Renewables Discussion Paper

August 2022 Refresh

PwC Restructuring team



August 2022 Market update



At a Glance

Long-term underlying dynamics remain positive in the renewables space, despite material disruptions.

However, there is currently significant short term uncertainty in energy markets globally due to unforeseen events and one-off shocks.

- Recently, in Australia, unprecedented spot prices (global events driving high commodity prices and unexpected local generator outages) has seen:
- · Generators with market exposure making wind-fall gains
- · Multiple energy retailers becoming non-competitive and failing or "giving away" their customers
- The regulator, AEMO stepping in and taking the unprecedented action of suspending the NEM for 9 days

This paper focuses on some of these recent shocks to the energy market and the challenges for existing renewables projects - particularly "original" pre-2018 projects. The issues being faced (both recent and longer standing) need to be considered in light of an upcoming wave of refinances (c.\$4b across the next two years). This environment of uncertainty and volatility, but longer-term positive outlook, may lead to opportunities for those able to take a longer-term view.

Renewables industry issues timeline



Latest Macro Developments

Energy Crisis and surging spot prices

- Since mid to late 2021 energy prices have been surging, due to:
 - high coal and gas prices, driven by the invasion of Ukraine; and
 - approximately 25% of coal power stations experiencing outages.

AEMO reported wholesale energy prices were 141% higher YoY in the first quarter of 2022.

- In response to surging prices, in June 2022 the Australian Energy Market Operator (AEMO) initially imposed a temporary \$300/MWh price cap, but then was forced to suspend the National Electricity market (NEM) across all territories for the first time since inception. In doing so, it applied a \$300/MWh compensation regime (plus compensation for any losses or fees incurred by generators forced to dispatch to meet supply requirements).
- The suspension only lasted 9 days and while the compensation regime served a purpose in alleviating immediate pricing concerns for consumers, it did so at a cost to supply dynamics. It also triggered potentially very significant compensation payments to generators – which will ultimately be passed on to already stressed energy retailers and then customers dealing with high cost of living pressures.
- We note that most renewable generators are underpinned by longdated Power Purchase Agreements (PPAs). Such generators are therefore unlikely to be materially benefiting from higher spot prices given the high proportion of their output that has been hedged. Some, however, made windfalls during this period.

Rising Interest Rates

- Since May 2022, the Reserve Bank of Australia (RBA) has increased the Cash Target Rate by 1.75bp (from 0.10bp) with strong consensus on further rises in the immediate future.
- The inherent cost structure of renewable projects, high capex with comparatively low opex, results in a higher dependency on debt than other energy sources and therefore a sensitivity to interest rates (for new, or unhedged projects) energy sources.
- In the short term, completed/operational projects will be largely hedged against this risk. However, swaps will often close out relatively early in the overall project lifespan, typically in line with the end of PPA terms. Projects with an upcoming refinance may therefore be facing tighter economics in long term than envisaged.
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Supply chain issues and inflation

- Inflation in cost of materials and labour, coupled with substantial supply chain disruptions, is having material impacts on new projects. Rystad reported a 300% rise in the cost of polysilicon (Solar) between 2020 and 2021. Globally, manufacturing costs have risen 30%+.
- Supply conditions are impacting delivery schedules for projects and is materially impacting the economics of both projects in construction and those under development. Insurance and maintenance costs have also seen rapid increases.
- For operational projects, as many PPAs cap pricing increases at the lower of CPI or 2.5%, rising operational expenses are not being offset by revenue increases, further tightening cash flows in the short term.
- Additionally, modern slavery issues are increasingly coming to the fore, particularly for solar projects. In addition to the grave social and moral issues at play, this issue also impacts supply.

Strong underlying dynamics for renewables (ESG landscape)

- Decarbonisation continues to be a key disrupter of traditional energy generation and appears to have not been deterred by COVID-19:
 - Zero carbon goals proliferating across most continents
 - Renewables cost gap vs traditional sources rapidly closing
 - Planned and unplanned retirements accelerating energy gaps
 - Battery cost economics rapidly improving distributed generation
- Renewables in Australia are being further supported by corporates, universities and other non-utility players taking PPAs directly.
- May 2022 election of a Labor government in Australia, and its pledge to invest \$20 billion in Australia's electricity grid, represents a further positive tangible policy shift toward renewables.
- Federal and State support for new transmission lines will see increased grid capacity become available for renewables. Whilst this may lower pricing, there are many potential offsetting factors impacting price, such as early closure of coal powered generators
- Eraring (NSW) and Yallourn (VIC) coal powered generators have brought forward their expected closure dates to 2025 and 2028 (8 and 4 years earlier than scheduled) respectively. State governments in both NSW and VIC have announced Renewable Energy Zone initiatives (refer page 4) to counteract this fall in supply.

