in many of these opportunities are that they involve reallocating the price and volume risks that energy retailers have traditionally managed through PPAs, providing the opportunity for the market to re-evaluate the level of risk to which they are comfortable.

- Corporate support structures provide an opportunity for corporates to take a more active role in sourcing energy and meeting their sustainability objectives whilst supporting the development of greenfield infrastructure.
- Financing projects on a merchant basis could allow project sponsors to capture first mover advantages or be used as a bridging mechanism to a long-term PPA.
- ECA and debt capital markets are already being used to optimise debt solutions in the renewable energy sector. There are further possibilities for these features of the debt market to address debt volume and term constraints when financing projects.
- Attracting new types of equity investors that are willing to price greenfield risk appropriately could also encourage investment in renewables or the re-appraisal of key risks.

These approaches could be instrumental in raising finance for greenfield renewable energy projects over the coming years, given the short runway to 2020.

Notes

[1] Clean Energy Regulator, Renewable Energy Target, 2015 Administrative Report and Annual Statement (Clean Energy Regulator Annual Statement), p68.

[2] Sources of voluntary demand include Greenpower and the ACT Government feed in tariff.

[3] For example, ACT feed in tariff prices were A$77/MWh for Hornsdale Wind Farm Stage 2 and $89.10/MWh for Sapphire Wind Farm Stage 1. See: http://www.environment.act.gov.au/energy/cleaner-energy/wind_power/outcomes-of-the-acts-second-wind-auction (viewed 1 July 2016)

[4] According to weekly spot prices provided in 'Mercari Closing Rates' published each Friday on 1 July 2016.

[5] Clean Energy Regulator, Renewable Energy Target, 2015 Administrative Report and Annual Statement, p8.

[6] In this document, PPA refers to a long-term (i.e. 10 years or longer) offtake agreement for power and LGCs.

[7] Examples in 2016 include the recent financing of White Rock Wind Farm, Origin Energy's recent power purchase agreement with FRV for the Clare Solar Farm, and the establishment of AGL's Powering Australia's Renewable Fund.

[8] So far in 2016, 343 MW of large-scale capacity has been committed (another 600 MW likely to be committed) according to the Clean Energy Regulator.

[9] p3 "A Bipartisan Renewable Energy Target. The Huge Opportunities for Australia" Clean Energy Council May 2015.

[10] Defined as electricity retailers that do not have a rating provided by a major credit rating agency

[11] http://reneweconomy.com.au/2016/origin-signs-15-year-contract-to-buy-output-from-moree-solar-farm-92344(viewed 14 July.16)

http://reneweconomy.com.au/2016/origin-signs-13-year-ppa-for-new-100mw-solar-farm-in-queensland-96763 (viewed 14 July.16)

[12] https://www.agl.com.au/about-agl/media-centre/article-list/2016/july/qic-and-future-fund-join-agl-in-flagship-renewable-energy-fund (viewed 29 July 2016)

[13] EY 'The Renewable Energy Country Attractiveness Index May 2016' (pg. 10)

[14] http://www.smh.com.au/environment/climate-change/confidence-in-renewable-energy-sector-evaporated-after-abbott-cut-bloomberg-20160114-gm5qbo.html (viewed 1 July 2016)

[15] Clean Energy Regulator.

[16] For example it takes around 1.5 to 2 years to construct a wind farm from financial close.

[17] With the exception of projects that are financed with partial of full merchant price risk exposure.

[18] Retailers can purchase LGCs to meet their annual obligations or pay the penalty for not meeting them, which is an effective cost of approximately ~A$93/MWh, given it is not tax deductible. The penalty therefore effectively caps the value of an LGC (i.e. at this price retailers may theoretically be indifferent about the choice of paying the penalty or acquiring and surrendering LGCs).

[19] Australian Energy Market Operator, Victorian Annual Planning Report, 2016, page 26-27.

[20] https://www.agl.com.au/about-agl/what-we-stand-for/sustainability/powering-australian-renewables-fund (viewed 14 July 2016).

[21] https://www.agl.com.au/about-agl/media-centre/article-list/2016/july/qic-and-future-fund-join-agl-in-flagship-renewable-energy-fund (viewed 29 July 2016).

[22] http://www.cleanenergyfinancecorp.com.au/media/releases-and-announcements/files/cefc-and-palisade-draw-major-funds-to-support-renewable-energy-projects-valued-at-$1-billion.aspx (viewed 14 July 2016).

[23] https://www.ergon.com.au/about-us/news-hub/talking-energy/electricity-industry/ergon-energy-offer-sparks-interest-from-renewable-energy-projects (viewed 14 July 16).

[24] http://www.cleanenergyfinancecorp.com.au/media/eleases-and-announcements/files/cefc-and-palisade-draw-major-funds-to-support-renewable-energy-projects-valued-at-$1-billion.aspx (Viewed July 2016).

