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30 November 2018

Department of Environment, Land, Water and Planning
PO Box 500
East Melbourne VIC 3002
Lodged electronically at www.engage.vic.gov.au

Dear Sir/Madam,

Submission to Victoria's Draft Solar Facilities Guidelines

I am pleased to respond to the Victorian Government's Draft Solar Facilities Guidelines on behalf of the Clean Energy Council.

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia. We represent businesses operating in wind, solar, hydro, bioenergy, marine and geothermal energy, energy storage and energy efficiency. Our membership includes around 600 leading clean energy businesses in the country.

As you are aware, the large-scale solar industry is an emerging sector in Victoria and Australia. Just a year ago, there was not one commercial large-scale solar facility (> 5 MW) in Victoria. Today, the economics of solar energy have improved markedly and large-scale solar is now cost competitive not only with wind developments in many locations, but also with new thermal generation. As a result, in 2018, three plants have been built and approximately nine more are under construction or expected to commence construction this year.

This is a very positive development. Firstly, because increased renewable energy generation is expected to drive down average annual electricity bills from 2018-19[1]. Secondly, because Victoria stands to benefit from the increased investment, job opportunities and economic activity that these developments deliver, particularly within regional areas. Direct employment for thousands of people will be generated by these plants during the construction phase, and hundreds of jobs will be supported directly and indirectly in the long term. Large-scale solar developments can also support diversification of regional economies and greater financial resilience for landowners and agricultural districts experiencing reduced rainfall and uncertain water allocations.

Finally, large scale solar energy can play a major role in accelerating the decarbonisation of Victoria's electricity sector in the coming decades along with other technologies including wind, pumped hydro and batteries in particular.

We congratulate the Victorian Government on its strong commitment to lift the share of renewables in Victoria's energy to 40 per cent by 2025 and 50 per cent by 2030.

The CEC welcomes the development of Victoria's new draft Solar Facilities Guidelines, which will provide valuable information and resources for local governments, communities and

[1] Australian Energy Market Commission, *2017 Residential Electricity Price Trends,* December 2017

proponents. We would like to provide observations and suggestions to inform the refinement of the guidelines with regard to:

1. the site selection considerations of solar farm proponents
2. striking the right balance in managing competing land uses
3. the impacts of solar farms on their surrounding environments and appropriate policy responses to these, and
4. the commitment of our members to good community engagement.

1. Site selection for solar farms

Site selection is a critical stage in a project's development, and our members must consider a wide range of criteria in locating a suitable site. Proponents typically require clear, flat (or gently sloping) land, in close proximity to an unconstrained section of the grid, without the constraints of surface rock, flooding, shading, geotechnical issues and underground infrastructure, land which can be difficult to find.

Large-scale solar developers seek out land that can accommodate a development area with limited impact to native vegetation and that is able to avoid development in areas of high cultural heritage significance. This is most often land which has been previously cleared for farming purposes.

As discussed, unless the development is very large, most large-scale solar projects will need to be located within close proximity of the grid in order for the project to be considered financially viable. This is due to the high costs associated with transmission extensions and the relatively low-margins for profitability of the development. In a typical project, proponents will seek to be within two kilometres of a high-voltage transmission line or substation.

Another critical constraining factor is the capacity of the local transmission network, which in-turn limits the number of new generation facilities that can be accommodated in any given region. Areas with transmission networks that may be ideal for large-scale solar, such as the sunny and relatively arid areas of north-western Victoria, are presently under-equipped to host many such projects because of the relatively weak network and limited available capacity on that network. The grid proximity requirements for a project mean that there is a very finite area of land around the regional electricity transmission network that can be economically used for most large-scale solar generation projects.

Given the importance of Australia building the necessary new power supply to support our needs as coal-fired power stations retire over the coming decades, it will become only more important for the Victorian planning system to be well-equipped to accommodate the land use needs of the energy sector and balance these with the needs of the other land uses.

