

Renewable Energy Projects Development Guide

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Robertson**

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- **Regulation of Australian Electricity Network**
 - **Foreign investment into the renewables sector**
 - **Considerations for corporate acquisition and structuring**
 - **Securing the right site access and tenure**
 - **Addressing planning and environmental considerations**
 - **Key elements of project finance and power purchase agreements**
 - **Risk across project delivery and operations**
 - **Transforming the Australian renewables sector for the future**

On behalf of McCullough Robertson's Resources and Renewables Industry Group, we are pleased to bring you this latest renewable energy projects development guide.

This guide provides some key considerations that should be taken into account when planning a successful renewable energy project as well as some of our team's thoughts about what is next for the sector.

Our team are always available to provide our expertise and support where you need us most.

For further information on this guide, please connect with any member of our team.



Damien Clarke
Lead Partner, Resources & Renewables



Kate Swain
Lead Partner, Resources & Renewables

Contents

| | |
|---|----|
| Introduction | 4 |
| Regulation of Australian Electricity Network | 7 |
| Foreign investment into the renewables sector | 13 |
| Considerations for corporate acquisition and structuring | 15 |
| Securing the right site access and tenure | 17 |
| Addressing planning and environmental considerations | 19 |
| Key elements of project finance and power purchase agreements | 22 |
| Risk across project delivery and operations | 25 |
| Transforming the Australian renewables sector for the future | 33 |

Introduction

The Australian renewable energy sector has continued to grow in leaps and bounds in recent years. Since 2016, the amount of electricity in Australia sourced from renewable energy has grown from 16% to 27%. While in the period between 2016 and 2019, 2.8 GW of coal capacity was retired including Victoria's Hazelwood Power Station and since then several other coal powered energy operators have announced planned facility retirements including, the New South Wales Liddell plant in 2022-2023 and Victorian Yallourn Power Station in 2028. This push and pull between renewable and traditional energy generation continues to be the key contributors to Australia's future energy transition and is central to Australia's energy security. However, with almost zero appetite in any jurisdiction (other than certain parts of the Federal Government) for any coal baseload power and a lack of commercial interest from the private sector for investment into more traditional generation, renewable energy is clearly the preferred source of energy generation moving forward.

Every Australian State and Territory has a renewable energy policy with New South Wales, Victoria and Queensland all adopting renewable energy infrastructure corridors and precincts to encourage development. This has been coupled with increased

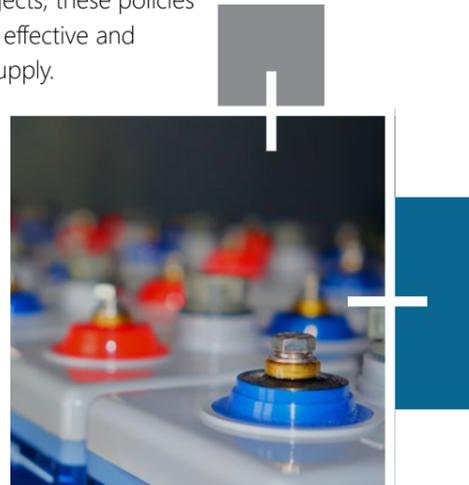


government investment towards further upgrades to the connection network to assist in the unlocking of these development zones. Interconnectors are being planned from Tasmania to the mainland as well as into regional Victoria, Queensland and New South Wales. With efficient access to the grid remaining the key issue facing all renewable energy projects, these policies provide meaningful support for effective and sustainable renewable energy supply.

However, this unprecedented growth in renewable energy projects is not without its challenges. With renewable energy targets set to expire, and the value of large generation certificates in question, policy around the renewable energy sector in Australia and demands greater focus. The Federal Government's technology roadmap and recent commitment to net zero by 2050, although important, are not sufficient to give the sector the policy guidance it needs.

The policy issues facing renewable energy are somewhat compounded by an outdated National Electricity Market (**NEM**) arrangements which do not facilitate renewable or the net zero energy demands of the future. Developed in the 90s for traditional centralised large generation, the NEM has struggled to adapt to the smaller dispersed generation capacity model. The pressure this places on the grid and market is now at a critical level. Whole root and branch reform of the NEM is needed, recent policy proposals such as the Federal Government's capacity charges or the Australian Energy Market Commission's (**AEMC**) plan to charge rooftop solar owners to sell into the grid, are unlikely to be sufficient.

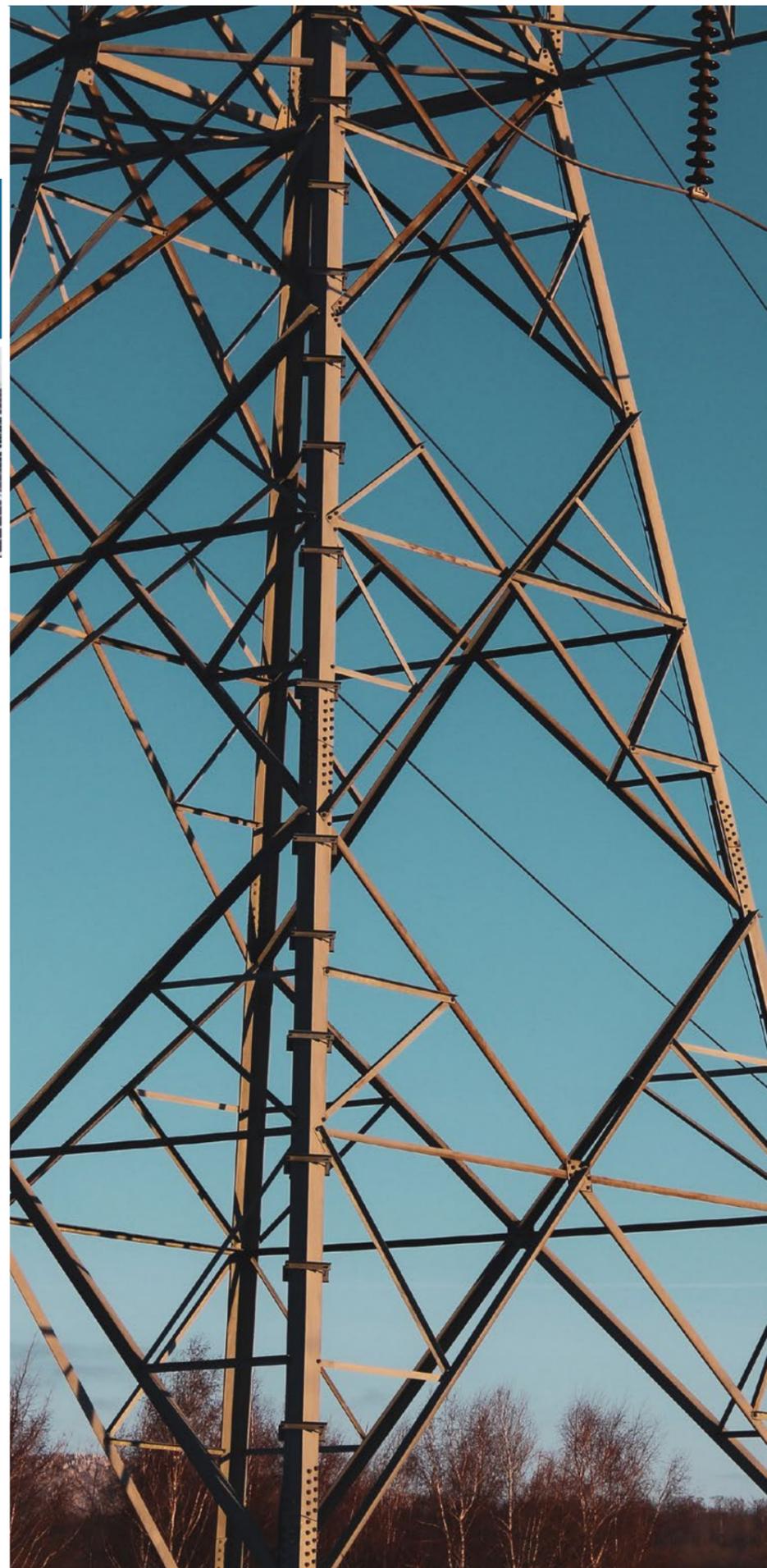
Grid stability, social equity and economic issues created by the design of the electricity market presents ongoing challenges to the ever-evolving renewable energy sector.



Despite these challenges, the renewable energy sector continues to gain momentum. Probably the most important advancement in recent times, which both creates opportunity and addresses a long-standing issue, is the battery revolution. The economics of batteries have changed and they are now an attractive feature of projects, providing revenue streams previously unavailable to intermittent generators. The increase in battery technology and production also creates opportunities for the Australian resources sector, with battery minerals such as lithium, cobalt and copper now in high demand both locally and globally. A demand that Australian resources are best placed to fill.

