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Submission on Solar Energy Facilities: Design and Development Guidelines

Southbank Residents Association (SRA) is a community non-profit organisation, aiming to bring together and support the interests of all who live or work within Southbank. SRA is the convener of the Southbank Owners Corporation Network (SOCN), which is a forum for our building memberships to work together and discuss common areas of interest when it comes to apartment living in Southbank. This submission is made on behalf of Southbank Residents Association and all our members both individuals and buildings alike.

As inner city residents, the environmental impacts of energy facilities do not have direct impact on us. Indeed as apartment dwellers in multi-storey buildings, we have limited capacity to make a direct personal contribution to renewable energy. Solar panels on the roofs of our buildings are of inconsequential benefit. So our contribution, as Victorian citizens, is to ensure that major infrastructure projects such as, Solar Energy Facilities, are the most appropriate.

Our concerns about the document are two fold:

1. Concentrated Solar Thermal (CST) technologies are inadequately explained.

This is exemplified by the fact that a link on CST in the document is to a webpage that has been closed down. Also the webpage was on a US website, whereas there are numerous Australian government sites that are more useful such as:

- <https://www.cleanenergycouncil.org.au/technologies/concentrated-solar-thermal.html> (Clean Energy Council)
- <https://arena.gov.au/news/paving-way-concentrated-solar-thermal-australia/> (Australian Renewable Energy Agency)
- https://ec.europa.eu/research/energy/pdf/cst_en.pdf (European Commission)

However, the omission in the brief description of CST technologies is that an essential part of their design is the capacity to store thermal energy on site so that it can be used later to generate electricity when the demand is high. Typically a CST power plant stores energy when the sun is shining so that it can be released at night. To quote the Clean Energy Council:

The advantage of concentrated solar thermal technologies is that they provide a dispatchable energy supply – that is, their power output can be adjusted based on grid demand. This makes them more flexible than traditional solar PV plants. Globally, solar thermal technology is being deployed on a large scale to provide electricity, and storage systems are also being investigated. Abundant sunshine and plenty of open space means Australia is ideally placed to take advantage of solar thermal technologies for energy generation.

CST plants are in operation around the world, principally in California and Spain, but also in India, Morocco, South Africa and the UAE. These are countries that have a similar climate and also similar direct normal irradiance to Australia, which is the amount of sunlight that comes from directly overhead.

Another key difference between PV and CST technologies is their energy efficiency. In PV solar energy is converted into electrical energy when particles of sunlight hit electrons in the material. This energy transfer only occurs for specific colours. The energy of other colours in the spectrum as well as infra red and ultra violet is not used. This limits the efficiency of PV technology. In CST all the colours of the spectrum are reflected by mirrors onto a single surface raising its temperature

to several thousand degrees centigrade. Depending on the material in the mirror, infra red and ultra violet can also be reflected. So all of the sun's energy can be captured by this technology. There are certainly energy losses in transferring this thermal energy into electrical energy, but these are a technical challenge rather than a theoretical limit.

2. The Design and Development Guidelines do not consider the impact and alternative technologies of the necessary associated energy storage facility.

Most types of energy storage facilities are significant infrastructures with their own environmental impacts, whether they store the energy as electrical energy (batteries), gravitational energy (pumped hydro schemes), thermal energy (heat banks) or chemical energy (hydrogen). The choice and location of an energy storage facility is as much an issue for public deliberation as the energy generating facility. From the comments above about the energy storage advantage of CST Technologies, this technology should be given due and proper consideration, rather than dismissed as a pipe dream or a fledgling technology.

So for the three survey questions:

- Do the draft Guidelines provide relevant and helpful guidance for siting, design and development of solar energy facilities?
- Do the draft Guidelines include sufficient advice on approval requirements for solar energy facilities?
- Do the draft Guidelines include enough information on best practice solar energy facility siting, design and operational matters?

Our response is No to all three.