



Planning the Energy Transition: A Comparative Examination of Large-Scale Solar Energy Siting on Agricultural Land in Australia

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ABSTRACT

The siting of large-scale solar energy projects on agricultural land has raised questions of how land use risks can be balanced. This balancing exercise creates a regulatory paradox. Solar energy is vital to energy system decarbonisation to mitigate climate change effects and create energy security. Yet, agricultural land may be negatively impacted where solar energy is not sited and regulated effectively to ensure arable land remains productive. The policy goals of facilitating solar energy development and arable land protection fall to planning regulatory regimes in Australia which, to date, have had varying approaches to assessing solar energy development on arable land.

This article explores how the twin policy goals of increasing solar energy and arable land preservation can be achieved via planning regimes with effective siting and co-location legal tools. Such planning tools can encourage the development of renewable energy to reach net-zero emissions goals while ensuring appropriate regulatory settings providing co-benefits to agricultural activities. The article provides a comparative analysis of the planning regimes in three Australian states, Queensland, New South Wales (NSW), and Victoria, and their varied approaches to assessing solar energy development on agricultural land. This comparative evaluation is viewed against the backdrop of increasing climate change risks and the need to urgently transition to renewable energy successfully proffered by effective planning regulation.

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Solar energy projects in Australia present a new suite of legal and policy opportunities and conundrums to address, one of which is land use. Large-scale solar energy projects require an average of 2 hectares (ha) of land per 1 megawatt (MW) of solar energy power generation.¹ In Australia, large-scale solar developments typically range between 350 and 1,200 ha.² Yet, the potential land use footprint of solar energy projects is difficult to estimate given that large-scale solar energy facilities are not consistently defined in Australian planning policies. For example, in Victoria, large-scale solar projects are defined as greater than 1 MW in contrast to Queensland's definition of greater than 5 MW. NSW defines large-scale solar energy projects based on capital expenditure of over AUD \$30 million, rather than power generation capacity. Regardless of power generation size and cost, large-scale solar projects necessarily require land to generate energy for distribution to the electricity network coupled with ancillary infrastructure. This scale of land use is compared with small-scale solar systems including rooftop photovoltaic (PV), generating energy for consumption exclusively on the host land.

Solar energy development land requirements have led to concern over the lack of strategic land use planning, resulting in potential impacts on agricultural soil quality, soil drainage, and future agricultural production.³ As highlighted by Agrifutures, 'solar farms seek to reduce their start-up and connection costs by targeting land that is already cleared and within close range of existing power distribution networks. This makes established farming areas ideal targets for solar farm development'.⁴ Despite the essential role of solar energy in decarbonising the energy sector and mitigating climate change effects, some agricultural communities and local councils have raised concerns over solar development in rural landscapes.⁵ This resistance often stems from fossil fuel development and heightened land use conflicts previously experienced, particularly coal seam gas development, raising 'similar community fears as the industry rapidly expands across agricultural landscapes'.⁶

The strategic planning and increased investment in large-scale solar energy projects will only increase given the new federal Australian government's commitment to investing in the electricity grid to increase capacity for renewable energy.⁷ This has led the NSW government to recognise the importance of balancing 'the use of land to ensure NSW can benefit from its renewable energy sources while also minimising impacts on its regional communities and future land uses'.⁸ Increased strategic land use planning focused on the nexus between energy, agriculture, and the environment, will be increasingly salient for solar energy development.⁹ Despite solar energy development increasingly being sited on agricultural land there is a lack of Australian comparative legal studies specifically examining large-scale solar energy regulation on agricultural land. This article seeks to address this evident gap in the literature.

1 Clean Energy Council, 'Australian Guide to Agrisolar for Large-scale Solar' (March 2021) <<https://assets.cleanenergycouncil.org.au/documents/resources/reports/agrisolar-guide/Australian-guide-to-agrisolar-for-large-scale-solar.pdf>> accessed 20 May 2022.

2 Georgina Davis, 'Impacts on Agricultural Land from Queensland's Energy Transition' (2019) 36 Environment and Planning Law Journal 587.

3 Priyabrata Santra and others, 'Agri-voltaics or Solar farming: the Concept of Integrating Solar PV Based Electricity Generation and Crop Production in a Single Land Use System' (2017) 7(2) International Journal of Renewable Energy Research 694.

4 Agrifutures, 'Best Practice Land Use Planning' (Agrifutures, December 2019), 19 <<https://www.agrifutures.com.au/wp-content/uploads/2019/12/19-060.pdf>> accessed 2 August 2021.

5 As evident in a number of recent legal actions including: *Helios Volta Holdings Pty Ltd v Mildura Rural CC* [2019] VCAT 1478; *Powervault Mildura Solar Generator One Pty Ltd v Mildura Rural CC* [2019] VCAT 1473. At the international level, concerns have also been raised by communities in the US as documented by Alexis S. Pascaris and others, 'Integrating solar energy with agriculture: Industry perspectives on the market, community, and socio-political dimensions of agrivoltaics' (2021) 75 Energy Research & Social Science 1.

6 Agrifutures, (n 4).

7 Australian Labor Party, 'Powering Australia' (Australian Labor Party, 2022), 21 <<https://www.alp.org.au/policies/powering-australia>> accessed 23 May 2022. The previous federal Australian government held a stretch goal of creating ultra-low cost solar production.

8 NSW Government, 'Proposed Infrastructure SEPP Amendments: Renewable Energy and Regional Cities, Explanation of Intended Effect' (September 2021), 2 <https://shared-drupal-s3fs.s3.ap-southeast-2.amazonaws.com/master-test/fapub_pdf/ISEPP+renewables+FINAL+EIE.pdf> accessed 12 March 2022.

9 Rebecca R Hernandez and others, 'Solar energy development impacts on land cover change and protected areas' (2015) 112 Proceedings of the National Academy of Sciences of the United States of America 13579.

Alongside energy, agriculture is a primary export industry in Australia, representing 12% of all goods and services exports and contributing 1.9% value to the Australian GDP.¹⁰ A decline in agricultural land uses of 14% between 1973 and 2017 is evident in Australia as a symptom of an absent federal strategic and comprehensive arable land protection policy.¹¹ Agricultural land in Australia is mapped and managed within state and territory land use policies and planning regulations intended to preserve valuable agricultural land and mitigate impacts of development by balancing land use risks. The expansion of solar energy development and associated infrastructure, when inappropriately sited, can cause fragmentation or alienation of land from agricultural productivity, raising issues of domestic food security.¹² This raises a broader question of how to strike a sustainable planning balance between solar energy development, protection of arable lands, and ensuring co-benefits to landholders.

In managing land uses, Williams and others recognise 'it is a defensible proposition that the only development activities that should be acceptable in a region are those that allow the landscape to maintain its function indefinitely'.¹³ This 'thorny'¹⁴ policy issue of maintaining agricultural land to enable food security while pursuing solar energy presents new policy and regulatory opportunities to amend existing planning frameworks. The weighing and balancing process to site solar energy has fallen to planning regimes and, ultimately, the relevant planning ministers and, in the case of Queensland, local councils. In the absence of specific laws and processes to manage solar farm proposals on agricultural land, largely voluntary planning guidelines for proponents and decision-makers have governed solar energy siting on agricultural land to date.

