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AER renewables edition — introduction

Robyn Glindemann *LANTEGY LEGAL*

Welcome to a special renewable energy edition of the *Australian Environment Review*. As I write this introduction, Canberra is sweating through yet another 40-degree day, Tasmania is battling many bushfires (again), Adelaide has just snatched the record for the hottest Australian capital city with 46.6 degrees and the Australian Energy Market Operator has ordered load shedding across the grid and activated emergency reserves while many homes and businesses across Melbourne struggle with electricity blackouts.

There is no escaping the fact that the Australian climate is changing and we need to make adjustments as to how we live to adapt to that change. One thing that has also been changing (a little too frequently perhaps) is our national energy policy and its relationship to climate change and its impacts. This has been to the detriment of Australia's ability to drive investment in the renewables and alternative energy sector and, depending on which report you read, Australia's ability to meet its existing international emissions reductions targets.

It has been nearly 10 years since the Rudd Government introduced the Carbon Pollution Reduction Scheme package of legislation. This was followed by the Clean Energy Scheme, passed under the Gillard Government in 2011, which made it to the operational phase but was repealed by the Clean Energy Legislation (Carbon Tax Repeal) Act in 2014. The Abbott Government then expanded the scope of the Carbon Farming Initiative and rebadged it as the Emissions Reduction Fund. And most recently, we have had the National Energy Guarantee which was on, then off and may be on again depending on the outcome of the next federal election.

While not without its own controversy, the Renewable Energy (Electricity) Act 2000 (Cth), which commenced operation in 2011, has at least made it into "adulthood" — having celebrated its 18th year on 18 January 2019.

As Dr Penelope Crossley notes in her article in this issue about the National Energy Guarantee: "The place of renewable energy within energy-exporting nations has long been fraught but there are few countries that have experienced a relationship as complex as that of Australia." Dr Crossley's article is an excellent summary of the current state of play in relation to the National Energy Guarantee and some of the ongoing issues with the policy.

Victoria Shute's article on the South Australian approach to supporting wind farm development is also a useful snapshot of the planning policy changes that have enabled the growth of the renewable energy sector in that State.

The other two articles in this issue shine a light on the complex interrelationships and competing interests that must be balanced when contemplating the development of renewable energy projects.

Jamie Pittock's article on pumped storage hydropower crystallises the many benefits and risks attaching to these types of projects and if you have never come across this type of project before, this article is a fantastic place to start.

Finally, the note from Madeline Simpson and Brody Brooke on the Mirani Solar Farm case in the Planning and Environment Court of Queensland neatly summarises the careful balancing act undertaken by the court when deciding an appeal from a refusal to grant a development application for a new solar farm in sugar cane country around Mackay.

I commend this issue to you.

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Australian
Environment
Review

The National Energy Guarantee: where next for clean energy?

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Introduction

On 17 October 2017, then Prime Minister Malcolm Turnbull, along with the then Minister for the Environment and Energy Josh Frydenberg, announced that the Commonwealth Government would introduce a National Energy Guarantee (NEG).[1] The NEG was designed as a means of integrating Australia's national energy and emissions policies to ensure that "more affordable, reliable and cleaner power [could be delivered] to Australian households and businesses"[2] Yet less than 12 months later on 7 September 2018, the new Prime Minister Scott Morrison announced that the NEG was "dead".[3] Despite this statement, there appears to be strong support among the Coalition for implementing the NEG's reliability obligation, however they have scrapped the emissions obligation. In contrast, on 21 November 2018, the Shadow Cabinet endorsed the NEG in its entirety in an attempt to encourage a bipartisan and as the integrated climate and energy policy should the Labor Party win the next election.[4] They also announced that they would adopt an emissions reduction target for electricity of 45% by 2030 and will be seeking to have an energy mix that is made up of 50% renewable energy by 2030.[5] Thus depending on who wins the next federal election, it is likely that either the reliability obligation or the entirety of the NEG will be formally enacted into the National Electricity Law.

This article examines the context and rationale for introducing the NEG, analyses the final design of the NEG and assesses why the NEG has, at least initially, failed to be politically adopted. This article concludes with a critical appraisal of how renewable energy law in Australia is likely to develop over the next 12 months.

Background

The place of renewable energy within energy-exporting nations has long been fraught but there are few countries that have experienced a relationship as complex as that of Australia. Australia has a large natural endowment of fossil fuels, in particular coal and natural gas, as well as the uranium feedstocks that are used in nuclear power generation facilities overseas. In 2018–19, coal exports were worth $58.1 billion to the Australian economy,[6] while Australia is also forecast to become the world's largest exporter of liquefied natural gas by 2020.[7] This natural endowment means that the Australian energy sector could, at least theoretically, continue to function without the need for renewable energy in its generation mix.

At the same time, Australia has an excellent solar and wind resource, which is geographically widespread throughout the Australian continent. This, coupled with high and rapidly rising electricity prices, a steep decline in the costs of the renewable technologies and very favourable state government policies supporting renewable energy, has spurred the deployment of both small- and large-scale renewable energy. Some 2 million Australian households now have residential solar systems installed.[8] Meanwhile, battery storage and other distributed energy resources have already become cost-competitive in a number of regions in Australia without the need for subsidies, leading to Australia being used as a test market for new energy technologies.

One of the challenges associated with the increased use of intermittent renewable generation is that it makes it more difficult to balance the grid and manage voltage and frequency. As a result, greater demand has developed for dispatchable energy resources to stabilise the grid to enable the Australian Energy Market Operator (AEMO) to ensure that all consumers can access reliable electricity when they need it. The Australian Energy Market Commission (AEMC) noted in March 2017 that "without clear, national, co-ordinated policy objectives and credible mechanisms that reinforce one another both business and consumers find it difficult to invest".[9] This issue has risen in public consciousness, after a series of high-profile events in late 2016 and early 2017, such as the South Australian blackout and the retirement of the Hazelwood and other coal-fired power stations, which highlighted the need for action to be taken. This issue is not surprising, with the *Independent Review into the Future Security of the National Electricity Market: Blueprint for the Future* (Finkel Review) having identified that in addition to having one of the most carbon-intensive electricity generation sectors in the world, nearly 70% of our existing coal-fired generation fleet will be at or beyond their scheduled operational life expectancy by 2035.[10] However, the lack of notice prior

to the recent closures gave the market insufficient time to invest to replace these assets, leading to supply constraints.

On 7 October 2016, the Australian Government announced the Finkel Review.[11] One of their key recommendations was the establishment of the Energy Security Board (ESB) to "drive implementation of [the] blueprint and coordinate whole-of-system monitoring of security [and] reliability".[12] In turn, the ESB recommended the development of a NEG as a mechanism to ensure reliability, restore investor confidence and address affordability while lowering emissions in the electricity sector.[13]

The final design of the NEG

The NEG was designed as a means of integrating energy and climate policy, while simultaneously maintaining the high levels of system reliability that Australian businesses are reliant on. It consists of two key obligations on energy retailers and some large energy users within the National Electricity Market (NEM) (who opt into the NEG):

- the retailer reliability obligation
- the emissions reduction requirement

The retailer reliability obligation

The reliability obligation was outlined in the amendments to the National Electricity Law in the draft National Electricity (South Australia) (Retailer Reliability Obligation) Amendment Bill 2018 (SA) (Reliability Draft Bill) released for comment in November 2018. The reliability obligation requires the AEMO each year to undertake forecasts of reliability within the different NEM regions. The purpose of these forecasts is to assess whether the reliability forecast within each NEM region meets the minimum level of the NEM reliability standard and has an appropriate mix of fast- and slow-starting dispatchable capacity. In the event of a shortfall, these forecasts should send a clear signal to the market that liable market entities should either invest in new capacity in dispatchable energy resources or make additional dispatchable capacity available to the NEM.[14]

Where there is a "material" gap between the forecast and the NEM reliability standard of 99.998%,[15] and it does not appear that the voluntary market response will be sufficient to address the forecast reliability gap, the AEMO may make a written request to the Australian Energy Regulator (AER) to issue statutory reliability instruments. Reliability instruments, which have the force of law, effectively compel the liable entities "to hold forward contracts with or invest directly in dispatchable energy resources that cover a predetermined percentage of their forecast peak load."[16] The liable entities for the reliability requirement are registered NEM participants who purchase electricity directly from the NEM spot market (including market customers) unless otherwise prescribed,[17] noting that other "non-liable customers" may choose to opt in to the reliability obligation. This capacity mechanism has been designed to be technology-neutral and may include demand response, distributed energy resources such as batteries, or additional hydropower, coal- or gas-fired generation, noting though that if additional coal generation is contracted, this could negatively impact on the liable customer's emissions requirement.

