



Wahrapaant

About this case study

This Case Study looks at the establishment of the Bushlight community renewable energy system at Wahrapaant and how this has helped residents to pursue their livelihood aspirations. Bushlight began their relationship with the small outstation of Wahrapaant in June 2005 with a series of Community Energy Planning (CEP) meetings. Based on these discussions and the information collected during them, a system was designed and then commissioned in September 2006. Since this time the system has been used by community residents without any major problems. Due to various reasons that will be discussed below, members of the two families involved have not visited their community as regularly or stayed as long as was anticipated during the CEP meetings.

Background

Wahrapaant is situated near the community of Pormpuraaw, approximately 700 kms northeast of Cairns. It is the traditional land of the Kuuk Yak people whose country extends to the east and south towards Kowanyama and including the Coleman River.



Myrtle Foote and grandchild

Pormpuraaw was established as an Anglican Mission in 1938. At this time it was known as the Edward River Mission and in 1967 administration of the community was handed to the Queensland Government. In 1987 the community changed its name to Pormpuraaw, taken from the local dreamtime story about a bee.

During the time of the CEP meetings in 2005, the core population of the outstation was 5, with an additional 15 –20 residents moving periodically in and out of the community. The main aspiration expressed by residents was that more people will come and stay at the homeland.



Wahrapaant residents with Bushlight's Sue Graham during Community Energy Planning Meetings

Pormpuraaw Aboriginal Shire Council are responsible for the delivery of some essential and municipal services to Wahrapaant. In more recent times, the level of this support has changed due to reduction in available funding and reduced field staff. During the CEP meetings it was noted that water supplies to the small community were in need of some repair. The solar water pump was not working and it was not clear if it was due to fault with the arrays or the pump itself.

More recently Bushlight identified that there are also fundamental faults with the installation of water pipes

Bushlight's Community Energy Planning Model

Bushlight's objective is to improve livelihood choices for remote communities by increasing their access to reliable energy services. To do so, Bushlight works directly with community members to provide them with independent advice and information about choosing which energy services are best for them, and advice on demand side management, and energy conservation. Using a range of pictorial resources, Bushlight invites communities to consider how they use energy and how much it costs them; and with them, look at what options are available for improving their access to reliable energy services.

Through workshops and community mapping exercises, Bushlight works with residents to prepare Community Energy Plans (CEPs). These plans detail the community's current energy needs as well as any future livelihood aspirations. The CEP documents an agreement between Bushlight and the community by setting out household energy budgets and the roles and responsibilities of the community in using and looking after their solar power system. The responsibilities of Bushlight, the community's service agency, and the system installer are also laid out.

After the initial CEP meetings and completion of the system design, Bushlight coordinates the installation of the RE equipment. Following installation Bushlight provides education and training in system operation and maintenance over several visits during the course of the first year. Bushlight's approach elaborates on the typical RE industry process by involving the community in all key activities and decisions.

between the bore and the main water tank.

Although in the past, Council was very supportive of the community and invested work and money in establishing infrastructures, due to recent major changes of Council's staff, including the departure of the outstation coordinator, the small community has not been as well serviced. This lack of services, combined with issues



Residents and rangers with their Bushlight system

relating to reliable water supplies, have contributed to minimal use of the facilities at the outstation.

Community Energy Planning (CEP) at Wahrapaant

During the CEP meetings in 2005, the residents of Wahrapaant thought about their goals and ideas for the future and how energy services might help. Many plans have been made for their future and having power and water have been identified as crucial for the success of these plans. It was made clear that more families and youth would like to spend more time living on their country and working there. It was clearly recognised that reliable power will contribute towards these plans by allowing the community to live comfortably at their homelands.

Two families, the Footes and the Edwards, are the main people who are living in Wahrapaant. During the CEP meetings, Myrtle Foote, one of the spokespeople for the family, indicated strongly that older people would like to spend far more time on the homeland and "the family would like the younger people to enjoy being on the homelands also".

Coinciding with the installation of the Bushlight system, Council installed wheelchair friendly cement paths and new kitchen benches to assist. The community also undertook some fencing of the main living areas.

Wahrapaant family members thought that making their homeland more comfortable would motivate more people including young ones, to stay for longer periods, including over the wet season. For example, for the old people, a



The Energy Management Unit and Switchboard in the main shed

place with reliable power and water supplies can become more attractive because it can be a place of refuge and rest. During CEP meetings residents stated that they would like to grow a variety of fruits and vegetables on the homeland. Also in partnership with the Homelands Co-ordinator plans were developed to build rooms inside the

main shed in the future. Bushlight designed the electrical layout to suit these aspirations.

Wahrapaant RE System

The system is comprised of the following major items: PV arrays, ground mounted with a 24 VDC (Voltage Direct Current); charge controller; battery bank; inverter and a battery charger.

The Bushlight renewable energy system at Wahrapaant was commissioned in December 2005. The system has been designed with a 20-year life expectancy. The renewable energy systems is designed to meet 100% of the daily energy requirements of the community as determined by the energy budget. Other loads identified as inappropriate for supply by the renewable energy system will be met by other means (such as by generator). The design load for the solar system at Wahrapaant is an average of 6.2kWhs per day. The solar system designed and installed in Wahrapaant is a 24V community solar RE system that can provide a maximum daily AC load of 7kWh.

An Energy Management Unit (EMU) is installed in the main shed which is used as a living quarters. The power is distributed via underground reticulation to six locations: the community's main dwelling; outdoors kitchen; shower; toilet; generator shed and storage shed.