[25] http://www.smh.com.au/environment/climate-change/confidence-in-renewable-energy-sector-evaporated-after-abbott-cut-bloomberg-20160114-gm5qbo.html

[26] The Review of the Renewable Energy Target scheme was a review of the renewable energy industry conducted in 2014, commissioned by the Federal government at the time. Market participants felt significant levels of uncertainty during and immediately after the review during 2014. The recommendations of the review were largely not adopted and subsequent bi-partisan support for a revised 33,000 GWh target was legislated

[27] The Clean Energy Regulator advises that so far in 2016, 343 MW of large-scale capacity has been committed (another 600 MW likely to be committed).

[28] Measured by capacity (MW). Refer to Appendix C for a full list of projects.

[29] Percentages are based on project size measured by capacity in MW. ARENA is the Australian Renewable Energy Agency. CEFC is the Clean Energy Finance Corporation

[30] Non-recourse debt is a type of loan secured by collateral and upon default, the issuer cannot seek out the borrower for any further compensation even if the collateral does not cover the full value of the default amount.

[31] Market Participants noted that at a macroeconomic level, volatility of the underlying electricity market in Australia is a constraint to deploying capital for greenfield projects. Some noted that the futures market for wholesale electricity, only has liquidity for approximately three years, which increases the risks associated with operating merchant plant in particular. Whilst the volatility of the underlying electricity market is not a key focus of this report, we acknowledge that it is an important factor in understanding the environment in which financing and investment decisions are made.

[32] Most project sponsors indicated that the recent actions by State governments and their energy retailers, to conduct reverse tenders for offtake agreements, is a positive step for the industry and has given them the opportunity to seek new pathways for their projects to obtain an offtake agreement.

[33] Clean Energy Regulator, Renewable Energy Target, 2015 Administrative Report and Annual Statement, p73.

[34] Clean Energy Regulator.

[35] Baker and McKenzie – The Rise of Corporate PPAs, http://www.bakermckenzie.com/en/insight/publications/2015/12/corporate-renewable-ppas-on-the-rise-reaching-an__/ (viewed 5th August2016)

[36] We note that in the US, renewable energy projects benefit from significant tax incentives which do impact on the financing models that are used to fund large-scale renewables. There are also numerous state based incentives in the US and feed-in tariffs in the UK which differ from Australia and which impact on the financing models in those countries (see Appendix B).

[37] The ACCC has issued a draft determination proposing to authorise Melbourne City Council and 13 other parties to establish a joint renewable energy purchasing group, which they have called the Melbourne Renewable Energy Project. The ACCC proposes to grant authorisation for fifteen years. https://www.accc.gov.au/media-release/accc-proposes-to-authorise-renewable-energy-joint-purchasing-group (viewed 5 August 2016).

[38] http://www.jointventure.org/images/stories/pdf/purchasing.power_best.practices.guide.to.collaborative.solar.procurement.pdf (viewed 1 July 2016)

[39] http://www.jointventure.org/images/stories/pdf/purchasing.power_best.practices.guide.to.collaborative.solar.procurement.pdf (viewed 1 July 2016)

[40] p6, http://www.wri.org/sites/default/files/Aggregating_Demand_for_Corporate_Rooftop_Solar_Installations.pdf (viewed 1 July 2016)

[41] p6, http://www.wri.org/sites/default/files/Aggregating_Demand_for_Corporate_Rooftop_Solar_Installations.pdf (viewed 1 July 2016)

[42] p6, Aggregating Demand for Corporate Rooftop Solar Installations: Lessons From the Collaborative Solar PV Procurement Project)

[43] Actual capacity (MW) depends on the capacity factor of project plants

[44] http://awsassets.wwf.org.au/downloads/fs_renewable_energy_buyers_forum_faq_08feb16.pdf (viewed 1 July 2016)

[45] http://www.melbourne.vic.gov.auSiteCollectionDocuments/Industry_Briefing_Presentation_MREP.pdf (viewed 1 July 2016)

[46] Debt service coverage ratio (DSCR), also known as "debt coverage ratio," (DCR) is the ratio of cash available for debt servicing to interest, principal and lease payments,

[47] https://ijglobal.com/data/project/22482/56mw-moree-solar-pv-plant (viewed 1 July 2016)

[48] http://www.ararat-windfarm.com/news (viewed 1 July 2016)

[49] https://ijglobal.com/articles/98717/australias-ararat-wind-closed (viewed 1 July 2016)

[50] http://reneweconomy.com.au/2015/goldwind-to-build-175mw-wind-farm-first-big-project-north-of-sydney-78802 (viewed 1 July 2016)

[51] http://www.nawindpower.com/online/issues/NAW1404/FEAT_02_Financing-Wind-Projects-With-Synthetic-PPAs.html (viewed July 2016)

[52] http://www.windpowermonthly.com/article/1344891/texas-finds-wind-security-hedges (viewed 1 July 2016)

[53] p11, Profiling the risks in solar and wind, by Swiss Re and Bloomberg New Energy Finance.