Reliability instruments must specify the NEM region in which the forecast reliability gap will occur, the duration of the forecast reliability gap and the "AEMO's one-in-two year peak demand forecast for the forecast reliability gap period."[18] Under the NEG, two different reliability instruments may be issued by the AER, the T-3 reliability instrument (issued 3 years prior to the forecast reliability gap) and the T-1 reliability instrument (issued 1 year prior to the forecast reliability gap).[19] The key difference between the T-3 and T-1 reliability instruments is whether liable entities *may* or *will* be required to hold net contract positions sufficient to meet liable entities' share of the one-in-two year forecast peak demand for the forecast reliability gap period.[20]

The AEMO will be the procurer of last resort if a T-1 reliability instrument is issued for a particular region and the AEMO believes there are insufficient qualifying contracts to secure the availability of reserves to cover the reliability gap period. If the AEMO acts as the procurer of last resort, it may recover its costs from the noncompliant entities. The draft Bill limits the liability for costs of a defaulting liable entity to $100 million.[21] However, the liable entity may also be subject to a civil penalty under a statutory compliance action, which will not exceed $1 million for the first breach relating to a reliability gap period, and $10 million for a breach relating to a second or subsequent reliability gap period.[22]

The emissions reduction requirement

The emissions reduction requirement was outlined in the National Electricity (South Australia) (National Energy Guarantee) Amendment Bill 2018 (SA) (Draft NEG Bill) that was released for comment in August 2018. It was predicated on the understanding that a national electricity emissions intensity target would be established under a new Commonwealth Act, the National Energy Guarantee (Targets) Act. This target would reflect the contribution that the Australian Government is planning for the electricity sector to play in meeting its Paris commitments.

Australia's Nationally Determined Contribution under the Paris Agreement is an economy-wide reduction in

greenhouse gas emissions by 26%–28% below 2005 levels by 2030.[23] In order to meet this target, the cumulative emissions reductions between 2021 and 2030 need to range between 868 Mt CO_2-e and 934 Mt CO_2-e.[24] While Australia is currently on track to overachieve its earlier 2020 target set under the Kyoto Protocol, since the repeal of the Carbon Pollution Reduction Scheme on 17 July 2014, there has been an increase in greenhouse gas emissions every year.[25] The electricity sector is responsible for the largest sectoral contribution to the national greenhouse gas inventory, representing 34% of the total emissions in the year to March 2018.[26] These emissions were predominantly the result of combusting fossil fuels, and in particular coal, for electricity generation.

Once the national emissions intensity target has been set it will then be allocated across the NEM to impose a level of emissions intensity on individual "liable customers". For the purposes of the Draft NEG Bill, "liable customers" are all registered market participants in the NEM who buy directly form the wholesale market or other large customers who opt in.[27] The emissions intensity will be based on an assessment of preliminary emissions intensity of the liable customer's liable load (its market load adjusted for exempt loads, scaling, non-market load and GreenPower load) within a compliance year,[28] as well as any carry forwards, deferrals or offsets.[29]

A liable customer may meet their emissions intensity requirements by either entering into contracts with existing generators or by investing in new generation capacity. Each contract purchased will specify both the amount of electricity procured, as well as its emissions level. If generation is purchased by the liable entity "from the spot market without a contract, [then it] will be assigned with the average emissions level of the uncontracted generation capacity available to the market."[30] This is likely to be a far higher level of emissions, as it is anticipated that the least cost lower emitting electricity sources will be subject to existing contracts and not available for the spot market. In order to meet the emissions obligation, liable entities will need to show the AER their "contracted and spot market purchases they have used to meet their emissions guarantee"[31] for each financial year compliance period. The AEMO will establish an emissions registry, in which:

> … every megawatt hour (MWh) of generation that occurs in a compliance year will be recorded in the registry for allocation against every MWh of market customer load in that compliance year [to help facilitate efficient compliance].[32]

If a liable customer overachieves on procuring emissions reductions in a given compliance year, they are permitted to carry forward up to 10% of their first-year emissions intensity target plus a fixed amount of 60,000 tCO_2-e.[33] Conversely, they may also defer some of their emissions liability, with the deferral limits currently set at 10% over 2 years.[34] The conditions applicable to carry forward and deferral permitted under the NEG have not yet been released and will be contained in amendments to the National Electricity Rules.

In the event that a liable customer does not have sufficient emissions reductions in the emissions register to meet their obligations and has used up their deferrals, the AER has a suite of options at their disposal and wide discretion to enforce compliance in a least cost manner. In the event of noncompliance, the AER can also apply to the courts for the imposition of a civil penalty of up to $100 million for a body corporate.[35]

Some ongoing design issues with the NEG

The ESB famously argued that the "status quo is not an option",[36] and that "an unstable and uncoordinated policy environment exacerbates these issues."[37] Modelling of the NEG conducted for the ESB estimates that it will lead to a reduction in wholesale electricity prices over the period of 2020 to 2030 of 23%, with the average household expected to save $150 compared to business as usual.[38] Indeed, the industry consensus appears to be that while the NEG is not the preferred policy option of most organisations, some policy certainty in the sector has to be preferable to a complete absence of policy. That said, the current design of the NEG still presents many issues for the sector, four of which will be discussed below.

First, the NEG does not address the issue of reliability and emissions in either the Northern Territory or Western Australia, as they do not form part of the NEM. These jurisdictions are responsible for 22% of the emissions nationally[39] and to not have a truly national emissions reduction target for the electricity sector is a major failure. Secondly, while the NEG is designed to provide clear, short- to medium-term investment signals to the market for dispatchable resources and distributed energy resources, it does not create policy stability post-2030. Most major energy projects are currently financed on loans that have to be fully repaid by 2030 due to the uncertainty in the post-2030 regime. The NEG does not address this issue and thus does not inspire the confidence needed to encourage investment post-2030. Thirdly, it has been argued that the emissions target contained in the NEG is not suitably ambitious. The Clean Energy Council has argued that the emissions target within the NEG is insufficient as it represents "only a minor reduction from what is expected under business as usual (excluding any impact from state government promises beyond the renewable energy reverse auctions already in train)."[40] They further argue

that the lack of ambition in the target is unlikely to attract sufficient new investment in generating capacity to address the concerns around reliability, affordability and emissions, it is inconsistent with the Australian Government's commitments under the Paris Agreement, and it fails to address the need for a clear emissions trajectory post-2030.[41] The final issue with the NEG is that it is a very complex legislative scheme that is entering into a policy environment with a number of existing overlapping laws and policies such as the Renewable Energy Target and the state-based schemes. It is important that the addition of the NEG does not have unforeseen consequences on existing investments and that the regulatory burden of adhering with multiple schemes in different jurisdictions is minimised.

