



Circular PV Alliance's Response to Call for Submissions

Productivity Commission Inquiry into Opportunities in the Circular Economy

Circular PV Alliance (CPVA) is an independent industry-led organisation, formed in 2021 with a mission to realise the full environmental, economic and social benefits of solar energy by supporting the Australian solar energy sector transition into a circular economy. CPVA collaborates with various industry partners to undertake research and projects to understand and realise the potential of the solar energy circular economy. A core aspect of CPVA's work is to focus on practical, commercial solutions that enable the self-determination of various stakeholders and market participants. CPVA's market leading research project with The University of Queensland - [Reclaimed PV Panels Market Assessment Industry Report](#) - received international recognition and is often referenced as a current and comprehensive snapshot of the solar energy circular economy today. This report is included as Supporting Attachment to this Submission. A lot of material and recommendations can be found in this report to consider.

Solar Energy In Australia: Pressures and Opportunities

Australia's transition to renewable energy sources and the development of utility scale solar energy plants around the country will require somewhere in the order of 2 to 4 billion new solar panels to be installed (CPVA Report page 7). Australia's current reliance on importing PV panels exposes our renewable energy ambitions to external market influences, placing Australia at risk of being at the will of a 'bull' market. This means Australian's will ultimately pay more for solar energy which will blow out costs from the energy transition. The potential for this to happen has been exemplified by the Chinese government considering limiting exports of advanced silicon solar technology used to manufacture solar panels. Prices for lithium, cobalt, silicon, steel, aluminium and copper have also soared recently. The pressure of the global energy transition and geopolitical dynamics will further escalate the cost of critical energy minerals embedded in renewable technologies.



This paradigm presents an opportunity to transform Australia's energy, manufacturing and waste management industries into an integrated, circular economy as part of the renewable energy transition. Australia is forecast to have one of the most significant accumulated PV waste streams in the world. And herein lies the opportunity, as this 'waste' stream presents a ready availability of feedstock to kickstart new domestic markets in manufacturing. A circular economy for solar energy opens a myriad of opportunities to re-evaluate Australia's global contribution to clean energy generation.

PV panels have historically followed a linear or 'take-make-dispose' lifecycle which results in them being sent to landfill. This is problematic for a range of environmental, social and economic reasons. A PV panel has significant residual value when removed from service through its technical capability to generate clean energy and the embodied value of its materials. The circular economy for PV solar panels provides an abundant source of materials such as high transmittance glass, aluminium, silicon, copper, silver and plastics. Reusing materials rather than extracting raw materials from the ground is a fundamental socio-environmental benefit of the circular economy.

The Australian battery industry is also actively involved in embedding circularity practices into the sector. CPVA has a reciprocal industry membership with ABRI (Association for the Battery Recycling Industry) as there are many similar challenges to work through to achieve circularity for batteries and PV panels. The two organisations will continue to work together to develop guidelines for industry to address common logistics, handling and other matters.

International Example

The United States has a strong PV panels reuse market due to the high cost of solar systems. In the US, it costs around \$4/watt to install new solar, in Australia it is about \$1/watt. Second hand solar panels in the US retail for around \$2/watt, making them a very attractive and affordable option. Australia's solar market is heavily subsidised through the Renewable Energy Certificates (RECs) scheme, however this is also very problematic. It is driving a consumption based economic model that does not encourage circularity, moreover it promotes consumption and circumvents circularity thus casting a shadow over solar energy's sustainability credentials. This is also



arguably at odds with the purpose of the federal *Renewable Energy (Electricity) Act 2000*, which was introduced to, among other points, “ensure that renewable energy sources are ecologically sustainable”.

