1. Executive Summary

I support appropriately located renewable energy facilities in my electorate and across northern Victoria in general. However, these are large, industrial facilities in a hitherto agricultural landscape, presenting complex and often novel issues for approval authorities to consider. A detailed policy and planning framework is therefore required to address these issues and guide decisions.

However, the draft Solar Energy Facilities - Design and Development Guidelines appear designed primarily to assist project proponents to navigate the existing assessment and development process for large-scale solar energy facilities in Victoria.

The Department of Environment, Land, Water and Planning (DELWP) says the draft guidelines were informed by a review of guidelines and best practice standards interstate and internationally. Yet the document does not propose any changes in Victorian planning provisions to ensure best practice is reflected in State and local government planning schemes. It does not, for example, specify key thresholds against which an application must be assessed. These provisions are required to ensure consistency in conditions imposed on developments across local government boundaries.

The document does not consider the threshold question of whether local government is the appropriate approval authority. The scale and potential landscape impacts of large solar facilities are comparable to wind farm facilities, for which the Minister for Planning is the responsible authority. As such, the document falls far short of the detailed policy and planning framework required to guide approval authorities. This framework should have been developed and in place before DELWP issued draft design and development guidelines for proponents. This framework must now be developed before more large solar energy facilities are approved in northern Victoria.

Recommendations

1. Establish a strategy taskforce to identify appropriate sites in each region.

2. Develop a specific policy and planning framework for large-scale solar energy facilities, akin to the policy and planning guidelines for wind energy facilities in Victoria.

3. Amend the Victorian Planning Provisions (VPP) to include a clause specifically on conditions for large-scale solar energy facilities.

4. Require that trends in local land and water use be considered in locating solar energy facilities, to avoid foreclosing on potential agricultural growth opportunities.

5. Require that each application be considered in the context of cumulative impact from multiple solar energy developments. In the interests of transparency, a publicly available map of all large-scale solar energy facilities approved, pending approval and proposed should be maintained.
6. Amend the Victorian Planning Provisions to include a clause prioritising the protection of productive land and irrigation assets in the Goulburn Murray Irrigation District (GMID), akin to Clause 14.01-1R Protection of agricultural land-Gippsland Strategy which specifically identifies the Macalister Irrigation District as an important foodbowl for Australia and Asia.

7. The GMID protection clause should specify that solar facilities be located to help deliver overarching regional strategic objectives, such as rationalising the irrigation infrastructure footprint and consolidating irrigated agricultural activity and water use towards the most productive and best serviced land. In effect, this would discourage solar facilities on properties directly connected to the GMID ‘backbone’, or primary channels.

8. Introduce a classification system for farmland of strategic significance within the GMID, to ensure the most productive land with the best irrigation services and future agricultural growth opportunity is protected.

9. Solar farm facilities in the most strategically important locations within irrigation infrastructure footprints should be regarded as a permanent removal of productive farmland for all practical intents and purposes.

10. Initiate a comprehensive research program on the dispersive heat island effect of solar facilities within the GMID, to gain a clear understanding of appropriate setbacks under Victorian landscape and agricultural land use conditions.

11. Set an interim, precautionary 50-metre setback for solar panels from boundaries, pending the results of the research above and recognising that the existing literature is too limited to provide meaningful guidance for facilities coexisting with intensive irrigated agriculture.

12. Set generous minimum threshold minimum conditions for vegetation screening to guide decision-making and provide neighbours with certainty on protecting their amenity. Conditions in northern Victoria, which often experiences prolonged hot and dry conditions, should include irrigation systems during the establishment phase of vegetation buffers.

13. Transfer approval authority for large solar facilities to the Minister for Planning, consistent with his approval authority for wind energy facilities. Large solar facilities will be defined as a capital cost of more than $30 million (or $10 million in an environmentally sensitive area) consistent with the NSW Large Scale Solar Energy Guideline, December 2018.

14. Require local government to amend local planning schemes to reflect the new VPP Clause for solar farm facilities, and the solar facilities policy and planning framework.

15. A moratorium on approvals of large solar energy facilities until the changes listed above are implemented.

16. The State Government and energy companies develop an investment strategy to upgrade the Victorian electricity transmission network to ensure it is fit for purpose to support decentralised electricity generation in appropriate locations.
2. Context

The draft Design and Development Guidelines for solar energy facilities were developed largely in response to concerns raised about the proliferation and location of solar facilities in northern Victoria, particularly in my electorate, the Shepparton District (Map 1).

