



## Kurraya

### The Setting

This case study looks at Kurraya, a small Warramungu community east of Tennant Creek. The community consists of 5 full-time residents and up to 10 regular visitors. The community have two houses and a shed.

The community have a vegetable garden, fruit trees and chickens. They have a broad aim to develop their infrastructure sufficiently to enable family currently employed in Tennant Creek to be able to sustain themselves financially in the community and therefore to be able to move to the community permanently. Both the core group of permanent residents and the family based in Tennant Creek work toward this aim by undertaking development projects on weekends and during work holidays.

Projects include setting up the communities old caravans and ablution blocks for visitor accommodation and erecting shade and out door living areas. The community also want to work with other nearby communities to set up a cattle enterprise.

### Bushlight's Approach

Bushlight has established a process that assists homeland communities plan and manage their energy services. This process is called the Community Energy Planning Model (CEPM).

Over several meetings, Bushlight regional staff meet with community residents and discuss the energy services available to the community and how these services can be used by the community to achieve their aspirations.

These interactive meetings and discussions are an exchange where the community provide important information to Bushlight about their community so that Bushlight can provide relevant information to the community to raise their awareness and knowledge of energy. The community use this awareness and knowledge to make decisions and to plan sustainable – that is, affordable, consistent and reliable – energy services that will meet their current and future energy needs.

## Existing Energy Services

During the initial meetings with Bushlight, it was established that the community had the following energy resources available:

- Wood
- Solar hot water heaters
- Solar bore pump
- Gas
- Diesel

Wood was plentiful around the community and is used for warmth in outside fires, an inside combustion stove and occasional outside cooking. Both houses were fitted with solar hot water heaters.

The bore that is the primary water supply for the community is equipped with a RE pump. This had already been operating reliably for many years. Although the bore water is potable and of good quality, rainwater tanks have been fitted at both houses in addition to the recently upgraded 25,000 L bore water storage capacity.

Both houses are equipped with gas stoves and the community used gas for cooking. Julalikari Council Aboriginal Corporation (JCAC), the community's primary service provider, exchanges empty gas bottles on behalf of the community. Both houses generally have spare bottles, however, so gas supply is not an issue. Refilling gas bottles was costing around \$120 each

Electricity was generated using a 14kVA diesel generator which was operated for approximately 12 hours a day, costing the community in excess of \$15,000 a year.

## Energy Service Goals

The Kurraya community considered a reliable and less costly power supply an important part of the development plans for their community. Reducing diesel costs would free up money for other purposes including community projects.

24-hour power was also considered important as it would enable the use of refrigerators and freezers to store food, making life more comfortable at the community. Entertainment equipment such as television and stereos could also be used creating a

community lifestyle more attractive to younger family members.

## Energy Services Planning

As part of the CEPM process, Bushlight and the community looked at all the energy sources available to the community and discussed the community's energy needs. Other factors such as population, social structures, future plans and daily activities, that might affect energy use in the community were also discussed.

The CEPM process culminated with the community making decisions about the most appropriate forms of energy to use in the community and the development of a 'Community Energy Plan' or CEP. The CEP is a document that details all the decisions made throughout the CEPM process.

The Kurraya community made a number of decisions regarding the use of energy in the community:

- RE energy would be used for refrigeration, lights, fans, washing machines and entertainment appliances
- The diesel generator would be used for power tools, kitchen appliances, air conditioners and hot water boosters
- Gas and firewood would be used for cooking



*CEP planning meeting at Kurraya*

## System Specifications

A Bushlight household renewable energy (RE) system was installed at each of the two houses at Kurraya. One system was installed under the 'new house' veranda and the other in an existing shed

### Bushlight RE system—Major System Component Specifications

RE system	PV array (kWp)	Battery bank (Ah @ 24V)	Inverter (kW @ 40°C)	Charge controllers (A @ 24 V DC)
Old house	1.92 (24 x 80W panels)	1400	1.5	100
New house	2.24 (28 x 80W panels)	1400	1.5	100

near the 'old house'. With the system installed remote from the old house, it was necessary to install a 'Remote User Interface' to enable the system metering to be monitored conveniently. For both systems the photovoltaic panels were installed on the roofs of the houses. These systems were commissioned in October 2004.



*Remote User Interface at the 'old house'*

The central community generator was also connected to each system as back-up and to supply 'generator only' loads at each house.

Each of the Bushlight RE systems provide power to non-critical appliances (eg. fans and TV) via "discretionary" circuits and to critical appliances (eg. fridge and lights) via "essential" circuits. If the battery bank charge falls below a predefined level, the power to any discretionary circuits is cut while maintaining a continuous power supply to critical appliances.