The legal aspects to this rapidly expanding source of energy generation are not without its challenges and, in parts, is in need of reform sooner rather than later. From the initial identification of a site and obtaining security of its tenure, to planning issues and ongoing interaction with government, acquisition and funding (whether international or local), construction (and construction disputes), a renewable energy project requires advice and assistance from day one. This guide is designed to assist renewable developers, investors and operators of all sizes in better understanding the legal and related issues of each stage of their project and to assist with what legal and other support they need.





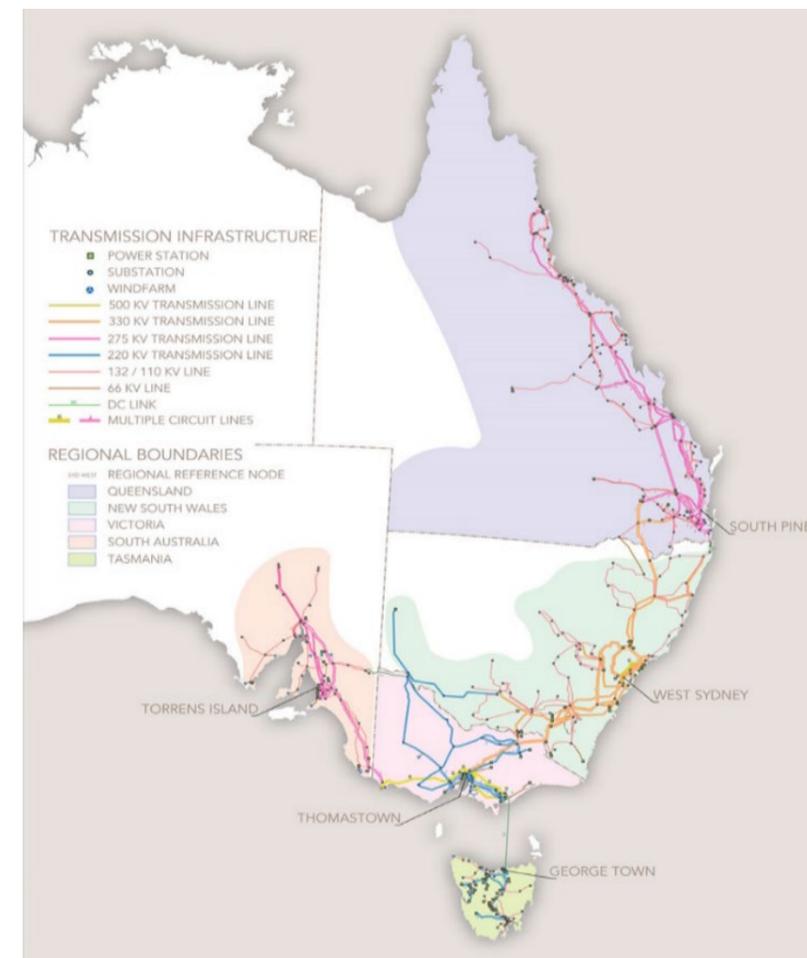
Regulation of Australian Electricity Network

The legal competency and responsibility for the regulation of electricity in Australia is primarily vested in individual State and Territory Governments as opposed to being a Federal Government competency vested in the Commonwealth of Australia. This means that the individual States and Territories are entitled to set the rules for the governance of energy, including electricity, in each of their respective jurisdictions to the extent they have not agreed otherwise with the Federal Government.

Certain States and Territories (the Australian Capital Territory, New South Wales, Queensland, South Australia, Tasmania and Victoria) decided with the Federal Government in the 1990s to combine their competency and establish what is now known as

the National Electricity Market (**NEM**) to regulate the generation, system connection, transmission, distribution and sale of electricity in those NEM jurisdictions. It was established pursuant to the *National Electricity (South Australia) Act 1996* (SA) which adopted the National Electricity Law (**NEL**) and National Electricity Rules (**NEM Rules**) that govern the NEM and its operation.

The NEM Rules set out and clarify the responsibilities, obligations, duties and functions of the various registered market participants in the NEM. The NEM Rules and NEL apply to the Australian Capital Territory, New South Wales, Queensland, South Australia, Tasmania and Victoria pursuant to adopting legislation enacted by each of those jurisdictions.

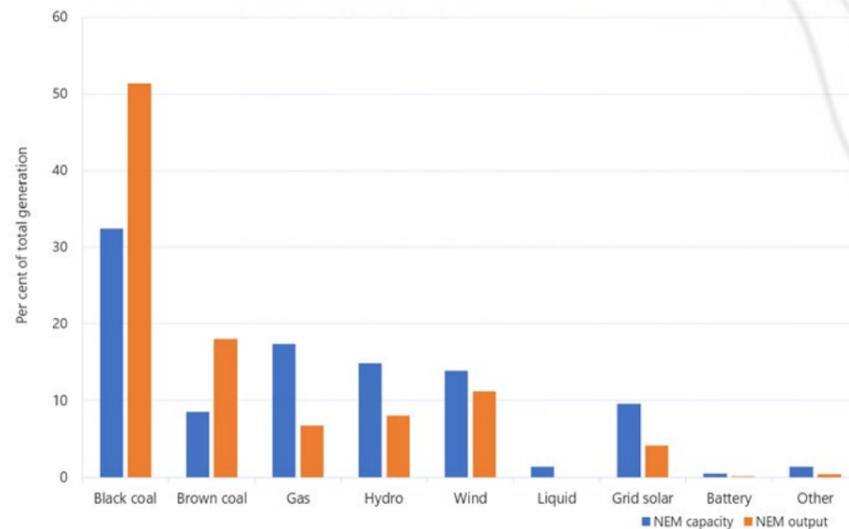


Source: www.aemc.gov.au

National Electricity Market

The NEM is the largest interconnected electricity network in the world, covering in excess of 45,000 kilometres of transmission and distribution lines stretching from Far North Queensland and across the Southern Ocean to Tasmania with an installed capacity of approximately 56,000MW.

The energy mix is in transition with lots more renewables to come yet:



Source: AER; AEMO, Last updated: 9 July - 1:24pm

The NEM is a wholesale energy only mandatory gross pool through which physical electricity is traded by registered market participants (registered generators and retailers). There is no 'capacity payments' mechanism although the Australian Energy Security Board (ESB) has recommended one be introduced as part of its suite of market reform proposals in its Post 2025 Project Advice (July 2021).

The NEM has dynamic spot pricing for the energy traded through it which is calculated on a regional basis for each of the participating States based on trading intervals of five minutes settled on a half hourly basis (settlement changed to five minutes beginning October 2021). This means, for example, that the spot price in Queensland may not be the same as the spot price in New South Wales for any given trading interval.

The NEM Rules allow for a maximum price cap and a minimum market floor price for spot prices. From July 2020, this cap and floor is set at A\$15,000 MW/h

(adjusted annually for inflation) and -A\$1,000 MW/h respectively. This is reviewed every four years.

It is compulsory for electricity generators with at least 30MW/h capacity to register as a NEM market participant.

The NEM Rules may be modified at the request of registered market participants, regulatory bodies and other stakeholders. This is a complicated process and modification proposals are subject to exhaustive consultation and can take years to be agreed upon and implemented.

Some generators seek to enter into power purchase agreements (offtake agreements) with third parties for the sale of their electricity for durations of anywhere from a year to ten plus years. Offtake agreements are subject to individual negotiation on pricing and are used to mitigate the volatility of pricing in the NEM spot market.



Offtakers range from registered electricity retailers to tech businesses and fast-moving consumer goods companies, as well as major industrial users.

Where generators do not enter into such offtake agreements, they rely only on the price from the NEM spot market which is known as taking 'merchant risk' for the electricity traded in that way. It is important to have strong technical advice and a degree of knowledge about forecast pricing over the coming three to five

years before negotiating offtake agreements so that a proper comparison can be made with the NEM spot price. Historically, there have not been that many offtake counterparties in Australia. While that is now changing, pricing can be tighter which makes some generators analyse whether to take some more merchant risk. Either strategy can involve a degree of financial hedging and pricing benchmarking off the NEM spot price. In Australia, there is a degree of market concentration in the market for hedging counterparties.

Principal relevant regulatory bodies

The Australian Energy Regulator (AER) is part of the Australian Competition and Consumer Commission (ACCC) and is responsible for the economic regulation and enforcement of those parts of the energy sector in Australia which are subject to regulation, the NEL and the NEM.

The ACCC is the Australian anti-trust and consumer protection agency which can investigate and prosecute breaches of Australia's anti-trust and consumer protection laws.

The Australian Energy Market Commission (AEMC) is responsible for making and amending the NEM Rules based on proposals from competent parties, and undertaking market reviews.

The Australian Energy Market Operator (AEMO) is the NEM operator and network planner.

It is responsible for ensuring system stability and supervises the operation of the NEM Rules. It has a key responsibility in dealing with and interpreting the connection standards requirements as specified by the NEM Rules, and also in making determinations concerning, for example, the marginal loss factors (MLFs) applicable to generators. AEMO regularly reviews the MLFs attributable to every generator in the NEM.