Mitigating multiple and overlapping uses of space is also a regulatory flashpoint in the successful development of offshore renewable energy. To mitigate potential conflicts and ensure integrated and efficient management of marine areas, marine spatial planning is increasingly used for offshore wind development¹⁵ to assign 'spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives'.¹⁶ Strategic, comprehensive, and holistic planning is thus key to the successful and sustainable implementation of both onshore and offshore renewables and the realisation of co-benefits.¹⁷

Despite potential land use risks, it is an accepted premise that large-scale renewable energy must be developed by countries with high solar resources to reduce carbon emissions and meet international climate change commitments.¹⁸ Benefits of solar energy and agricultural activities include a secondary income for agricultural landholders to improve economic resilience and the dual use of agricultural land to achieve co-location where suitable. According to Huber and others 'any transition to such new geographies of energy production would necessarily involve powerful new claims on, struggles over, and massive new deployments of capital and labor in rural spaces in many locations around the world'.¹⁹ These *new geographies* of renewable energy

¹⁰ Department of Agriculture, Fisheries and Forestry, 'Snapshot of Australian Agriculture 2022' (23 May 2022) <<https://www.owe.gov.au/abares/products/insights/snapshot-of-australian-agriculture-2022>> accessed 2 February 2022.

¹¹ Agrifutures (n 4).

¹² Hernandez and others (n 9).

¹³ John Williams, Ann Milligan, and Tim Stubbs, 'Whole of Landscape Assessment and Planning in the Management of Unconventional Gas Exploration and Production in Australia' in R. Quentin Grafton, Ian G. Cronshaw, and Michal C. Moore (eds), *Risks, Rewards and Regulation of Unconventional Gas: A Global Perspective* (Cambridge University Press 2016) 427.

¹⁴ Hongtao Yi and Richard C. Feiock, 'Renewable Energy Politics: Policy Typologies, Policy Tools, and State Deployment of Renewables' (2014) 42(3) *Policy Studies Journal* 291.

¹⁵ Marine spatial planning regulation may also be applied to floating solar energy as these technologies mature.

¹⁶ Pablo Quero García, Javier García Sanabria, and Juan Adolfo Chica Ruiz, 'The Role of Maritime Spatial Planning on the Advance of Blue Energy in the European Union' (2019) 99 *Marine Policy* 123, 124. See also Ignacio Herrera Anchustegui, 'Distributive Justice, Community Benefits and Renewable Energy: Offshore Wind Projects' in Ruven Fleming, Kaisa Huhta, and Leonie Reins (eds), *Sustainable Energy Democracy and the Law* (Brill 2021); Mhairi Aitken, 'Wind power and community benefits: Challenges and opportunities' (2010) 38 *Energy Policy* 6066.

¹⁷ Andrew Newman, 'Creating the power for renewal: Evaluation of New South Wales' renewable energy planning law changes and suggestions for further reform' (2012) 29 *Environmental and Planning Law Journal* 498.

¹⁸ See in particular the United Nations Framework Convention on Climate Change, 'Report of the Conference of the Parties on its Twenty-First session, Paris, 30 November – 13 December 2015' UN Doc FCCC/CP/2015/10/Add.1, Annex – Paris Agreement.

¹⁹ Matt Huber and James McCarthy, 'Beyond the Subterranean Energy Regime? Fuel, Land-use, and the Production of Space' (2017) 42 *Transitions* 656, 665.

in rural spaces require the assessment and allocation of risks and benefits based on the size and intensity of a project. This complex balancing exercise of risk and reward of solar energy has seen NSW and Victoria amend their planning regimes so as to require state development consent for large-scale solar energy projects.

Planning development assessments must be specific to each solar siting while allowing other industries, particularly agricultural land uses as examined in this article, to minimise any potential negative externalities. What follows in Parts 2 and 3 is an analysis of planning regulatory frameworks in Queensland, NSW, and Victoria when assessing solar energy projects proposed on agricultural land.

2. PLANNING REGULATORY FRAMEWORKS

Energy development and land use are fundamentally linked.²⁰ Any form of onshore energy development and production requires legal consideration and mitigation of environmental, biophysical, and social land use risks and impacts.²¹ Energy activities and overlapping land uses have been regulated for over a century and bodies of case law, legislation, and policies examine when, where, and how energy development may take place. The law creates the regulatory settings resulting in the success or failure of energy technologies and the relevant energy policies.

A crucial question arises as to how states can most effectively regulate solar energy to mitigate any potential land use risks, minimise any potential conflicts, and create synergetic uses of space. Solar energy development is a relatively new land use in Australia giving rise to complex socio-legal conundrums given the urgent need to increase renewable energy generation. In such a situation, how should the state regulate and anticipate such issues? In addition, how should regulation and policies determine the priority between these two competing land uses? This requires consideration of how law can support the transition to more effective and beneficial regulation for sustainable land uses for solar energy during planning decision-making and informing co-location outcomes where possible.

2.1 LANDHOLDER CONSENT

Unlike petroleum development, solar energy development leases generally requires landholder consent. The Commonwealth is afforded specific powers within the Australian Constitution with residual powers reserved for the Australian states and territories.²² Consequently, public ownership of petroleum and minerals, as subsurface resources, affords ownership to the relevant state or territory granting exploitation rights to private entities via exploration and production licensing systems. This is formalised through explicit statutory vesting provisions and resource regulatory frameworks. In contrast, and relevant to solar energy, the doctrine of tenure affords fee simple landholders the retention of proprietary rights over the surface estate of land. Fundamental to fee simple proprietary rights over the surface estate of land is the right to exclude others. Therefore, solar energy proponents must receive landholder consent to access and use the surface estate of land before submitting a planning development application. The absence of consent, whether express or implied, may create an action of trespass.²³

Where landholder consent is granted to solar energy proponents, the land is leased by the registered proprietor to the solar energy company to facilitate development. The relevant consent authority, being the local council or state planning authority, will then either refuse or permit development. In Queensland, for example, local councils have refused development consent for solar energy projects despite the solar proponent obtaining landholder consent 'due to concern regarding the loss of Good Quality Agricultural Land (GQAL) and the fact that

20 Madeline Taylor and Tina Soliman-Hunter, *Agricultural Land Use and Natural Gas Extraction Conflicts: A Global Socio-Legal Perspective* (Routledge 2019); Drew Clarke and others, 'Australian Energy Transition Research Plan. Report four: social engagement dynamics: report for the Australian Council of Learned Academies (ACOLA)' (2022) <<https://acola.org/wp-content/uploads/2022/05/ACOLA-2022-AETRP-Report-4-social-engagement-dynamics.pdf>> accessed 4 July 2022.

21 Iñigo del Guayo, Lee Godden, and Donald D. Zillman, *Energy Justice and Energy Law* (Oxford University Press 2020).

22 Commonwealth of Australia Constitution Act 1900 (Cth).

23 Andrew R. Buck, *The Making of Australian Property Law* (Federation Press 2006).

an overriding need to place the facility on GQAL land has not been demonstrated'.²⁴ Where planning consent is refused by a planning authority, the relevant court may confirm or set aside the decision to enable solar energy development.

In comparison with fee simple estate land, consent of both the landholder and the state government is required in the instance of a pastoral lease. Crown pastoral leaseholds are common in rural Australia²⁵ and represent 44% of the Australian mainland.²⁶ Pastoral leases were created to secure the ongoing development of agriculture and hold a long and flexible legal history in Australia.²⁷ Pastoral leases are limited tenure proprietary interests vested by statute, and not common law, allowing government land to be leased for pastoral purposes,²⁸ for example, livestock grazing or agricultural purposes. Pastoral leases are governed by relevant land legislation at the state and territory level and range from annual to perpetual terms. As pastoral leaseholders are not afforded a fee simple estate, their limited rights due to government ownership of land, afford the relevant state and territory body the power to consent and grant a solar lease.