Concerns include, but not are exclusive to, agricultural land loss and impact on water infrastructure; potential third-party impacts from a heat island effect, glint and glare, noise, light and other potential amenity loss; and, conflict between State and local planning scheme provisions to protect strategically important agricultural land while also supporting the expansion of renewable energy.

Map 1. GMID - approved and proposed solar farms

A solar planning and policy framework with greater clarity and thresholds is essential if approval authorities are to make informed decisions, and deliver consistency across local government areas in regions with common strategic land use and economic development interests.

My electorate falls within such a region: the Goulburn Murray Irrigation District (GMID) in northern Victoria, covering 27,000km² from Cobram in the east to Cohuna in the west and spanning five local government areas. The GMID is Victoria's food bowl, generating $5.9 billion of dairy, fruit, vegetables, meat and cereals. One in three jobs are on farms, farm services and food processing. Almost all GMID irrigators are family farmers.

The Commonwealth and State governments have spent $2 billion modernising the GMID infrastructure footprint. Rationalisation is an important element, to save water lost through system inefficiencies, evaporation and seepage; and, to reduce operating and maintenance costs for users.

To this end, the system ‘backbone’ (also known as the primary channels) was identified. Properties directly connected to the backbone channels have an advantage with higher water service delivery standards and are generally considered prime land for irrigation. That makes these properties of more strategic significance for meeting State agricultural policy objectives.
It is essential that this investment is not undermined by poorly located solar facilities that may exacerbate the ‘Swiss cheese’ effect whereby irrigated agricultural activity is scattered and fragmented across the footprint, rather than consolidating water use towards the land best suited for irrigated agriculture in terms of soils, climate and irrigation service delivery standards.

While some land adjoining the backbone may not currently be irrigated, it should be reserved for agricultural use to help attract and consolidate new irrigated agricultural activities. Allowing solar facilities on this land will effectively preclude new agricultural development and therefore growth for several decades. It is also not necessary when there is plenty of other land of less agricultural significance with the GMID and northern Victoria.

To be clear, I support appropriately located renewable energy facilities in my electorate and across northern Victoria in general. However, these are large, industrial facilities in a hitherto agricultural landscape, presenting complex issues for which local government may not have the resources to thoroughly and independently assess the information proponents provide.

At present, approval authorities have next to no guidance: to paraphrase a recent planning report before Campaspe Shire Council for a solar facility at Lancaster:

*Section 60 of the [Planning and Environment] Act requires a responsible authority to consider, among other things, State and local planning policies, and any significant environmental, social and economic impacts of the proposed land-use when considering a planning permit application.*

*[However] the Municipal Strategic Statement (MSS) and local policies ... provide minimal guidance regarding ‘appropriate’ locations or decision guidelines related to renewal energy facilities.*

*Although the scheme includes a state-wide particular provision Clause 52.47 Renewable Energy Facilities, specific guidelines regarding appropriate locations are not outlined and no ‘code of practice’ is available compared to other particular provisions*.

Goulburn-Murray Water, a key referral authority for solar energy facility permit applications, identified the risks in the absence of a clear policy and planning framework:

*The land area and water use associated with the subject properties is not large in the context of the overall GMID. However, the absence of guiding principles relating to the location of these and future developments provides a precedent and scope for a proliferation of solar farms and the attendant problems.*

The absence of guidance raises the risk of inconsistent decisions across local government areas that may undermine the integrity of strategic planning for the GMID as a whole to maximise the benefits of the $2 billion modernisation investment.

Inconsistency may emerge among local approval authorities with inevitably subjective and inexpert judgements about the relative strategic value of agricultural versus solar facility land use at particular sites, the weight given to strategic plans for irrigation infrastructure and agricultural growth, the mitigation of third-party impacts and awareness of cumulative land use change impacts.

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2 Ibid.
3. Best practice

**Protection of agricultural land**

*UK guidelines for solar farms and land classification.*

In the United Kingdom, the National Planning Policy Framework strongly discourages locating large-scale solar energy facilities on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification).

Specifically, it says such facilities should ideally utilise previously developed land, brownfield land, contaminated land, industrial land or agricultural land preferably of classification 3b, 4, and 5 (avoiding the use of “Best and Most Versatile” cropland where possible).