Conclusion

In conclusion, there is very strong support for the call that maintaining the status quo will no longer deliver Australian energy consumers a reliable energy supply that is affordable and addresses climate concerns. However, energy policy in Australia has long been a political battleground that is ideologically driven. Due to this, there has been a lack of regulatory certainty in how the electricity sector will address climate change and transition to cleaner energy sources. This has increased risk for those investing and operating within the energy sector and for both commercial and residential customers. There is currently strong popular support for reforming the energy sector to enable energy and climate policies to be integrated. This means that depending on who is elected at the next federal election, the NEG is likely to be implemented in some form. It will be important that the final design and implementation is carefully managed to ensure that it is interoperable with the existing Commonwealth and state support schemes and provides the policy and regulatory certainty that the sector has been sorely lacking.

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Footnotes

1. M Turnbull, Transcript of Press Conference with the Hon Josh Frydenberg MP, Minister for the Environment and Energy and Members of the Energy Security Board, 17 October 2017, Parliament House, Canberra.
2. Energy Security Board "Final Detailed Design of the National Energy Guarantee" media release (1 August 2018) www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Final%20Detailed%20Design%20-%20ESB%20Media%20Release.pdf.
3. S Benson "National energy guarantee 'dead' as Morrison sets new course" *The Australian* 8 September 2018.
4. ABC Radio, *RN Breakfast*, 22 November 2018, www.markbutler.net.au/news/transcripts/rn-breakfast-221118/.
5. Above.
6. L Caruana "Coal overtakes iron ore as Australia's largest export" *Australia's Mining Monthly* 3 July 2018 www.miningmonthly.com/investment/international-coal-news/1341648/coal-overtakes-iron-ore-as-australia%E2%80%99s-largest-export.
7. Australian Petroleum Production & Exploration Association, Export revenue, 9 February 2017, www.appea.com.au/oil-gas-explained/benefits/benefits-of-lng/export-revenue/.
8. Clean Energy Council, Number of Australian homes with rooftop solar tops 2 million … and counting, 3 December 2018, www.cleanenergycouncil.org.au/news/2018/December/2-million-solar-households.html.
9. Australian Energy Market Commission "AEMC submission to the independent review on the future security of the national electricity market" media release (7 March 2017) www.aemc.gov.au/news-centre/media-releases/aemc-submission-to-the-independent-review-on-the-f.
10. Alan Finkel and others *Independent Review into the Future Security of the National Electricity Market: Blueprint for the Future* (2017) 87 www.energy.gov.au/sites/default/files/independent-review-future-nem-blueprint-for-the-future-2017.pdf.
11. Department of the Environment and Energy (Cth), Independent Review into the Future Security of the National Electricity Market, 9 June 2017, www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market.
12. See above n 10, at 6.
13. Letter from the Board of the Energy Security Board to the Ministers of the COAG Energy Council, 13 April 2018, www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/ESB%20Letter%20to%20Ministers_High-level%20design%20document.pdf.
14. See also generally, Energy Security Board *Consultation on National Energy Guarantee amendments: Bulletin* (August 2018) www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Bulletin%20-%20Consultation%20on%20NEL%20amendments%20for%20Guarantee.pdf.
15. Australian Energy Market Commission *Reliability standard and settings review 2018: Final Report* (2018) www.aemc.gov.au/markets-reviews-advice/reliability-standard-and-settings-review-2018.
16. Energy Security Board "Overview: Retailer Reliability and Emissions Guarantee" (2018) 2.
17. National Electricity (South Australia) (National Energy Guarantee) Amendment Bill 2018 (SA), s 14ZB.
18. Above n 17, s 14ZG(4)(c)(v).
19. Above n 17, s 14ZE.
20. See above n 16; and above n 17, s 14ZG.

21. Above n 17, s 14ZR.
22. See above n 16, at 6.
23. Australian Government "Australia's Intended Nationally Determined Contribution to a new Climate Change Agreement" (August 2015).
24. Department of the Environment and Energy (Cth) *Australia's emissions projections* 2017 (December 2017) 11 www.environment.gov.au/system/files/resources/eb62f30f-3e0f-4bfa-bb7a-c87818160fcf/files/australia-emissions-projections-2017.pdf.
25. Above n 24, at 9; Department of the Environment and Energy (Cth) *2017 Review of Climate Change Policies* (December 2017) 5 www.environment.gov.au/system/files/resources/18690271-59ac-43c8-aee1-92d930141f54/files/2017-review-of-climate-change-policies.pdf.
26. Department of the Environment and Energy (Cth) *Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2018 — Incorporating emissions from the NEM up to June 2018: Australia's National Greenhouse Accounts* (2018) 8 www.environment.gov.au/system/files/resources/63391569-7ffa-4395-b245-e53893158566/files/nggi-quarterly-update-mar-2018.pdf.
27. Above n 17, s 14G.
28. Above n 17, s 14L.
29. Above n 17, s 14J.
30. See above n 16, at 2.
31. Above n 16, at 2.
32. Energy Security Board *National Energy Guarantee: Final Detailed Design* (2018) 2 www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Final%20Detailed%20Design%20-%20National%20Energy%20Guarantee_1.pdf.
33. Above n 32, at 2.
34. Above n 32, at 35.
35. Above n 17, s 14H.
36. Above n 32, at 9.
37. Above n 32, at 9.
38. Above n 32, at 52.
39. Clean Energy Regulator (Cth), State and territory emissions profile 2016–17, 28 February 2018, www.cleanenergyregulator.gov.au/NGER/Pages/Published%20information/Data%20highlights/2016%E2%80%9317%20factsheets/State-and-territory-emissions-profile-2016%E2%80%9317.aspx.
40. Clean Energy Council *National Energy Guarantee: Clean Energy Council Submission to Consultation Paper: Final* (2018) 6.
41. Above n 40, at 6.

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Wind power in South Australia — more than just whistling in the wind!

Victoria Shute *KELLEDYJONES LAWYERS*

Introduction

Whilst debate concerning the role of renewable energy in Australia continues throughout the media and in our Commonwealth Parliament, electricity generation from wind farms has been quietly increasing in South Australia:

- In 2017 and 2018, between 48% and 55% of South Australia's power was generated by renewable energy sources.[1] In September 2017, wind energy accounted for 52% of large-scale generation in South Australia.[2]
- South Australia became a net electricity exporter for the first time in 2018.[3]
- In early 2018, the state's former Labor Government set a renewable energy target of 75% by 2025.
- In 2018 it was predicted that South Australia will come close to meeting a 75% renewable energy target by 2025 without government intervention.[4]

By way of comparison, in Australia as a whole, it is predicted that between 40% and 50% of electricity generated will be from renewables by 2025.[5]

This article examines the various legislative measures which have assisted the growth in renewable energy, in particular wind energy, in South Australia.

Legislative initiatives

Before 2003, South Australia had one operating large wind turbine, being a 150 kW unit at Coober Pedy.[6] As of 2017, South Australia had 20 operating wind farms with a total installed capacity of close to 1700 megawatts.[7]

Growth in wind energy in South Australia has been assisted through the passage of legislation by successive state governments since 28 June 2007 when the Climate Change and Greenhouse Emissions Reduction Act 2007 (SA) was proclaimed.

This Act prescribes a state greenhouse gas emissions reduction target and obliges the Minister administering the Act to establish policies, programs and other initiatives to address climate change in addition to establishing the Premier's Climate Change Council to provide advice to the Minister in this regard.

The Act prescribes a target for South Australia's greenhouse gas emissions to be reduced by at least 60% to an amount that is equal to or less than 40% of 1990 levels.[8] Further, the Act prescribed renewable energy targets for the proportion of energy generated and consumed in the state to both reach 20% by 31 December 2014.[9]

Planning initiatives

The growth in wind energy generation in South Australia has also been assisted through changes to its planning system.

In South Australia, land use planning and development is governed by the Development Act 1993 (SA). Under this Act, each council area in the state is covered by an individual development plan. Areas of the state that are not within council areas are covered by additional development plans.