2.2 ENVIRONMENTAL PLANNING INSTRUMENTS AND DEVELOPMENT ASSESSMENTS

Environmental Planning Instruments (EPIs) sit within the matrix of planning regulation as subsidiary and supplementary to state planning legislation. EPIs traditionally focus on local government council planning and have been expanded to consider land use coordination between 'the natural and cultural environment'²⁹ including 'soil and agricultural resources, and mining and energy resources'.³⁰ This expansive focus requires consent authorities to assess and evaluate projects against several factors including the principles of ecologically sustainable development, efficient land use planning, and applicable EPIs.³¹

Relevant EPIs form part of the matrix of planning instruments governing specific land uses, including arable land protection, or geographical policies for regions to advance strategic objectives. EPIs are coupled with local planning schemes overlays relevant to other planning aims, such as biodiversity protection. According to Godden and others, EPIs in Australia have witnessed a shift away from zoning specifying prohibited and permissible uses within designated zones to land use allocations based on planning objectives.³² This is facilitated through coordination processes directly identifying 'desired environmental outcomes for each area' and permitting 'alternative measures that meet the qualitative criteria for each outcome'.³³ The most relevant EPIs for solar energy are typically found in infrastructure planning instruments. For example, in NSW the recently updated State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPPTI) governs solar energy development amongst other essential infrastructure and transportation approvals by setting out relevant planning rules and controls.

²⁴ *Mirani Solar Farm Pty Ltd v Mackay Regional Council & Mackay Sugar Limited* [2018] QPEC 38 [35].

²⁵ About two thirds of Queensland's total land area is leasehold and the bulk of that area comprises leases issued for pastoral, grazing or agricultural purposes. A pastoral lease means a pastoral holding, preferential pastoral holding, pastoral development holding or stud holding. Land Act 1994 (Qld) sch 6.

²⁶ Australian Trade and Investment Commission, 'Land tenure' (2021) <<https://www.austrade.gov.au/land-tenure/land-tenure/pastoral-leases#:~:text=Pastoral%20leases%20cover%20approximately%2044,regions%20and%20the%20tropical%20savannahs>> accessed 17 March 2022.

²⁷ Julie Brunner and John Glasson, *Contemporary Issues in Australian Urban and Regional Planning* (Routledge 2015).

²⁸ *Wik Peoples v Queensland* (1996) 187 CLR 1.

²⁹ Ross Ramsay and Gerard Row, *Environmental Law and Policy in Australia: Text and Materials* (Butterworths 1995) 345.

³⁰ *ibid.*

³¹ However, planning governance often results in conflicting or overlapping incentives and policies existing between national, state/provincial, and local authorities. This is often the case in energy development, for example in the context of offshore wind between EU level Directives (Renewable Energy Directive (2018/2001/EU) and the EU Strategy on Offshore Renewable Energy) and the delayed establishment of an offshore wind regime in Norway, likely to hold its first offshore wind auction in 2022. See also Anchustegui (n 16).

³² Lee Godden, Jacqueline Peel, and Jan McDonald, *Environmental Law* (2nd edn, Oxford University Press 2019) 215.

³³ *ibid.*

Historically in Australia, land use planning regulation and authorisation processes are the responsibility of local governments utilising planning tools including development assessment and approvals and zoning regimes following their geographically relevant local planning instruments.³⁴ A key policy decision for governments in regulating potential land use risks is whether to adopt land use zoning mechanisms under strategic planning frameworks or rely on a generic development assessment process. For example, zoning mechanisms for wind energy are evident in Wales by mapping Pre-Assessed Areas for Wind Energy where, in principle, wind development is acceptable and there is a presumption in favour of large-scale onshore wind energy development.³⁵ Although Australia is currently establishing Renewable Energy Zones (REZs) connecting solar and wind farm corridors close to existing transmission infrastructure, regulatory amendments to incentivise renewable energy development are still under development. REZ transmission or energy generation projects are still likely to require state development planning approvals under existing planning instruments.³⁶

Development assessment requires review by the relevant consent authority to either grant consent with conditions or refuse consent. This evaluating task requires the review of proposed projects considering several factors including environmental impacts; the public interest; the social and economic welfare of the community; and applicable EPIs, regulations, and policies. Consent authorities may also consider guidelines where relevant, which are not usually expressly legally binding. This can create gaps where unique land use risks for solar energy siting on agricultural land are not adequately regulated and enforced.

3. ASSESSMENT REGIMES FOR SOLAR ENERGY DEVELOPMENT ON AGRICULTURAL LAND

The effectiveness of planning assessment regimes must be measured against the goal of balancing and mitigating land use risks. In analysing the regulatory regimes of three Australian states, Part 3 of this article considers the divergence of planning approaches, EPIs, solar farm guidelines, agricultural land protection regimes, consent authorities, and the policy prospect of co-location.

3.1 QUEENSLAND

Queensland gives responsibility for large-scale solar farm development assessment and consent to local councils as regulated by the Planning Act 2016 (Qld) (PA). The voluntary Solar Farm Guidance for Local Government in Plan Making³⁷ and the Queensland Solar Farm Guidelines: Practical Guidance for Communities, Landowners and Project Proponents³⁸ (collectively the 'Queensland Solar Farm Guidelines') recognise the risks that may arise between existing land uses and large-scale commercial solar farms in stating, 'it is the responsibility of local government to identify relevant state and local interests, determine how to balance these interests and how best to integrate these interests into a local planning scheme'.³⁹ Therefore, each solar project proposed on agricultural land is assessed subjectively taking into account local planning schemes regulated by the PA.

As consent authorities, local councils in Queensland undertake planning impact assessments referring to local EPIs, regional planning schemes, and overlays⁴⁰ when deciding to approve or conditionally approve or refuse the application. This balancing exercise must assess the risks

³⁴ Planning Act 2016 (Qld) s 8(2).

³⁵ Welsh Government, 'Future Wales: The National Plan 2040' (2021), 97 <<https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf>> accessed 17 March 2022.

³⁶ NSW Government, Renewable Energy Zones (2019) <<https://www.energy.nsw.gov.au/media/1946/download>> accessed 17 March 2022.

³⁷ Queensland Government, 'Solar Farm Guidance for Local Government in Plan Making' (2020) <<https://dsdmipprd.blob.core.windows.net/general/solar-farm-guideline-part-1-local-government.pdf>> accessed 2 August 2021.

³⁸ Queensland Government, 'Queensland Solar Farm Guidelines: Practical Guidance for Communities, Landowners and Project Proponents' (2018) <https://www.epw.qld.gov.au/__data/assets/pdf_file/0012/16122/solar-farm-guidelines-communities.pdf> accessed 2 August 2021.

³⁹ *ibid* 13.

⁴⁰ Queensland Government, 'Agricultural Land Overlay Code' (2020) <<http://www.maranoa.qld.gov.au/development/PublishingImages/planning-scheme/Agricultural%20Land%20Overlay%20Code.pdf>> accessed 1 August 2021.

of competing land uses and evaluate whether an overriding need in the public interest exists creating relevant benefits to justify development approvals. This is a complex endeavour when weighing up the relevance of agricultural activities taking place on a proposed solar energy site and any ‘material conflicts’ must be weighed against ‘the benefits that would arise if the proposed development went ahead’.⁴¹

The Agricultural Land Overlay Codes in Queensland (Applicable for Class A and Class B land representing the most productive land for successful crop production) allows alienation and fragmentation of agricultural land where ‘an overriding need, the public interest is demonstrated’.⁴² Therefore, ascertaining the ‘public interest’ requires the preservation of agricultural land weighed against the social, economic, or environmental benefits for the community and also ‘against any detrimental effect upon the natural values of the land and adjacent areas’⁴³ and any strategic planning policy conflicts. According to the Queensland Solar Farm Guidelines, this regulatory balance must be struck by local governments ‘against a range of other existing uses or matters such as agriculture’⁴⁴ in which ‘competing land uses, and the potential impacts will vary for each local government area’.⁴⁵

This balancing exercise reflects the regulatory burden for local governments to respond, balance existing land uses, and approve or reject large-scale solar projects on agricultural land. The Queensland Solar Farm Guidelines also recommend that local governments should consider whether solar development may contain an ‘important agricultural area’ to ‘reduce potential land-use conflicts’.⁴⁶ Such ‘important agricultural areas’ include strategic cropping areas and priority agricultural areas.⁴⁷ Strategic cropping and priority agricultural areas are agricultural land zones created and regulated, in part, by the Regional Planning Interests Act 2014 (Qld) (RPIA) which was enacted specifically to encourage ‘coexistence’ of natural resource activities on agricultural land.