The framework also requires cumulative impacts to be considered and addressed. To this end, the Local Planning Authority is required to maintain a record of all applications received and all planning decisions relating to large-scale solar energy facilities.

**Victorian Planning Provisions**

The Victorian Planning Provisions (VPP)\(^3\) include several clauses to protect productive farmland of strategic significance, including:

1. 14.01-1S Protection of agricultural land, specifically:
   - Protect productive farmland that is of strategic significance in the local or regional context
   - Identify areas of productive agricultural land by consulting with the Department of Economic Development, Jobs, Transport and Resources and using available information.
   - In considering a proposal to use, subdivide or develop agricultural land, consider the:
     - Desirability and impacts of removing the land from primary production, given its agricultural productivity.
     - 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.

2. 14.01-1R Protection of agricultural land - Gippsland Strategy
   - Protect productive land and irrigation assets, including the Macalister Irrigation District, that help grow the state as an important foodbowl for Australia and Asia.

However, 14.01-1S is so high level as to be almost useless in guiding approval authorities on what constitutes strategically significant farmland. It provides no guidance on how to assess whether a particular development may affect adjoining properties, the viability of GMID irrigation infrastructure, or the desirability of surrounding land for future agricultural development.

Without clear land classifications like the UK model, determining what constitutes farmland of strategic importance and assessing third-party impacts becomes subjective. This is already leading to inconsistency in decisions across local government areas on vital issues such as setbacks, vegetated buffer zones, and avoiding fragmentation of productive land across the GMID irrigation footprint.

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Compounding the problem is the glaring omission in the VPP of a specific strategy to protect agricultural land in the GMID, similar to 14.01-1R recognising the State significance of the Macalister Irrigation District in Gippsland. The GMID is the largest irrigation district in Victoria, and the most productive agricultural region generating the highest return on land use. The Commonwealth and State have recognised its significance now and in the future by investing $2 billion in modernising the irrigation infrastructure. It is more than surprising then that the VPP does not already recognise firstly that this is strategically significant farmland, and secondly, that it needs protection.

The draft Guidelines make passing reference to the Government proposing to amend the State planning policy to include reference to a map of the modernised irrigation grid, supported by planning provision changes, in order to guide proponents\(^4\). However, no timeframe is proposed; in the meantime, approval authorities are under no obligation to assess permit applications with reference to the modernised GMID infrastructure grid, to avoid inappropriate locations. A moratorium on approvals should be imposed until the State planning policy is amended.

Within the GMID, farmland could easily be classified by its strategic and productive significance according to its proximity to the ‘backbone’, or primary channels that form the core of the modernisation (Map 2).

**Map 2. GMID ‘backbone’, or primary channels.**

As mentioned earlier, properties directly connected to the backbone channels have an advantage with higher water service delivery standards and are generally considered prime land for irrigation. Backbone channels also will not be rationalised over time, whereas smaller spur channels may be as part of Goulburn Murray Water’s 25-year asset management strategy to ensure the infrastructure

footprint reflect the fact that irrigation water use is almost half what it was 15 years ago. This makes backbone properties strategically significant for meeting the State’s agricultural policy objectives.

A three-tier classification system could be introduced easily into the GMID, along the following lines:

1. Class 1. Properties directly connected to the backbone. Solar farms should be actively discouraged in these locations.
2. Class 2. Properties adjoining those on the backbone or within 2 kilometres of the backbone. Careful consideration should be given to proposed solar farms in these locations, including potential impacts on backbone properties or the risk of foreclosing future agricultural development particularly involving land use change.
3. Class 3. All other properties in the GMID. Solar farm proposals in these areas to take into account land and water use trends, using available information such as land and water use trends mapping (for example, Map 3).

Map 3. GMID land and water use 2016

Projects of State significance

Under Victoria’s Renewable Energy Action Plan, the State Government has committed to renewable energy targets to ensure an affordable, reliable and renewable energy future. This includes increasing renewable energy generation to 50 per cent by 2030, building on the targets of 25 per cent by 2020 and 40 per cent by 2025 in the Victorian Renewable Energy Target (VRET) legislation6. 