2. Striking the right balance in managing competing land uses

Under the *Planning and Environment Act 1987*, land within the Farming Zone may have multiple uses, including cropping, grazing, cattle feedlots, timber production or utility installations or a renewable energy facility. An application to permit a particular permissible land use should not be deemed to take preference over another permissible land use if it is able to demonstrate compliance with the planning policies of the applicable Scheme.

Nevertheless, the CEC supports the principle that the industry should make reasonable efforts to minimise the impacts of renewable energy developments on highly productive agricultural land and this is reflected within the CEC's *Best Practice Charter for Renewable Energy Developments*, released in July 2018. (See Appendix 1.)

The concept of highly productive land should be based primarily on the agricultural yield capability of the land in relation to soil quality. It may also take into consideration agricultural infrastructure investment (eg. the modernised irrigation network), strategic clustering of agricultural industries (eg. cultivated land, dairy) and the regional context. Table 1 of the draft guidelines, which outlines the considerations for determining 'strategically significant agricultural land', is an appropriate reference list.

We urge policymakers to exercise caution however in ruling out non-agricultural development in regions which may meet some of these criteria. For instance, the presence of modernised irrigation agriculture in a specific region does not automatically signify that all land is high quality. Indeed, the opposite may be true, with sub-economic or inefficient use of water required to enable production on land with poor soils. Large-scale solar can offer an opportunity to rest land with a relatively low-impact development, alleviate pressure on water allocations in the district, and provide a complementary revenue stream for farmers seeking to maintain the financial sustainability of their ongoing farm business.

Ideally, the identification of high-quality agricultural land should be straight forward and determined in a timely manner according to well-defined parameters during pre-lodgement analysis and consultation. However, we note that Victoria lacks a centralised, publicly accessible register or mapping system of this information. Existing assessments are scoped and commissioned by different parties including councils, water catchment management authorities, water authorities or agricultural stakeholder groups on an as required basis.

Noting that this centralised database is not available, and that the process of developing and maintaining one would be complex and resource intensive, the CEC proposes a fit-for-purpose process for proponents and local governments to assess the appropriateness of cleared land for a solar development.

Process for balancing large-scale solar and strategically significant agricultural land uses

Step 1: The proponent assesses whether the land is highly productive/strategically significant agricultural land based on its current use and information collected from the landholder.

In many cases, this can be judged based on whether it is currently being used for higher-value uses such as orchards, horticulture or dairying, OR for less intensive farming such as dryland cropping and grazing.

Step 2: The proponent consults with the local council to confirm its practical assessment of the productivity/strategic importance of the land.

Where the land is not deemed to be of high strategic value, and Council is in agreement with this position, Council should confirm this assessment in the pre-lodgement consultation/information request stages, and no further steps should be required.

Where there is either uncertainty or a conflicting view as to the strategic value of the land, the process should move to step 3 below.

Step 3: Proponent commissions an independent specialist's report.
Where there is uncertainty or differing positions held by Council and the proponent, the proponent should commission an independent assessment by a suitably qualified specialist, such as an agronomist.

If the assessment confirms that the land in question is not of strategic importance, no further work should be required.

If the assessment shows either that the land is of strategic importance or that it is a marginal result, then the proponent should move to a fourth and final step.

Step 4: Where the project is proposed to be sited on land of strategic value (or land whose strategic value is unclear following the specialist's report), the proponent should demonstrate that:

i. Reasonable endeavours have been made to find an alternative site with lower impact on highly productive agricultural land within the relevant section of the electricity network, and
ii. The solar farm development would not have a material negative impact on the viability of the region's agricultural industry.

This final test as described in step 4 is the basis on which Queensland's Planning and Environment Court made its judgement on the suitability of the Mirani Solar Farm earlier this year. This case, *Mirani Solar Farm vs Mackay Regional Council and Mackay Sugar (2018),* was the first in Australia to test how the competing land uses of large-scale solar and agriculture should be balanced.

The proponent was able to demonstrate that reasonable efforts had been made to find a land parcel of lower quality within the section of the network, and that none were readily available. It had also been able to demonstrate that the use of the cane growing property for a large-scale solar development would not adversely affect the viability of the local sugar refinery.