The Clean Energy Regulator (CER) administers the renewable energy target scheme as established by the *Renewable Energy (Electricity) Act 2000* (Cth) (RET) (see further below). The CER also administers the Australian Carbon Credit Unit (ACCU) scheme as established by the *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth).

Market body roles



Australian Energy Market Commission

Rule maker, market developer and expert adviser to governments

Protects consumers and achieves the right trade-off between cost, reliability and security.



Australian Energy Regulator

Economic regulation and rules compliance

Polices the system and monitors the market.



Australian Energy Market Operator

Electricity and gas systems and market operator

Works with industry to keep the lights on.

Source: www.aemc.gov.au

Energy Security Board (ESB)

The ESB was established by the energy ministers of the Commonwealth of Australia, the States and Territories to coordinate implementation of recommendations from the *Independent Review into the Future Security of the National Electricity Market (Finkel Review)* which was published in 2017 and proposes a series of recommendations to stabilise the grid, manage an orderly transition from fossil fuel baseload generation, and promote overall security of electricity supply on a technology neutral basis. The ESB has introduced

measures to support grid reliability such as the Retailer Reliability Obligation (**RRO**) (see further below). It has most recently published its Post-2025 Project Advice in July 2021 which specifies what measures are necessary post-2025 to amend Australia's market design in order to future proof the Australian energy network and market. Its recommendations include a form of capacity market and proper ancillary services markets like FCAS to ensure system reliability and resilience in the energy transition era.



Grid Connections

Every generator must obviously be connected to the local transmission or distribution system if it is not operating 'behind the meter' and wishes to export electricity for sale. Companies which own or operate transmission or distribution networks (**Network Service Provider or NSP**) must also be a registered market participant in the NEM. Generators must have a grid connection agreement with the relevant NSP appropriate to their facility.

The NEM Rules have detailed provisions about connections and the technical information which must be provided to AEMO and the relevant NSP in order for a connection to proceed. These provisions are designed

and interpreted with a view to ensuring any connecting facility does not result in any grid congestion, insecurity or unreliability while having regard to existing system strength and resilience. This also includes competing or proximate generators (or applicants for connection). If a generator is located in a congested area of the grid, this may result in AEMO changing the MLFs for that generator.

NSPs receive connection services fees. Whilst the fees themselves are not fully regulated, a component of the fees is referable to network 'use of system' charges which are subject to change by the NSP following a prescribed regulatory process.

Renewable Energy Zones (REZ)

In order to prevent undue network congestion and to promote network stability to attract renewable generation, some State Governments, such as New South Wales and Queensland, are designating certain geographic areas of the State as Renewable Energy Zones (**REZ**) where renewable generation will have preferential treatment for development and generation purposes.

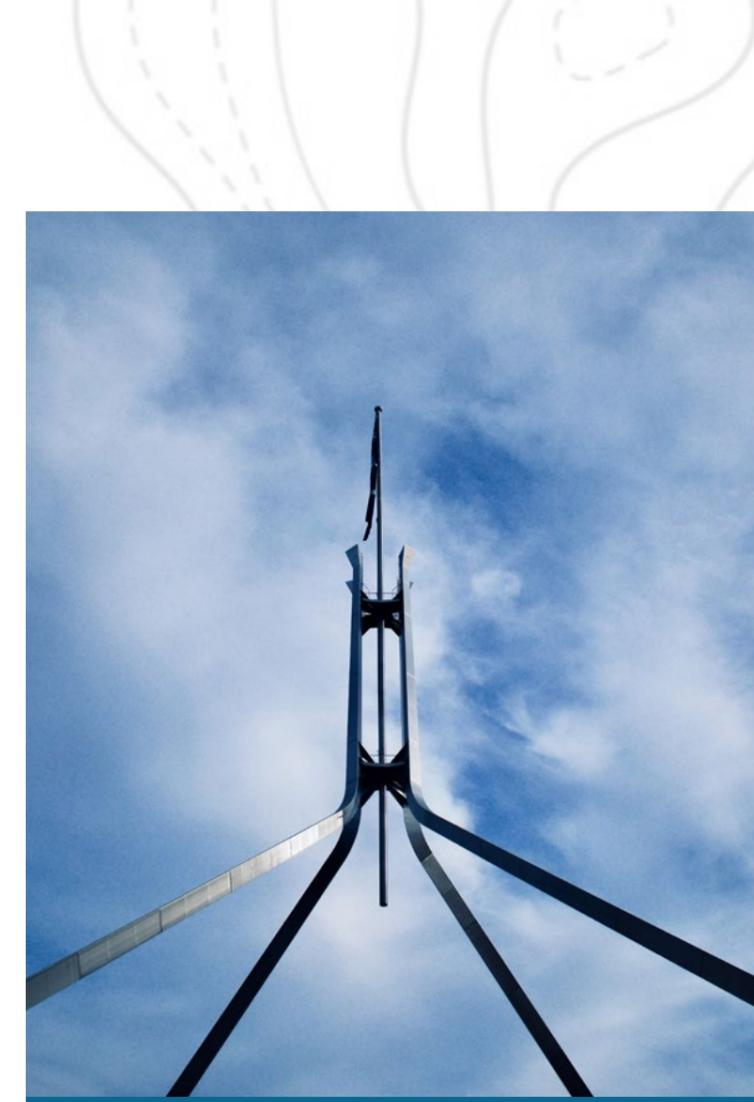
Renewable energy

The Federal Government has implemented support initiatives for renewable energy generation in Australia primarily via the RET for renewable energy projects and the ACCU regime in relation to carbon emissions. It has also established two other support agencies via the federally-owned Australian Renewable Energy Agency (**ARENA**) and the Clean Energy Finance Corporation (**CEFC**). ARENA provides financial and technical assistance for Australian renewable energy technology and innovation. CEFC is a debt and equity funder for renewable and sustainability projects across Australia.

The RET

The RET is a Federal Government scheme established pursuant to the *Renewable Energy (Electricity) Act 2000* (Cth) that aimed to facilitate the generation of 23.5% of electricity from renewables by 2020 and is administered by the CER. Although this target has been achieved, the RET has an end date of 2030 for eligible projects. The RET allows for financial incentives for utility scale renewable power generation in the form of Large-Scale Generation Certificates (**LGCs**) for the development or expansion of renewable energy power stations. One MW/h of qualifying renewable energy generated equals one LGC. In order to be accredited to receive LGCs, the renewable generator applicant must make an application to the CER which assesses it on its merits against the statutory qualifying criteria. The principal criterion is whether the power is generated from an approved source recognised as being renewable. This includes wood waste, agricultural waste, landfill gas, food waste, biomass based components of municipal solid waste, as well as solar and wind.

LGCs are required by entities (usually licensed electricity retailers) which have annual statutory obligations to obtain a certain amount of LGCs. The LGCs are created



by accredited renewable generators when power is produced and exported and are then sold to those entities liable to buy them and who then surrender them to the CER. LGCs are not traded through the NEM. LGCs are tradeable in their own right and constitute a separate property right. Consequently, there is a separate market and pricing for power and LGCs which can be subject to bundled or separate transactional offtake arrangements. It is prudent to take technical advice on the pricing forecast for LGCs before entering into any offtake arrangements.

Regulated Rate Option

The Regulated Rate Option (**RRO**) is a mechanism whereby generators and retailers can be mandated to supply and purchase certain volumes of electricity derived from various technologies to ensure system security and reliability if there is likely to be a forecast gap or shortfall in supply. As fossil fuel generation retires, it can serve a useful purpose in providing revenues for battery energy, other baseload proxies and similar.

Australian Carbon Credit Units

The Australian Carbon Credit Units scheme was established by the *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) to incentivise carbon emissions abatement. Each ACCU issued by an accredited project generating ACCUs represents one tonne of carbon dioxide equivalent (tC. O₂-e) stored or avoided by a project. ACCUs are tradeable in their own right and constitute a separate property right. Entities may need to buy ACCUs in order to be compliant with carbon emissions obligations.

What's next?

Domestic and international policy will dictate the shape of Australia's energy market. Domestic change will likely see some reform of the NEM to introduce a capacity mechanism, ancillary markets like FCAs, and other measures to ensure system reliability and energy security so that Australia does not end up with a Texas-style blackout (highly unlikely given the specific climate issues here are not the same), rolling blackouts or being just short energy or transmission capacity/resilience.

International change post-COP26 and later in 2020s may see an international 'blockchain' based market for green certificates (carbon offsets) if binding international agreement is reached on a net zero transition. Australia's positive renewable (wind, solar, hydro, storage) has it best positioned to take advantage of such an international development.

John Kettle
Partner



Foreign investment into the renewables sector

Like most large-scale development in Australian history, the development of Australia's renewable energy sector has been fuelled by offshore funding.

