



Birri Williams

The Setting

Birri Williams is a small outstation situated on the northern coast of Mornington Island some 300 metres from the oceans edge. *Birri* means 'many underground water' in the Lardil language of Mornington Island.

Birri Williams is the permanent home of Johnny and Betty Mae Williams and their immediate family. Birri is visited by their many family members regularly and Johnny and Betty Mae provide respite and care to a number of family children.

The outstation is sited on Johnny's traditional country from his father's side and was established about 14 years ago.

The outstation has one main house dwelling and a smaller metal framed shed structure located closer to the beach, which is used for visiting family.

Mornington Island's main town, Gununa is approximately 26kms from Birri Williams by dirt road. This road is accessible during the wet. The outstation is 2 km from Birri Resort, a privately run fishing lodge leased from Mornington Island Shire Council and an outlet for cultural artefacts produced by Johnny and his family.

Bushlight 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 residents at Birri Williams established with Bushlight in the early stages of the CEPM that their goal was to have access to 24 hour reliable power generation. They saw this would offer a peaceful lifestyle and be more economically viable. The family also wanted power to continue the production of artefacts, supporting the family's livelihood aspirations and assist in respite care provided to youth and family at Gununa.

Pre-Bushlight Energy Services

In initial discussions with Birri Williams residents it was determined that the community used:

- Firewood for cooking and heating water
- Solar for hot water and two way radio
- Gas for cooking
- Diesel to generate electricity, both domestic and livelihood related activities

An open fire was used for cooking and for heating water. The outstation is surrounded by timbered land and there is plentiful firewood.

Gas was being used for cooking when available. The community had one 45kg gas bottle, and the cost to fill this at the time of CEPM was \$180. The community purchased these when financially able to. Mornington Island Council CDEP delivered these when it was possible.

A solar hot water service was installed during the period that Bushlight was working with the community.

The community has one generator. A 10kVA FG Wilson Lister diesel generator had been used to provide power for approximately 6 hours a day for both domestic and livelihood needs. Power was primarily used for lights, fans, TV/DVD, electric hand tools, a small hot water service and a pressure pump.

The community arranged the purchase of diesel fuel from nearby Birri Resort. The community collected the diesel daily in a 18 litre drum which they transported to and from the Resort in a wheel barrow. Diesel at the time of the initial CEPM was \$1.30/litre and the community was spending approximately \$20/day when they were financially able to. This gave them approximately 15 hours power supply a day. Annually the community was using approximately 6,500 litres of diesel a year, costing \$8,450/annum.



Birri Williams' Generator

Mornington Island Shire Council (MISC) CDEP offered some maintenance and servicing of the generator and it was in good condition and running well.

Energy Services Planning

The *Energy Service Planning* stage of the CEPM allows Bushlight an opportunity to investigate the community's energy needs and issues, social structures, mobility, household members and daily activities. During this process community members build up a greater understanding of issues associated with energy provision and use. This allows both parties to make informed decisions about appropriate energy services.

The residents at Birri Williams had a basic understanding of energy service issues in relation to access and financial implications. Using diesel generated power allowed the use of some appliances that used a lot of power, such as power tools.

The end result of this process is the **Community Energy Plan (CEP)**, a document that details the agreed use of available types of energy.

Birri Williams residents agreed on the following:

- Firewood would be used for cooking
- Gas to be used for cooking when available
- The diesel generator would provide back-up power
- The RE system would provide power to the main house for the lights, fans and entertainment (TV/DVD, radio and games)



Birri Williams Community Energy Planning

Birri Williams residents accepted the limitations of the RE system and were happy to include their generator as an energy source in times of heavy electrical loads or extended cloudy weather.



Bushlight Household System at Birri Williams

They also agreed to use power from the RE system to run the washing machine and power tools only when the batteries were fully charged and there was plenty of sun.

At the time of the Bushlight CEP Review the community did not have any gas bottles. This impacted on the use of energy services, by putting an extra load on the Bushlight system through use of an electric frypan. (see Training)

System Specifications

A Bushlight Household RE System has been located at the rear of the house and is designed to provide an average daily AC load of 7.3 kWh/day. The Bushlight household RE system at Birri Williams was commissioned in November 2004. The system is located under the existing verandah, with Mornington Shire Council laying a concrete slab for the system to stand on. The photovoltaic arrays for the system were roof mounted.

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.

Major System Component Specifications

PV Array	3.0 kWp (40 x 75W)
Battery Bank	2,400Ah @ 24V
Inverter	2.2kW @ 40°C
Charge Controller	120A@24VDC

Costing Information

The total installed cost of the energy system was \$107,667. 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, energy management fittings and construction of the concrete slab.

The Remote Renewable Power Generation Program (RRPGP) provided a rebate of approximately \$47,811 on the total cost.

The total diesel offset by the provision of 24 hour RE power to the community is equivalent to 16,545 litres per annum. This equates to an annual cost saving of approximately \$25,645, and greenhouse gas abatement of 48 tonnes.

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. The residents of Birri Williams advise that they are happy to participate with 12 people nominated as contributors.

Community Training



Initial training at Birri Williams

Bushlight delivered training to community residents directly after installation and commissioning. The process of training as outlined in the CEPM is to deliver three stages over a period of several months, covering operation and maintenance, basic troubleshooting and energy management. This allows the community to become familiar with the system, before moving onto the next stage of training.

Bushlight revisited certain aspects of training and use of the system at the 3 monthly visit, especially in regard to need for the battery to regularly reach float and the corresponding longevity of the batteries. Although data showed that the battery had been reaching float when the system was first

installed this had progressively dropped off over the 3 month period. The community was happy to accommodate this and undertook to watch the volt meter more carefully when using power tools.