[54] http://www.risk.net/energy-risk/analysis/2458369/deal-of-the-year-morgan-stanley (viewed July 2016)

[55] http://www.risk.net/energy-risk/analysis/2458369/deal-of-the-year-morgan-stanley

[56] http://reneweconomy.com.au/2015/infigen-swiss-re-design-risk-hedge-to-compensate-when-wind-doesnt-blow-39816, (viewed 1 July 2016) http://www.swissre.com/corporate_solutions/Swiss_Re_Corporate_Solutions_and_Infigen_Energy.html, (viewed 1 July 2016)

[57] Australian Energy Regulator, State of the Energy Market 2015, p54.

[58] CEFC, Fact sheet – CEFC finances Taralga Wind Farm.

[59] http://www.ararat-windfarm.com/ararat-wind-farm-signs 200-million-debt-package/ (viewed 1 July 2016)

[60] Example taken from p87, IRENA, Unlocking Renewable Energy Investment

[61] https://ijglobal.com/articles/86925/midamerican-plots-solar-bond-issue

[62] https://ijglobal.com/articles/86925/midamerican-plots-solar-bond-issue

[63] Owano, N (2014), World's largest solar farm is up and running in California

[64] P85, IRENA – Unlocking Renewable Energy Investment.

[65] P87, IRENA, Unlocking Renewable Energy Investment.

[66] Climate Bonds Initiative, Bonds and Climate Change, The State of the Market in 2016, p15.

[67] http://www.premier.vic.gov.au/victorian-green-bonds-an-australian-and-world-first/ (viewed 26 July 2016)

[68] Jädraås onshore wind case study

[69] http://www.whiterockwindfarm.com/wp-content/uploads/2016/04/Goldwind-and-CECWPC-Announce-White-Rock-Wind-Farm-Construction-08042016.pdf (viewed 1 July 2016)

[70] http://www.cleanenergyfinancecorp.com.au/media/releases-and-announcements/files/cefc-and-palisade-draw-major-funds-to-support-renewable-energy-projects-valued-at-$1-billion.aspx (viewed 1 July 2016)

Appendix A

Market consultation methodology and responses

Market consultation process

EY conducted a market consultation process with key commercial and industry participants to capture their views on the investment challenges and opportunities in the Australia's renewable sector. Each participant plays a critical role in financing renewable projects. They include project sponsors, debt providers, energy retailers and other government agencies. Participants were asked for their views in the areas that most impact them, which include government policy framework and RET, challenges specific to their sector, issues around power purchasing agreements, and innovations. All views expressed by participants were treated confidentially and were not attributed to any specific party. This approach was used to encourage open discussions during the market consultation process.

Market responses

The table below summarises the feedback from the commercial participants grouped into major themes of the discussion. The views expressed are from the commercial participants surveyed. They are not held by EY.

Government Policy Framework and the RET
Energy Retailers
▸ Combination of RET and grant based schemes such as ARENA ▸ Policy certainty and consistency is important in creating "belief" in the market. Going forward, policy should not be amended or revised to maintain certainty in the market. Consistent messaging from Government is also important ▸ No need for state-based schemes, one set policy is best
▸ Formally assign accountability for this capability to the CISO ▸ The CISO should assign responsibility for the capability to the Security Governance & Awareness function
▸ Formally assign accountability for this capability to the CISO ▸ The CISO should assign responsibility for the capability to the Security Governance & Awareness function
Financiers
▸ RET is the main policy driver
▸ Policy consistency and bipartisan support is important
▸ Policy uncertainty after 2030 is a key risk
▸ Setting a firm policy framework with consistency and certainty is important for long-term growth, changing policies half way through is not helpful
Developers
▸ RET is the main policy driver, CEFC and ARENA also help
▸ Policy has not always been consistent. State-level policies are more ambitious but lack bipartisan support. But welcomes any additional schemes
Other
▸ RET is the main policy driver and ARENA is critical
▸ For off-grid projects, RET is not a driver and project viability depends on other incentives
▸ Government policy largely in alignment, but there are some conflicting agendas, e.g. battery storage vs. fire department

Energy retailer specific challenges
▸ Retailers fund PPAs through their balance sheets, and there is a significant financial commitment which can impact on their credit rating
▸ Long term supply of LGCs a key driver for writing PPAs
▸ Amongst the largest impediments include differences in term between C&I customers (1-3 years) and generators

