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Submission for the Opportunities in the circular economy inquiry

Introduction

We contribute to this enquiry as a business operating in the photovoltaic (PV) waste management space in Western Australia since 2018. Our business focus is the capture and reuse of functional solar panels, storage batteries and other system components. Our activities fall into the category of closing the loop, and we hope that our submission provides a real-world insight into the viability of a second-life market for used PV equipment.

Solar panels are made to last 25+ years, but research shows many are decommissioned on average, after only 8 years. It is indicated that 80% of panels that are taken down from rooftop systems are still functional[1], this aligns with with what we see coming through our door. With a number of future high PV waste areas identified in major Australian cities by a recent UNSW study[2] capturing functional panels prior to disposal or recycling would best align with circular principles. Reuse is a priority to reduce valuable mineral extraction, finite resource consumption and emissions embedded in creation and recycling processes, whilst also keeping waste and pollution out of our environment. The academic focus around PV sustainability has been on technology which enables recycling and dismantling, with plenty of descriptive data but a lack of applied solutions[3].

'Most research into circular solar solutions focuses on the technological aspects of PV recycling and dismantling' ~Zahra Amrollahi Biyouki et al. 2024

Business Operations

The WA Solar Recycling founder recognised the coming PV waste problem and identified the potential for a second-life market for these products. We offer disposal of panels, specific batteries, inverters and other components to the public, businesses and councils. After assessment, functional panels and batteries are sold for domestic retail and export. Since opening the business has saved over 42,000 solar panels from landfill. The retail businesses we work with market second-life panels to the off-grid market, presenting an affordable solution for a variety of applications including caravans and RV's, 4WD, tiny homes, rural properties, agricultural applications such as water pumping and in mining for remote communications.

The business is currently fully privately funded, demonstrating the viability of the second life market. In order to scale operations or introduce in-house recycling in addition to reuse operations, funding would be required.

Disposal fees for panels were recently introduced, which are in line with charges seen nationally, and reflective of the costs involved in our operations. In response to this we have had some potential customers advise they will take them to landfill instead. Many consumers are reluctant to cover sustainable waste management practices. As local councils are responsible for waste management, we introduced a system whereby panels can be dropped off by residents at a local waste management facility and held until a viable

quantity for transport to our depot is reached (approximately 80 panels). We then pay the council for functional panels and charge for non-functional. This aligns with WA Waste Authority's *Waste Avoidance and Resource Recovery Strategy*[4] by developing material recovery pathways and is available to any council across WA.

Product stewardship schemes have been suggested, which would put the onus on producers to deal with end-of-life. However, unlike the successful beverage container deposit scheme, dealing with solar waste is far more complex with very limited recycling options available. Western Australia currently has no infrastructure for efficient panel recycling capable of separating usable individual materials. Inefficient and uneconomic recycling options have been suggested to reduce the motivation of manufactures to cooperate[3]. Investment in the latest and most efficient recycling equipment, currently in prototype testing in NSW[5], offers the greatest potential solution for this problem, but would require funding.

Our Observations

During operations we have recognised a mechanism contributing to the early decommission of household rooftop solar. The current small-scale renewable energy scheme (SRES) and small scale technology certificate (STC) rebates offers some credit for upgrading systems, which combined with modern solar panels becoming more efficient, presents an appealing incentive for early removal of still functional panels. There appears to be minimal research on this impacting PV waste generation at present.

There is still a stigma around second-life products and a mindset shift within the public is required to maximise circular economic potential. Government funded education campaigns could support this shift[3].

Unregulated PV export to lower-income countries presents a worrying loophole which could facilitate disposal of defunct panels in nations without suitable or sufficient waste management infrastructure[9]. Transferring the end-of-life management over seas could create an issue paralleling those observed within textile[6] and plastic waste export[7]. As a high-income nation we have a responsibility to ensure we capture these products. A solution to this issue would be a re-certification system to ensure products are safe to use. This process also guarantees the quality of second-life products entering the domestic market. Regulatory requirements, standards and the CEC approval list are constantly changing and need to accommodate functional used products to expand market potential and secure circularity in the PV sector.

Ongoing and ad-hoc government investment will be required in our industry and others, in public education campaigns and infrastructure to actualise circular goals identified in federal and state level waste management strategies. Whilst one off grants have been issued such as the WA Government E-waste Infrastructure Grants[8], ongoing funding opportunities would encourage continued innovation, the creation of new businesses stepping up to fill the gaps and new employment opportunities. The one-off grants offered by the WA government aligned with the introduction of the e-waste disposal to landfill ban. It felt like somewhat of a token gesture to demonstrate government action and now they have done their bit they have washed their hand of this problem and moved on. This does not demonstrate an ongoing commitment to develop a circular economy in our state.

We hope our perspective and observations as a sustainability focused business are helpful to the commission and we look forward to the outcome of this inquiry.

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