

SunSHIFT Webinar Summary

MAY 2019



Australian Government
Australian Renewable
Energy Agency

ARENA

Since April 2017, ARENA has provided \$2.1 million in funding to assist SunSHIFT develop the world's first megawatt-scale prefabricated, modular and movable solar power solution for the off-grid mining sector.

The project involved the design, manufacture, installation and deployment of a 1 MW SunSHIFT solar module at a mine site in remote northwest Queensland. SunSHIFT's redeployable solar solution assists off-grid mines switch to renewable power generation. The redeployable asset helps mitigate the owner's risk of an asset outliving the life of a mine and means decisions about long-term investment are easier to make.

Find out more about SunSHIFT's deployable solution [here](#).

Listen to the webinar [Hybrid Power for Off-Grid Mining: Knowledge Sharing](#) here.

(*please note that minor technical difficulties were experienced at the beginning of this webinar recording)

On 1 May 2019, SunSHIFT General Manager Will Rayward-Smith presented a Knowledge Sharing webinar on lessons from the deployment of 3 MW of solar PV, including the ARENA-funded deployment and an additional 2 MW deployment. The webinar introduced the details of the project to the audience, walked them through a virtual tour of the site and shared key lessons. This summary provides a link to the webinar recording and audio transcript, presents key takeaways from the webinar and summarises the Q&A session.

Key takeaways

- The SunSHIFT solution includes three 1 MW AC blocks of fixed angle SunPower cells using ABB string inverters over 6 Ha of land, fibre optic gas power station control system integration, and 11 kV step-up transformer electrical overhead powerline integration.
- The SunSHIFT system generates 6,420 MWh (P50) per annum of electricity to deliver 4,000 - 6,000 t CO₂e of greenhouse gas emissions abatement.
- Key lessons learnt:
 - Remote work
 - Clarify the safety management system to be followed, where Principal Contractor obligations for the site lie during construction and operation phases, and which legislative Act(s) are applicable to the works.
 - Contract development
 - Ensure that design, construction and commissioning phases are detailed within the energy offtake agreement.
 - Include a base design document within the contract and have a process for managing client required design variations and associated cost implications.
 - Risk avoidance
 - Trial exercises with a piling rig at the site will help determine actual piling productivity rate, equipment requirements, and confirm the process.
 - Consider the inclusion of a clause to manage in-ground risk, particularly if there is only a client-provided geotechnical report.
 - Good construction practices
 - Break down the project into work packs to ensure efficient time management and improved productivity.

Q&A Session with Will Rayward-Smith

Q: How did the panels / frames survive the five relocations? What was the failure rate?

A: Current-voltage (I-V) sweep testing was performed on a large sample of the solar panels before and after the relocations, with zero failures and no detriment to the output identified. This came as no surprise because SunSHIFT had done significant work with SunPower to ensure the mounting system maintains the integrity of the panels. This is why SunPower can maintain their 25 year warranty with SunSHIFT across five redeployments.

Q: How many solar module manufacturers, and specifically who, maintain the validity of the warranty after redeployment?

A: SunPower is the only supplier to offer a warranty to SunSHIFT for 5 relocations and that's due to both the uniquely robust design of their panels and the work that SunSHIFT did to design and test a mounting system for the panels. Any factor of importance for any party considering a redeployable or recoverable asset, is to ensure that there is a comprehensive set of warranties that specifically address relocation. That should be a key consideration for asset owners and financiers.

Q: How well to the panels manage in the extremely hot, dry and dusty conditions?

A: It was a key consideration to understand the maximum temperatures of the sites that this solar farm will be installed on as this affects the electrical output of the solar panels, the ventilation required on the transformers and the overall life of the equipment. This was all addressed in the design, revenue modelling as well as the contacts.

This site doesn't include batteries at this stage as it is integrated with the EDL gas power station. As you look to the later stages of an incremental hybridisation pathway, you would certainly be introducing batteries.

Q: How long did deployment take? How long did relocation take?

A: In terms of assembly on site, SunSHIFT had the crane crew of three people lay out all of the modules (that's the solar panels, steel structure and DC wiring looms) in a three week period. In terms of relocation, as shown in the time-lapse footage, a 50kW array was relocated five times in a single day. Ultimately, the system is as fast to redeploy as it is to deploy.

Q: What infrastructure and equipment was required? Did the ground require compaction prior to deployment? Were the cranes specialist cranes?

A: SunSHIFT has done a lot of work to design a system that only requires standard equipment and that can be installed by a range of equipment. The footage shows the modules being craned in by a standard crane that was available on site already, but off-site SunSHIFT tested installing the modules with a crane, excavator and tele-handler, on much rougher terrain than here.

In terms of compacting the soil, it's not required for the foundations of the solar farm but might be considered on other sites for vehicle movement. The solar farm foundations can be screw piles, driven piles or even concreted piles if necessary, each site will need some level of geotechnical investigation. Part of the reason SunSHIFT tested installing the panels with an excavator was to confirm the possibility of installing the modules on soft ground.

Q: What is the cost (\$/kWp) to deploy the SunSHIFT modules? What does the minimum time between initial construction and redeployment need to be to make redeployment economical?

A: The solution is certainly cost competitive with fossil fuel and can offer flexibility. In order to provide a detailed response SunSHIFT would need to know a few details about the particular site. If any audience members, miners or IPPs are seeking a costed proposal, please contact SunSHIFT directly.

For more information on the SunSHIFT project, please contact:

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