Project sponsor specific challenges
▸ Project sponsor specific challenges

Power Purchasing Agreements
Energy Retailers
▸ Accounting treatment ignores the counter balancing asset and the ability to re-price to increase revenue
Financiers
▸ Local market's inability to provide long-term PPAs impede renewable greenfield development
▸ Other markets have seen innovations such as government backed PPAs to encourage growth, but not the local market
▸ Current market price LGCs might not provide enough incentives for signing new PPAs
▸ Currently most PPA terms are less than 10 years, extending the term will help mitigate risks for lenders
Developers
▸ There are opportunities for corporate signed PPAs but still in its early days
▸ Mid-tier retailers need sufficient credit
Other
▸ Local debt market usually provides short term, e.g. 5-7 years compared to overseas market
▸ Merchant risk traditionally viewed as high risk and as a result requiring higher debt service cover ratios

Innovations
Energy Retailers
▸ The US market has benefited from lower manufacturing cost, better interconnection, and willingness to take merchant risk
▸ Retailers are taking RET repeal risk
Financiers
▸ Debt size, longer terms debt and PPAs, address refinancing risk, manage construction cost and equipment constraints
▸ The number of solar projects will be smaller than wind projects, but there might be more solar projects than anticipated
▸ Innovations around PPAs, e.g. the US market where investment banks sign PPAs and act as intermediary
▸ CEFC has capacity to use innovative financing structure, e.g. funding partial/full merchant projects, Innovation Fund
Developers
▸ Solar to be smaller than wind, depends on ARENA/technology developments
▸ The US market has seen some innovations such as reverse auction, tax credits such as PTC, accelerated depreciation, green bonds and are more willing to take risk
Other
▸ Innovation includes ECA backed debt, methods to share EPC risk, secured government CFDs

Appendix B

Similarities in market conditions between Australia, US and UK

Market condition	Description	Conditions in the USA	Conditions in the UK	Relevance to Australia
Renewable certificates	Corporates have been able to acquire renewable generation certificates from PPAs.	√	×	√
Tenor	Reduced retailer appetite to contract for long term PPAs.	√	√	√
Falling costs	The cost of renewable technologies is falling and PPA costs are falling with the reduced investment cost.	√	√	√
Regulatory environment	Increase in regulatory uncertainty and associated policy changes dis-incentivising parties entering into a PPA arrangement.	×	√	√
Ability for synthetic PPAs	Corporates who wish to sign a PPA without receiving physical power from the renewable generator are able to sign a synthetic PPA through a contract for difference (CFD) mechanism.	√	√	√
Price hedging	Long term renewable PPAs enable corporates to improve their energy price security in a fluctuating electricity price market, with the exception of projects with merchant finance.	√	√	√
Tax credits	Corporates investing equity in renewable generation are able to take advantage of the tax incentives to claim generous tax credits on their investment. This can support some corporates wishing to reduce their tax liability.	√	×	×
Depreciation regime	Corporates investing in renewable generation are able to claim up to 50% of the cost of their investment in depreciation in the first year under current legislation.	√	×	×

Appendix C

Projects awarded a PPA or reaching financial close 2015 and 2016

Project	Location	Financial close	Size (MW)	Offtaker Category	Offtaker	ARENA grant	CEFC finance
Clare Solar Farm	Qld	No	100	Commercial PPA	Origin	-	
Darling downs Solar Farm	Qld	No	105	Commercial PPA	Origin	Application pending	
Mt Emerald Wind Farm	Qld	No	170	Government PPA	Ergon Energy	-	
Hornsdale Wind Farm Stage 2	SA	Yes (2016)	100	Government FiT	ACT Government	-	
Hornsdale Wind Farm Stage 1	NSW	Yes (2015)	100	Government FIT	ACT Government	-	
White Rock Wind Farm	NSW	Yes (2015)	175	Merchant	N/A	-	
Sapphire Wind Farm	NSW	Yes (2015)	100	Government FIT	ACT Government	-	
Ararat Wind Farm	Vic	Yes (2015)	159.5	Merchant	N/A	-	Yes
Ararat Wind Farm	Vic	Yes (2015)	80.5	Government FiT	ACT Government	-	Yes
Infratech Industries Floating Solar	SA	Yes (2015)	3.2	Government FiT	Northern Area Council	-	
Degrussa photovoltaic plant	WA	Yes (2015)	10.6	Commercial PPA	DeGrussa Copper Mine	Yes	Yes
Yulara Solar Project	NT	Yes (2015)	1.8	Government PPA	Voyages Indigenous Tourism Australia	Yes	
Coonooer Bridge Wind Farm	Vic	Yes (2015)	20	Government FiT	ACT Government	-	
Barcaldine Solar Farm	Qld	Yes (2015)	25	Merchant	N/A	Yes	Yes
Mugga Lane Solar Farm	ACT	Yes (2015)	13	Government FiT	ACT Government	-	
Waterloo Wind Farm Stage 2	SA	Yes (2015)	20.7	Commercial PPA	EnergyAustralia	-	
Total			1,184.3				

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