Bushlight staff carried out the CEP Review on a weekend. At this time there were over 20 people visiting Birri Williams. The family had been out fishing. The cooking fire had not been started and some hungry young men proceeded to cook their evening meal using the electric frying pan. None of these visitors had had any training in the use of the Bushlight RE System. This was an opportune time for the Bushlight staff to deliver some impromptu training to 4 family members, showing how quickly the volt meter went down while the frying pan was on for a short time. The men were more than happy to start up the generator to finish cooking their meals.

This highlighted to Bushlight staff the importance of 'real' training experiences, for example switching on appliances whilst demonstrating and the resulting engagement with training for community members.

Similarly, at an earlier visit Bushlight staff identified an energy inefficient freezer that was drawing power 24 hours continuously. This has contributed significantly to the communities high energy use. Bushlight explained to Birri residents the impact this was having on the system and the importance of energy efficient appliances. This highlighted another important module in Bushlight's training which delivers understanding of energy use, not only different appliances and electric motors, but also the importance of well maintained and serviced appliances. The community has undertaken to purchase a new freezer and Bushlight has supported them with information on appropriate choices.

Bushlight Technical Services System Performance Report (August 2005) indicates an increase in energy demand on weekends, in particular on Friday nights. This confirms the weekend of the CEP review as a regular occurrence.

Bushlight has offered to deliver more training to the residents, in particular to visiting family. As Johnny explained to the youth of the family:

"When you fellas are fathers, you will want this solar system to be still working, so you got to know how it works and to look after it now!"

*Johnny Williams
CEP Review
September 2005*

The residents of Birri Williams have showed a great willingness to accommodate the training and advice of Bushlight staff. They have welcomed Bushlight's proposal of additional training.

In December 2005 Bushlight delivered its Level II Training on Mornington Island. Key areas of training delivered include: basic electrical concepts; RE system components and what they do; basic maintenance tasks; common problems and how to fix them; managing energy use; working safely with RE equipment.

Johnny and his nephew both undertook this training which furthered broadened their knowledge of RE and the components of the Bushlight systems, in particular batteries and their care.



Level II training at Mornington Island

The experiences at Birri Williams have highlighted the importance of ensuring that as many people as use the energy services have access to Bushlight training. It is not always appropriate for cultural and social reasons for the main householder to train or compel family members to undertake the needs of the RE system.

Maintenance and Service

At the 3 monthly visit, Bushlight staff downloaded data from the Birri Williams RE system. Data showed that the system was not regularly reaching float and the household was drawing power in excess of the load design. On further inspection it was found that three trees were shading the PV array from around 12 noon. One tree was removed at the time and the community undertook to have the other two trees trimmed to remove shading. These trees were trimmed in May by the community.

The Bushlight Technical Services System Performance Report demonstrates that there has been a general improvement in the health of the system, supported by new data and measured by battery voltage and an increase in average battery voltage. This has resulted since both the trees were trimmed and further community training undertaken.

Data also shows that the PV input has exceeded the design input 34% of the time over the data set reviewed. This may also explain why the community has been able to draw a load in excess of the design load from the system.



Trees shading array at Birri Williams



Trimmed trees now prevent shading of photovoltaic panels

As one of the first household system installations, the system at Birri Williams did not incorporate a Remote User Interface (RUI) as have later models. The system was located at the rear verandah of the house, an area not often accessed by the family, thereby preventing regular access and monitoring of the battery volt meter. The Bushlight CEP Review made the following recommendation to help the community manage their energy use.

Recommendation: Install a Remote User Interface on the front verandah of the house to help assist DSM and make metering more accessible to all the members of the family.

Bushlight CEP Review

September 2005

This recommendation was taken up by Bushlight Technical Services and a RUI was installed and

commissioned on the 19th November 2005. Further visits to Birri Williams and discussion with the community will recognise the benefits and outcomes of the RUI and the communities continuing management of their power.

Community Outcomes

Johnny Williams and his wife Betty Mae told us they were very happy with the Bushlight RE System.

"Quiet, no noise, no duk duk duk all night long"

*Johnny Williams
Bushlight CEP Review
September 2005*

24 hour reliable power has significantly brought about a change in quality of life for Johnny, Betty Mae and their family. Foremost, the reduction in generator use has resulted in several outcomes for the community.

- The community is well aware of savings from reduced diesel use. Johnny told us that diesel purchase has reduced from \$20/day to \$20/week.
- Particularly important to the community is they no longer experience long periods of noise pollution from the operation of the generator and the community does not have to access and transport fuel in the wheelbarrow everyday, from Birri Resort, approximately 2km away.

This with reduced operation of the generator gives the community more time to spend on livelihoods. For Johnny, he has more time to carry out the role of carer for his wife and the children that stay with them. He does the cooking, cleaning and washing. RE has made these tasks much easier and less stressful.

Johnny is also able to make more artefacts utilising both the free time and the excess power from the RE system during the middle of day to run his power drill and angle grinder. This has allowed him to further develop his sales of artefacts to the tourists that visit Birri Resort and staff from Gununa.

The family is also appreciating access to entertainment, especially for the youth and children who are enjoying watching videos and listening to the radio.



Birri Williams Youth enjoy videos powered by the new Bushlight Household RE System

The installation of the Bushlight Household RE system is providing a basis for more of the family to stay at the outstation. Johnny and Betty Mae are enjoying the increase of visitors to Birri Williams. Having the family and their children on the out station relieves a lot of worry from their minds. It removes the burden of worry for the problems in town and allows freedom for the kids to play, swim, and fish and for the parents to relax from work, hunt for healthy food and maintain family unity, story telling and traditional ties to country.



Johnny and Betty Mae Williams

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