Refinancing developments



- \$3.8b of solar/ wind debt is due for refinance in the next 2 years.
- This is off the back of Australia's 2016 investment boom, following the finalisation of State and Federal Renewable Energy Targets (RET).
- In total, investors committed 135 new renewable projects between 2016-2021, representing 16,000MW of generation capacity and ~\$26.5 billion in capital investment.

Refinancing challenges

- In recent years the capacity for some projects to meet debt repayments has been put under pressure. Whilst a number of the contributing factors are showing signs of improvement (e.g. commissioning, curtailment and MLF), they have left lasting impacts on the early stage performance of a number of projects.
- Recent volatility in financial and energy markets adds further uncertainty during this refinancing window



for projects once they do secure a refinance.

Area	Background to issue	Current issues/impact on refinancing		
Project commissioning	Particular areas of the grid with higher levels of instability have been at risk, in particular the West Murray region (see page 5). Many projects (now fully commissioned) experienced earlier delays, impacting	Historical commissioning delays are likely to have impacted the base case financial models/economics. This could increase the risk profile of projects facing refinancing as maturity dates arise compared to original expectations.		
	revenue generated and amortisation profiles.	Whilst now less of an issue, some commissioning delays are still being observed across the NEM. Further delays to certain greenfield projects were flagged by AEMO in June 2022.		
Curtailment	Unexpected levels of exogenous curtailment have inhibited the ability of some renewable projects to generate at levels originally forecast, causing immediate profitability issues.	Average curtailment of renewable generators in the NEM was 9% (351MW) in Q3 2021. Some generators in the West Murray and North Queensland regions have suffered curtailment of up		
	The duration of curtailment often linked to planned or necessary infrastructure/grid upgrades - delays to those works will prolong the impact of curtailment on the top lines of impacted projects and creates forecast uncertainty.	to 33%. Per opposite, for some projects, these issues will hopefully be alleviated by new transmission lines, however these have long lead times and are subject to planning and construction cost and delay risks.		
MLF	Lower than expected MLFs have negatively impacted the functional output and, by extension, revenue of generators across the NEM.	Whilst MLFs have improved in certain regions of the NEM, assessing ongoing forecast assumptions remains a challenge. Many projects have a higher risk profile than originally forecast due to MLF impacts/uncertainty.		
PPA issues	Renewable PPAs were viewed as highly valuable historically, if not essential, when securing finance for renewable projects.	The volume of PPAs underwritten by retailers has declined (post 2020 20% RET), whilst demand for "corporate" PPAs has increased. It is unclear whether this change in counterparty will create risks to PPA market liquidity in the near future.		
Negative pricing	Whilst solar and wind technologies are impacted less by such periods, negative spot risk persists for operators unable to sufficiently ramp down. Negative trading periods threaten profitability for plants exposed to market pricing	FY21 witnessed 4,931 intervals where trading prices were negative, more than double that of the prior year, partly due to increased prevalence of solar rooftop PV. Whilst currently a non-issue in FY22, it may return.		
Energy and financial market volatility	Energy markets have experienced recent challenges with pricing, system strength, supply shortfalls (refer to page 2). Global financial markets are also experiencing uncertainty due to economic headwinds. Significant inflation in	Whilst still a very attractive sector, energy market turbulence is likely to heighten financier's risk sensitivity. Additionally, general tightening of credit markets may add to a thinner market for refinancing in addition to higher costs of financing		

Typical renewable finance model (project reaching Financial close in 2018)

Australia has led to regular recent interest rate increases.



Energy market policy and Greenfield projects



Energy Market Updates

- We have previously observed that the Australian renewables industry was suffering from a federal policy vacuum following the expiration of the federal 2020 RET.
- There have since been a number of important updates from regulators, state and federal governments impacting the energy market.
- The May 2022 election of a Labor government, and its pledge to invest \$20 billion in Australia's electricity grid represents a tangible policy shift, however uncertainty continues for industry participants regarding the timing and implementation of regulatory changes and infrastructure delivery.

