

Powering Melbourne Zoo's Sustainability Message with Printed Solar

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CSIRO is developing new materials and processes for the manufacture of printed solar films. Unlike conventional silicon solar panels, printed solar is flexible, lightweight, semi-transparent, easy to install and is manufactured using processes that offer the prospect of large scale, low cost and bespoke design. Printed solar films are a relatively new and an exciting advance in solar power generation. The potential for this technology to transform solar power generation is yet to be realised.

Zoos Victoria and CSIRO partnered together to develop and test the integration of a printed solar film prototype into an existing shade structure adjacent to the Butterfly House at Melbourne Zoo. The design of the prototype harnessed and highlighted the unique features of the technology, thereby maximising its visual impact.

This multi-faceted project involved three main stages; the design phase, the construction phase and the implementation phase.

During the design phase, three design ideas that had been formulated by an industrial designer were presented to Zoos Victoria. All three design ideas aimed to capitalise on printed, flexible solar films' unique physical attributes. The final design chosen by Zoos Victoria is depicted in Figure 1.



Figure 1. CAD drawing of Zoos Victoria solar prototype.

During the construction phase, the technical and logistical challenges associated with integrating printed solar films into existing infrastructure were considered. Material compatibilities, lamination requirements and electrical connections were considered and developed. In addition, a structural



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engineer was engaged to advise on the physical connections required to safely suspend the solar prototype from the existing structure. 80 meters of printed solar film was printed using roll-to-roll methods; this film was then encapsulated to protect it from degradation due to water and oxygen. The electrical connections of the solar film and hardware to house these electrical connections was devised. Hardware to connect the prototype to the original structure was designed in consultation with the structure engineer.

The implementation stage involved working with Zoos Victoria grounds staff and an external “at heights” engineering company to physically install the prototype. The prototype then needed to be connected electrically on site.

The prototype represents the first time CSIRO has integrated this technology in a large-scale, real-world application. The poster will include a discussion on unforeseen complications that were encountered along the way.