



Sandridge

The Setting

Sandridge is a small community 17km east of Borroloola. The community is situated on a ridge of sand on the McArthur River floodplain. In the wet season the location is not affected by flooding. However, the access road to Sandridge crosses the McArthur River and the river's floodplain. This means that the road is impassable every wet season, usually for about two months.

The community was established in 1996 by traditional owner Nancy McDinny, her husband Stewart Hoosan and their extended family. The families were seeking a quieter place to live where they could run cattle. This provides stock work for the young men of the community. Community numbers swell during the school holidays with the influx of the school aged children.

Stuart and Nancy are both successful artists and work from both the arts centre in Borroloola and at Sandridge.

When Bushlight began working with the community in 2004, Sandridge had one house and one shelter. A Bushlight household system was provided to power the older house and shelter. This system was commissioned in October 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 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.

12 months after installation Bushlight undertakes a Community Energy Plan (CEP) Review with the community to obtain feedback on Bushlight services and assess community outcomes.

Energy Service Goals

The people of Sandridge hoped to achieve the following goals through access to a reliable, sustainable power supply:

- To run a large freezer so a whole butchered beast could be safely stored
- To reduce the frequency of trips to Borroloola to buy diesel fuel
- To spend less money on diesel

Existing Energy Services

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

- Wood for cooking and space heating
- Gas for cooking
- Solar water heaters
- Diesel for power generation and transport



Sandridge's Generator

Wood is plentiful around the community, and open fires are used for night time warmth and cooking during the dry season.

In the wet season, due to the difficulties of keeping sufficient wood dry, cooking is done on a gas burner inside the house. A nine litre gas bottle is used, lasting about two months and costing \$25 to refill in Borroloola. The community are happy to use gas but at this stage, experience the inconvenience of owning only one bottle.

Before the Bushlight RE system was installed a diesel generator was used to produce electricity for about 12 hours every night. This took 20 litres of diesel per night. When people needed to use the freezer (such as after they had slaughtered a beast) or do a lot of washing, the generator was used during the day time too. The community spent approximately \$11,000 on diesel a year, including transport costs of diesel to the community. Before the wet season, Sandridge residents had to stock up on diesel before the rain restricted access to the community. Five 44 gallon drums, about 1000 litres, of diesel had to be stockpiled, creating a financial burden for the community. Sometimes during the wet season Stewart has had to walk from Wandangula (about 2km away) with diesel in a wheelbarrow or on a horse.

Sandridge has a Lister three phase 15kVA generator wired as single phase which provides about 7.5kVA.

The community has an essential services agreement with Borroloola-based resource agency Mabunji Aboriginal Resource Association Inc. (Mabunji). This agreement covers the provision of water, sewerage, power services and other essential services and infrastructure, such as housing maintenance and generator servicing.

The community pumps water from a bore about 15km away as the water at the site is of poor quality. This system sometimes fails due to horses, pigs and buffalo breaking the pipeline to get water in the dry season.

Energy Services Planning

During this 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 to assist people with making decisions about energy.

The end result of the process is the CEP, a document that details the most appropriate use of available types of energy. This document includes details of the proposed RE system.

Bushlight developed Sandridge's Community Energy Plan in consultation with the community and Mabunji.

It was decided that a mix of energy sources would be used at Sandridge:

- RE for refrigeration, lights, fans and entertainment equipment. The washing machine would also be run from the RE system when enough power was available.
- Firewood for cooking
- Gas for cooking
- Diesel for heavy load appliances such as power tools and musical instruments and the coolroom.
- Solar thermal hot water heaters

As it is common in the Borroloola area to have several cloudy weeks in a row during the wet season, it was anticipated that the generator would be needed to back up the RE system during this period.

The system has been designed so that the peak load could occur in the wet season when refrigerators were drawing a greater load in the high ambient temperatures, combined with low insolation.

A number of children visit the community at weekends and school holidays, but this was not expected to significantly affect the design load because the children spend most of their time outdoors.

February is the worst month for the ratio between demand and RE availability. While it is frequently overcast, high temperatures mean refrigerators are cycling more often and fans are used frequently. The system has been designed to accommodate this situation.

No standby loads were included (for televisions, stereos, etc) as community members agreed to switch appliances off at the wall.