The RPIA has not been amended to include solar energy projects and thus these developments are currently carved out and not assessed under the regime. This is despite several solar farms operating within an area of regional interest and the relevant land falling within the Agricultural Land Classification. The RPIA prohibits ‘regulated activities’ and ‘resource activities’ within ‘areas of regional interest’⁴⁸ including ‘priority agricultural areas’ and ‘strategic cropping areas’ unless the proponent holds or is acting in accordance with a Regional Interests Development Approval (RIDA). A ‘resource activity’ includes petroleum, mineral, geothermal, and greenhouse gas storage licences and leases, and a ‘regulated activity’ is defined as ‘likely to have a widespread and irreversible impact’.⁴⁹ Consequently, large-scale solar farm development is not classified as a ‘resource activity’, being renewable energy, nor a regulated activity as solar farms constitute temporary loss⁵⁰ of agricultural land. For example, in *Mirani*,⁵¹ despite the land in question falling within Class 3 agricultural land, the RPIA was not applicable and hence a RIDA was not required. Three other solar farms have also recently been approved in Class 1 agricultural land in Queensland totalling 5,895 ha, while a cluster of 13 solar farms are proposed or operational within the Darling Downs Priority Agricultural Area.⁵²

⁴¹ As a ‘relevant matter’ under s 45(5) of the Planning Act 2016 (Qld). See *Mirani* (n 24) [110].

⁴² Queensland Government, ‘Agricultural Land Overlay Code’ (2020) <<http://www.maranoa.qld.gov.au/development/PublishingImages/planning-scheme/Agricultural%20Land%20Overlay%20Code.pdf>> accessed 1 August 2021.

⁴³ Ibid. As found in the Mackay Regional Planning Scheme, for example, being the applicable planning scheme in *Mirani*. See also Mackay Regional Council, ‘Mackay Regional Planning Scheme’ (2017), 328 <https://www.mackay.qld.gov.au/business/planning_and_development/planning_schemes_and_strategic_planning/mackay_region_planning_scheme2> accessed 12 July 2021.

⁴⁴ Queensland Government (n 37) 8.

⁴⁵ Ibid.

⁴⁶ Queensland Government (n 37) 9.

⁴⁷ Ibid.

⁴⁸ Regional Planning Interests Act 2014 (Qld) s 3.

⁴⁹ Ibid ss 12 and 17.

⁵⁰ *Mirani* (n 24) [45].

⁵¹ Ibid.

⁵² Calculated by the author using the Queensland Government Development Assessment Mapping System. See Queensland Government, ‘Development Assessment Mapping System’ (2021) <<https://dams.dsdi.esriaustraliaonline.com.au/damappingsystem/?accordions=Other%20State%20Planning%20Matters,Areas%20of%20Regional%20Interest>> accessed 1 October 2021.

As argued by Davis, the pattern of solar farm development in priority agricultural areas is increasing and thus warrants the triggering of the RPI regime or similar agricultural protection instruments as an additional layer of regulatory approval.⁵³ Requiring a RIDA alongside local council development approvals will require solar energy development to not ‘unreasonably constrain, restrict or prevent ongoing agricultural operation’.⁵⁴ Rather than prohibiting solar farm development, the RIDA regime may create further conditions of co-benefits to protect areas of regional interest.⁵⁵ For example, ensuring that there is no ‘material loss of land’ and no ‘threat to continued agricultural use’.⁵⁶ While local councils must assess most large-scale solar farm development proposals in Queensland, state government assessment and approvals may be required for larger developments, or if the proposal is of economic and social significance to the state. Therefore, triggering an agricultural land protection regime, like the RPIA, may ensure that there is state government assessment of large-scale solar farm development proposals.

3.2 NEW SOUTH WALES

In contrast to Queensland, NSW requires state-level assessment of large-scale solar energy projects. This policy decision requires assessment at the state level and has led to EPIs being highly instructive in development assessments. In NSW, large-scale solar energy projects are defined as development with ‘capital investment of more than \$30 million, or more than \$10 million’ where located in an ‘environmentally sensitive area’ (which is not considered agricultural land),⁵⁷ and classified as State Significant Developments under the Environmental Planning and Assessment Act 1979 (NSW) (EPAA). Permissibility of solar energy projects is assessed primarily under the EPAA and relevant EPIs by the state planning authority and Independent Planning Commission (IPC) where the exhibited Environmental Impact Statement (EIS) receives more than 50 unique public submissions by way of objection or the local council has objected to the application.⁵⁸ The role of the state as assessment and consent authority in NSW recognises the regulatory burden on local councils to assess and deliver solar energy development approvals.

NSW has recently undertaken extensive amendments to its state planning regulatory framework. Commencing in 2022, 45 existing state EPIs are now consolidated into 11 policies.⁵⁹ This consolidation takes place against the backdrop of the NSW government’s development of REZs across five strategic regional areas in NSW, most of which are rural regions, to support a rapid transition to renewable energy. While REZ areas are likely to be subject to a bespoke planning approvals process, 70% of solar and wind development is earmarked for development outside REZs. The recent substantial and rapid development of solar energy projects in these regions has prompted the state to make two key amendments to its planning regulatory framework, including a consolidated EPI relevant to solar energy and the NSW Draft Large-Scale Solar Energy Guideline (‘NSW Draft Guideline’).⁶⁰

Two EPIs, the transport and infrastructure State Environmental Planning Policies (SEPP), have recently merged to create the SEPPTI incorporating several important amendments to solar energy development in non-REZ regional areas to ‘balance the use of land to ensure NSW can benefit from its renewable energy sources whilst also minimising impacts on its regional communities and future land uses’.⁶¹ The SEPPTI requires State significant ‘electricity

⁵³ Davis (n 2).

⁵⁴ Queensland Government, ‘The Regional Planning Interests Act and the Community’ (2016), 2 <<http://www.dlgrma.qld.gov.au/resources/factsheet/planning/rpi-act-and-the-community.pdf>> accessed 12 July 2021.

⁵⁵ For example, ‘requiring the applicant to ensure the impact of the activity is limited or restricted to a stated level’ per Regional Planning Interests Act (n 48) s 50.

⁵⁶ Queensland Government, ‘The Regional Planning Interests Act and the Agricultural Sector’ (2016), 2 <<http://www.dlgrma.qld.gov.au/resources/factsheet/planning/rpi-act-agricultural-sector.pdf>> accessed 12 July.

⁵⁷ State Environmental Planning Policy (Planning Systems) 2021 (NSW) s 20.

⁵⁸ Environmental Planning and Assessment Act 1979 (NSW) pt 2 division 2.3.

⁵⁹ NSW Government, ‘Consolidated State Environmental Planning Policies’ (2022) <<https://www.planning.nsw.gov.au/Policy-and-Legislation/State-Environmental-Planning-Policies/Consolidated-state-environmental-planning-policies>> accessed 1 March 2022.

⁶⁰ NSW Government, ‘Draft Large-Scale Solar Energy Guidelines’ (2021) <[https://shared-drupal-s3fs.s3.amazonaws.com/master-test/fapub_pdf/Exhibition+Draft+Revised+Large-scale+Solar+Energy+Guidelines+\(1\).pdf](https://shared-drupal-s3fs.s3.amazonaws.com/master-test/fapub_pdf/Exhibition+Draft+Revised+Large-scale+Solar+Energy+Guidelines+(1).pdf)> accessed 18 December 2021.