Area of impact	Body: Policy/change	Description	Impact on renewable projects
Renewable Investment incentives	State Government: Renewable Energy Zones (REZ's)	REZ's are a means by which to develop and expand Variable Renewable Energy (VRE) network hosting capacity in regional areas, with the underlying intention to connect multiple parties that would otherwise act independently, thereby avoiding duplication and optimising scarce network resources.	Increasing adoption of REZ's as a policy is anticipated to create opportunities for new plant securing adjacent sites. However, wholesale price risk may exist for such projects due to "crowding out" in a widespread policy adoption scenario.
Transmission infrastructure	AEMO: 2022 Integrated Systems Plan Federal Government: ALP - Rewiring the nation	AEMO released the Final 2022 Integrated System Plan (ISP) on 30 June 22, an ambitious and tangible roadmap to deliver accelerated investment in large-scale greenfield renewable capacity (over 120GW across the NEM), energy storage and transmission buildout. The ISP target of 40GW Network investment is increasingly supported by Federal and State Government. This includes the NSW Transmission Acceleration Facility and ALP Rewiring the Nation.	Infrastructure enhancements such as new interstate transmission lines create a broader market for the power produced. Major projects such as EnergyConnect and Marinus Link will improve supply security for renewable generators but face delays in their expected completion due to construction industry bottlenecks
Regulatory policy	Various regulatory bodies: Capacity mechanism, AEMO connections reform, Essential system services reform and others	A significant body of energy market reform policy is underway. The increasing proliferation of variable generation in energy supply mix means reforms are required to ensure there is sufficient market incentives for dispatchable capacity in the system. Additionally frameworks are needed so that new generation can be readily delivered in anticipation of retirement of base load coal fired generators.	Given most policy changes are in a consultation stage and subject to refinement before being finalised, the ultimate impact of these changes is uncertain.
Supply and Demand impacts	Early closure announcements; green hydrogen market electrification	 Demand for renewable power is expected to increase due to combination of: coal fired generators announcing earlier than anticipated closures, Increased electrification of transport, industry, offices & homes and energy demand for hydrogen production 	Likely to increase opportunity for new renewable generators given extra demand. Increased demand may also have the effect of increasing power prices and providing a market for energy during historically low-peak periods e.g. middle of the day

Greenfield Projects

- Securing up front finance remains one of the major milestones for such capital intensive projects and the changing landscape will impact both new
 financing and upcoming refinancing. Such dependence risks creating challenges for industry stakeholders including sponsors, developers,
 contractors engaged to construct and maintain renewable projects, off-takers and lenders.
- Moreover, rising costs and supply chain issues vis-à-vis raw materials have created additional challenges during early development phases. In particular;
 - Lockdown measures due to COVID-19 caused supply chain disruption, causing increases in steel and solar panel costs
 - Since July 2020, prices of raw materials have surged following general rising demand and various other supply shocks, see below
 - Strong rebounds in demand and further supply shortages have kept prices high throughout 2022

Raw materials as a share of total CAPEX, %



Rise in price of key raw materials







Global Copper prices USD/kg, nominal



Source: PV Tech, Financial times, EnergyTrend, Investing.com

Update on MLF and Curtailment

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Marginal Loss Factors (MLF) - Update

- The biggest losers from MLF over the last 5 years have been regional solar and wind farms on the more distant corners of the grid such as those found in western NSW, northern VIC and northern QLD.
- Both the West Murray and North Queensland regions continue to be impacted with MLF below the overall grid average

Generators with Low MLF 2022/2023	State	Avg. last 5 yrs	FY21/22	FY22/23	Var. 22/23 to prior 5 years
Silverton Wind Farm	NSW	0.88	0.85	0.80	-9.6%
Wattle point Wind Farm	SA	0.82	0.81	0.82	0.0%
Limondale Solar Plant	NSW	0.80	0.80	0.83	3.9%
Moree Solar Farm	NSW	0.89	0.89	0.83	-6.4%
Sunraysia Solar Farm	NSW	0.80	0.81	0.83	4.0%
Gunnedah Solar Farm	NSW	0.90	0.90	0.84	-6.5%
Broken Hill Solar Plant	NSW	0.85	0.80	0.84	-1.5%
Murra Warra Wind Farm	VIC	0.93	0.89	0.87	-6.9%

Legend:

NSW indicates generator is located in Western Murray zone [RED] indicates decline on prior year [GREEN] indicates increase on prior year

MLF – Comparison of Entire Grid v Distressed Zones



Curtailment

The following NEM projects, have faced high curtailment levels in the past 2 years. Curtailed projects lose revenue as a result of lower generation and may face additional penalties from PPA off-takers.