The *Foreign Acquisitions and Takeovers Act 1975* (Cth) (**FATA**) regulates all foreign investment into Australia, requiring all investment to obtain approval unless an exemption applies or the investment is below the relevant monetary investment threshold. More often than not, a renewable energy developer who is considered a foreign person for FATA purposes is required to make an application to the Foreign Investment Review Board (**FIRB**) for the acquisition of an interest in a greenfield renewable energy project.

A wind or solar farm will usually be located in the vicinity of a population centre and close to a grid connection point. Ideally, there would be few other projects in the immediate locality and sunshine and wind would be plentiful. These factors most often correlate with land that would be classified as agricultural land for FATA purposes (a type of land subject to some of the strictest controls under the FATA). A foreign investor seeking to secure a long term lease over agricultural land will

require FIRB approval where the investor and their associates own \$15 million worth of agricultural land, including the target acquisition. The value of a lease in these circumstances is measured by adding up all payments over the life of the lease – a developer with multiple interests would reach this threshold relatively quickly.

Where land is not going to be used for agricultural purposes, the FATA provides some carve outs from this classification. The FATA deems agricultural land not to be agricultural land where an approval is granted to develop a wind or solar farm and that land is not predominantly used for a primary production business. This means the land must be classified as either developed commercial land or vacant commercial land. Happily, commercial land has an investment approval threshold of \$281 million, but the catch is, a greenfield site will not have the necessary development on it yet to be classified as developed commercial land. Therefore, it is classified as vacant commercial land with an investment approval threshold of \$0. The only real benefit of this exception is a lower FIRB application fee.



Another feature of these 2021 reforms are the new 'call in' and 'last resort' powers. In short, if your project is not caught by the mandatory prior approval requirements under the FATA and there is a national security issue with the project – for example, the project is a large-scale energy development controlled by a foreign government that has complex relations with Australia – the investment can be called in and assessed by FIRB. This assessment may then lead to the imposition of new conditions or, potentially, even a divestment order. There are limited means to manage these risks and all investors should be aware of them.

What's next?

Things are about to become even more complicated in the FIRB world. At the start of 2021, the Foreign Investment Review Board (**FIRB**) instituted new laws that extended their power both in oversight and enforcement. The Australian energy sector was one such sector targeted and will be subject to ongoing regulation. A new approval requirement has been introduced – a foreign investor must obtain FIRB approval when obtaining a direct interest in a **national security business**. Currently, the definition of a national security business does not always extend to an entity that carries on a renewable energy development.

However, with the imminent introduction of amendments to the *Security of Critical Infrastructure Act 2018* (Cth), almost all aspects of a renewable energy project (including development, operation and connection to the grid) will be subject to increased FIRB requirements as the entity carrying out these features of a project will likely be classed as a responsible entity for the purposes of the *Security of Critical Infrastructure Act 2018* (Cth).

Despite this, FIRB and the Australian government remain very welcoming of foreign investment into the renewable energy space. They have, however, increased their imposition of conditions and ongoing compliance monitoring. This all results in FIRB no longer being a part of just the process, but rather an ongoing compliance issue investors must consider.

Andrew Bukowski
Senior Associate



Considerations for corporate acquisition and structuring

Given the nature of a greenfield renewables development, the typical corporate acquisition structure is somewhat standardised. A developer will secure the tenure most likely by way of a long-term lease exercisable through an option and seek the relevant approvals to be granted over the land. The developer then packages this up in a special purpose vehicle and sells the company or the holding entity. This approach provides the greatest level of flexibility for incoming parties to implement their desired investment structure, as well as allowing developers to sell off individual projects as they reach 'shovel ready' otherwise known as 'development ready' status.

Although the above acquisition structure may seem straight forward, as usual the devil is in the detail. The approach to consideration adopted in the above developed models is most often in two parts – an upfront payment and an earn-out arrangement of one variety or another. This structure offers risk and reward to both the buyer and the seller. The seller, although not able to walk away from the project with a 'windfall' payment, can potentially benefit in the upside of the project, as well as seeking a higher purchase price as it has agreed to share the development risk. For the buyer, it can delay capital expenditure and push development risk back onto the seller, but can also expect an eager

seller to impose covenants on how, when and at what pace the project is developed.

The earn-out calculation formula itself can be complex, with good earn out arrangements including clearly agreed and articulated, calculation principles, trigger events, development requirements and delay and acceleration provisions. As is the case with all agreements with deferred consideration, the agreement between two friendly parties at the start of a project may not be what is understood later in the project's lifecycle, when grid connection delays or construction disputes have seen the project not come online in the proposed time frame. Clear and precise drafting is critical to managing these earn-out dispute risks.



The less straight forward aspect is the investment structure a party uses. In designing these arrangements a party must take into account the usual structuring concerns such as tax arrangements, double tax treaties, and exit options. These structuring considerations are made more complicated by the fact the treatment of wind turbines and solar panels as fixtures vs chattels is being considered by a number of courts at the moment, while at the same time the Australian Taxation Office has already released rulings on their position (wind turbines are chattels). Whatever the outcome of these judicial considerations there could be significant tax consequences for existing and future developments.

What's next?

A secondary market has already evolved. Between 2015 and 2019, we witnessed the rapid acquisition and development of energy portfolios by large and emerging energy companies. Since 2020 we have seen these same energy companies seek to divest or list their now developed and operating assets.

Large developers such as FRV, BlackRock, Elliott Green Power and Windlab have all either carried out or are in the process of divestment of all or part of their Australian renewables portfolios. These sales processes are each taking different forms. For example, in 2020 Windlab became 75% owned by a subsidiary of Squadron Energy Pty Ltd (a wholly owned subsidiary

of Andrew Forrest's privately held Tattarang group) and 25% by Federation Asset Management Pty Ltd via a scheme of arrangement. Meanwhile FRU has just secured the Canadian pension fund (OMERS, as a long-term equity venture having acquired 49% of FRU).

The structure and execution of these sale processes depend on the scale of the portfolio being sold, existing corporate structures (listed or not), whether it is a total or partial sale, and the characteristics of the purchaser. Although domestic and international superannuation and pension funds were tipped to be the ideal purchasers for these renewable energy assets due to their revenue generation potential and the requirement for funds to consider the environmental and ethical concerns of their members, these types of acquisitions are not as common as anticipated.

Due to the continuing development, investment and subsequent divestment of such projects, the corporate structures for such projects should factor in the long-term plan for the assets by their owner, in order to avoid unintended tax and commercial issues in the future.

Damien Clarke
Partner

Andrew Bukowski
Senior Associate

Securing the right site access and tenure

From the initial investigation stages through to the decommissioning of a project, one of the most important aspects of developing a renewables project is securing the appropriate rights of access and tenure of land. The relevant considerations a renewables project developer would need to turn their mind to would depend on the type of arrangement entered into between the developer and landowner (e.g. sale or long-term lease) and the stage of the renewables project.

In Australia, long-term lease arrangements are the most common type of arrangement for the development and operation of renewables projects. The table below outlines possible development stages and the corresponding access requirements that should be at the forefront of a project developer's mind when documenting access and tenure.

| Stage | Activities |
|--------------------|--|
| Preliminary 1 | Early access for non-intrusive investigations (e.g. surveys) |
| Preliminary 2 | Early access for intrusive investigations and preliminary works |
| Construction phase | Access and occupation of the land to install renewables infrastructure, and supporting infrastructure and to construct roads and access ways |
| Operational phase | Running of the renewables project |
| Decommissioning | Decommissioning and removal of the renewables infrastructure and reinstatement of the land |

Consideration should be given to the arrangement most suitable to each stage of developing a renewables project; the appropriate balance between the level of flexibility and access given to the developer and the amount of compensation payable to the landowner. The transaction documents between the renewables developer and the landowner would typically include early access licences, option agreements, leases and easements.

Solar and wind farms generally require large areas of land. As a result, they are usually installed and operated on agricultural land (see our article Foreign investment into the renewables sector for more information on land classifications for renewable projects on page 13). The concerns and priorities of the landowner should be considered and addressed in any documentation put forward by a renewables developer. Renewables developers generally have more success in negotiating long-term lease arrangements when consideration is given to the farming and other activities of the landowners which may co-exist with the renewables project. For example, where a long-term lease arrangement is selected, a working relationship with the



lessor will be useful when a project financier is looking to register a security over a lease. A poor relationship can see financing delayed due to a lack of lessor consent.

The tenure secured for a development will not only be one of the most scrutinised features of a project by any purchaser or investor but it will also impact planning approvals, obligations under environmental laws, financing and security arrangements, as well as a developer's relationship with other stakeholders. Planning the preferred tenure as part of a project's long-term goals can create efficiencies in the future and assist with on time project delivery.

In addition to securing access and tenure over the renewable project land, other property interests such as easements may also be required. For example, often easements will be required over adjacent land to obtain long-term access rights to the site for construction and maintenance purposes or a short term licence may be required to carry out due diligence and investigations.