⁶¹ NSW Government (n 8) 2.

generating works⁶² to obtain development consent in a prescribed ‘rural area’ identified in a local environmental plan (LEP).⁶³ Rural areas are commonly used for primary production and agricultural industry activities⁶⁴ and do not necessarily include Biophysical Strategic Agricultural Land (BSAL), considered prime arable or important agricultural land.

Of relevance to agricultural communities is Section 2.42 of the SEPPTI which provides that where solar energy development is proposed in a ‘regional city’,⁶⁵ the consent authority must be satisfied that the development:

- (2) (a) is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the development, and
- (b) is unlikely to have a significant adverse impact on the regional city’s —
 - (i) capacity for growth, or
 - (ii) scenic quality and landscape character.
- (3) In determining whether to grant development consent, the consent authority must consider measures proposed to be included in the development to *avoid or mitigate conflicts* referred to in subsection (2)(a) or adverse impacts referred to in subsection (2)(b).

These regional cities represent eight cities and a small percentage of regional NSW.

These matters provide additional legal hurdles for solar energy approval and reversion to a zoning approach to planning, recognising the need to effectively balance solar energy and agricultural land uses. The matters are mandatory given the SEPPTI’s status as an EPI. EPIs must be considered in development assessments pursuant to section 4.15(1)(a)(i) of the EPAA as one of the listed matters of consideration for all proposed development set out in section 4.15 of the EPAA. This means only targeted regional cities have the benefit of new matters of consideration for solar development, rather than a state-wide approach to balancing solar energy land uses on all agricultural land despite its regional zoning.

The explicit requirement to consider measures to mitigate or avoid land use risks in regional cities represents a significant shift in NSW’s planning policy to a more protective stance over arable land in targeted regional areas. However, a clear planning policy opportunity has been missed by limiting the SEPPTI amendments to specific regional areas. A compulsory Agricultural Impact Assessment (AIA) for all agricultural land with proposed solar development within the SEPPTI for all rural areas would also be pertinent to avoid potential land use risks. AIAs were introduced to assess the land and water impacts of development on prime arable land in NSW and are typically applicable for resource exploitation, including mining and coal seam gas development.

The NSW Draft Guideline aims to provide ‘policy and technical guidance on key issues including visual impacts, land use risks and benefit sharing’⁶⁶ of solar energy land uses. The NSW Draft Guideline is currently at the public consultation stage and has no legal enforceability, given it is not enforceable under the Infrastructure SEPPTI or EPAA at this stage. Unlike the SEPPTI, the Draft Guideline guides proponents to conduct a physical soil assessment and Level 3 detailed AIA, coupled with a consideration of co-location to support agricultural land, where proposals are situated on high-quality agricultural land (Classes 1 – 3 or BSAL).⁶⁷ The Draft Guideline

⁶² See State Environmental Planning Policy (Transport and Infrastructure) 2021 (NSW) division 4, which defines electricity generating works as ‘a building or place used for the purpose of— (a) making or generating electricity, or (b) electricity storage’.

⁶³ Unless the solar energy system is carried out by or on behalf of a public authority and the system is ancillary to an existing solar energy project. See *ibid* s 2.38 division 4.

⁶⁴ NSW Government (n 8) 54.

⁶⁵ Regional cities are defined as Albury, Armidale, Bathurst, Dubbo, Griffith, Orange, Tamworth and Wagga Wagga. The SEPPTI amendments apply to land within 10 kilometres of commercial centres and 5 kilometres from residential land.

⁶⁶ NSW Government (n 60) 1.

⁶⁷ Important agricultural land or moderate capability land is defined as ‘Biophysical Strategic Agricultural Land (BSAL), a Critical Industry Cluster (CIC) or LSC Class 1–3 under the Office of Environment and Heritage’s (OEHL) Land and Soil Capability Assessment Scheme. This is generally land that is capable of supporting a wide variety of uses including cropping, grazing and horticulture’. The NSW Draft Guideline proposes a detailed agricultural land assessment for highly productive land, including consideration of co-location opportunities. A detailed assessment is not required for ‘low capability land’ being classes 5–8. See NSW Government (n 60) 35.

broadly recommends that ‘siting of solar energy infrastructure should avoid important agricultural land’.⁶⁸ In the absence of being listed as a ‘matter of consideration’, a detailed consideration of potential co-location of agricultural activities and solar energy is advised for a Level 3 detailed AIA only. This represents a gap in agricultural land use risk mitigation. A requirement for proponents to explore co-location options via a detailed Level 3 AIA, signalled as a key policy aim in the Draft Guideline,⁶⁹ should arguably be required for all agricultural land uses. Level 3 AIAs for all classes of agricultural land could significantly diminish land use risks and improve co-benefits for agricultural landholders.

A potential avenue to provide more oversight and enforcement of arable land co-location when siting solar energy is through expert panel assessment. Similar to Queensland, NSW has enacted a regulatory framework to protect agricultural land specifically in response to natural resource exploitation. Although the land use impacts of natural resource exploitation are extremely invasive with far greater land use and subsurface risks, a specific agricultural panel assessment process may facilitate greater co-location and mitigate potential agricultural landholder concerns.

The NSW Gateway Process⁷⁰ requires proponents undertaking mining and petroleum production to conduct an Agricultural Impact Statement (AIS). Additional assessment is required via a Gateway Certificate from the Gateway Panel before lodging a development consent application on BSAL. This process requires applicants to apply for a Gateway Certificate from the Gateway Panel assessing the application by awarding either a conditional or unconditional certificate.⁷¹ There is no comparative regime for solar energy which is not afforded a specific SEPP nor are detailed agricultural land assessments required for all agricultural land. To enable greater regulation over solar energy development on agricultural land to encourage co-location, a similar Gateway Panel and Certificate process could produce certainty, transparency, and protection for agricultural land of all classes.

3.3 VICTORIA

In Victoria, solar energy projects representing power generation over 1 MW are similarly assessed at the state level with the Minister for Planning as the consent authority. This is a recent development, as prior to 2019 solar energy proposals were assessed by local councils. The change in consent authority jurisdiction resulted from Victorian Civil and Administrative Tribunal (VCAT) cases⁷² upholding local council decisions rejecting solar farm approvals on agricultural land.⁷³ The change in regulatory oversight from local councils to the Minister for Planning was specifically to ‘reduce burden on councils and provide for consistent decision-making’.⁷⁴ Arguably, the amended streamlined approach at the state level improves facility siting and design guidance and may increase transparency for developers and communities.

The Planning and Environment Act 1987 (Vic) (PEA) is the primary legislative framework for solar energy assessments. The consent authority must consider several matters pursuant to s 60 of the PEA, including the relevant planning scheme; objectives of planning in Victoria; submissions; comments and decisions by a referral authority; and any significant effect of the development on the environment, socially, and economically. Diverging from Queensland and NSW which both classify solar energy broadly as infrastructure development, solar energy facilities are defined as distinct land use in Victoria as ‘land used to generate electrical energy

⁶⁸ *ibid* 27.

⁶⁹ *ibid* 35.

⁷⁰ New South Wales Government, ‘Gateway Assessment and Site Verification’ (2021) <<https://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/Gateway-Assessment-and-Site-Verification>> accessed 10 September 2021.

⁷¹ State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (NSW).

⁷² *Helios Volta* (n 5); *Powervault* (n 5).

⁷³ Victorian Government, ‘Solar Energy Facilities’ (2021) <<https://www.planning.vic.gov.au/permits-and-applications/specific-permit-topics/solar-energy-facilities>> accessed 10 July 2021.