Project name	Location	Est curtailment % (avg last 2 years)
Molong Solar Farm	NSW	32.8%
Sun Metals Solar Farm	QLD	25.7%
Manildra Solar Farm	QLD	22.0%
Wemen Solar Farm	VIC	21.2%
Limondale Solar Plant 1	NSW	20.9%



*Estimate of curtailment based on AEMO's publicly available market dispatch information, calculated on a monthly aggregate basis using the differential between generation available and generation dispatched. This includes both technical curtailment and market curtailment These figures are indicative only as the differential between generation available and dispatched can also be periodically attributed to unavailability of plant or equipment



FY22/23 MLF of Australian Renewable generators

Electricity is lost as it travels long distances over transmission lines from the point of generation to the point of use. Each year AEMO calculates the impact of this electricity lost in transmission and announces Marginal Loss Factors (MLF) for every power generator in the grid. MLF's are determined based on geographic location and as such generators cannot do anything to influence the outcome. Energy output from the generator is multiplied by the MLF to determine how much of the energy the generator is actually paid for. This means a project with an MLF of 0.8 will only receive payment for 80% of energy output (putting significant strain on financial models).



Source: PwC analysis, AEMO dispatch information

Explainer: Curtailment

AEMO imposed output constraints - Some regional renewable projects have fallen into a "bottleneck trap" where transmission cables do not have either the capacity or voltage requirements to carry all the power generated in that area of the transmission grid.

In some cases, competing generators in a certain area were never modelled and due to limits on the amount of power that can be transmitted along a cable, generators are finding themselves having output constrained.

Other system stability issues are also forcing AEMO to limit output from a generator; causing additional uncertainty for renewables.

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Curtailment of Renewable generators in last 2 years (NEM only)

Our restructuring credentials

(Please note that our restructuring team is also supported by our market leading of c.150 industry specialists... and growing)



In addition to a wide range of credentials and expertise in bringing capital to renewables projects, we have extensive expertise bringing stakeholders to the table to reach consensual solutions in restructuring situations

QRetailer role

Engaged by an ASX listed Com energy retailer to assess forecast cash flows and recapitalisation options Our role involved working with management to assess the Group's forecast liquidity profile,

- including opportunities to
- Shareholders/Project improve cash flows, risks
- to the forecast and options for to mitigate risks, and
- recapitalisation options
- Acting 1 including both debt and equity solutions.

Our role involved working with management to assess the Group's forecast liquidity profile, including opportunities to improve cash flows, risks to the forecast and options to mitigate risks, and recapitalisation options including both debt and equity solutions

Buy-side advisory role

Buy-side advisor to a private

equity backed innovator in the

Renewables space, who were

looking to purchase a Not For

Profit (NFP) with a focus on

increasing solar uptake.

O Project Glow

Engaged by an ASX listed

energy retailer to assess

forecast cash flows and

recapitalisation options.

+++Project Blade

Engaged by an OEM to conduct an option analysis on the impact of potential insolvency to a consortium partner where they are jointly EPC contractors to a number of renewable projects in the construction phase Involved an assessment of

impacts of insolvency on the projects and the impact on the OEM in light of likely positions to be taken by key stakeholders in the projects.

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Û INTERGEN

Administrators of InterGen Energy owned companies (the Group) which have a 50% interest in the Callide C Power Station, a 810megawatt supercritical coalfired power station located near Biloela, Queensland. We worked with the

Group's shareholders to implement a refinancing/recapitalisation of the Group involving \$270m in new funding and preparing a court application pursuant to section 447A of the Act to allow the Group to be returned to solvency

O LINC ENERGY

Administration of Linc Energy Ltd, a Singapore (SGX) listed energy producer and explorer with a substantial portfolio of energy assets across Australia, the United States and Europe. Linc had approximately \$530m outstanding to noteholders on appointment.

We undertook a process to recapitalise and/or realise the Australian assets, and restructure the US operations through Chapter 11. Further, we have been involved in complex litigation with the State Government relating to environmental liabilities.



Appointed administrators of Caledon Coal Pty Ltd and related entities which operated the Cook Colliery and a shareholder/shipper of WICET. We conducted a sale campaign to recapitalise the Group, and/or sell its business and assets. This process has involved extensive negotiations with the Group's key stakeholders including its secured creditors and Glencore as head lessor of the mining lease for the Cook Colliery. This sale process and negotiations have resulted in execution of a sale for the Group's business and mining assets

VICTORIA EastWest

Appointed to assist the Victorian Government in protracted negotiations with the Consortium contracted to build the East West Link PPP project following the Government's decision not to proceed with the project.