Policy Gaps

Fully operational solar panels only a year or two old are being “recycled” or dismantled if not thrown to landfill, in favour of reuse or refurbishment. This is largely due to a gap in policy and lack of clear regulations, liability or licensing around reuse. The expertise exists to test a panel for safety and performance in order to promote reuse and allay potential consumer concerns. CPVA’s own pilot project to test used panels found that panels between 10-15 years old were both safe and still generating energy at 94% of nameplate value on average. A recent project by the Smart Energy Council found that at least 80% of used panels were still working and didn’t need to be thrown out. A recent research project CPVA participated in with PV Lab and Australian National University found that the backsheet for solar panels can be refurbished in order to prolong a panel’s functional lifespan. Further investment is required to streamline panel testing and refurbishment to make it more efficient and thus more financially viable to deploy at scale. Incentives for reuse will help drive the necessary commercial investment in innovation to bring about these technology solutions.

Circularity for Solar: Things to Consider

A variety of push and pull mechanisms are required to create a healthy circular ecosystem for solar PV panels. Refer to pages 22 onwards in the Reclaimed PV Panels Market Assessment Industry Report for further detail. A few key points to specifically address the TOR for this inquiry include:

- First and foremost, the circular economy for solar panels includes reuse, repair and refurbishment. The current trend and tendency to skip these steps and jump straight to recycling or materials recovery from solar panels is not sustainable. Important commercial opportunities and low cost solar energy solutions are also missed.
- There is a need for consistent policy around PV waste management across states/territories, such as landfill bans, and closing loopholes in existing

policies by being more specific in what constitutes “recycling”. For example, removing the aluminium frame for scrap and then discarding the remainder of the panel to landfill is not acceptable but is common practice. Setting targets for materials recovery rates for PV panels will help. We suggest a target of between 90–95% minimum materials recovery from solar panels.

- Supporting industry initiatives to promote and reward circularity practices, such as “CPVA Certified” – a world first circularity certification for solar energy projects. CPVA developed this in collaboration with industry, to bring about positive behaviour change towards circularity practices. CPVA Certified provides a tool project developers can use to structure and manage their projects, supports reuse/refurbishment, creates a funnel for panels into recycling businesses, and builds social licence by directly addressing community concerns around waste generated by large scale solar projects.
- Incentives to reward consumers for choosing reused or refurbished solar panels will establish and nurture a thriving second hand solar panel market. This could be implemented using a similar type mechanism to the Renewable Energy Certificates (RECs) that have successfully encouraged the uptake of rooftop solar in Australia.
- Implementing recycled content requirements for products used on government or other large solar energy projects to drive commercialisation of products manufactured using recycled content.
- Support for logistics companies to explore and integrate transport of decommissioned solar panels on freight networks, to improve efficiency.
- Implementing locally (Australian-made) content requirements for government contracts, energy, infrastructure or other projects to drive commercialisation and investment in local business and manufacturing capabilities. A successful example of this working is Tindo Solar in South Australia. Recovered materials from solar panels in Australia can be used to manufacture new solar panels, other building materials or electrical goods for example.
- Import tariffs on PV panels which can be used to fund product stewardship activities in line with a circular economy. Such a tariff should be broadly applied i.e.; not dependent on quantity/volume of panels being imported but on each panel regardless. A sliding scale could be considered; this will need



further engagement with industry to arrive at an appropriate and acceptable calculation.

- Supporting independent industry-led organisations like Circular PV Alliance through grants and/or other mechanisms, to develop and deliver innovative solutions to support solar energy circular economy stakeholders as the market matures. This could be in the form of appointing CPVA to oversee/implement stewardship activities, policies or schemes.
- Implementing better quality standards for imported solar panels. Despite Australian quality standards, some inferior quality PV panels still make their way into the Australian market. This has created a substantial legacy waste issue which is well documented in the media and well known to consumers. Randomised quality testing of imported solar panels will prevent the common practice of inferior quality batches of panels being 'hidden' behind a quality set of panels provided by importers/manufacturers for quality testing.

The circular economy for solar energy, and solar panels in particular, offers a myriad of commercial opportunities whilst creating a more sustainable solar energy industry as a whole. Australia is well placed to build a thriving circular ecosystem for solar energy, which would see mutual benefits across domestic manufacturing, logistics and waste management industries. CPVA fully supports a circular economy for solar energy and is happy to participate in any further work the Productivity Commission may undertake to this end.