Amendments to development plans may be initiated by the Minister for Planning or the relevant council. However, it is only the Minister who can approve a development plan amendment.[10]

Development applications can be divided into four public notice categories.[11] Of relevance, Category 2 and Category 3 development applications must undergo public notification before they are determined.[12]

The owners and occupiers of all *adjacent land*[13] to the proposed development site must be given notice of a Category 2 development application,[14] noting that there are no regulations which correspond to s 34(4)(b) of the Development Act. The relevant development application and supporting documents can be inspected, and copies obtained within a prescribed period and representations can be made in respect of the development application.[15] Those persons who make a representation on a Category 2 development application may be afforded the ability to be heard on their representation.[16]

Where a development application is Category 3, the owners and occupiers of adjacent land are notified of the development application as well as:[17]

- any other owner or occupier of land which, according to the determination of the relevant development authority, would be directly affected to a significant degree by the development if it were to proceed

- the public, generally

The latter is achieved through publication of a notice in a newspaper circulating throughout the state.[18]

Those persons who make a representation on a Category 3 development application are entitled to appeal against the decision made on that development application to the Environment, Resources and Development Court of South Australia (ERD Court).[19]

Prior to 2011, wind farm development applications in South Australia were largely Category 3 forms of development. In October 2011, the then Minister for Planning declared the interim operation of the Statewide Wind Farms Development Plan Amendment (the DPA).[20] The DPA was formally approved on 18 October 2012.

The DPA amended the development plans of all areas where wind farm development is possible. Consequently, all wind farm developments in rural-type zones are deemed Category 2 forms of development unless they propose one or more turbines which are within 2 km of a residential or township-type zone, in which case they are Category 3 forms of development. Further, the DPA amended planning assessment criteria such that wind farm developments are more strongly encouraged than in the past.

The DPA occurred subsequent to a decision of the ERD Court to overturn the approval of a wind farm development on the basis that it would detrimentally affect visual amenity.[21]

Following the commencement of the DPA, there has been one appeal by a developer against a decision of a council to refuse a development application for a wind farm which was subsequently upheld.[22] There has also been a representor appeal against the approval of a Category 3 wind farm which was dismissed.[23]

The future?

In 2016, the Planning, Development and Infrastructure Act 2016 (SA) was partially proclaimed. This Act contains the framework for an entirely new land use and planning system in South Australia, including the replacement of the state's 72 current development plans with a single Planning and Design Code.[24]

Further, in March 2018, South Australians elected a Liberal Government after having had four successive Labor governments since 2002. The various legislative and planning initiatives concerning wind farms detailed above were all undertaken by Labor governments.

Prior to the election, the state Liberal Party released their "Liberal Energy Solution" which focused on reducing electricity prices for homeowners by encouraging more rooftop solar and battery systems and by installing a new interconnector.[25] This "solution" does not propose any changes to South Australian legislation or planning policy towards wind farm developments. Further, the Liberal Government has, since their election, stated that they will continue to encourage wind energy and other forms of renewable energy in South Australia.[26]

It appears therefore that South Australia will continue to increase its electricity generation from renewables, particularly from wind energy, and may continue to lead Australia in doing so.

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Footnotes

1. A Hough "Solar energy, wind power use in South Australia leading the world" *The Advertiser* 26 February 2018; G Parkinson, How Australia will get to 33% renewable electricity by 2020, 27 June 2018, https://reneweconomy.com.au/how-australia-will-get-to-33-renewable-electricity-by-2020-2030/.
2. H Saddler, Busting more myths about South Australia's wind and solar, 29 November 2017, https://reneweconomy.com.au/busting-more-myths-about-south-australias-wind-and-solar-61495/.
3. G Parkinson "South Australia rides renewables boom to become electricity exporter" *The Guardian* 4 June 2018 www.theguardian.com/australia-news/2018/jun/05/south-australia-rides-renewables-boom-to-become-electricity-exporter.
4. N Harmsen "SA election: 75pc renewables achievable with or without Weatherill's target, analyst says" *ABC News* 21 February 2018 www.abc.net.au/news/2018-02-21/sa-to-be-powered-by-75-per-cent-renewables-by-2025/9470408.
5. Parkinson, above n 1; K Baldwin, A Blakers and M Stocks, At its current rate, Australia is on track for 50% renewable electricity in 2025, 10 September 2018, https://theconversation.com/at-its-current-rate-australia-is-on-track-for-50-renewable-electricity-in-2025-102903.
6. D Clark, Wind power and wind farms in SA, 18 January 2019, http://ramblingsdc.net/Australia/WindSA.html.
7. Government of South Australia, Wind farms in South Australia, 7 February 2018, www.renewablessa.sa.gov.au/topic/large-scale-generation-storage/wind-farms-south-australia.
8. Climate Change and Greenhouse Emissions Reduction Act, s 3(1)(a)(i).
9. Above, s 3(1)(a)(ii).
10. Development Act, ss 24–26.
11. Above, s 38(1).
12. Above n 10, ss 38(4)–(5).
13. Adjacent land is defined in s 4 of the Development Act.
14. Above n 10, s 38(4)(a).
15. Above n 10, s 38(7); Development Regulations 2008 (SA), Pt 6.

16. Above n 10, s 38(10).
17. Above n 10, s 38(5).
18. Development Regulations, reg 33(2).
19. Above n 10, ss 38(14) and 86(1)(b).
20. For detailed articles on the interim DPA, please see: V Shute "Wind farms welcome in South Australia — Statewide Wind Farms Development Plan Amendment" (2011) 10(2) *LGovR* 28; V Shute "Wind farms — the South Australian context" (2012) 10(7) *LGovR* 108.
21. *Paltridge v District Council of Grant* [2011] SAERDC 23.
22. *Penfold v District Council of Robe* [2015] SAERDC 31.
23. *McLachlan v Mid Murray Council & Tilt Renewables Australia Pty Ltd* [2018] SAERDC 15.
24. For more articles on the South Australian planning reforms, see: V Shute and S Sutton "New Council Assessment Panels in South Australia — an overview" (2018) 17(1) *LGovR* 7; V Shute "(Planning) systems are go! South Australia's transition to a new planning system is underway" (2017) 16(5) *LGovR* 91; V Shute "Planning law reform builds momentum in South Australia" (2013) 11(8) *LGovR* 126; P Metljak and C Lucas "A look into the future — the Planning, Development and Infrastructure Bill 2015 outlines South Australia's new planning system" (2016) 15(1) *LGovR* 204; V Shute "Planning, Development and Infrastructure Act 2016 — South Australia's new planning system has passed into law. What does the new Act contain and what will happen next?" (2016) 15(4) *LGovR* 264.
25. Liberal South Australia, Liberal Energy Solution, 10 October 2017, www.saliberal.org.au/liberal_energy_solution.
26. G Parkinson, SA Liberals vow to continue energy transition, go big in batteries, 23 May 2018, https://reneweconomy.com.au/sa-liberals-vow-to-continue-energy-transition-go-big-in-batteries-93367/.

Australian
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Pumped-storage hydropower: trading off environmental values?

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Introduction

A flood of pumped-storage hydropower (PSH) project proposals have washed over Australia in the past 5 years. This article will outline the nature of PSH, and its past and proposed use in Australia. Environmental impacts and opportunities from this technology are summarised, followed by an assessment of the implications for regulators in Australia.

PSH projects exist and are under construction or are being considered in New South Wales, Queensland, South Australia, Tasmania and Victoria. While this old technology has been deployed in Australia since 1973, the need for greater energy storage capacity to enable increased use of intermittent solar and wind generation has seen a resurgence of interest in pumped storage. Thousands of physically feasible sites for PSH exist in Australia. PSH developments can involve trade-offs between greater use of renewable energy to mitigate climate change and other environmental values. The implications for regulating the negative impacts and positive synergies for PSH in Australia are discussed here.

How does it affect you?