What's next?

Development of large-scale renewable projects is one of the fastest growing sectors in Australia. Untapped opportunities to up the scale of renewables projects to larger sites exist, but each come with their own challenges, including the ability to navigate multiple 'puzzle solving' engagements with land owners, community consultations, investors, and dealing with property specific issues such as overlapping mining tenements and other contradictory land uses.

We have seen developers achieve larger scale projects through the amalgamation of land with multiple land owners. Others have also fostered relationships with large land-owning funds, such as agricultural fund managers that own extensive rural land appropriate for the development of renewable projects across Australia. There are also opportunities to partner with other developers or energy providers on larger projects.

As land tenure is a critical aspect of any renewables project, a number of Australian States are considering reforms to their respective land tenure regimes to specifically facilitate increased renewable development. For example, the Western Australian Government announced in mid 2021 that it is currently developing regulatory reforms to enable renewable developments to be a permitted activity on pastoral lease land. Pastoral leases cover about 36% of remote parts of Western Australia but these lease currently only permit pastoral activities. Reforms of this nature would open up vast parts of regional Australia for further renewable developments.

Eva Vivic
Partner

Liam Davis
Partner

Bethany Du
Senior Associate



Addressing planning and environmental considerations

Site selection

Site selection for a renewable energy project is not only determined by the natural features of the site, including sunlight, water supply, elevation, wind frequency and other similar attributes. The success of any development will also be influenced by issues such as grid connection, land access, land zoning, conflicting land uses and vegetation clearing just to name a few. A comprehensive due diligence for any site should be prioritised to identify issues of concern including site-based risks that have the potential to cause lengthy delays or require additional approvals to be obtained.

Development application and approval process

The development assessment process and the consent authority for renewable projects is generally determined based on the scale and location of the proposed development. The specific environmental assessment requirements for each jurisdiction and each type of renewable development will differ, but the general approval pathway will be the same across each State and Territory in Australia, with some examples discussed below.

In New South Wales, the relevant Local Government will assess and determine any development applications for small scale projects, whereas the New South Wales Government Department of Planning, Industry and Environment will be the consent authority for larger

State significant developments that have a capital investment value of over \$30 million or over \$10 million in an ecologically sensitive area. A project may be assessed against the development standards in the *State Environmental Planning Policy (Infrastructure) 2007* (NSW) or the applicable local environmental plan. A development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (NSW) must be obtained to carry out any renewable energy project in New South Wales.

Similarly, the assessment requirements for renewable energy projects in Queensland are generally specified in local planning schemes and the consent authority will either be the Local Government or the State Government, depending on the scale and type of development and the site location. For example, wind farms in Queensland are assessed against State Code 23 and the development application must be lodged with the State Assessment and Referral Agency.

The environmental impact assessment for a renewable energy project in any jurisdiction will need to provide a detailed description of the proposed development and identify potential impacts such as traffic, biodiversity, visual, noise, cultural heritage among other matters, as well as outline mitigation measures that will be taken to minimise these impacts. Following consideration of the environmental impact assessment, together with any public submissions on the project, the consent authority will decide to either approve or refuse the application.

Compliance with conditions of approval

Gaining approval to carry out a development is the first hurdle. Following this, the developer must ensure compliance with the conditions of any consent, permit or approval that is granted.

Most consents will require the preparation of various management plans detailing specific mitigation and management measures to be taken in the carrying out of the development. These management plans must be further endorsed by the consent authority prior to works commencing. Other conditions of consent may restrict the hours of construction or impose reporting obligations.

It is common for construction activities associated with a renewables project to impact on public roads, to some degree. The conditions of consent may require the developer to enter into a separate agreement with the road's authority requiring the developer to carry out certain road maintenance or repairs, or to make a monetary contribution towards these works.

If the planning approval conditions are too onerous or the project changes over time, a developer may be able to lodge a modification application with the consent authority to change the approved scope of development and to amend the conditions imposed.

Understanding the multitude of approvals and permits that may be required for any large-scale renewables project can be complex. In addition to any planning approval required for a project, environmental protection licences, environmental authorities or permits may be required for some renewable energy projects that present a greater risk of environmental harm, often triggered by impacts on air quality, noise or pollution. These approvals are granted by the relevant environmental authority in each jurisdiction and are generally granted subject to strict operating conditions.

Biodiversity impacts

Each jurisdiction has a comprehensive biodiversity offset scheme. Generally, before planning approval is granted for a project, assessment of the potential biodiversity impact of the proposed development must be undertaken by the developer. The consent authority generally requires impacts on biodiversity to be avoided and minimised, with any residual impacts to be addressed through agreements to secure the long-term conservation of land or other measures to ensure the protection of biodiversity.



Separate approval may also be required under the federal *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) if an action, such as the development of the renewable energy project, is likely to have a significant impact on a matter of national environmental significance or Commonwealth land. Matters of national environmental significance extends to things like migratory species, threatened species and ecological communities.

Native title and cultural heritage

Native title refers to the bundle of rights and interests in land and waters that Aboriginal and Torres Strait Islander people can hold under traditional laws and customs.

Procedural requirements under the *Native Title Act 1993* (Cth) may be triggered if the proposed development requires the creation of a legal right to carry out the development on Crown land where native title rights and interests have not been extinguished by previous extinguishing acts. The procedural

requirements will differ depending on the legal right to be created and may, for example, involve notification to be provided to native title claimants or holders, a non-claimant determination to be obtained from the Federal Court, or the negotiation of an Indigenous Land Use Agreement.

Project developers also have obligations to protect Aboriginal objects and places, with consequences for any person that causes harm to Aboriginal cultural heritage. As part of the environmental assessment process for the renewables development, it is prudent to search the Aboriginal cultural heritage register in the relevant jurisdiction to ensure that the project will not have a significant impact on Aboriginal cultural heritage matters, and also consider the project's broader compliance strategy.

What's next?

Throughout 2021, most State Governments across Australia announced plans for the development of renewable energy zones in their respective jurisdictions to facilitate a coordinated process for the introduction of new renewable generation projects. This has resulted in a rush of proposed projects in these zones lodging applications for planning approval, whilst other projects outside of these identified zones left questioning the long-term viability of their projects.

Further reforms will also be required across other planning and environmental legislation in each jurisdiction to address new forms of renewable energy that haven't been previously developed in Australia. For example, the raft of approvals that will be required for hydrogen projects is still yet to be refined by regulators and will be dependent on whether it is a blue, green, grey or other type of hydrogen project. Similarly, the New South Wales Government has just introduced a new special water licence for pumped hydro projects. Without the creation of this new type of license, these developments would otherwise struggle to secure adequate water access rights on the open market.

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Key elements of project finance and power purchase agreements

Investments in renewable energy projects often combine capital intensity and new technologies. As such, securing funding for a renewable energy project is a critical step in the path to commercialisation.

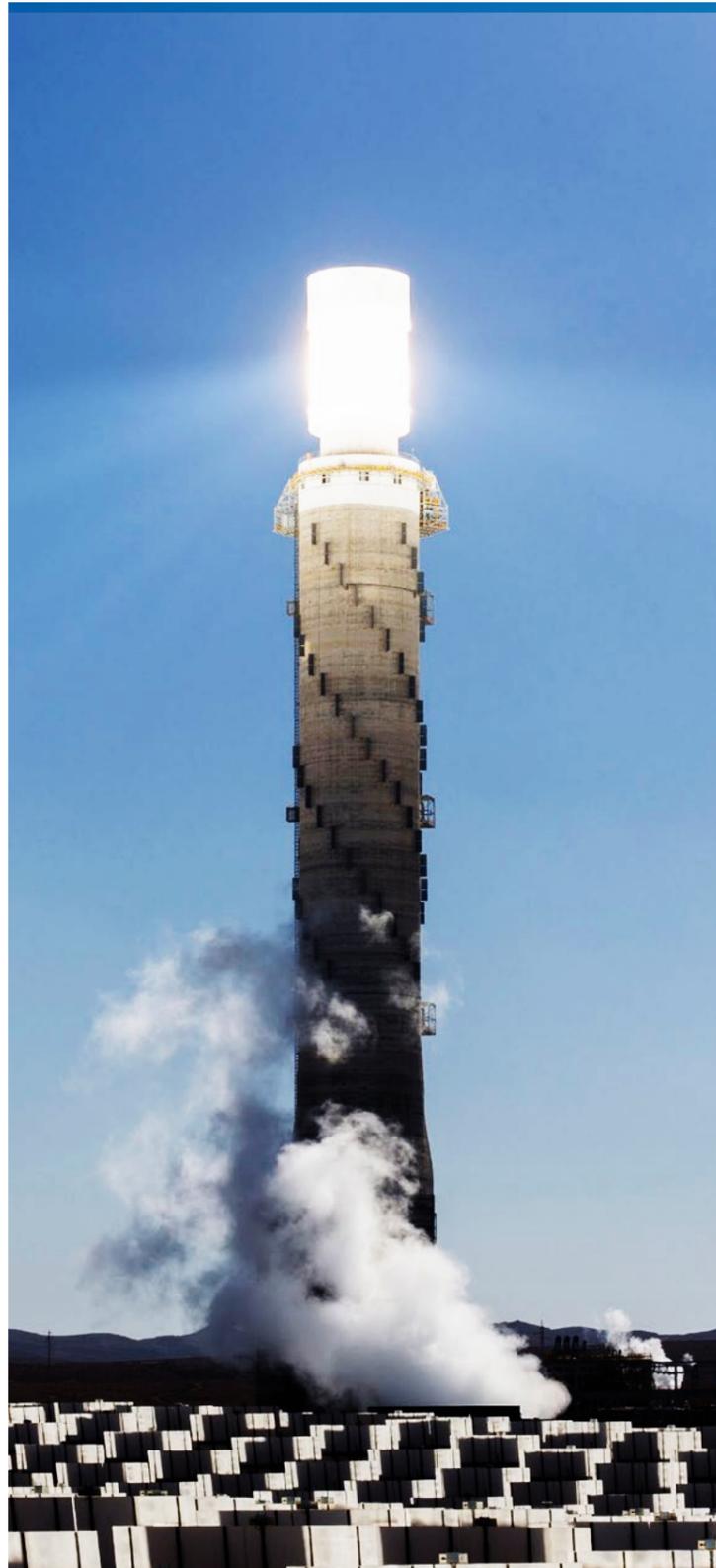
With the big four banks reducing their exposure to fossil fuels and increasing their focus on sustainable lending, access to finance for innovation and investment in renewable energy projects will increase.