We conducted due diligence investigations on behalf of the State and our analysis ultimately assisted the Government in developing and reaching a commercial settlement with the Consortium.

Advising

Government on

PPPs/Infrastructure Projects



Engaged as a financial and strategic advisor to the State of Tasmania in respect of a dispute with Basslink, owneroperator of a 370-km high voltage electricity interconnector with Tasmania. Our role included understanding the financial position of Basslink and advising on the options available to its stakeholders in various dispute resolution scenarios.

Project Orange

- Appointed advisor by a syndicate of lenders to a
- Creditors large distressed solar farm
- with a total exposure of approximately \$240m.
- We assessed the
- Secured immediate liquidity need
- of the project, options to finance medium term for
- Acting 1 liquidity shortfalls and negotiated an amend and
- extend with appropriate covenant and risk mitigations. To achieve this, we obtained a detailed understanding of the forecast financial

performance of the project , and the impact of the issues being faced.

corporate advisory engagements.

project owed c. \$240m

Relevant experience

Contact us:

The NFP had entered voluntary administration. Accordingly, our role combined financial due diligence and advice, alongside specialist advice around the structure of the purchase as well as the industry issues that were

Stephen leads PwC's Restructuring practice. He has been a trusted corporate advisor for over

Financial advisor to a syndicate of domestic and international lenders to a major solar

Solar Systems - Administrator of this company which constructed and operated

Restructuring and strategic adviser to the State of Tasmania in respect of Basslink, a high

concentrated photovoltaic (CPV) solar power stations in Australia. It also proposed to build a 100 megawatt solar power station in Mildura Victoria after completing a 1.5MW

Nine Entertainment Group - Independent Expert and Scheme Administrator of the \$3b

Linc Energy – Administrator of this Singapore (SGX) listed energy producer and explorer with a substantial portfolio of energy assets across Australia, the United States and Europe

Strategic adviser to the Federal Government and the Australian Submarine Corporation on counterparty risk for the Hobart Class Air Warfare Destroyer project

Energy Brix - managed the wind down of operations, closure and decommissioning of this

25 years, and has worked on Australia's largest and most sensitive restructurings and

voltage electricity interconnector between Tasmania and Victoria

prevalent.

Stephen Longley

+61 414 921 241 stephen.longley@pwc.com

Partner Melbourne

Annual loan portfolio reviews for CEFC, now comprising review of 12 renewables projects with a total exposure of approximately \$925m. Our role involved assessing the financial and other relevant information to determine the adequacy of CEFC's assessment of credit and other risks. This covers both debt and equity positions, with assessment of loan provisioning for each of the debt exposures To achieve this, we obtained

a detailed understanding of the financial performance of each project and the impact of the issues being faced by the industry.

Appointed advisor and ultimately receiver and manager to the PPP group on behalf of a syndicate of domestic and offshore banks.

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In conjunction with management, we successfully transitioned the operations from the construction phase to the operations phase, enabling the negotiation of a sale of the assets (AirportLink) to Transurban Queensland for \$2b. Over the course of the engagement, we managed a diverse syndicate of up to 25 financiers



Adam Colley Partner

Sydney +61 427 957 205 adam.colley@pwc.com

Adam has over 18 years' experience in corporate advisory and restructuring developing and implementing solutions for financial stakeholders across a range of sectors and businesses. Relevant experience

- Ongoing financial advisor to a syndicate of domestic and international lenders to a major solar project owed c. \$240m
- Advisor to the secured lenders of a major construction and engineering company operating in the renewables sector
- Assisted a secured creditor to a failed greenfield solar project navigate a Deed of Company Arrangement with the Sponsor, allowing the project to recommence
- Advisor to the secured lenders of a major construction and engineering company operating in the renewables sector
- Current advisor to the South Australian Government in relation to the Whyalla Steel and Mining operations
- Financial advisor to a listed retail energy provider on refinancing and restructuring options
- Advised the syndicate of lenders on the \$1.2bn restructure and recapitalisation of Bis Industries, which was completed in December 2017 following a complex restructuring process
- Advised the SA Government in relation to the review and negotiation of the Flinders Group (ex- Alinta Energy) restructuring agreement

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demonstration plant in Bridgewater Victoria

debt for equity restructure of Nine

small Victorian based power station

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