- New, large developments are proposed in five states that would more than double PSH capacity in Australia.
- If sited and built well, these developments would accelerate Australia's transition to renewable energy and enable reoperation of existing, environmentally damaging water infrastructure and mine sites.
- Poorly located PSH developments could damage freshwater and coastal ecosystems and extend high-voltage power line easements through key habitats.
- The developments will be subject to regulations to conserve water resources and biodiversity.
- Regulators will be challenged by proposals that involve multiple, separate approvals for different stages of development and for generation versus transmission infrastructure.
- Strategic environmental assessment may better address environmental impacts and opportunities.

Pumped-storage hydropower

PSH is an old technology that has been widely deployed to store energy, accounting for 161,000 MW, over 94% of installed global energy storage capacity.[1] PSH supports power grid stability, reducing overall system costs and energy sector emissions. Unlike "once-through" hydropower, excess electricity (for example, from solar or wind generators) is used to pump water from a lower reservoir to an upper reservoir. Electricity can then be generated to meet peak demands, commencing within seconds, by releasing water from the upper reservoir to flow downhill through pipes (penstocks) to a generator and back to the lower reservoir. The energy efficiency of this cycle is around 80%.[2] In the past, PSH has been used to enable coal and nuclear power stations to operate at a continuous and high level of generation and meet peak electricity demand. PSH has also been deployed to enable a "black start" of electricity grids that have suffered outages.

As the world transitions from fossil fuels, PSH is critical to enable storage of electricity from intermittent solar and wind generators for supplementary generation to maintain grid stability and meet peak demand.[3] These imperatives are behind the current flood of PSH proposals in Australia, with one project under construction and at least 21 proposals being assessed (see Table 1).

PSH differs substantially from once-through hydropower. Two reservoirs are required at different elevation with at least 100 m pressure head. Generation potential increases with pressure head. Penstocks between the reservoirs are required with a gradient of less than 1:10.[4] As water is cycled between the two reservoirs, they can be located off-stream, minimising many of the worst impacts of hydropower on freshwater ecosystems. Indeed, at suitable locations, the ocean can be used as a lower reservoir in a system charged by sea water. Old mine pits and existing reservoirs can be re-engineered for PSH in many cases, for example, using two mine pits at Kidston in Queensland, and connecting two existing reservoirs in the Snowy scheme in New South Wales (see Table 1). Further, reservoirs constructed specifically for PSH off-river can have a relatively small area-to-volume ratio, reducing the land required and evaporation. Only minor replacement of losses may be required once a PSH scheme is initially filled with water.

There are alternative energy storage technologies. The prospect of centralised battery storage or decentralised storage in, for example, electric car batteries, is receiving a lot of public attention. While battery storage is potentially valuable, PSH is a proven technology and has a much greater and longer duration of generation capacity than existing battery farms.[5] Further, one study suggests that the lifetime operating costs of battery storage are 18 times greater and the carbon emissions double those of PSH for equivalent energy storage capacity.[6] A limited number of solar thermal power stations with molten salt storage are operating internationally, but none appear to be proposed by commercial interests in Australia at this time.[7]

The Australian energy market provides price premiums for generators who can supply electricity quickly to provide grid stability and meet fluctuating demand.[8] Consequently, there are incentives for investment which are likely to lead to increased uptake of PSH technologies.

PSH in Australia

PSH projects exist, are under construction or are being considered in New South Wales, Queensland, South Australia, Tasmania and Victoria. Three schemes with 2610 MW capacity were built last century, primarily to support baseload coal-fired electricity generation (see Table 1). A resurgence of interest this decade has been sparked by the rapid growth of intermittent solar and wind generation and the closure of many coal-fired power stations that provided baseload electricity. Following blackouts in South Australia, the need to stabilise the electricity grid has become an economic and political priority. New pumped storage projects are under construction or are being considered in Australia that could add more than 6000 MW capacity (see Table 1).

Around 22,000 physically feasible sites for PSH in Australia have been identified based on geographical features. These included existing or potential reservoir sites with adequate difference in elevation and proximity to each other, while excluding national parks and urban areas.[9] Development of only around 20 PSH projects would enable Australia to transition fully to renewable energy.[10] This initial assessment includes a large number of sites that are unlikely to be viable for many reasons, including lack of available water and localities far from existing transmission lines. As the places suitable for PSH occupy prominent sites in the landscape due to their elevation, a great many are likely to be of importance for biodiversity and the cultural heritage of Indigenous and other Australians.

Table 1: Existing and proposed PSH projects in Australia (as at 2018)

State	PSH scheme	Status	Generating capacity (MW)	Comment and reference
New South Wales	Tumut 3	opened 1973	1800	Snowy scheme power station built for a black start of the east coast grid[11]
New South Wales	Shoalhaven	opened 1977; proposed expansion 2018	240 now; plus 160–235 proposed	expansion options for 160 or 235 MW being considered[12]
Queensland	Wivenhoe	opened 1984	570	large facility at Wivenhoe Dam[13]
Queensland	Kidston	under construction	270	reusing two gold mine pits, integrated with an adjoining 320 MW solar power station[14]
South Australia	Goat Hill	development approved	230	water from SA pipe network[15]
New South Wales	Snowy 2.0	feasibility study	2000	proposed expansion of the Snowy scheme[16]
South Australia	Cultana	proposed	225	PSH proposed to use sea water[17]
South Australia	Middleback Ranges	scoping	90	reuse of old iron mine pit[18]
South Australia	Baroota	scoping	230	based on existing Baroota Reservoir[19]
South Australia	Highbury	scoping	300	reuse of disused quarry near Adelaide[20]

Tasmania	14 options	scoping	up to 2500	reoperating existing hydropower schemes[21]
Victoria	Bendigo	concept	30	state government pre-feasibility call for expressions of interest to reuse old gold mine shafts[22]
New South Wales	Upper Hunter	concept	unknown	reuse Idemitsu's Muswellbrook coal mine[23]
New SouthWales	various	concepts	unknown	state government call for expressions of interest to redevelop existing state-owned reservoirs[24]
New South Wales	Snowy 3.0 to 6.0	concepts	not public	no publicly available information[25]

Ambitious concepts for linking renewable electricity generation in North West Australia to a proposed Asian energy grid would require extensive PSH capacity in the Kimberley region.[26]

The number of PSH project proposals listed above indicates that many development approvals will be sought in the coming decades. These will challenge communities and regulators to assess and weigh the benefits and costs of PSH for the chosen sites.

Potential benefits

An obvious benefit of PSH is the potential role that it has to play in transitioning away from reliance on fossil fuels and towards renewable energy generation technologies, thereby mitigating the impacts of climate change.[27] As a proven technology, PSH can be relied upon to facilitate this transition whilst simultaneously ensuring security of baseload electricity supply.[28]

The circulation of water makes PSH systems substantially less vulnerable to climate-induced changes in precipitation compared to traditional hydropower systems. By comparison, Hydro Tasmania experienced a series of drought years and in 2014 downgraded their estimate of reliable annual generation from their traditional system from 10,000 GWh to 8700 GWh, a 13% decline.[29] Hydro Tasmania is now considering 14 PSH projects to increase their generating capacity.[30] By reducing reliance on the once-through flow of water, PSH also provides opportunities for more effective environmental flows downstream of existing hydropower systems. Where an existing onstream reservoir is the lower reservoir of a new PSH project, there is more flexibility to re-regulate environmental releases to mimic pre-development water flows.[31]

Another appealing attribute of PSH is the opportunity to redevelop old industrial sites for more sustainable renewable energy generation. Redevelopment of disused quarries and mine pits for PSH projects is underway or proposed, such as the Highbury quarry near Adelaide (see Table 1), offering the potential to reduce legacy environmental impacts. Existing dams could be used as reservoirs for PSH, reducing the need for impacts on greenfield sites, as with the Snowy 2.0 proposal to link the existing Tantangara and Talbingo Reservoirs with tunnels under Kosciuszko National Park.[32] Existing once-through hydropower facilities can be redeveloped for PSH, although this may require major new works since penstocks will usually need to be realigned to pumping and generating facilities below the level of the lower reservoir's supply level. Reoperation of existing reservoirs provides opportunities to retrofit them with infrastructure needed to minimise their historical environmental impacts, which may include fish passage devices, thermal pollution control infrastructure, and valves for more appropriate environmental flow releases.[33]

A further opportunity lies in the potential for development offsets, such as those required under the Biodiversity Conservation Act 2016 (NSW), to restore past environmental impacts from historical industries on the sites, and to invest in catchment management. For example, in the case of Snowy 2.0, academics are calling for payments for environmental services to fund conservation of the alpine catchments, including pest species control, revegetation of damaged lands and restoration of wetlands.[34]

In these ways, PSH can help society mitigate climate change, re-use old industrial sites in more sustainable ways, and potentially improve environmental flows and investment in catchment conservation. However, as with any technology, there are negative effects.