Project finance

The key feature of project finance is that funding is provided on a limited recourse basis to a special purpose vehicle formed to build and operate the project. As a result, sponsors can insulate themselves from the project risk, have greater opportunities to structure the project for tax purposes, and more easily accommodate for joint venture or partnership arrangements with co-sponsors. However, project finance is invariably more expensive than raising corporate funding, requiring considerable management time and resources to organise, implement and administer. The high costs and due diligence required makes project finance well suited to large long-term projects that generate reasonably predictable cashflow, rather than small projects with a limited operating life.

Project finance typically comprises primarily of debt-funding, with the balance being provided either by way of equity, subordinated debt or a combination of both. The scale of large renewable energy projects dictates that they usually cannot be financed by a single lender, and therefore, a syndicate of lenders is required in most instances to fund projects. The complexity of most project financings will mean that arrangers of a syndicate are typically large banks or similar institutions, with the relevant experience or dedicated teams specialised in this area, with smaller lenders taking a participant role.

Whilst project financing documents will often follow a typical suite comprising sponsor documents, project documents and loan/security documents, each are tailored for the specific deal and often negotiated to a significant degree between the parties. One of the core challenges of project financing is co-ordinating



the large number of parties usually involved (including sponsors, contractors, offtakers, lenders, security trustees, mezzanine lenders and other interest groups such as governmental authorities), each with their own divergent interests, and bringing them together to close the financing documentation and complete the project.

Power purchase agreements

One of the key elements to funding a renewables project and managing its financial risk is the securing a power purchase agreement (**PPA**). A PPA offers a project a cash flow to bank a project and against which an investor can assess the viability of a project, while also offering hedging options against potentially volatile power price fluctuations.

The number one issue facing most developers seeking a PPA is obtaining a suitable one that will underwrite a project. Outside of this, other important issues to consider when negotiating a PPA include, negative pricing (energy and green certificates), volumes, term and risk allocation. These fundamental issues will feed into the bankability of the project(s) or business and so too the overall enterprise value and return.

The National Electricity Market (**NEM**) energy spot price can and does go negative which means that a generator will be paying the system to take its energy if it continues exporting energy during negative pricing trading periods. This is an important commercial point in a PPA, and therefore the ability of the energy supplier to cease operation of the project should the wholesale price be less than \$0 is often a hotly contested commercial point. It will not always be possible to negotiate a suspension of energy delivery to the buyer in these circumstances, but a failure to address or include a provision of this nature could see the energy supplier caught between liability to the Australian Energy Market Operator (**AEMO**) and the buyer, rather than being able to stop exporting when commercially suitable to do so. Again, hedging becomes very important here if a suspension for negative pricing periods cannot be agreed.

As noted, a PPA offers hedging opportunities for a developer, and it is these hedging options which drive most of the commercials behind a PPA. The NEM is a wholesale energy spot market where price fluctuates at five minute intervals. Therefore, the NEM price is not a static price. This is why a PPA will usually be accompanied by a 'Contract For Difference' or 'CFD'.

The CFD regulates the pricing structure for the electricity, and sets out which party takes the risk for the NEM wholesale energy price being over or under the contracted price which the parties have agreed between themselves in the PPA. These contracts can sometimes be included in the one agreement, but most retailers and more sophisticated and large Buyers will require a separate agreement and International Swaps and Derivatives Association (**ISDA**) documentation to regulate the trades.



A common issue encountered by new developers is that if a CFD is entered into, the supplier must check whether or not it requires an Australian Financial Services Licence (**AFSL**). Generally, agreeing to one or two CFDs on an infrequent basis will not trigger this requirement, but agreeing to CFDs on a more routine basis may see developers breach the *Corporations Act 2001* (Cth) if they do not have an AFSL.

What's next?

PPAs tend to cater only for the sale of energy. Australian renewable projects eligible for the creation of LGCs also sell those either via a 'bundled' PPA together with their energy, or via a standalone LGC sale agreement. LGCs are usually sold for a fixed price.

With the continued recognition of the role businesses play in tackling issues such as climate change and a key focus on ESG issues, there is growing appetite for sustainable lending in the corporate and finance communities.

In recent times we have seen a rise in the uptake of sustainability-linked loans (**SLLs**). SLLs are lending arrangements which incentivise borrowers to meet sustainability targets through pricing benefits over the life of the loan. Sustainability covenants within SLLs are usually focused on the borrower's own ESG framework and targets and will be negotiated on a case by case basis. While SLLs are not yet mainstream, they will fast become the norm as the focus on ESG issues intensifies in the future.

Sustainable financing and responsible investing are more important now than they have ever been. The increased focus on sustainable lending will improve access to financing for investment and innovation in renewable energy, which in turn will help overcome some of the key challenges for climate change mitigation and meeting the international climate objectives as set by the Paris Agreement.

This increased focus on ESG will also likely generate more opportunities for PPAs, as companies seek to both hedge their exposure to fluctuating power prices and show consumers they are reducing their emissions by entering into a renewable energy PPA. As the demand for PPAs grows, developers will be given more options when seeking to underwrite their projects.

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Risk across project delivery and operations

The contracting arrangements for the construction and operation of the project will be a key means by which a developer will mitigate project risks and will also be critical to the 'bankability' of the project if external financing is required.

While not an exhaustive list, we set out below some of the key issues that will need to be considered by developers when negotiating these contracts.

Contracting structure

A threshold issue will be the selection of the contracting structure. For renewables projects, the most common approach is for a developer to enter into a lump sum 'engineering, procurement and construction' (**EPC**) contract for the entire project. This is attractive to developers because it involves the engagement of a single contractor to design and deliver the entire project for a fixed price. However, the structure can result in substantial premiums being included in contract pricing to protect the contractor against the risks it is assuming under the structure.

Alternatively, developers may seek to deliver their projects by way of multiple contracting packages with separate contractors – for example, a supply and installation contract with a solar panel or wind turbine manufacturer and a 'Balance Of Plant' (**BOP**) contract with a separate contractor for the performance of civil, electrical and other works. While this structure can result in substantial cost savings, the trade-off is the assumption by developers of a greater degree of 'interface' risk as there is no single contractor to turn to if issues arise on the project (and, among other things, this may be a concern to lenders).

Importantly, there is no 'one-size-fits-all' solution, and the section of a contracting structure will depend on a number of factors, including the developer's required returns and in-house technical and project management expertise as well as lenders' requirements.

Eight key risks to consider when contracting

The contracting arrangements should deal clearly with the allocation of key risks, including the following:

- 1. Site risk** – Developers will often seek to transfer all geotechnical and other site-related risks to the contractor. However, this is sometimes resisted, particularly if the contractor has not been given sufficient opportunity to carry out its own site investigations prior to contract award. If site risks are to be 'shared', the developer should ensure that the contractor's entitlements to relief are appropriately confined. For example, an approach sometimes adopted on wind projects involves specifying in the contract the alternate turbine foundations that will be used (and the additional cost of those foundations) if particular ground conditions are encountered during delivery.
- 2. Force Majeure** – It is 'market' to provide the contractor with relief from performance in the event of 'force majeure' - more contentious is the scope of the 'force majeure' definition. Contractors will typically seek a broad definition, which covers both site-based and non-site-based impacts of the relevant events (including, for example, impacts to shipping and other transport activities). On the other hand, developers often seek to limit 'force majeure' to site-based impacts only. Ultimately, regard will need to be had to the specific risks affecting the project in agreeing the scope of 'force majeure' relief.