5 Increasing Victoria’s renewable energy target and boosting jobs. Media release, 8 November 2018.
Northern Victoria’s topography, sunlight hours and proximity to the energy grid make it an attractive region for the large-scale renewable energy facilities required to help meet the State Government’s renewable energy and greenhouse emission targets. Such facilities also provide an economic boost through local procurement and jobs.

Large-scale solar energy projects are therefore clearly State-significant projects in the context of delivering a State-significant policy for a clean energy future. As such they are more appropriately assessed and approved by the Minister for Planning than by local approval authorities.

Centralised decision-making will ensure consistency in the assessment of large-scale solar projects and alignment with the State’s renewable energy objectives. It would also recognise that large-scale solar farms are comparable with wind power developments in scale, scope and potential off-site impacts. It is illogical that the Planning Minister should be the approval authority for all wind power projects, and not for large-scale solar projects as well. It is illogical that the Victorian Planning Provisions should contain Clauses 52.32 and 52.32-3 setting out conditions for wind turbines, but there are no clauses with conditions specific to solar energy facilities that are comparable to wind farms in scope, scale and State significance in contributing to the Government’s renewable energy targets.

Victoria should adopt the NSW approach, with a tiered approvals regime for renewable energy systems, to ensure the level of assessment is appropriately tailored to the system scale and type.

Under the NSW State Environmental Planning Policy (State and Regional Development) 2011, renewable energy proposals such as wind or solar farms with a capital cost of more than $30 million (or $10 million in an environmentally sensitive area) are considered as State Significant Development under Part 4 of the Environmental Planning and Assessment Act 1979. The NSW Planning Minister is the approval authority for State Significant Development.

Almost all the 20 solar energy facilities approved, pending approval or in development in the GMID would qualify as State significant development under the NSW thresholds.

4. Key issues

The July 2018 report of the panel considering four solar facility applications in the City of Greater Shepparton local government area provides a thorough assessment of the current planning provisions and some guidance on planning principles that could be incorporated into a Victorian solar energy facilities policy and planning framework. It also identifies the limits of knowledge on key issues such as the dispersive heat island effect, and as such its conclusions should be treated with caution rather than allowed to stand and set planning precedent.

i). Temperature and effect on horticulture, livestock and insects
The panel found that, while limited, the scientific evidence was sufficient to determine that temperatures would not be higher beyond 30 metres of a photovoltaic array. It said the precautionary principle therefore did not apply and Council’s proposed generic 50-metre setback was not required to address potential temperature impacts on neighbouring residences, orchards, horticulture, farming for cattle and livestock, and insect population numbers.

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The panel relied primarily on two reports on research into solar farm heat island effects in two locations, one in the Arizona desert and other in farmland in North America, although the exact location is not specified. It also heard from the lead author of one report, Dr Barron-Gafford of the University of Arizona, and an expert witness called by the City of Greater Shepparton Council, Mr Guthrie of Sustainable Energy Transformation Pty Ltd.

Both research reports agreed that solar farms create a dispersive heat island effect, increasing temperatures outside the boundaries of the facility. However, they disagreed on the extent of the effect. The Arizona report concluded the effect was negligible at 30 metres from the boundary. The second report concluded the temperature was approaching the ambient landscape level by 300 metres from the boundary.

Methodological issues with the second report, including the integrity of the instruments and relevance of their location were discussed and agreed to be problematic, so the panel went with the Arizona report to conclude that the minimum setback should only be 30 metres.

The panel’s conclusion risks setting an unacceptable precedent in Victoria’s planning framework based on the results from a single research project in a desert location that is not comparable in any way with northern Victoria in general and the GMID specifically in climate, soils, vegetation types or land use. A single research project in an overseas desert location does not constitute ‘sufficient scientific evidence’ to determine appropriate setbacks in an Australian farmland context.

The Victorian Government must immediately commission research into the heat island effect of large-scale solar farms in various northern Victorian locations. In the meantime, it should introduce an interim and precautionary 50-metre setback from the boundaries for all large-scale solar facilities.

### ii) Visual impact

The panel agreed that landscape screening vegetation should be provided to soften views to the solar panels and buildings and to provide screening from adjoining residences.

It recommended that the screening vegetation should be permanent, at least seven metres deep and three metres tall, and that each applicant should have a vegetation maintenance program including the replacement of any dead or diseased plants.