One of the main features of this design is the ability of the system to provide power for up to three days under cloudy conditions. As in all Bushlight systems, three separate circuits have been installed: one for Essential, one for Discretionary and one for generator use. This means that if residents run out of 'discretionary' power,



The Accommodation/Kitchen Shed

important appliances like refrigeration, a light for safety and any medical equipment will remain powered. Also, any appliances can be powered by the generator.

The total project cost was approximately \$137,500. This included system mobilisation and installation, two service visits in the first year and additional works such reticulation and fencing of the PV array compound.

Since commissioning and as of June 2008 (after 21 Months of operation) the PV arrays have produced a total of 7355 DC kWh. Analysis of system performance data (collected periodically from all Bushlight systems)

shows the system is operating well in conditions of moderate use.

Servicing, Training and Support issues

One of the main aspects of the Bushlight project is to increase the capacity of local residents to take responsibility for some of the operational and maintenance tasks associated with the RE system. A Community Service Agreement between Bushlight, community residents, and the service provider is signed to set out these arrangements. Although Bushlight provides two more years of monitoring and services after commissioning, the Transfer of Ownership document sets out the fact that the Resource Agency, in this case the Council take legal ownership of the system. In the case of Wahrapaant, negotiations with the Pormpuraaw Council are continuing towards signing these agreements.



Rangers in level 2 training at Wahrapaant

Bushlight provides training to community residents and Resource Agency staff in the operation and maintenance (O&M) of the system. Two levels of training are usually provided: Level 1 training is provided to all community residents and covers all basic O & M tasks as well as troubleshooting and energy management. Level 2 training is a more involved course delivered over 2 days to Resource Agency staff and interested community members.

In the case of Wahrapaant, all residents took part in the level 1 training, and they show confidence in the day to day operations of the system and there is clear indication that they understand how the EMU works and how to monitor their energy consumption. The level 2 training was provided to a group of local rangers from Pormpuraaw.

Bushlight systems work by dividing a community's electrical loads into two categories: essential and non-essential, or discretionary. A certain amount of energy (an energy budget) is then allocated to each household each day at 12 noon with a certain amount of the energy set aside for loads on essential circuits (fridges and freezers, smoke alarms, security lights) and the rest being available for appliances on discretionary circuits (light, fans, and TVs etc.). If the allocated power is used up before 12 noon the next day the power will be lost to that circuit. The energy budgets are designed in such a way that essential circuits - which are regular and consistent - would never run out.

Since then, the outstations coordinator has vacated the position within the Council and has not been replaced. This and other staff changes has impacted on the rangers' ability to conduct regular visits to the community and carry out the basic maintenance tasks. This lack of regular services and support has resulted in general neglect of infrastructure in the community and consequently levels of occupation of the homeland have been reduced. For example, residents stated that the lack of reliable water supply has meant that people are unable to stay permanently at the community, and if the community was a lot more comfortable, they would stay out longer.



Water and tank issues

The close proximity to the main community of Pormpuraaw (only 8kms) is also a contributing factor for residents not staying in the outstation more frequently and for longer periods. The Foote family has a community house in Pormpuraaw and are obviously very comfortable there, with younger family members working there and the kids attending the local school. This close proximity also provides some advantages if some of the water issues were to be resolved.

Bushlight provides all communities that receive Bushlight systems with information related to the long term operation and maintenance. This includes possible costs to replace certain components. The simplest way to ensure that money will be available when the time comes to replace a component or to pay for a technician is by starting a savings account and contributing regularly to it. Unfortunately, in the case of Wahrapaant this regular contribution hasn't started yet. It is an issue that Council normally would be assisting with setting up but the high staff turnover means that the payment system hasn't been established. Residents of Wahrapaant indicated clearly that they will be happy to contribute once a system is in place.

Before the Bushlight system was installed, the community was using a diesel generator for their power. Since then this generator hasn't been used much and as from mid 2007 has been broken down and not repaired. On one hand, it is not good for such a

machine to sit idle. The longer it is not working the more costly it would be to repair it. On the other hand, this clearly shows that the power provided by the RE system has been sufficient for all uses. With the exemption of a washing machine (no running water to use it), the community has managed their power needs very easily.

The future

Since commissioning, the RE system has been operating without any major problems. All required manuals are in place and residents confirmed that the training provided by Bushlight staff has helped them to manage all aspects of power use. According to residents, the only reason they are not staying more often and longer in the homeland is to do with not having a reliable water supply. The problem with the water supply was identified during the CEP meetings. It was expected that the Council would solve the issue.

The next couple of years will be crucial in determining the small community's future. It is a very well established community with good infrastructure and easy access to the main community of Pormpuraaw. At the moment, water is the only serious obstacle between living there and realising their aspirations. However, if the water and other services issues will not be resolved within a reasonable time frame, there is a real threat that infrastructure will start to deteriorate.

Despite these issues, the community has plans for future development: the main shed, currently shared between all residents, could be divided for smaller sections and creates more private areas for the two families. Once the water system has been repaired and upgraded, the community has plans for establishing gardens and planting fruit trees. There are also plans to install new gates and/or move old one to better protect the community. A better water reticulation to the shower area will be installed and a new septic system is planned for the toilet.

The community understand that they have a role to ensure Council provides them with services they require. Over the past few years, the Council has spent considerable amount of money on various infrastructures in the community and now that reliable power supplies are installed, it will only take small effort to complete the job.

The future of the small community has challenges in terms of infrastructure management; but the two families remain committed to their involvement in their country known as Wahrapaant.