Judge RS Jones came to the conclusion that:

> "*Ensuring the protection of good quality agricultural land is a matter of significance as the evidence referred to identifies. That said, in performing the balancing act that I am required to do, I have reached the conclusion that I am satisfied that the proposed development ought to have been approved. To use the language of the Mackay Regional Planning Scheme, I am satisfied there is a need for this proposal that over-rides the need to protect good quality agricultural land and there is no alternative site. My conclusions might have been otherwise had there been evidence of the loss of this good quality agricultural land having an economic impact that might have affected the viability of the sugar mills in the region and otherwise involved a risk of material negative impact on the economy of the local government area, but that is not the case."*

In summary, we believe that this process represents a fair, reasonable and workable test for striking an appropriate balance between the competing land uses.

3. Considerations of impacts of solar farms on their surrounding environments

Visual impact

In the majority of cases, solar farms will be located in Farming Zones near existing transmission infrastructure. The visual impact of developments is assessed from the private realm (such as a dwelling) and the public realm (such as public road network, bike paths and public open spaces).

We note that while views from abutting residences should logically be considered for investment in protections, in line with the findings of the Planning Panels Victoria report on the *Greater Shepparton Solar Energy Facility Planning Permit Applications* (2018), it is not necessary to screen all views to a solar farm, and '*landscape screening vegetation is not required in locations which do not interface from abutting residences'.*

In those cases where a development is expected to result in a moderate to high visual impact to a nearby sensitive receptor such as a dwelling (from a single solar farm or cumulatively), the proponent can reasonably be required to demonstrate that the visual impact can be mitigated with landscape screening, acknowledging it can take a few years for the vegetation to become effective. The view from the broader farm property should not be given the same priority due to the productive intent of the land in the Farming Zone.

Views from the public realm are most commonly experienced in a dynamic environment, such as by people travelling by car along a public road. If the cumulative visual impact is considered to be moderate to high, taking into consideration the sensitivity of these views, it is reasonable to expect that landscape mitigation may be required to break up or limit views experienced from the public realm.

Glint and glare

The draft guidelines suggest that *'proponents should carry out a glint and glare assessment of the solar energy facility to understand these issues'.* The CEC regards this blanket requirement for all solar farms as unnecessary given the very low levels of glare associated with solar panels. Photovoltaic solar panels are designed to absorb light rather than reflect it, and as such they have relatively low-levels of reflectivity. They are constructed of dark, light-absorbing materials and many panels are also covered with an anti-reflective coating.

Glare can be found in both the natural environment (bodies of water, snow) and the built environment. As you will see from the comparison photos over the page, the glare associated with some natural landscapes is far more significant than a dark, light-absorbing solar farm.

While the metal frames around the individual panels and the mounting frames may have glint impacts, this is limited to a very small surface area. In addition, some panels now have a dual glass frameless design and hence have zero glint.

Figure 1: Reflectivity of solar PV (Source: Solar Photovoltaic Energy Facilities: Assessment of Potential glare for Impact on Aviation, January 2011.)

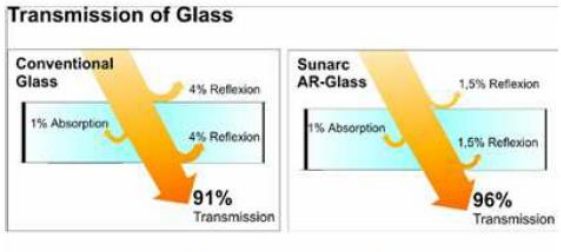


Figure 2: Reflectivity values[2]

4.2 These values are significantly lower than the reflectivity of other building materials. Figures 3 and 4 provide comparisons of the reflectivity of different materials.