Potential negative impacts

A limitation of PSH is that PSH developments are dependent on water availability. Many of the sites identified in the Australian atlas are likely to be unfeasible for this reason, for instance, those in Central Australia.[35] However, the volume of water required for smaller schemes is relatively modest. Once filled, a PSH project will only require minor topping up of evaporative or transmission water losses. The environmental impacts of taking sea water for PSH projects are yet to be evaluated and may be akin to smaller desalination plant intakes.

Environmental impacts of PSH developments on the land and waterways have the potential to be significant. Most PSH developments will require some impact on previously undeveloped lands. Even in the case of the Snowy 2.0 proposal, which would use existing reservoirs, modest areas of land will be disturbed, including for construction worker accommodation, access roads, test drilling, adits and surge tunnels, spoil disposal, the proposed generator cavern portal, and transmission line easements.[36]

PSH will occupy elevated parts of the landscape and the escarpments between the reservoirs will often be undeveloped lands with native vegetation. These sites will often have cultural significance for Indigenous and other Australians. As with proposed wind and solar farms, some rural communities are likely to object to the industrialisation of their localities. Development is cheaper with above-ground penstocks but potentially less obtrusive with this infrastructure in underground tunnels. Often such elevated land will have high biodiversity values and will be located in nature reserves, raising the question of how much development, if any, is acceptable under or in a conservation reserve.

The Snowy 2.0 proposal illustrates this debate. Kosciuszko National Park in which it is situated was established to protect the catchments of the current Snowy scheme. As the major hydropower scheme in New South Wales, Snowy 2.0 will contribute significantly to mitigating the threat of climate change to the alpine ecosystems and broader society by facilitating transition to renewable energy. Snowy 2.0 has a very large pressure head and links two large reservoirs, and thus may generate more electricity for longer than other PSH projects being considered to date.[37] Yet many people consider that no development in a national park is acceptable.[38]

Tunnelling generates a lot of spoil that is expensive to remove and reuse from remote locations. In Kosciuszko National Park, work continues to restore over 400 sites — many of them spoil dumps — damaged by construction of the Snowy scheme since the 1940s.[39] In the case of Snowy 2.0, Snowy Hydro is proposing to dump the spoil (mostly tunnel boring machine sludge) in the anoxic dead zone (deepest portion below the outlet valves) of the existing Tantangara and Talbingo Reservoirs.[40] This raises the question of whether the spoil will contain contaminants that may degrade water quality, for example, sulphides that could be oxidised into acid.

Transmission lines servicing new PSH may have an equally big or larger land footprint than the PSH infrastructure itself. One way of limiting this impact is to choose sites close to existing transmission infrastructure. Roads and transmission easements are likely to fragment natural habitats and facilitate pest species invasion.[41]

The spread of invasive species is a likely potential impact of PSH developments.[42] Transfer of water between previously disconnected water bodies risks moving invasive aquatic species. In the case of Snowy 2.0, environmental assessments raised the possibility that the exotic, predatory redfin fish could be moved from Talbingo Reservoir to Tantangara Reservoir, where it would impact indigenous species. Snowy Hydro is funding research into measures that may prevent such transfers.[43] Development of roads and disturbance of soils will also facilitate invasion of pest species. Weed control is a particularly likely impact that requires ongoing control with any PSH project.[44]

The key negative impacts are, therefore, likely to be in terms of the land footprint and impacts on waterways for PSH and transmission infrastructure, disposal of any tunnelling spoil, and the spread of invasive species. Developments by, under or in conservation reserves, and on places of cultural importance, will be of great social concern and therefore subject to high levels of regulatory scrutiny, as discussed below.

Regulatory implications

While many of the regulatory issues for PSH are similar to other major developments, the unusual use of water in new locations, risks from lack of strategic environmental impact assessment, and need to govern associated environmental programs well in the long term may challenge current institutions.

As with any major development, PSH projects are likely to be subject to state planning, biodiversity conservation and water laws. Federally, the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) will be the key regulatory instrument for ensuring environmental impacts of a PSH project are appropriately avoided, mitigated and managed.

The legal status of water sought for PSH projects may become an issue for some projects. Major hydropower generators have traditionally enjoyed privileged access to water outside of the principles enshrined in the National Water Initiative. For example, Snowy Hydro uses water under a licence from the New South Wales Government that is distinct from the water entitlement system applying to the rest of the Murray–Darling basin.[45] In the case of Snowy 2.0, Snowy Hydro has indicated that it will not change releases required under this licence into the basin; thus, no changes to the licence are required.[46] Other projects will need to purchase sufficient water entitlements from the relevant water market. For instance, the proposed Goat Hill project will require need to purchase entitlements in

order to draw water from the South Australian pipe network. Projects using sea water or poor-quality water from mine pits will need to ensure that their operations do not leak and contaminate adjacent freshwater resources, and that appropriate approvals and permits are in place to regulate any discharges.

Regulators will be challenged by proposals that involve multiple, separate approvals for different stages of development and for generation versus transmission infrastructure. In the case of Snowy 2.0, Snowy Hydro has sought environmental approval for an exploration phase, and foreshadows a later, full environmental impact assessment application.[47] Perhaps reasonably, Snowy Hydro has been unwilling to commit to their $4 billion (approximately) portion of the project without a tunnel into the proposed generator cavern site to ascertain the stability of the rock, as well as testing the impact on water quality of dumping a small amount of spoil in Talbingo Reservoir.[48] As the transmission network is owned by a different company, TransGrid, separate environmental approvals (three) may be sought for each of the transmission lines from the generator to the existing network, then additional lines north and south.

Fragmentation of environmental assessment is undesirable as it may result in better development options and cumulative impacts being overlooked. Greater use of strategic environmental assessment may better address environmental impacts and opportunities of PSH development. Provisions for such strategic assessment vary from state to state. Federally, there is provision in the EPBC Act, s 146, for state government to voluntarily agree to a strategic environmental assessment of a "policy, plan or program", a provision that could be used much more widely. This provision does not apply to private development proponents.

Activities outlined in this article to seize benefits from PSH projects or minimise harms involve long-term work, such as catchment restoration and pest species control. Funding derived from PSH projects for environmental benefits will need to be administered accountably in the long term. Governments will likely need to set up relevant trusts to undertake this task. There are a number of existing models that could be used more widely for this purpose. The New South Wales Government's Treasury trust account that funds the National Parks and Wildlife Service work in the Rehabilitation of Former Snowy Scheme Sites Program is one example.[49]

Conclusion

PSH is undergoing a resurgence in Australia in new forms and new locations. Some major environmental benefits are possible, notably, underpinning the national shift to renewable energy as well as improving the environmental attributes of a number of brownfield hydropower and mining sites. Reoperating existing hydropower schemes may provide for more effective downstream environmental flows. Yet, there are trade-offs across environmental policy realms. Previously undeveloped lands will be impacted by PSH infrastructure and associated transmission lines, in particular, many elevated sites of cultural and biological importance. Robust environmental assessments and conditioning of approvals will be required to manage the likely impacts of particular projects, including the disposal of tunnel spoil, the safe use and discharge of any polluted or saline water, and the prevention and control of pest species invasion. These projects will challenge regulators to better govern water use, undertake more strategic environmental assessments, and set up long-term institutions for investments in environmental restoration activities.