⁷⁴ Victorian Government, ‘Victoria Planning Provisions Amendment VC192: Explanatory Report’ (2021) <https://stfpbsprodapp01.blob.core.windows.net/amendmentfiles/cee615ba-b602-eb11-a813-000d3acb4083_ce854eb9-98dd-41b9-bad5-84e95487b861_VC192%20Explanatory%20Report%20Approval%20Gazetted.pdf> accessed 4 July 2022.

using ground-mounted photovoltaic and thermal technology structures, where the primary role is to export power to the electricity network...'.⁷⁵

Several supplementary instruments where triggered must be considered in assessing a solar energy proposal in Victoria, particularly the Victoria Planning Provisions (VPPs). The VPPs have standardised EPI planning provisions, prepared by the Minister for Planning to assist in 'providing a consistent and coordinated'⁷⁶ framework for planning schemes in Victoria, which must be considered by consent authorities where appropriate.⁷⁷ VPPs are flexible and amendable by the Minister for Planning and used in conjunction with state and local planning policies to guide consent authorities. Consent authorities may also consider 'if the circumstances appear to so require'⁷⁸ any 'guideline which has been adopted by a Minister, government department, public authority or municipal council'.⁷⁹ While guidelines and VPPs are not expressly mandatory considerations, the PEA differs from its Queensland and NSW planning legislative counterparts by listing guidelines and planning policies as being a 'relevant consideration' for consent authorities. This signals VPPs and guidelines as being an 'integral part of assessment'.⁸⁰ Consequently, solar energy proponents should proactively comply with the VPPs and guidelines are likely to be triggered by s 60(1A)(g) of the PEA and can be enforced by the relevant consent authority as required in the circumstances.

Clause 65 of the VPPs provides the general requirement of the consent authority assessing whether the proposal produces 'acceptable outcomes' per PEA s 60, the VPPs, and, of relevance to solar energy siting on agricultural land, 'factors likely to cause or contribute to land degradation'.⁸¹ The application of Clause 65 to agricultural land must incorporate factors within the relevant VPPs to determine whether a solar energy proposal will have a significant impact on agricultural land capabilities and degradation.

Three VPPs are most relevant to solar project development on agricultural land, namely Clause 35.07 (Farming Zone), Clause 53.13 (Renewable Energy Facility), and Clause 14.01–01S (Protection of Agricultural Land). Where a proposed solar project is situated within a Farming Zone, utility installation will trigger a Section 2 of Clause 35.07 of the VPPs use requiring a permit for the building and associated works. A solar energy facility is a non-specified Section 2 permit required use whereas utility installations are a Section 2 use. A Section 2 permit requires numerous additional assessment factors to be considered including:

- i. 'Whether the use or development will support and enhance agricultural production.
- ii. Whether the use or development will adversely affect soil quality or permanently remove land from agricultural production.
- iii. The potential for the use or development to limit the operation and expansion of adjoining and nearby agricultural uses.
- iv. The capacity of the site to sustain agricultural use.⁸²

Exploration of co-location opportunities is thus required to obtain a Section 2 permit requiring consideration of whether agricultural production 'can be supported or enhanced' by solar energy projects.

Factors for consideration in determining a solar farm application pursuant to Clause 53.13 include 'the impact of the proposal on strategically important agricultural land'.⁸³ This empowers the consent authority to hold solar farm development approvals accountable for failure to comply

⁷⁵ Victoria Planning Provisions Clause 73.03.

⁷⁶ Planning and Environment Act 1987 (Vic) s 4A.

⁷⁷ Victoria Planning Provisions Clause 65.01.

⁷⁸ Planning and Environment Act (n 76) s 60(1A)(g).

⁷⁹ *ibid* s 60(1A)(g).

⁸⁰ Mangalore Solar Farm, 'Application for planning permit' (2021), 30 <<https://www.planning.vic.gov.au/permits-and-applications/ministerial-permits/browse-ministerial-permits#MinisterialPermits--PA2101218>> accessed 10 March 2022.

⁸¹ Victoria Planning Provisions Clause 65.

⁸² *ibid* Clause 35.07–6.

⁸³ *ibid* Clause 53.13–3.

with the VPPs and the Solar Energy Facilities Design and Development Guideline ('Victorian Guidelines').⁸⁴ This is reiterated in the Victorian Guidelines whereby 'planning permit conditions *must be consistent* with the provisions of VPP Clause 53.13 Renewable energy facility, and they should be *generally consistent* with this guideline'.⁸⁵

The Victorian Guidelines provide information and direction about the relevant planning regulatory framework relating to each stage of solar energy development. In so doing, the Victorian Guidelines provide further detail informing the application of Clause 53.13 and state that proponents must address considerations 'in a written report component of planning permit application'. Therefore, solar energy developers should conduct an AIA considering several factors including the 'impact on the loss of the site if it has high-quality soils; the impact of fragmentation and a change of land use to non-agriculture activity on local and regional productivity and output; and whether the proposed solar energy facility can *co-locate* with other agricultural activity, to help diversify farm income without reducing productivity'.⁸⁶ The Victorian Guidelines are the only currently operating solar energy specific guidelines requiring aspects of co-location to be broadly considered for all agricultural land.

Solar energy development proponents must also consult VPPs Clause 14.01-01S where land is considered to be strategic agricultural land.⁸⁷ Clause 14.01-01S requires consent authorities to consider several factors where development is proposed on agricultural land including: 'impacts on the continuation of primary production on *adjacent land*, with particular regard to land values and the viability of infrastructure for such production; *Compatibility* between the proposed or likely development and the existing use of the surrounding land; Land capability'.⁸⁸ This highlights consideration for impacts and risks to adjacent agricultural land when approving solar energy projects, including potential issues such as glint and glare, and the compatibility of proposed solar energy development to produce co-location of beneficial land uses. Highlighting co-location to diversify farm incomes represents an emphasis on co-benefits in the VPPs and Victorian Guidelines, similar to the NSW Draft Guideline. The Victorian Guidelines, however, cross-cite the relevant agricultural protection VPPs concerning agricultural land use, regardless of its soil class. This represents a more holistic approach to balancing agricultural and solar land uses and satisfying dual policy objectives to manage solar energy and protect agricultural regions.⁸⁹

3.4 COMPARISON OF REGULATORY FRAMEWORKS

A comparison between regulatory frameworks applicable to solar energy development provides an evaluative analysis of the differing approaches to managing development assessments, EPIs, agricultural land protection, and considerations of co-location. A common feature across the comparative solar energy planning regulatory frameworks surveyed is the lack of mandatory consideration of agricultural land use enshrined in primary planning legislation with specified criteria and risk indicators. With Queensland as the exception, the move towards state responsibility for the regulation and development assessment of large-scale solar farms shows increasing recognition of development controls to appropriately manage land use risks when these solar farms are sited on agricultural land. Victoria requires solar energy developers to address agricultural land loss; co-location; fragmentation and other land use impacts within its VPPs and the Victorian Guidelines. AIA requirements are also proposed in the NSW Draft Guideline. The lack of national planning guidelines and the varying approaches to state and local council authority over solar farm development means that solar energy proposals are treated as largely generic infrastructure development proposals with supplementary guidelines in most states. Specific agricultural protection processes and permits for development in

⁸⁴ Planning and Environment Act (n 76) s 60(1A)(g). Victorian Government, 'Solar Energy Facilities Design and Development Guideline' (2019) <https://www.planning.vic.gov.au/_data/assets/pdf_file/0028/428275/Solar-Energy-Facilities-Design-and-Development-Guideline-August-2019.pdf> accessed 4 July 2022.

⁸⁵ *ibid* 39.

⁸⁶ Victorian Government (n 84) 15.

⁸⁷ Strategic Agricultural Land is currently being mapped by the Strategic Agriculture Land and Development Project. See Agriculture Victoria, 'Strategic agricultural land and development' (2021) <<https://agriculture.vic.gov.au/about/agriculture-in-victoria/strategic-agricultural-land-and-development>> accessed 10 March 2022.

⁸⁸ Victoria Planning Provisions Clause 14.01-01S.

⁸⁹ Victoria has four key irrigation districts protected under VPP Clause 14.02-3S which require further assessment by the Secretary to the Department administering the Water Act 1989 (Vic).