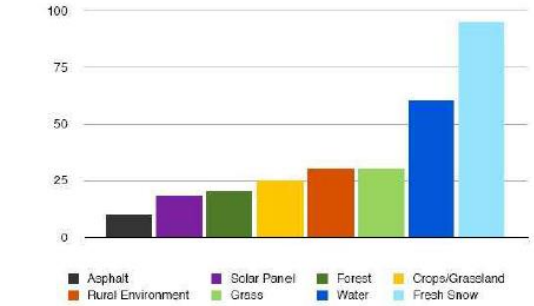


Figure 3: Comparative reflection analysis

Images below: Contrasting reflectivity on water bodies and large-scale solar farms

Such is the low level of risk from the glint and glare associated with solar panels that solar arrays line the Tullamarine-Calder interchange (VicRoads project), have been placed on top of the Brisbane Airport, alongside the Darwin International Airport, at Kansai airport in Osaka (30MW), and along a number of freeways in Europe.

Images below: From left to right are the 210 solar panels fitted along 500 metres of Tullamarine Calder interchange; Rooftop solar panels at the Brisbane Airport.

Given this low level of risk of significant glint and glare from large-scale solar arrays, we therefore recommend that any visual impact mitigation to nearby dwellings is adequate to address any nominal glint and glare impact to nearby dwellings with a moderate to high visual impact from the solar farm infrastructure.

The heat-island effect and large-scale solar developments

Concerns have been raised in some communities regarding the extent and impact of any heat island effect (PVHI) that may be associated with large-scale solar developments.

Given this concern, it would therefore be helpful for the guidelines to summarise the conclusion of the recent Planning Panels Victoria's report on the Greater Shepparton Solar Farm Applications (July 2018), which examined the available evidence in detail.

That Panel found that the findings of a prominent study by Dr Greg Barron-Gafford at the University of Arizona, had been misinterpreted or misconstrued by many stakeholders, and that *'surrounding farm operators should be comforted that the so-called 'heat island' effect was not a threat and will not adversely impact surrounding farm operations'* (pg.31).

The Barron-Gafford[2] study had found that while temperatures *within* the perimeter of a solar PV array increased by 3-4°C, the heat dissipated rapidly over a short distance, and that *'the PVHI was indistinguishable from air temperatures over native vegetation when measured at a distance of 30 m from the edge of the PV array'.*

While noting that few studies were available on the spatial heat dissipation, the Panel determined that there was *'sufficient scientific evidence to determine that no proposed solar energy facility will increase temperature beyond 30 metres of a solar array'.*

[2] Barron-Gafford, Greg A., et al, 'The Photovoltaic Heat Island Effect: Large solar power plants increase local temperatures', *Nature*, 13 October 2016

The CEC believes that there is an opportunity for further empirical research to be carried out in an Australian context to provide further detail about the spatial heat dissipation patterns associated with solar farms. In the meantime, it is appropriate that the Victorian Government includes a succinct summary of the Panel's conclusions within its final guidelines, in order to explain the research for communities and local governments.

In the absence of further studies the Clean Energy Council view is that an appropriate position based on the information available would be:

> *Solar panels should be set back at a distance of 30 metres from sensitive receptors. Sensitive receptors include cold climate horticulture crops and dwellings. It does not include other land uses such as dryland cropping, grazing and public roads. Remnant native vegetation in suitable solar farm regions is likely to be relatively hardy and tolerant to relatively minor temperature changes within the context of the Australian climate, and should not be treated as a sensitive receptor unless shown otherwise.*
>
> *Should modules be proposed to be located within 30 metres of a sensitive receptor, the proponent should be required to provide analysis to support its position that the solar farm will not have a detrimental impact to the agricultural yield or residential amenity.*
>
> *Planning policy with regards to setbacks should be updated to reflect evidence ascertained from any further credible studies in this area.*

4. A strong commitment to good community engagement

The renewable energy industry recognises the importance of working closely with communities to develop new generation facilities in a responsible manner that reflects community expectations.

As mentioned earlier, in July 2018 the CEC released a *Best Practice Charter for Renewable Energy Developments*, which has received tremendous support from across the large-scale renewable energy industry with over 40 companies signing onto the charter to date. The voluntary charter commits signatories to engage respectfully with the communities in which they plan and operate projects, be sensitive to environmental and cultural values, and make a positive contribution to the regions in which they operate.