- 3. COVID-19** – The impacts of COVID-19 are ongoing and should be specifically addressed in the contracting arrangements. It is increasingly common for the contractor's entitlement to relief to be limited to the impacts COVID-19 related changes in law occurring after contract award and government-mandated site shutdowns only, often subject to and compliance with a 'COVID-19 management plan' as a 'pre-condition' to relief. However, it is not uncommon for relief to also be provided for impacts on certain, specified supply chains, particularly given key equipment such as solar panels, trackers, inverters, wind turbines and batteries are typically manufactured overseas. Given the potential difficulties in establishing (and disputing) causation in relation to the alleged impacts of COVID-19 on supply chains, developers should ensure that any relief entitlement for supply chain impacts is appropriately limited.
- 4. Other contractors** – Where the delivery of the project is split into multiple contracting packages, contractors will typically seek time and cost relief for the impacts of delays caused by interfacing issues with the developer's other contractors and delays caused by third parties, such as delays by the distribution network providers. While this is not unreasonable (and is consistent with the developer bearing a greater degree of interface risk in a 'split contract' structure), developers should ensure that each contractor's entitlement to relief is appropriately limited. At a minimum,

relief should not be triggered to the extent the delay results from a failure of the contractor to cooperate and coordinate its activities with those of other contractors.

- 5. Defects** – Given the nature of renewables projects, in addition to a 'traditional' regime which requires the contractor to rectify defects identified within a 'defects liability period' (typically 12-24 months from practical completion), it is common for contracting arrangements to also include protections in relation to serial defects (i.e. the occurrence of the same defect in 'like' components) and latent defects (i.e. defects not reasonably capable of being identified within the original defects liability period).

Contractors are also commonly required to procure that suppliers of key equipment enter into a 'direct deed' with the project developer in order to provide the developer with additional recourse in relation to defects (including in the event of insolvency of the head contractor).

- 6. Performance testing** – Careful consideration should be given to the performance testing regime that will apply in respect of the delivery of the project (such as 'availability' testing, 'performance ratio' testing for a solar farm and 'power curve' and 'acoustic' testing for a wind farm). This includes not only the tests required to be carried out as a pre-condition to practical completion, but also to post-completion tests. While the pre-completion tests are carried out over an abbreviated time frame, post-completion tests are carried out over extended periods (sometimes, for the length of the entire defects liability period) and typically trigger the payment of liquidated damages for under-performance to compensate the developer (up to a cap), for reduced returns over the remaining life of the asset.

- 7. Liability regime** – The liability regime (including liability exclusions, caps and 'carve-outs', indemnities, delay liquidated damages, performance liquidated damages and insurance requirements), will be a key component of the contractual arrangements and will be of central importance from a 'bankability' perspective. Legal and insurance advice will be required to ensure the liability regime is fit for purpose.
- 8. Counterparty risk** – The unique difficulties encountered by contractors in the development of renewables projects in Australia is well documented. Developers should ensure that they are adequately protected in the event a contractor becomes unable to perform its contractual obligations (whether as a result of financial distress, deficiency in capability, or otherwise). In this regard, consideration should be given to (among other things):
 - the security package (including whether a parent company guarantee is required);
 - the requirement for direct deeds with key suppliers;
 - access to intellectual property in relation to key processes and equipment to ensure the project can be completed and operated despite the materialisation of supply chain risks (including access to 'black box' intellectual property in the event of a key supplier's insolvency);
 - whether 'step-in' rights are required as an additional means to mitigate the impacts of contractor default;
 - the structuring of the payment regime to ensure the contractor is not subject to overly onerous cashflow constraints which may impact on its performance; and
 - the dispute resolution process, including in the context of enforcement against foreign-based counterparties and parent companies (in this regard, arbitration rather than litigation may be the more appropriate forum for the final resolution of disputes).



Operations & Maintenance contracts

As with the contracting arrangements for delivery of the project, there are a number of options for structuring the Operations and Maintenance (O&M) arrangements. Where the developer has the requisite experience, it may choose to operate the project itself, supported by a technical services agreement with the key equipment supplier.

On the other hand, if the developer does not have the capability to operate the project, it will typically enter into a long-term O&M contract with either the EPC contractor or the key equipment supplier (as contracting with these entities will generally enable the developer to secure more extensive performance-related guarantees than from a third-party operator).

Alternatively, a developer may choose to enter into a shorter-term O&M contract in the first instance, with a view to taking over operations (again, supported by a technical services agreement with the key equipment supplier) after it has the opportunity to 'upskill' during the initial O&M contract term.

Again, there is no 'one size fits all' solution, and the most appropriate contracting strategy will ultimately depend on the developer's (and lender's) specific requirements.

Construction litigation and the risks to a renewables project

The complex nature of renewables projects in Australia has been accompanied by a steep rise in arbitration, litigation and other forms of dispute resolution.

We set out below some of the key issues that tend to arise frequently in renewable energy project construction disputes.

Six key risks that could lead to a dispute

- 1. Design failures and gaps** – Frequently disputes in the renewable energy space arise due to failures in the design and engineering of renewables projects, particularly in respect of hybrid plants. Disputes also tend to arise when there are 'gaps' in the delivery contractor's scope of works or inconsistencies between the contract documents. Naturally, a delivery contractor will argue it is not required to carry out works beyond the scope of works without additional payment and, potentially, an extension of time. Often, the documents comprising the contract (such as the applicable specifications, scope of works and technical requirements) will be prepared by different consultants. Unless carefully reviewed prior to the contract being signed, this creates a real risk of the documents being inconsistent and the parties ending up in dispute as to which standard or requirement prevails. While an 'order of precedence' clause in the contract may assist in resolving the issue, it is frequently the case that it fails to resolve inconsistencies between competing technical / engineering specifications, leading to complex and lengthy disputes.
- 2. Grid connection risks** – Developers rely on the existing electricity infrastructure in Australia (the grid) which varies in strength and quality across the regions. In order to connect to the grid, developers must demonstrate through technical modelling and hold-point testing that their power output will not adversely impact the operation of the local or regional grid. Further, the developer's modelling must take into account any other generators already connected to, or those intending to connect to, the grid. Any new connections to the grid prior to the project's completion require the developer to update its modelling, and may require changes to the planned hold-point testing and commissioning activities which are likely to increase costs and delay completion. There is also a risk that the project's output will be curtailed by the regulatory bodies to avoid excessive output to the grid. Developers often seek to transfer the grid connection risk to the contractor; however, this does not always avoid protracted connection

delays and disputes, particularly if the delay is caused by a third party (such as the relevant network service provider).

- 3. Programming & time** – Completing a project on time is critically important for renewable projects given the grid connection risks outlined above. For each day of delay, there is a real risk that a neighbouring generator will connect to the grid, necessitating additional modelling and testing to ensure grid stability. In order to manage this risk, developers should carefully consider the programming of a project which includes all activities required to complete the project, including commissioning and grid connection. Any such program should clearly set out the critical path and link certain activities to any milestone payments, as required. Including an appropriate notification of delays regime and extension of time regime that clearly sets out the circumstances in which the delivery contractor is entitled to claim an extension to the time for completion will mitigate risks and unexpected delays at the end. Similarly, the developer should also consider including a liquidated damages provision, which requires the delivery contractor to pay a stipulated sum to the developer for each day the project remains unfinished after the stipulated date for completion. The purpose of

such a provision is to compensate the developer for losses it will or is likely to suffer as a result of the delivery contractor's delay, so it pays to consider the type and amount of losses likely to be suffered if the project is not complete on time.

- 4. Defects risk** – Defects in design, plant and equipment are a common source of dispute following completion of the project. It is essential that developers include an appropriate 'defects liability period' in their construction contract that requires the delivery contractor to return to site and rectify, at its cost, any defects identified in its works for a certain period (usually 12–24 months). A properly drafted provision will entitle the developer to claim the reasonable rectification costs of any defect that the delivery contractor does not rectify within the defect liability period. Developers should also ensure that the delivery contractor assigns all manufacturers' and suppliers' warranties to the developer on completion. An effective assignment means the developer may call upon the warranty directly if a defect is identified upon the expiry of the delivery contractor's defects liability period.



5. Security – It is usual for delivery contractors to provide performance security to developers, usually in the form of unconditional bank guarantees. In principle, the developer should be able to call upon the unconditional security to satisfy a debt owed to it by the delivery contractor (for example, liquidated damages for delay), however these calls are frequently resisted. Delivery contractors will often seek to restrain the developer's call upon its security by way of a court-ordered injunction. If an injunction is granted, the developer will be unable to call upon the contractor's security until the dispute is finally resolved through the relevant dispute resolution process under the contract, such as arbitration or litigation. A carefully drafted security clause can minimise the risk of the delivery contractor successfully obtaining an injunction.