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Footnotes

1. International Hydropower Association "The world's water battery: Pumped hydropower storage and the clean energy transition" Working Paper (December 2018) www.hydropower.org/sites/default/files/publications-docs/the_worlds_water_battery_-_pumped_storage_and_the_clean_energy_transition.pdf.
2. Task Committee on Pumped Storage of the Committee on Hydropower of the Energy Division of the American Society of Civil Engineers, *Hydroelectric Pumped Storage Technology: International Experience*, New York, 1996.
3. A Harby and others, "Pumped Storage Hydropower" in *Transition to Renewable Energy Systems*, D Stolten and V Scherer (Eds), Wiley-VCH, 2013, p 597.
4. US Army Corps of Engineers *Engineering and design hydropower* (1985).
5. B Dunn, H Kamath and J M Tarascon "Electrical energy storage for the grid: a battery of choices" (2011) 334(6058) *Science* 928.
6. K Krüger, P Mann, N van Bracht and A Moser, "Li-Ion Battery versus Pumped Storage for Bulk Energy Storage — A Comparison of Raw Material, Investment Costs and CO_2-Footprints" (Paper presented at the HydroVision 2018, Charlotte, North Carolina, 27 June 2018) http://voith.com/corp-en/Voith_2018_06_27_HydroVision_Li-Ion_Vs_Pumped_Storage.pdf.

7. Y Tian and C Y Zhao "A review of solar collectors and thermal energy storage in solar thermal applications" (2013) 104 *Applied Energy* 538.
8. Energy EXchange, The wholesale price of energy, 9 February 2012, www.eex.gov.au/large-energy-users/energy-management/energy-procurement/energy-pricing/the-wholesale-price-of-energy.
9. A Blakers and others "An atlas of pumped hydro energy storage" (21 September 2017) https://arena.gov.au/assets/2018/10/ANU-STORES-An-Atlas-of-Pumped-Hydro-Energy-Storage-The-Complete-Atlas.pdf.
10. A Blakers, J Pittock, M Talent and F Markham, "Pumped hydro for large scale storage of solar generated electricity in Australia" (Paper presented at Solar 2010, the 48th Australian Solar Energy Society Annual Conference, Canberra January 2010).
11. Snowy Hydro, Power stations, 17 July 2012, www.snowyhydro.com.au/our-energy/hydro/the-assets/power-stations/.
12. C Latimer "Origin's plan to double its hydro power at Shoalhaven" *The Sydney Morning Herald* 7 May 2018 www.smh.com.au/business/companies/origin-s-plan-to-double-its-hydro-power-at-shoalhaven-20180507-p4zdv3.html.
13. CS Energy, Wivenhoe Power Station, 5 June 2018, www.csenergy.com.au/what-we-do/generating-energy/wivenhoe-power-station.
14. Genex Power Limited, available at www.genexpower.com.au.
15. Altura Group, Goat Hill, 28 October 2017, www.alturagroup.com.au/our-projects-goat-hill/.
16. Snowy Hydro *Snowy 2.0 Feasibility Study Report* (2017) www.snowyhydro.com.au/our-scheme/snowy20/snowy-2-0-feasibility-study/.
17. EnergyAustralia "Fact Sheet: Cultana Pumped Hydro Project" (2017) www.energyaustralia.com.au/sites/default/files/2017-08/Cultana%20Pumped%20Hydro%20Project%20Fact%20Sheet%20-%20August%202017.pdf.
18. ZEN Energy, GFG Alliance commits to funding Middleback Pumped Hydro Study, 8 February 2018, www.zenenergy.com.au/blog/gfg-alliance-commits-to-funding-middleback-pumped-hydro-study/.
19. Rise Renewables, Baroota Pumped Hydro Project, 23 July 2018, https://riserenewables.com.au/projects/baroota-hydro-mid-north-port-pirie-energy-electricity-project/.
20. Tilt Renewables, Highbury Pumped Hydro Energy Storage, 16 February 2018, www.tiltrenewables.com/assets-and-projects/highbury-pumped-hydro-energy-storage/.
21. Hydro Tasmania, Investigating Tasmania's pumped hydro potential, 9 June 2018, www.hydro.com.au/clean-energy/battery-of-the-nation/pumped-hydro.
22. Department of Environment, Land, Water and Planning (Vic), Pumped Hydro, 24 September 2018, www.energy.vic.gov.au/renewable-energy/pumped-hydro.
23. C Latimer and P Hannam "AGL to transform coal mine to pumped hydro for Liddell shortfall" *The Sydney Morning Herald* 28 May 2018 www.smh.com.au/business/companies/agl-to-transform-coal-mine-to-pumped-hydro-for-liddell-shortfall-20180525-p4zhgr.html.
24. P Hannam "Dam fine energy plan: Tapping the nation's water resources for power" *The Sydney Morning Herald* 18 April 2018 www.smh.com.au/environment/climate-change/dam-fine-energy-plan-tapping-the-nation-s-water-resources-for-power-20180418-p4zadt.html.
25. Above n 16.
26. E Halawa and others "The Prospect for an Australian-Asian Power Grid: A Critical Appraisal" (2018) 11(1) *Energies* 200.
27. A B Pittock, *Climate Change: The Science, Impacts and Solutions*, 2nd edn, CSIRO Publishing, 2009.
28. Above n 3.
29. J Opperman, J Hartmann and D Harrison, "Hydropower within the climate, energy and water nexus" in *Climate, Energy and Water*, J Pittock, K Hussey and S Dovers (Eds), Cambridge University Press, 2015, pp 79–107.
30. Above n 21.
31. Above n 29.
32. Above n 16.
33. J Pittock and J Hartmann "Taking a second look: climate change, periodic relicensing and improved management of dams" (2011) 62(3) *Marine and Freshwater Research* 312.
34. J Pittock and others, The environmental dividend from Snowy 2.0, 25 May 2018 (unpublished submission to the NSW and federal governments) www.linkedin.com/pulse/environmental-dividend-from-snowy-20-jamie-pittock-phd/.
35. Above n 9.
36. Above n 16.
37. Above n 16.
38. Nature Conservation Council of NSW "Position statement — Snowy 2.0" (2018).
39. E MacPhee and G Wilks "Rehabilitation of former Snowy Scheme sites in Kosciuszko National Park" (2013) 14(3) *Ecological Management & Restoration* 159.
40. Above n 16.
41. A Normyle and J Pittock "A review of the impacts of pumped hydro energy storage construction on subalpine and alpine biodiversity: Lessons for Snowy Hydro 2.0"(unpublished manuscript).
42. Above.
43. Institute for Land Water and Society, Charles Sturt University, Predicting redfin survival through the Snowy 2.0 scheme (Assignment 2) (2018-2019), July 2018, www.csu.edu.au/research/ilws/research/summaries/2018/redfin-survival.
44. Above n 41.
45. Department of Industry *Ten year review of the Snowy Water Licence: draft report* (2018) www.industry.nsw.gov.au/__data/assets/pdf_file/0018/161451/Ten-year-review-of-the-Snowy-Water-Licence-draft-report.pdf.
46. Above n 16.
47. EMM *Environmental Impact Statement: Exploratory Works for Snowy 2.0 (Volume 1: Main Report)* (2018) https://v2.communityanalytics.com.au/snowy/ew/downloads.
48. Above.
49. Above n 39.