Queensland and NSW are largely triggered only in the case of mining and unconventional gas development, as generally higher risk and impact activities compared to renewable energy projects including large-scale solar. This is evident in the RPIA not being triggered for solar farm development in Queensland nor is the Gateway Process triggered in NSW.

As demonstrated in Table 1 below, Queensland, NSW, and Victoria all regulate solar energy development within their respective planning regulatory frameworks. Each state has produced its respective solar farm guidelines, which are largely voluntary other than arguably the Victorian Guidelines which could be enforced by s 60(1A)(g) of the PEA.⁹⁰ Victoria is the only state recognising solar energy facilities as a distinct land use, rather than simply generic infrastructure development. Victoria also requires assessment of whether solar energy development is incompatible with agricultural land protection policies within solar specific planning instruments per VPPs Clause 53.13 and Clause 14.01–1S.⁹¹ Finally, Queensland deems local councils to be development assessors for a proposed solar farm on agricultural land compared with assessment at the state level in NSW and Victoria.

Table 1 Comparative Table of Solar Farm on Agricultural Land Regulations.

Source: Compiled by author.

POLICY AND REGULATORY AREA	QUEENSLAND	NSW	VICTORIA
Large-Scale Solar Farm Development Assessment	Planning Act 2016	Environmental Planning and Assessment Act	Planning and Environment Act 1987
Environmental Planning Instruments	Relevant regional planning schemes	State Environmental Planning Policy (Transport and Infrastructure) 2021	Victorian Planning Provisions
Solar Farm Guidelines	1. Solar Farm Guidance for Local Government in Plan Making 2. Queensland Solar Farm Guidelines: Guidance for local governments	Large-Scale Solar Energy Guideline for State Significant Development Draft NSW Large-Scale Solar Guideline currently proposed	Solar Energy Facilities Design and Development Guideline
Mandatory consideration of Agricultural Land Protection Policy	No Regional Planning Interests Act 2014 is not triggered	Proposed Gateway Process is not triggered Detailed Agricultural Impact Assessment required for Level 3 Assessments (BSAL land and Classes 1–3) under Draft NSW Large-Scale Solar Guideline currently proposed	Yes Clause 35.07 Clause 53.13 Clause 14.01–1S
Proponents must consider supporting co-location	No	Proposed Only for Level 3 Assessments (BSAL land and Classes 1–3) under Draft NSW Large-Scale Solar Guideline currently proposed	Yes Solar Energy Facilities Design and Development Guideline
Consent Authority	Local Council	Minister for Planning and/or IPC	Minister for Planning

Whilst the guidelines in Queensland, NSW, and Victoria recognise that large-scale solar farms are possibly linked to additional land use considerations, there is notable inconsistency amongst the guidelines as to which risks are recognised.⁹² The guidelines are consistent, however, in suggesting that land use risks be considered in applications for solar energy site approval. Only Victoria currently links potential impacts to directly applicable specific solar energy planning provisions, particularly Clause 53.13. The Victorian guidelines also require consideration of agricultural land impacts to be addressed in a written report including exploring options for co-location.⁹³ The current NSW guidelines do not require detailed land use assessment⁹⁴ and

⁹⁰ NSW Government, 'Large-Scale Solar Energy Guideline For State Significant Development December 2018' (2018), 9 <<https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/large-scale-solar-energy-guideline-2018-12-11.pdf?la=en>> accessed 12 July 2021; Victorian Government (n 84) 15; Queensland Government, 'Solar Farm Guidelines: Practical Guidance for Communities, Landowners, and Project Proponents' (2018), 3, 12, 13 <<https://dsdmiprd.blob.core.windows.net/general/solar-farm-guideline-part-1-local-government.pdf>> accessed 12 February 2022.

⁹¹ Victorian Government, 'Protection of Agricultural Land' (2021) <https://planning-schemes.api.delwp.vic.gov.au/schemes/vpps/14_01-01S.pdf> accessed 11 August 2021.

⁹² NSW Government (n 90) 12, Victorian Government (n 84) 10, 13, 14, 16, 20, 23; Queensland Government (n 90) 15, 16.

⁹³ Victorian Government (n 84) 15.

⁹⁴ NSW Government (n 90) 11.

the Queensland guidelines state that the local government might require a proponent to demonstrate that they have sought to minimise impacts on agricultural land.⁹⁵

The differing and divergent legal tools and paths selected by differing jurisdictions addressing this ‘awkward problem’⁹⁶ in balancing the need for solar energy development and minimising land impacts are instrumental in informing new planning directions and potential reform. As explored in Part 4 below, if known and emerging risks associated with solar farms are to be pre-emptively and legitimately managed, planning regulation must provide clear and coherent tools to mitigate any potential land use issues.

4. TOWARDS A MORE HOLISTIC LAND USE BALANCE: OPPORTUNITIES FOR REFORM

A strategic, comprehensive, and holistic approach to planning regulation is necessary for the successful long-term implementation of solar energy projects.⁹⁷ Synergies presented between state regulatory approaches are crucial to determining optimal tools to balance solar and agricultural land uses. Planning policies and regulations are the primary governmental intervention to steer renewable energy developments and create co-benefits across multiple land uses. As explored throughout this article, land use planning consists of authorisations, leasing, and restrictions while promulgating the public interest, consistency and transparency, equity between land uses, economic efficiency, stakeholder engagement, and environmental protection.⁹⁸

When establishing a regulatory framework for solar energy development, consent authorities must determine the optimal tools to permit solar energy siting on agricultural land. The challenge for regulators is to create effective regulatory tools to mitigate land use risks, balancing the clear value of increasing solar energy development and protecting agricultural interests. The following section presents differing policies and tools that may better balance these interests.

4.1 CO-LOCATION

The co-location of solar energy projects with agricultural activities during the assessment of solar energy projects by consent authorities is crucial. Co-location and coexistence both require shared use and access to land between agriculture and solar energy development. Yet, co-location and coexistence promulgate differing policy aims. Coexistence represents continuing agricultural and solar land uses. In contrast, a definition of co-location is offered by the NSW Draft Guideline as supporting ‘the continued agricultural productivity of the land and protects existing land uses to ensure that they can continue after the solar energy project site has been decommissioned and the land has been rehabilitated and returned to its former use’.⁹⁹ This definition highlights multiple land uses existing before and after a solar energy project – more akin to coexistence.

Arguably, a more apt definition of co-location distinguished from coexistence denotes and requires co-benefits beyond coexisting, such as farming income diversity and ongoing agricultural activities support.¹⁰⁰ An element of solar energy land use being ‘subserving’ to agricultural activities is required to satisfy co-location. Co-location has been described as a ‘win-win-win situation’¹⁰¹ and seeks to reconceptualise solar sites as a net contributor, by preserving, aiding, or even improving land and water quality and the industries which rely upon it.¹⁰² This definition of co-location incorporates elements of the Victorian precedent on

⁹⁵ Queensland Government (n 90) 18.

⁹⁶ Sandro Sacchelli and others, ‘Trade-Off Between Photovoltaic Systems Installation and Agricultural Practices on Arable Lands: An Environmental and Socio-Economic Impact Analysis for Italy’ (2016) 56 *Land Use Policy* 90, 91.

⁹⁷ Newman (n 17) 499.

⁹⁸ United Nations Conference on Environment and Development, ‘Rio Declaration on Environment and Development, U.N. Doc. A/CONF. 151/5/Rev.1’ (1992) <https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf> accessed 10 September 2021.

⁹⁹ NSW Government (n 60) 35.

¹⁰⁰ This definition of co-location in assuring co-benefits between multiple users of space could also be applied to offshore energy.

¹⁰¹ *Powervault* (n 5) [146].

¹⁰² Queensland Government, (n 90) 15.