We believe that the charter will be a valuable tool for communities, local and state governments, providing a clear and accessible statement of what excellence in project development looks like. The Department may like to consider including a reference to the charter within the guidelines, as a useful summary of best practice conduct in the development of projects.

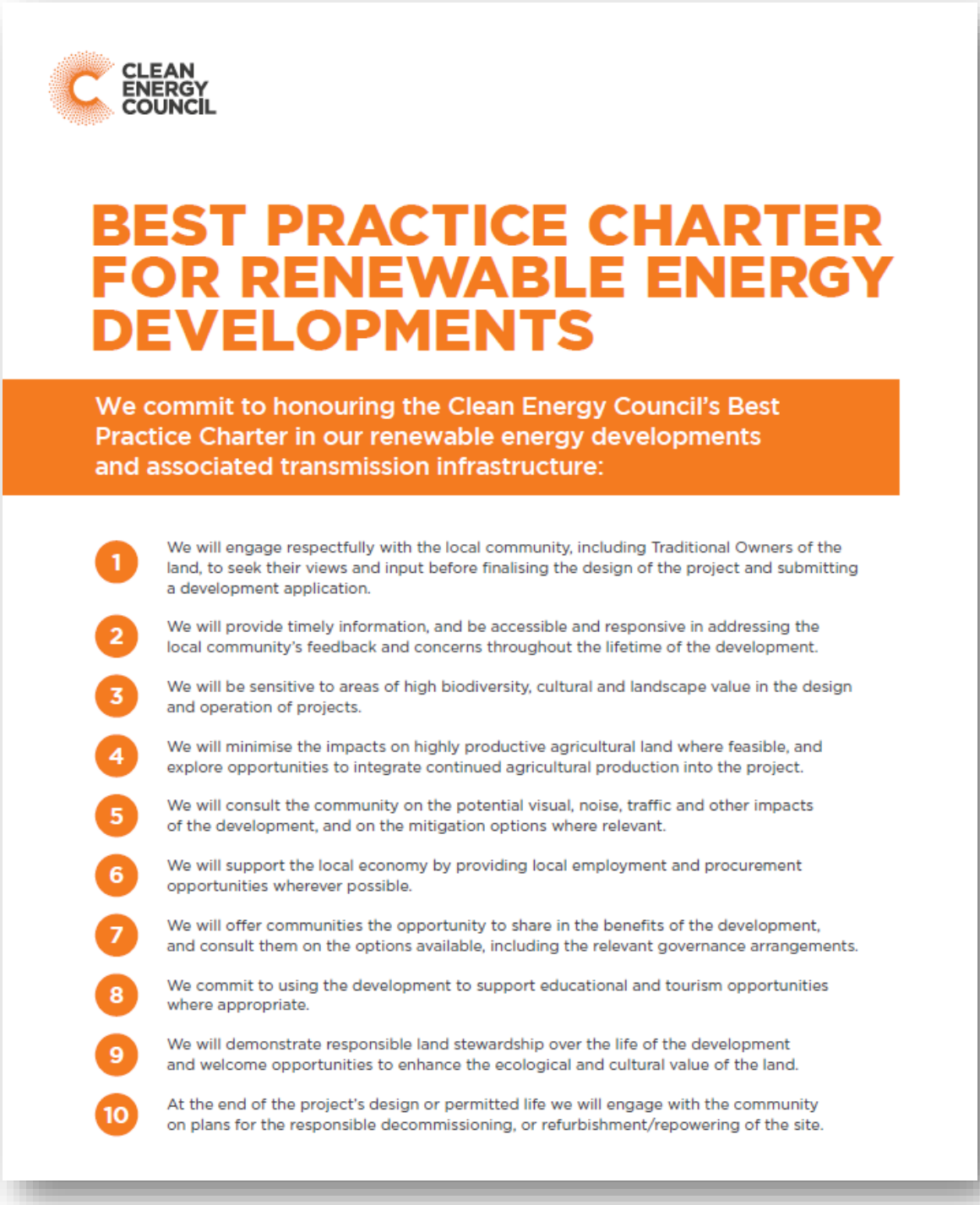
Thank you for the opportunity to provide feedback on the guidelines. Should you have any further queries regarding our submission, please don't hesitate to contact me at afreeman@cleanenergycouncil.org.au or on 0417 033 752.