### Costing Information

The total installed cost of the two energy systems was \$180,900. This figure includes costs associated with two service visits in the first year and additional works such as changes to the wiring of each house and the installation of efficient lighting and energy management hardware. The Australian Greenhouse Office 'Remote Renewable Power Generation Program' (RRPGP) provided a rebate of approximately \$69,996 on the total cost.

These Bushlight energy systems provide 24 hour power to the community and offsets the use of over 10,000L of diesel fuel with annual savings of \$17,082 and abatement of over 33 tonnes of greenhouse gases annually.

### Community Service Agreement

The Community Service Agreement (CSA) is an agreement between the Kurraya community, Julalikari Council Aboriginal Corporation (JCAC) (Kurraya's primary service provider) and Bushlight, to work together to maintain and sustain the energy services at Kurraya. The agreement incorporates the Community Energy Plan and outlines the responsibilities of each party. Technical details of

the RE systems and their service and maintenance requirements are also included.

The CSA documents the financial contribution the community makes toward the maintenance of the Bushlight RE systems and how these contributions will be administered. Although community members have agreed to make fortnightly contributions and JCAC has agreed to administer these payments, JCAC has determined that such contributions should be implemented across all 40 communities they service, not just at communities Bushlight works with. JCAC staff perceive this as too complex a task, however, and this has therefore stalled the finalisation of the Kurraya CSA.

### Community Training

Bushlight delivered user training directly after installation and commissioning of the RE systems. Training is delivered in three stages over a period of several months and covers operation and maintenance, basic troubleshooting and energy management.

Some Kurraya community members as well as JCAC staff also attended Bushlight's Level II RE training course held in Tennant Creek in 2005. This training is more advanced and serves to reinforce the community level training and build on skills in troubleshooting and basic system maintenance. This was an important part of Bushlight's plan to address the shortage of skilled RE service providers in the Tennant Creek region.



*Family members in front of the House 1 system*

## CEP Review

A year after installation, Bushlight reviewed the CEP. This involved meeting with the community again and discussing all the decisions made during the CEPM process and the impact the RE systems have had on the community.

## Maintenance Issues

As part of the CSA, it is the responsibility of the community to report any problems with the Bushlight RE systems to JCAC or directly to Bushlight. As there is no telephone in the community, this means either calling in to the JCAC office while in town or reporting it to JCAC staff when they visit the community.

Kurraya residents have experienced few problems with the Bushlight RE systems. At Christmas 2004, however, power at the "new house" unexpectedly cut out. This occurred twice more over the next six months, and although the problem had been reported to JCAC, it was not reported to Bushlight until August 2005. It appeared the community were not particularly with the problem as it was a very intermittent problem and over the summer period they were running the generator frequently to use air-conditioners. It is suspected that the problem was caused by a faulty appliance tripping a safety device (RCD).

As there are no trained RE technicians in the Tennant Creek area, technicians currently travel from Alice Springs. As part of Bushlight's plan to develop a regional service provider network, Bushlight is working to increase the skills of JCAC staff and to assist local electrical contractors to gain accreditation to install RE systems and to develop experience with servicing and repairs.



*Bushlight's Ben Purcell with Dwayne Foster at Kurraya*

## Community Outcomes

Residents reported no trouble adjusting to using RE energy. Soon after installation, residents of the 'old house' lost discretionary power during a cloudy period. From this experience they learnt to manage their energy use during cloudy periods and did lose discretionary power again throughout the cloudy wet season.

Community members also reported having a much higher disposable income now that the diesel generator is used less frequently. The generator is used during particularly hot nights in the wet season to operate air conditioners at night but is used rarely for the remaining seven months of the year.

Community member, Dwayne Foster, said that after a year of using the Bushlight system, he had saved money towards buying a reliable car.

*"I don't know exactly how much, but I've got a couple of thousand that I've saved up in the bank."*

*Dwayne Foster, Kurraya Resident*

With the only vehicle at the community an unreliable old car, Dwayne said that he and his mother couldn't travel between town and the community without relying on other family with a more reliable car.

Dwayne commented that the RE system was much easier for his mother to operate than a generator.

*"Before she wouldn't stay out here. If I went to town on a day trip, she wouldn't stay out here on her own. Now with solar, it's much easier for her to just press the buttons in the house."*

*Dwayne Foster, Kurraya Resident*

A regular visitor to Kurraya, Richard James, says that the provision of RE power has made it easier for people to inhabit the outstation and that the next step is to establish work and training plans for young people, as part of a program that will both build skills and improve the outstation.

Richard and his family plan to move permanently to Kurraya within the next few years to start a business. It is important to Richard that satisfying work is provided for young family members when they leave school.

*"I want to get out there with the kids. That's their future."*

*Richard James, Kurraya Resident*