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Case note: Mirani Solar Farm Pty Ltd v Mackay Regional Council

Madeline Simpson *and* ***Brody Brooke*** *HERBERT SMITH FREEHILLS*

Introduction

On 2 March 2017, Mirani Solar Farm Pty Ltd (Mirani) lodged a development application for a material change of use and reconfiguration of lot (long-term leases) for the development of a "Major Utility (Solar Farm)" (Solar Farm).[1] The applications were refused by Mackay Regional Council's (Council) Economic Development and Planning Standing Committee on 8 November 2017, due to concerns regarding the loss of Good Quality Agricultural Land (GQAL) and the lack of overriding need to develop the Solar Farm on GQAL. Mirani appealed the refusal, contending that the land would not ultimately cease to be GQAL and would be capable of sustaining agricultural activities after the Solar Farm was decommissioned. On 20 August 2018, the Planning and Environment Court allowed the appeal, finding an overriding need to advance that renewable energy was in the interest of the state and the public. Additionally, the court found there was no evidence that the Solar Farm would have a negative economic impact on the sugar industry.

Facts

The Solar Farm is proposed for the broader Mackay Region in the townships of Benholme and Mirani. The site is included in the Rural Locality and Rural Zone of the Consolidated Mirani Shire Plan (MS Plan). The original proposal was made under the MS Plan, which was replaced by the Mackay Regional Planning Scheme (MRP Scheme) in July 2017. Consequently, the provisions of both the MS Plan and MRP Scheme were considered in the appeal. Under the MRP Scheme, the subject land was zoned in the Agricultural Land Overlay Code. The development was impact assessable and required assessment against other "relevant matters" in addition to the relevant mandatory assessment benchmarks.[2]

The site is composed of four lots and a total site area of approximately 229 hectares, of which 165 hectares would be utilised for the proposed Solar Farm. The proposed Solar Farm has a lifespan of 40 years and is expected to generate up to 60 MW of power, estimated as electricity for the equivalent of 30,000 households. The entire subject land was classified as Class 3 GQAL. Under the proposal, any electricity generated would be fed into the nearby Mirani substation and subsequently be distributed. The subject land and surrounding land had historically been used for cattle grazing and sugar cane production.

Issues

Site selection and possible alternate sites

The court recognised that the subject land, apart from being classified as GQAL, satisfied the requisite physical and commercial features for a viable solar farm. Expert economists considered the viability of two alternate sites involving smaller areas of GQAL in the broader Mackay area in their evidence.

The relevant assessment benchmarks in the MRP Scheme operate to restrict development that does not maintain agricultural capacity, unless an overriding need in the public interest is demonstrated and "no alternate site … [is] available".[3] The court found that both sites possessed unsatisfactory physical features, including areas of environmentally significant vegetation.

The Council argued that there was no evidence suggesting that Mirani had attempted to locate a suitable alternate site and the applications disguised as a public benefit what were, in reality, private interests. The court dismissed these claims, accepting unchallenged evidence from Mirani that "stringent" criteria were applied during the site selection process.[4] It concluded that, on balance, there was no viable alternative site for Mirani's proposal.

Would a decision have adverse impacts on the sugar industry?

A point of difference between the expert town planners concerned the impacts of the proposal on the sugar cane industry. In addressing these concerns, the court noted that the critical importance of the sugar industry in the local government area was "beyond doubt", and that the majority of GQAL in the region is used for sugar cane production.[5] The Council, in conjunction with Mackay Sugar Ltd (MSL), alleged that the

subject land should not be lost to the industry as the proposed Solar Farm would not protect GQAL from non-agricultural uses, or promote agricultural uses contrary to the provisions of the MRP Scheme.

The court had regard to what the proposal would mean for the sugar industry generally, noting that the total site footprint of 165 hectares equated to approximately 0.08% of land available for sugar cane production in the Mackay Region. The parties' economists agreed that the loss of the subject land for the 40-year term would have no measurable impact on sugar cane production. The court adopted this position and determined that the proposal would be very unlikely to have a genuine economic impact on that industry.

Would a decision conflict with the relevant categorising instruments?

The subject land was zoned rural under both the MS Plan and the MRP Scheme. Considering the substance of the relevant provisions, the court deliberated as to whether the introduction of sheep grazing constituted primary production or "animal husbandry", as was protected by the intent of the rural zone under the MS Plan. Ultimately, the court concluded that the introduction of grazing sheep did constitute animal husbandry (as defined), and therefore, the proposal was not in conflict with the outcomes or purpose of the Rural Locality Code, even though the grazing was not a separate, economically viable activity in this case. A number of potential conflicts with the local planning instruments remained, however, in issue.

The court also considered the potential conflict with the State Planning Policy 2017 (SPP17) which requires "development that will have an irreversible impact on [GQAL]" to be avoided to protect sustainable agricultural uses.[6] Based on the expert evidence, the court was satisfied that upon the removal of all infrastructure at the end of the 40-year term, the land would still be GQAL, and possibly in better condition. The court stopped short of determining a specific timeframe to apply to provisions requiring GQAL not to be "alienated" or "permanently alienated". The Solar Farm was found to be in significant conflict with planning instruments because the subject land was not being protected for agricultural purposes, notwithstanding that the proposal would not further fragment or alienate the land on a permanent basis, and consequently the productive capacity of the land would not be diminished.

Other relevant matters

The benefits of the proposal were considered a relevant matter for the purposes of s 45(5)(b) of the Planning Act 2016 (Qld). The court considered the policy interests expressed in the SPP17, including the development and supply of renewable energy in appropriate locations. Emphasis was given to these provisions having been absent from the previous State Planning Policy 2007. SPP17 was read in combination with the *Draft Queensland Solar Farm Guidelines: Guidance for Local Governments*[7] (Draft Guidelines), which assist local governments in deciding applications for large-scale solar farms. The Draft Guidelines provide that no state interest under the SPP17 is prioritised over others, however, local governments should attempt to balance the benefits of solar farms against any economic, social and environmental impacts for the relevant local area.

The court found that the economic benefits of the proposal would be twofold: first, during construction there would be significant job creation; and second, subsequently the Solar Farm would add to a cost-effective and reliable electricity supply for the Mackay Region. Considering the broader community benefits of the proposal, the court noted that solar farms reduce greenhouse gas emissions by decreasing reliance on resources such as coal. The Council argued that the court should be careful in accepting these matters as being in the public interest, in particular that emissions targets were already being met and that no need for the proposal on the site existed. The court did not find these arguments persuasive, given there were benefits flowing from the proposal, the importance of state interests as emphasised by the SPP17, and the evidence of lack of negative impacts associated with the proposal.

Decision

Balancing the material conflict with the higher order provisions of the planning instruments against the interests of the broader community, the court allowed the appeal. Protection of GQAL is a significant consideration, however in this instance, the benefits of the proposal advancing the public interest in renewable energy sources outweighed the temporary loss of agricultural capacity of the subject land.[8]

Conclusion

This decision highlights the numerous considerations that are to be weighed when assessing a proposed development that is in material conflict with the higher order provisions of a planning scheme. The decision demonstrates that it is possible to overcome those conflicts, provided there is a broader state or public interest in the approval of the development, a rigorous site selection process displays no alternative sites for the proposal, and the development does not permanently alienate or inhibit the prescribed purpose of the land.

The critical nature of the evidence presented to the court was also emphasised by this decision. While deciding in favour of approving the development, the

court noted that if the evidence had demonstrated that the proposal would negatively impact Mackay's sugar mills, or the industry generally in the region, the appeal would have likely been dismissed.

Finally, the decision reinforced the focus on the current energy climate, which, although not prioritising any particular state interest over others, recognises the need for renewable energy development in today's planning regime.

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Footnotes

1. *Mirani Solar Farm Pty Ltd v Mackay Regional Council* [2018] QPEC 38; BC201807429.
2. Planning Act 2016 (Qld), s 45(5).
3. Above n 1, at [78].
4. Above n 1, at [49].
5. Above n 1, at [55].
6. Above n 1, at [94].
7. Department of State Development, Manufacturing, Infrastructure and Planning (Qld) *Draft Queensland Solar Farm Guidelines: Guidance for Local Governments* (2018) https://dilgpprd.blob.core.windows.net/general/draft-solar-farm-guidelines-for-local-government.pdf.
8. Above n 1, at [130].

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