Yours sincerely,

Anna Freeman
Director Energy Generation

Appendix 1 – The CEC's Best Practice Charter for Renewable Energy Developments

The Best Practice Charter was released on 31 July 2018, and over 40 CEC members have signed onto the voluntary charter to date.



CLEAN ENERGY COUNCIL

BEST PRACTICE CHARTER FOR RENEWABLE ENERGY DEVELOPMENTS

We commit to honouring the Clean Energy Council's Best Practice Charter in our renewable energy developments and associated transmission infrastructure:

1. We will engage respectfully with the local community, including Traditional Owners of the land, to seek their views and input before finalising the design of the project and submitting a development application.
2. We will provide timely information, and be accessible and responsive in addressing the local community's feedback and concerns throughout the lifetime of the development.
3. We will be sensitive to areas of high biodiversity, cultural and landscape value in the design and operation of projects.
4. We will minimise the impacts on highly productive agricultural land where feasible, and explore opportunities to integrate continued agricultural production into the project.
5. We will consult the community on the potential visual, noise, traffic and other impacts of the development, and on the mitigation options where relevant.
6. We will support the local economy by providing local employment and procurement opportunities wherever possible.
7. We will offer communities the opportunity to share in the benefits of the development, and consult them on the options available, including the relevant governance arrangements.
8. We commit to using the development to support educational and tourism opportunities where appropriate.
9. We will demonstrate responsible land stewardship over the life of the development and welcome opportunities to enhance the ecological and cultural value of the land.
10. At the end of the project's design or permitted life we will engage with the community on plans for the responsible decommissioning, or refurbishment/repowering of the site.

Appendix 2 - Detailed comments on specific sections of the guidelines

Section 5.2.2 of the Draft Victorian Solar Facilities Guidelines provides a detailed list of proposed features of a proponent's design response. The CEC has provided feedback on a number of the suggested requirements below. No changes are suggested in those areas left blank.

5.2.2 Design response	***CEC comments on 'design response requirements'***
The design response must include:	
• Detailed plans of the proposed development (see below).	*The CEC notes that depending on the development approach adopted, only concept layout plans and elevations of PV arrays and ancillary infrastructure (substations, O&M buildings, batteries etc.) may be available at the time of lodgement of the application. This is because a typical arrangement for the financing and construction of a solar farm involves engagement of an Engineer Procure Construct (EPC) contractor that undertakes the detailed design engineering, procurement and construction post-approval once finance has been secured.* *Where this is the case, permit conditions should require that detailed plans are lodged and approved prior to construction commencing to discharge the relevant conditions.*
• Accurate visual simulations illustrating the development in the context of the surrounding area and from key public viewpoints.	*Depending on the site context, visual simulations/ photomontages may be unnecessary (eg. located away from houses; on flat land with proposed landscaping). Therefore, the CEC recommends that visual simulations/photomontages should only be required where sensitive viewpoints have been identified by suitably qualified specialists or through a robust community consultation program.*
• An assessment of the extent of vegetation removal and a rehabilitation plan for the site.	*It is reasonable to expect an assessment of the amount of any expected vegetation removal required for the purposes of the planning permit application.* *Consistent with practices in the wind industry, the permit should require a rehabilitation plan to be prepared in advance of the decommissioning of the site, closer to the end of life of the asset.*
• A written report with comprehensive information about the proposal (see below).	

