Light and Life in the Bush

BUSH LIGHT

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Ngarantjadu

The Setting

Ngarantjadu is located in the Fitzroy Region of the West Kimberly, 400 km southeast of Derby. Ngarantjadu—Tjillji Bore Aboriginal Corporation is the official name for this community, however Ngarantjadu is commonly used.

Ngarantjadu was established in 2003. The original location of this homeland was about 25 km south around the small lake known as Ngarantjadu, people moved to the current location to access better water supplies.

This case study looks at the Bushlight Household Renewable Energy (RE) System that was installed in September 2004.

Bushlight's Approach

Bushlight has established a process for use with homeland communities to plan and manage their energy services.

This process involves a series of facilitated workshops and is called the Community Energy Planning Model (CEPM). Bushlight regional staff work with community residents through this process.

The process informs residents and helps them to choose and manage energy services that are best for them and that will help them achieve their aspirations.

Residents are provided with technical and other information so they can choose sustainable – that is, affordable and reliable – RE services that will meet their current and future energy needs.

In making decisions about energy services, residents take into account the technical and financial limitations that are associated with their various energy service options.

At 12 months Bushlight undertakes a CEP Review with the community to obtain feedback on Bushlight services and assess community outcomes

Energy Service Goals

During the CEP Ngarantjadu community members identified a number of energy service goals. These include:

- Replace the old RE pack equipment
- Power the new “homemaker” Bough Shelter
- Supply power for existing shelters
- Supply power for planned bush rehabilitation camp for young offenders

The community expressed a wish to replace their AEC solar pack as it no longer provided enough power to meet the community’s need. The community also used a generator to provide power for 12 hours a night and hoped that a new RE system would alleviate the burden of diesel power generation.

Connecting the new ‘homemaker’ shelter to power and providing the existing shelters to accommodate lights, small appliances and fans would also help raise the standard of living on the community.

In negotiation with Department of Justice the community wishes to establish a bush rehabilitation camp for young offenders. Power would be an essential component of setting up this camp and providing amenities.

Existing Energy Services

In the initial discussions it was determined that the community used:

1. RE for small DC loads for refrigeration and lighting
2. Diesel for power generation and transport
3. Firewood for cooking
4. Solar Hot Water Service

Ngarantjadu had a legacy system providing DC power for refrigeration and lighting. This RE system supplied the community with approximately 2.4 kWh in the wet season and 2.0 kWh in the dry season. Reticulation was to via extension cords.

Diesel was being used for power generation. Power was reticulated to buildings via extension leads. The 5 kVa BTR genset used around 2,500 litres of diesel a year at $1.20 per litre at the time of the initial CEP. The community made payment for diesel and repairs and maintenance by direct debit through their Community Development Employment Program administered by Kurangal Resource Agency. Kurungal would transport a 44 gallon drum to the community.

Ngarantjadu residents use firewood for cooking and space heating. Timber is readily available around the community.

The community had access to a solar hot water service situated at the ablution block. This was not working at the time of the planning process.

Energy Services Planning

During the Energy Services Planning stage of the CEPM, Bushlight provides education about energy service options and finds out about the community’s energy needs and issues, social structures, mobility, household members and daily activities. Bushlight looks at all the energy sources available to the community in order to assist people with making decisions about what would be the best energy options for their homeland.

The end result of the process is a Community Energy Plan, a document that details the most appropriate sources and uses of available types of energy. This document includes details of the proposed RE system.

Bushlight developed the Ngarantjadu Community Energy Plan in consultation with the community and Kurungal Resource Agency.

Ngarantjadu Community agreed on the following:

- Firewood would be continued to be used for cooking
- The diesel generator would provide back-up power during the wet season and run other heavy load appliances
- Thermal solar HWS
- The Bushlight RE system would provide power for refrigeration, lights, fans and entertainment appliances(TV/video/stereo) to the three shelter houses and two street lights.

Ngarantjadu residents understood that using RE would have limitations. They were particularly aware of this in regard to their use of the legacy RE system. They were happy to continue using generator power for heavier electrical loads and also in extended cloudy or wet weather. They agreed to use power from the RE system to run the washing machine only when the batteries were fully charged or trade off power needed to run the washing machines with another power load.

Bushlight staff and Ngarantjadu residents discuss their energy plans

Major System Component Specifications

PV Array	1.5kWp (20 x 75W)
Battery Bank	960Ah @ 24VDC
Inverter	2.2kW @ 40°C

System Specifications

A Bushlight Household RE System has been located inside the existing AEC solar pack and is designed to provide an average daily DC load of 2.3 kWh/day and an AC load of 1.7 kWh/day. The photovoltaic arrays are installed on the roof of the solar pack. The legacy PV array installed on the solar pack was reconnected and incorporated into the Bushlight system.