Agrophotovoltaics (APV) and is proposed by this article as a normative reconceptualisation of the term distinguishable from the definition offered by NSW.

Co-location in the context of solar energy development was defined in *Powervault Mildura* as 'where parts of a site are shared between agriculture and solar energy generation [offering] potential for a better balance to be achieved having regard to the policy tension around renewable energy facilities and agriculture'.¹⁰³ *Powervault Mildura*¹⁰⁴ concerned an appeal of Mildura Rural City Council's refusal to grant development permits for three large-scale solar farms each 7.5 MW on a combined 31.56ha of Farming Zone lands.¹⁰⁵ The lack of consideration of future co-location was a key factor in the decision to reject two solar farm proposals due to the removal of the land from potential agricultural production and uncertainty relating to the restoration of agricultural land following decommissioning.¹⁰⁶ Thus, mandatory co-location assessments must be integrated into the regulation of solar energy developments on agricultural land. *Helios Volta Holdings*¹⁰⁷ was approved by the Victorian Civil and Administrative Tribunal (VCAT) partly due to the ability of the solar farm to be successfully co-located with horticultural grape growing. VCAT found the balance between solar farm and agricultural land uses is achieved where co-location is evident, defined as where solar facilities are 'subservient to agriculture...(and) acting to support ongoing agricultural activities within productive areas'.¹⁰⁸

Local councils, state governments, developers, and landholders have clear benefits in seeking co-location as solar farm leases are often long-term leasehold interests. Co-location may represent the new legal principle and objective needed in planning regimes to strike the right balance in development assessments to produce mutually acceptable outcomes. In response to the *Helios* and *Powervault Mildura* decisions, Victoria is the only state currently requiring solar energy proponents to address 'whether the proposed solar energy facility can co-locate with other agricultural activity, to help diversify farm income without reducing productivity'.¹⁰⁹ Thus, as is recognised in the language of the Victorian tribunals, APV should only be encouraged if it can be done in a way that protects and preserves agricultural land.¹¹⁰

4.2 SOLAR ENERGY ENVIRONMENTAL PLANNING INSTRUMENTS

The emerging nature of solar energy developments as assessable land use in Australia has led to piecemeal and diverging regulatory frameworks. As solar energy developments must rapidly increase to decarbonise the electricity sector, standardisation of regulatory guidelines, monitoring of energy production, and decommissioning processes will become increasingly urgent. In response, consent authorities must create a common assessment framework to mitigate or minimise risks to agricultural land. Each of the respective regulatory regimes in Queensland, NSW, and Victoria surveyed within this article acknowledges the need to avoid the loss of productive agricultural land, whilst both agricultural soil assessments and restoration of land to its pre-development state for all agricultural land use (regardless of its productivity or soil class) are currently not explored in detail.¹¹¹ How to define and mitigate long-term impacts to 'restore' agricultural land to its pre-development condition remains a fundamental question for regulators.

Solar energy specific EPIs effectively administered could provide a more effective regulatory tool to minimise land use risks. The complex management of planning development applications has led to capital-intensive or large-scale solar energy projects triggering the 'state significant' threshold and the intervention of state development agencies in NSW and Victoria. State agencies and EPIs are arguably well equipped to provide effective oversight of solar energy

¹⁰³ *Powervault* (n 5) [147].

¹⁰⁴ *ibid.*

¹⁰⁵ The three separate permit applications included 'to use and develop sites at Fifth Street, Merbein (P2074/2018), McKays Road, Birdwoodton (P2075/2018) and Lake and Gibbs Streets, Mildura (P2077/2018) each for a 7.5 MW (megawatt) capacity renewable energy facility (solar energy facility)'. *ibid* [1].

¹⁰⁶ *ibid* [110].

¹⁰⁷ *Helios Volta* (n 5).

¹⁰⁸ *ibid* [75].

¹⁰⁹ Victorian Government (n 84) 15.

¹¹⁰ Stephan Schindele and others, 'Implementation of Agrophotovoltaics: Techno-Economic Analysis of the Price-Performance Ratio and its Policy Implications' (2020) 265 *Applied Energy* 1, 13–14.

¹¹¹ Agricultural Land Impact Assessments and decommissioning and rehabilitation of land may be addressed in detail in NSW if the NSW Draft Guidelines are adopted in their current form. See NSW Government (n 60).

development and evaluation of agricultural land impacts as a complex assessment process. In introducing mandatory requirements for agricultural land impact assessments within EPIs, states like Queensland could amend their regulatory framework to require state-level assessments of large-scale solar farm proposals by default. Queensland could also create a mandatory state solar code for all large-scale solar activities, like its Wind State Code.¹¹² This might provide a more consistent, certain, and coordinated state-level approach to the assessment and regulation of solar farms to diminish adverse impacts from exploration, construction, operation, and decommissioning of large-scale solar developments.

No single regulatory approach or framework is a panacea for addressing underlying concerns and emerging issues relevant to solar energy situated on agricultural land in Australia. NSW has recently amended its SEPPTI to introduce new matters of consideration for specific regional areas in development assessments including: 'the likely impacts of the development, including environmental impacts on the natural and built environments, and social and economic impacts in the locality; and the suitability of the site for the development'.¹¹³ Yet, it is not clear whether all aspects of the NSW Draft Guideline will be mandatory, and how the requirement for Level 3 detailed agricultural impact assessments for high quality agricultural land to inform site selection will be enforced.

Mandating assessment of agricultural land use impacts by solar energy development, regardless of its respective agricultural land class, may have the potential to facilitate a more effective approach to co-location. While all proposed solar energy projects within the states analysed require development assessment within their respective planning frameworks, consent authorities must be subject to mandatory relevant considerations specific to solar energy on agricultural land through development standards in EPIs. An explicit solar energy EPI designed specifically to manage solar energy land use risks, including on agricultural land, could clearly and comprehensively ensure that co-location is effectively explored, encourage co-benefits, and mitigate impacts on agricultural land. A Solar Energy EPI could also trigger referral powers to the relevant Minister for Agriculture, or an independent agricultural land commission for solar energy development on agricultural land, to ensure that land use risks are minimised and land is restored to its previous agricultural land capabilities.

CONCLUSION

This article demonstrates diverging planning frameworks to regulate the development of large-scale solar farms on agricultural land in three Australian states. The comparative analysis throughout this article illustrates aspects of the surveyed planning frameworks that do not encourage effective co-location between large-scale solar development and agricultural land uses. Setting appropriate regulatory aims and corresponding tools is essential to effectively managing the potential cumulative effects of solar farm development and promoting sustainable development on agricultural land. It remains to be seen which state planning framework will be most effective in addressing the evolving impacts of solar energy on agricultural land. Opportunities for reform may entail a solar specific EPI requiring detailed assessments of agricultural land impacts and co-location of agricultural activities. The legal and policy principle of co-location is key in striking an effective balance between these two crucial industries.

Whether or not regulation can create interdependence between solar and agricultural land uses by harnessing APV is a salient question. A regulatory regime that offers both industries the opportunity to thrive provides another body of research ripe for analysis. Finally, questions of which actors are best positioned to shape the sustainable development of solar energy on agricultural land may create a case for the creation of an independent agricultural land commission or referral powers to state agricultural departments to oversee large-scale solar energy development and ensure co-location where appropriate. Ultimately, for large-scale solar to be a sustainable industry, regulators must structure planning regulations requiring solar developers to address and demonstrate how agricultural land impacts will be managed, mediated, and minimised. This will provide regulatory certainty and efficiency, while balancing land uses to capture the environmental and economic benefits of solar energy and minimising impacts on agricultural communities and future agricultural activities.

¹¹² Queensland Government, State Code 23: Wind Farm Development (2017) <<https://epuron.com.au/documents/457/wind-farm-state-code-planning-guideline.pdf>> accessed 12 September 2021.

¹¹³ NSW Government (n 8) 4.

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