The detailed plans should cover:	
• Information on the layout and dimensions of the facility and any associated building and works.	*This is good environmental planning practice. We note however that this information may be indicative at the planning permit application stage and will not include specific details of the panels, inverters and mounting structures to be selected, aside from the maximum permissible dimensions that the proponent is seeking to be permitted.*
• Relevant design elements.	
• The reflectivity of the facility.	*As discussed within the main body of the CEC's submission, glint and glare associated with solar farms pose minimal risk. As such, there should be no blanket requirement for a glint and glare assessment.*
• The electricity distribution point (where the electricity will enter the distribution system).	
• Site access points.	
• Vehicle access to roads and parking areas.	
• A description of any drainage system for the site.	*A detailed stormwater management plan is the appropriate place in which to describe site drainage, and this will usually be developed post-approval as a 'prior to commencement of construction' condition of the permit being granted, as it is inherent to the EPC contractor's detailed design and construction plan.*
The written report should include:	
• An explanation of how the proposed design responds to the site analysis.	
• A description of the proposal, including the types of processes that will be utilised.	
• Materials to be stored, and the nature of any onsite treatment of waste.	*It is standard industry practice to cover these matters as part of an Environmental Management Plan, which should be addressed as a condition of a permit rather than in the permit assessment phase.*
• Whether a works approval or licence is required from EPA Victoria	
• The potential amenity impacts such as noise, glint, light spill, emissions to air, land or water, vibration, smell and electromagnetic interference (see Best Practice section).	*It is reasonable to expect that a proponent provide an overview of the expected amenity impacts within the planning assessment report. It should not be necessary to provide specialist consultant reports to address each of these potential impacts.*

• The effect of traffic to be generated on roads, including a traffic management plan.	*A detailed traffic management plan is the appropriate place in which to describe transport and roads management, and this will usually be developed as a 'prior to commencement of construction' condition of the permit being granted, as it is inherent to the EPC contractor's construction planning.*
• A strategic assessment of the impact upon Aboriginal or non-Aboriginal cultural heritage.	
• A strategic assessment of the impact of the proposal on any species listed under the Flora and Flagstaff Guarantee Act 1988 or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (where relevant).	
• An environmental management plan including a construction management plan, and information on any proposed site rehabilitation and monitoring (see Best Practice section).	*Provision of a detailed Environmental Management Plan (EMP) and construction management plan is ordinarily a permit condition requirement that would be met by the EPC contractor prior to starting works on site.* *At the initial permit application stage, a high-level environmental management framework, or dot points detailing the construction methodology, outlining high level environmental objectives/outcomes would be appropriate.* *The subsequent EMP would demonstrate how those objectives/outcomes will be achieved.*
• The design of any associated electricity transmission or distribution infrastructure, including pole design, route options, road safety considerations, visual amenity impacts, setbacks from sensitive land uses and the relationship to existing infrastructure.	*The CEC notes that the design of associated powerlines are subject to a planning permit where the powerlines are 220kV or more. No permit is required for buildings and works associated with a minor utility installation (62.02-1).* *Irrespective of the powerline size, proponents should provide a map of the indicative grid connection route as part of the written report.* *Separate to this, proponents should also engage with stakeholders and affected communities regarding the proposed powerline alignment, size, location and appearance.*
• A statement of why the site is suitable for a renewable energy facility (see below).	

The statement about site suitability should cover:	
• The agricultural quality of the site.	*If unclear, Responsible Authorities should direct proponents to seek written advice from the appropriate state regulatory agency to determine whether the land should be identified as highly productive agricultural land.* *It is not appropriate for a Responsible Authority to defer their position on the categorisation of the land beyond the further information request or public notice stage if advice is sought to resolve this earlier.*
• A calculation of the estimated reduction in greenhouse gas emissions due to the facility's production of emissions-free energy.	*While many proponents provide this information already it is noted that DELWP could assist through the provision and regular updating of an emissions intensity multiplier, to ensure consistent assumptions are used.*
• The amount of strategically significant agricultural land in the council area and the region.	*Please see response provided in the main body of the submission.*
• The impact of removing this land from agricultural production.	*Should agreement be reached that the land should be categorised as highly productive agricultural land, a proponent should provide:* – *Evidence of an analysis of alternative sites within this section of the network, and applicable assumptions in undertaking this setback (ie. grid corridor, slope, proximity to sensitive receptors and environmental constraints)* – *An analysis of the net highly productive agricultural land available in the council and the region and the impact to the regional agricultural industry should the solar farm proceed.*