

A remote and rewarding solar project

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At an Indigenous community in the Northern Territory, a 20.9 kilowatt solar installation is powering a town of more than 60 residents. The installation was the winner of the 'Best design and installation of a stand-alone power system greater than 10 kilowatts category at the 2012 Clean Energy Week Awards.



Consulting the Raymangirr community was an important aspect of the project.

Raymangirr is an Indigenous community located in the East Arnhem Region in the Northern Territory, and is home to over 60 permanent residents. The Raymangirr community contains six houses, a school, a clinic and a workshop, all connected to a 20.9 kilowatt (kW) Bushlight solar system.

Before Bushlight

Power for the community used to be supplied by a 22.55 kilovolt, three-phase diesel generator, which ran from 6pm–8am, when diesel was available.

While the school was connected to a renewable energy system, the supply of power was unable to run refrigeration and the charging of the school's laptops, in addition to powering the building.

With these challenges in mind, a new solar photovoltaic (PV) system was designed to replace the diesel generator supply and to provide the maximum possible usage of solar energy.

Technology specifications

The 20.9 kW system, developed by Bushlight and installed by Inland Electrical, has an average load capacity of 43.6 kW hours per day.

The system features 110 Suntech solar panels, one Selectronic 18 kW inverter and three Magellan Power charge controllers.

The system also features a 2,400 ampere-hour battery bank containing 120 Sonnenschein cells, and seven Bushlight household energy management units.

System design and installation

The Raymangirr project required unique solutions to local environment challenges to ensure successful delivery.

For example, the control enclosure was entirely manufactured from powder coated aluminum, specifically designed to withstand the harsh weather conditions in the Northern Territory. It houses the main system's components, such as the regulator and the electrical switchgears.

To accommodate these components correctly and to maximise the expected life of the components, the enclosure was designed to minimise heat build-up while maintaining ingress protection from water, dust and vermin. The inverter sits alongside the control enclosure on a plinth for easy access and heat control. The whole system is contained within a thermally-efficient shed that features a cyclone-resistant roof.

The roof-mounted PV array is carried on this tropical roof, reducing the overall footprint of the installation. The shed is divided into an equipment room, a battery room and a generator room; all with the appropriate controlled level of personnel access.

The performance monitoring of this site is primarily done through the data collection functionality of the inverter. The inverter records internal parameters such as PV current, battery voltage, temperatures and loads. The inverter stores data at selected 15-minute intervals.

Each of the connected buildings has an energy management unit or energy meter fitted to control demand-side management. This ensures use by each connected building is monitored and splits the power into three discrete buses – essential, discretionary and generator only. The intent of this is to provide a staged shutdown of supply if the power use exceeds the allocated capacity.

Refrigerators, and lights are installed on the essential bus, while the balance of the lighting load, the ceiling fans and power outlets are connected to timed circuits on the discretionary bus.

Community engagement

As the primary contractor, Bushlight undertook significant community engagement activities to ensure the Raymangirr community was aware of the work ahead, and to gauge the energy usage of each household.

The engagement activities, known as Community Energy Planning, included the development of household-specific 'daily energy budgets' that are agreed to by the residents of each house.

The daily energy budget is an amount of energy provided to the house and managed by residents via the energy management unit. The user-friendly interface allows residents to see how they are tracking against their energy budget.



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Project name: Raymangirr Solar Installation

Location: Raymangirr, East Arnhem Region, Northern Territory

Nearest capital city: Darwin

Demographic: Rural

Owner and contractor: Bushlight

Installer: Inland Electrical

Capacity: 20.9 kW

Commissioned: November 2011

Technology details: 2,400 Ah battery bank (120 x Sonnenschein cells), 20.9 kWp array (110 x Suntech panels), 1 x Selectronic 18 kW inverter and 3 x Magellan Power charge controllers, 7 x Bushlight household energy management units