Compare this conclusion with the more specific condition proposed by the City of Greater Shepparton, requiring solar facilities to have permanent screening trees and shrubs with a minimum of six rows using a mixture of local trees and understory species.

And then compare the City of Greater Shepparton’s proposed condition with the vegetated buffer conditions agreed by the Campaspe Shire Council for the Lancaster solar facility. In this case, the proponent was required to establish a permanent screen of trees and shrubs with a minimum of three rows using a mixture of local trees and understory species to be more than four metres in height along the boundaries, and an in-ground irrigation system to service all landscaped areas.

While the extent of screening vegetation will vary depending on individual circumstances, the planning and policy framework must nonetheless provide generous threshold minimum conditions

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to guide decision-making and provide neighbours with certainty on what to expect to protect their amenity.

It is also particularly important in northern Victoria, which often experiences prolonged hot and dry conditions, that irrigation systems are required at the very least during the establishment phase of vegetation buffers.

iii). Farming Zone
Clause 14.01-1S Protection of agricultural land in the Victorian Planning Provisions requires, among other things, avoiding the “permanent removal of productive agricultural land from the state’s agricultural base without consideration of the economic importance of the land for the agricultural production and processing sectors”.

The Campaspe Shire Council planning report for the Lancaster solar facility concluded that the proposal was unlikely to result in a permanent loss of agricultural land, as it did not rely on any buildings and earthworks that could not be reversed. Some sheep grazing would also continue to maintain the site, and upon decommissioning of the solar farm, the land could again be used primarily for agriculture.

The Lancaster proposal is in a dryland area, and so this assessment is probably justified. However, this approach may not be appropriate within the GMID irrigation infrastructure footprint, particularly on properties directly connected or near the backbone channels. Unlike dryland regions, land suitable for irrigation and well-serviced by irrigation infrastructure is limited.

In strategically significant irrigation areas, the 40-year lifespan of a solar farm is to all practical intents and purposes a permanent removal of productive farmland. Forty years is almost two generations of farmers, and almost two generations of trees in permanent plantings. Inappropriate location of solar farms within the irrigation infrastructure footprint may foreclose the opportunity for new agricultural investment.

The Victorian Planning Provisions should be amended to treat solar farm facilities in strategically important locations within irrigation infrastructure footprints to be a permanent removal of productive farmland for all practical intents and purposes.

5. The Victorian electricity transmission network

The draft Guidelines identify that the existing transmission network infrastructure is a constraint against locating large solar energy facilities where the best solar resources exist\textsuperscript{11}.

In other words, the existing network is not fit for purpose to support the decentralised renewable energy generation envisaged by the State Government\textsuperscript{12}. It is not even fit for purpose to guarantee reliable electricity to many regional towns and businesses, or support modern farming production.

Without a fit-for-purpose transmission network, proponents for large solar energy facilities must find locations in close proximity to existing suitable network infrastructure. These locations may not


be consistent with planning policies to protect productive farmland of strategic significance, inevitably creating an intractable conflict between different Government objectives.

The regional electricity transmission network was already in desperate need of upgrading before the Government introduced ambitious renewable energy targets. The Government and energy companies must urgently develop an investment strategy to ensure the transmission network is fit for purpose to support the Government’s vision for a modern, decentralised electricity generation system based on renewables.

6. Conclusion

The panel considering the four solar facilities proposed in the City of Greater Shepparton rightly concluded that the overall permit decision process would have been clearer and further expedited if there was additional and more detailed strategic guidance.

It found that while limited, there was sufficient decision guidance to assess each planning permit application on its individual merits. However, it also warned that future solar energy facilities may have a cumulative adverse effect on agricultural production in the GMID, therefore future permit applications would benefit from further guidance on where they should be located in Victoria.

The draft Solar Energy Facilities - Design and Development Guidelines document is a sorely inadequate response to this need.

The document appears designed primarily to assist project proponents to navigate the existing assessment and development process, as if the City of Greater Shepparton panel was satisfied with the current planning framework. It was not satisfied. It said approval authorities need further guidance.

As such, the draft Solar Energy Facilities - Design and Development Guidelines document falls far short of the detailed policy and planning framework required to guide approval authorities when assessing permit applications.

This framework should have been developed and in place before DELWP issued draft design and development guidelines for proponents. This framework must now be developed before more large solar energy facilities are approved in northern Victoria.