Community Energy Planning at Sandridge

System Specifications

The system is under a verandah at Stuart and Nancy's house, with the photovoltaic (PV) panels on a freestanding frame next to the house. This position was chosen for its lack of shade. Power has been reticulated to the shelter via a new

underground cable. A switch at the shelter allows the switching from the RE system to generator supply. Additional works also include an extension of the verandah roof and construction of a slab for the enclosure which houses the battery and user interface.

Bushlight systems power non-critical appliances via "discretionary" circuits and critical appliances via "essential" circuits. To ensure continuous power to critical appliances, power to discretionary circuits is cut when the battery charge drops below a predefined level.

The contract for the installation of the Bushlight Household RE systems at Sandridge was won by Mabunji. The staff member who performed the installation work is accredited with the Business Council for Sustainable Energy (BCSE). Two CDEP workers from Mabunji assisted with installation works. Mabunji is the first resource agency in the Northern Territory to install a Bushlight RE System under contract to Bushlight.



Major System Component Specifications

PV array	3.0kWp (40 x 75W)
Battery Bank	2400Ah @ 24V
Inverter	2.2kW @ 40°C
Charge controller	2 x PL60 (2 x 60A @ 24 VDC)

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. At Sandridge, community members working on CDEP (Community Development Employment Program) each contribute \$10 a fortnight for future RE system maintenance. This money is held and administered by Mabunji. There are currently 17 CDEP participants in the community.

Post Installation Community Training

Community Training was delivered to Sandridge 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.



Bushlight staff deliver RE system training to Sandridge residents

Service and Maintenance

Residents at Sandridge are fortunate in currently having access to a BSCE accredited RE technician. This staff member is familiar with the community and is accustomed with the Bushlight RE Systems. Mabunji staff check on the systems regularly while visiting, and are on call in case of any problems with the power supply.

While Sandridge residents have been sure of a quick response to problems in the dry season, access problems can lead to delays during the wet season. On one occasion an array breaker was left off in the wet season, leading to power losses. As the river was in flood, it was two weeks before Mabunji could visit and fix the problem.

“Nancy had story about older kids helping the younger kids – she said to me that the night before Bushlight was coming the kids were looking through the user manual, the little kids had problems understanding the language and pictures, the older kids were helping them.”

CEP Review

Community members reported another problem to Mabunji in late August 2005. After noticing that less power was available, residents had checked the system and found another array breaker off. They switched it on but it went off again the next night. Mabunji and Bushlight worked together and resolved the problem, found to be caused by loose wires in the circuit breaker. While this was not the sort of problem residents could diagnose, their response to it indicated that training had given them the confidence to troubleshoot and describe problems.

Sandridge residents told Bushlight staff that the user manual was easy to read and understand, and had given them confidence to troubleshoot any problems.

Community Outcomes

The community’s major reason for switching to RE power was to save some of the money they were spending on diesel, and this has been achieved. Community members have also found they are experiencing other benefits too, including the convenience of 24-hour power. While this makes life at home more comfortable, there are also flow-on effects which benefit Stuart and Nancy’s art business.

Annual diesel costs for the family have been reduced from \$10,000 to around \$1,000, and Nancy commented to Bushlight staff that they were now able to buy more food. Keeping that food fresh is now easier with 24-hour power to run freezers and refrigerators.

Nancy and Stuart also told Bushlight that having lights available all day and night made it easier for them to paint at home, as they could paint inside at night or during wet weather. With their work going into exhibitions all over Australia, these two successful artists like being able to paint at home as well as at the art centre, particularly when a deadline for an exhibition is approaching. Nancy also commented that she appreciated having greater access to the washing machine, as it was important to have clean clothes when visiting town or working at the art centre.

Community members are impressed with the reliability of the system. Stuart said the Bushlight system coped well with the influx of visitors during the wet, despite cloudy weather.

Stuart's words about wet season power supply were:
"When the river is over the power lines, Wandangula [the next closest community to Borroloola from Sandridge] has no power, but Sandridge has power [when the water is up in the river the mains power gets cut – Wandangula is on mains power]."

Bushlight CEP Review



Stuart, Nancy and grandchildren in front of the Bushlight System

Contact Bushlight

Bushlight Administration
PO Box 8044, ALICE SPRINGS NT 0871
Tel (08) 8951 4344, Fax (08) 8951 4333
enquiries@bushlight.org.au