6. Security of payment legislation risk – Each State and Territory in Australia has its own unique and specific 'security of payment' legislation regulating the payment of delivery contractors under construction contracts that cannot be modified or contracted out of. The purpose of the legislation is to ensure cashflow to contractors and avoid insolvencies. The ins and outs of the various security of payment acts are complex and the following summary is not intended to be exhaustive. The legislation entitles anyone who carries out construction work to payment for that work. In addition to creating an interim statutory entitlement to payment, the legislation provides for the interim resolution of payment disputes known as adjudication.

In order to take advantage of adjudication, a contractor must first serve a valid claim for payment that complies with the applicable legislation. If the recipient of the claim either does not pay the claimed amount by the due date for payment or otherwise disputes the contractor's claim, the contractor may submit an adjudication application to an authorised nominating authority for the dispute to be resolved 'on the papers' (meaning without a hearing). Usually the parties will submit submissions and evidence in support of their respective positions, often incurring significant legal costs as well as disrupting the project team who will be required to provide detailed evidence.

Once a determination is made, any amount determined to be payable to the contractor can be enforced as a judgment of the court. The adjudication process is very quick, generally taking only a matter of weeks for a determination to be made.



Risk Mitigation

From the outset of any renewables project, developers should give due consideration to the issues that may or are likely to give rise to a dispute. By being aware of the likely issues, developers can take steps to mitigate the likelihood of a dispute arising.

As discussed earlier, a critical first step is considering the nature and size of the project to ensure an appropriate delivery model and payment method (that complies with the relevant security of payment legislation) is utilised.

It is vitally important to select an appropriately qualified delivery contractor who is experienced in constructing and connecting similar projects in Australia (and ideally, within the relevant regional grid network). An inappropriately experienced delivery contractor is unlikely to deliver a project within budget and on time, both of which are leading causes of disputes.

Poor contract administration is another significant cause of disputes in any construction dispute, including renewables projects. To minimise and hopefully avoid this risk, it is essential that appropriate systems and procedures are in place to support the contract administration and project teams throughout the project. This includes ensuring the contract administrator understands the construction contract documents, including their obligations for assessing claims for payment, variations, extensions of time, and so on. Closely linked to contract administration is the keeping of appropriately detailed documents and records (including meeting minutes), as these will be invaluable if a dispute does arise.

What's next?

Given the explosion of new international players in the market, there are more renewables projects in production than ever before. This increase has also seen a rise in disputes referred to arbitration, litigation and other forms of dispute resolution.

In addition to the surge of new players, the last few years have seen major players exit the renewables market due to increased risk allocation to the contractor and rigorous testing in order to connect to the grid. As a result, we are seeing principals and delivery contractors request innovative and new forms of contracting to mitigate these risks. Parties are also looking towards collaborative forms of contracting (which may include elements like: early contractor involvement; incentive payments; and good faith or similar clauses) to avoid disputes and mitigate delays in progressing the design and construction works on renewable projects.

It is likely we will see an increase in technology and a shift in risk profiles across the sector and a continuation of collaboration, particularly in a COVID-19 impacted environment.

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Transforming the Australian renewables sector for the future

The renewable energy sector is experiencing more innovation and transformation than almost any other industry in Australia. The Federal Government's Technology Road Map highlights the role that technological development will play in Australia meeting its emissions targets. This innovation is taking many forms, from increasing output of the panels and turbines, to technological solutions ensuring more efficient production, distribution and use of the energy generated. But with this increase in automation and cloud based solutions, comes increased cyber risks which need to be managed by developers and Governments alike.

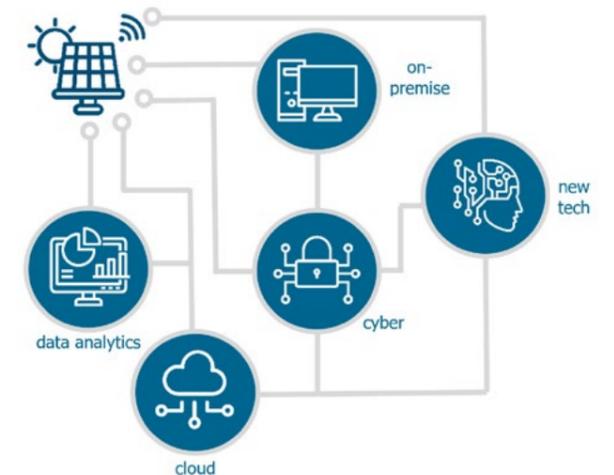
When considering how to develop renewable assets, there are a number of factors to consider. The use of technology with renewable assets is enabling significantly enhanced operational capability and efficiencies, but has equally created more centralised vulnerabilities. The type of considerations and risks will depend on the nature, and intended use, of the technology being implemented.

On-premise solutions

Technology solutions can be implemented in a number of ways. The most traditional approach is to implement such solutions on a local environment, known as 'on-premise solutions', with no external connections other than to the renewable assets, such as monitoring software and alert systems. When procuring and implementing these types of solutions, asset owners, and operators charged with operating such assets on behalf of the owners, should ensure that such solutions are carefully evaluated. This evaluation should be based on software demonstrations, accompanying documentation and the available support services. Corresponding contractual provisions should be put in place that address in detail the scope of the project, and typical risks associated with such technology solutions.

Cloud solutions

Increasingly, cloud technology is being used where renewable assets which are connected to management systems, and operational processes, such as maintenance and repairs, are being automated. Cloud solutions are typically implemented and operated remotely from third party IT infrastructure, and are accessed via the internet. When procuring cloud solutions, the commercial, technical and legal concerns differ from on premise solutions. Asset owners and operators should carefully evaluate the guaranteed 'availability' (also known as 'uptime') of the solution, level of support provided for such systems, and the security measures put in place by the third-party provider.



Data analytics

The application of technology to renewable assets has also allowed asset owners and operators to capture, monitor, analyse in real time and utilise data generated by those assets. For example, analytics solutions, used in surveying and mapping technology and more sophisticated weather forecasting and tracking, are enabling renewable assets to be deployed more effectively and existing renewable technologies to be applied in new and different ways. Asset owners and operators should consider the potential of their renewable assets to generate data, and the value of that data – both for their own use, as well as for commercialising by licensing the use of that data to other parties.

'New' tech

The advent of new science and engineering, such as green technologies, artificial intelligence and quantum computing, has resulted in new renewable asset types and infrastructure, and new opportunities to apply these technologies. Equally, the application of existing technologies that have long been utilised in traditional IT and manufacturing infrastructure, such as real-time monitoring, real-time analytics and digitised supply chains, are being used to enhance the existing capability of energy assets. Again, the type of technical and legal considerations and risks will depend on the nature, and intended use, of the technology being implemented, as well as any legislation regulating the use or security of such technology or any resulting data.

Cyber

By bringing renewable assets 'online' through a mix of the technologies mentioned, traditional infrastructure is being slowly converted into a series of connected 'smart' assets. Cybersecurity risk is the most significant technical and operational concern that is at the core of every smart asset. Malware, remote disabling of assets, deletion of files and denial-of-service attacks have already been used to attack energy distributors and providers and disrupt energy supplies to whole cities. Such attacks are also sometimes motivated by a desire to exfiltrate intellectual property, valuable data and other proprietary information.

An increasingly 'online' energy infrastructure places sharper focus on generic vulnerabilities in software and firmware and the upfront consideration of information security that is required. 'Security by design' should be at the heart of any technology strategy for asset owners and operators who want to bring their renewable assets online. This means considering the security measures built into, or being taken by, third party technology providers (depending on the nature of the solution). For cloud solutions, this also means examining the responses and procedures that the technology provider has in place in the event of a data security incident.

Asset owners and operators should proactively take an enterprise wide security approach that implements appropriate cyber protection for all aspects of the infrastructure that may be brought 'online' through an interconnected network, including its intellectual property, proprietary data, critical systems, renewable assets, as well as ensuring appropriate security levels throughout the supply chain. Appropriate contractual provisions should be put in place to address the obligations and risks associated with each of these issues.

What's next?

With renewed global vigour for the Paris Agreement and countries around the world setting aggressive climate targets, there is the potential for societal and global pressure to drive more active government involvement, which in turn will add regulatory pressure across the energy supply chain.

It is also anticipated that cybersecurity considerations will be central to Australia's national defence strategies, with specific security standards and regulations, like those that already exist in the United States and the European Union, being enacted to apply to critical systems, infrastructure and utilities. With responsibility for cyber resilience already being considered within a director's duty of care and diligence, renewable asset owners and operators should expect the importance of cybersecurity to go beyond being central to their technology strategy, to being legally mandated.

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