Bushlight systems power non-critical appliances via "discretionary" circuits and critical appliances via "essential" circuits. To attempt to ensure continuous power to critical appliances (like fridges and freezers), power to discretionary circuits is cut when the battery charge drops below a predefined level. In this installation DC loads were assigned to essential circuits. DC appliances included a freezer, fluorescent lighting and HF radio.

Costing Information

The total installed cost of the Bushlight Household RE system was $121,303. This figure includes costs associated with two service visits in the first year and additional works, i.e. reticulation connecting the generator, additional house wiring and lighting and energy management fittings and the restoration of the existing DC legacy system on the ablution block to provide lighting to this building.The Remote Renewable Power Generation Program (RRPGP) provided a rebate of approximately $48,024 on the total cost.

The total diesel offset by the provision of 24 hour RE power to the community is equivalent to $8,199 litres per annum. This equates to an annual cost saving of approximately $12,299 a year and greenhouse gas abatement of 23.78 tonnes per annum.

Community Service Agreement

The Community Service Agreement (CSA) is an agreement between the community, its support or resource agency, the agency funding maintenance of essential services and Bushlight where each party agrees to work together, in a spirit of cooperation, to maintain and sustain the energy services. The CSA clearly articulates the roles and responsibilities of each party as well as describing maintenance and repair arrangements.

As of the 1 July 2006 Bushlight will be responsible for the maintenance and repairs of all Bushlight RE Systems. However the actual delivery mechanism will be determined by local circumstances. Existing CSAs will be renegotiated to include this new arrangement.

The CSA also covers the collection of user contributions to pay for future maintenance carried out by the Resource Agency.

Post Installation Community Training

Community members with Bushlight resources

Community Training was delivered to Ngarantjadu residents with the aid of a pictorial based User Manual and their RE systems. This training included

system operation and maintenance, basic troubleshooting and energy use management. Bushlight training was designed to be broken into stages to allow time to experience system use and operation.

Raymond Peterson, a community leader, was trained by Bushlight in *Operation and Maintenance* at a Level One standard with this system. Raymond was expected to assume the prime responsibility on behalf of the community.

During the CEP Review, John Schmidt, Regional Manager described:

> Raymond "was not interested in all sorts of fancy trouble shooting and energy management training, he was just so delighted that he could press the green button and the lights come on!"

It was expected that other young community members at Ngarantjadu would be trained at a later date to support Raymond. It was also expected that Level One training would continue into *Trouble Shooting and Demand sit Management.* This never eventuated, for reasons outlined below in the community outcomes section.

Service and Maintenance

All inspections, reports and data logging analysis clearly identify that the Bushlight RE system at Ngarantjadu is in good working order and carries a small load.

The system has never worked to a maximum capacity and/or failed so there has never been an unscheduled breakdown visit. The commissioning identified a number of minor defects and they were rectified by Mambulanjin during the six month service warranty visit in May 2005. Mamabulanjin also carried out the 12 month service warranty in December 2005.

Community Outcomes

The community has not been occupied since the Bushlight RE systems was installed in September 2004. Raymond Peterson and community members stated during the CEP Review that they have not lived permanently at Ngarantjadu during this time, but have accessed the community regularly.

Bushlight Regional staff have carried out regular post install visits, data logs and/or install modifications. Mamabulanjin have carried out the 6 and 12 month service warranty visits and CAT service/maintenance contractors have been out to the community carrying out services to the Genset. All confirm that Ngarantjadu has not been occupied during these visits.

Ngarantjadu families have advised Bushlight that they will not be returning to live on their homeland on a permanent basis, but rather use it only as a "visiting" outstation. The main issue for the community is that of lack of transport and ongoing support to set up the bush rehabilitation camp for their youth at risk.

Under the terms of the Community Service Agreement signed by Hitler Pambu (Ngarantjadu community leader) in 2003, Bushlight agreed to maintain the Bushlight system for at least one year should the community be unoccupied, but beyond that time Bushlight would take steps to relocate the equipment to another community that is lived in all the time.

Following numerous meetings it has been decided that the Bushlight system currently located a Ngarantjadu will be relocated. The local Indigenous Coordination Centre has given approval for the system to be installed at another community with similar energy needs and in the same region. Bushlight are currently in negotiations regarding the proposed site for the Bushlight system to be installed.

Even after the removal of the Bushlight equipment, the Ngarantjadu outstation will be left with a better power system than it had before 2003. The buildings are now wired up for electricity and the generator will be permanently connected, ready for immediate use. The community has indicated that they will continue to use the outstation for respite and a place they will regularly visit..

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