



## Gunun Woonun

### The Setting

Gunun Woonun, meaning *tall oak tree*, is a small homeland situated on the southern coast of Mornington Island, about 29 kms from the main township of Gununa. Aelon Thompson, his wife Joyanne and around eight other family members live a quiet and traditional lifestyle on their homelands. Aelon's daughters and their families visit regularly during the week and on weekends.

The homeland was established in 1993. There are 3 main buildings; a 3 bedroom house, a school house and a small shed used infrequently by other family members.

Fishing and hunting are a large part of family's life. They have a strong connection with their country and

they value the peacefulness of living there.

The grand children of the family spend a lot of time on the homelands where they have freedom of their country and ocean and learn fishing and hunting skills, which are important to the families self sustainability. The children also receive schooling, with a mobile teacher visiting once a week for lessons.

The family travel to town regularly to pick up and drop off family and access supplies. During the wet, Gunun Woonun can become isolated and sometimes, although not preferred, the family relocate to Gununa.

## Bushlight's Approach

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

This process is called the Community Energy Planning Model (CEPM). Bushlight regional staff work with community residents to go through this process.

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

This is in part achieved by providing residents with technical and other information so they can choose sustainable – that is, affordable, consistent 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 services 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 Gunun Woonun established with Bushlight in the early stages of the CEPM that their goal was to have access to 24 hour reliable power generation. This would provide power for:

- Refrigeration
- Entertainment
- Washing machine
- and reduce their dependency on costly diesel power generation.

They felt RE would compliment their peaceful lifestyle and be more economically viable. The community also wanted to have power to the school house.

## Pre-Bushlight Energy Services

Before Bushlight, residents of Gunun Woonun were able to use:

- Firewood for cooking and heating water
- Gas for cooking
- Diesel generating electricity for cooling, entertainment and hot water
- Solar for two way radio and pumping water
- The community chose mainly to use firewood year round to cook and heat water. Using gas is more expensive and it is often difficult to transport gas bottles to and from Gununa.

The families main fire is located under the verandah of the house. This area is their central living space, especially for cooking and eating. A second fire is outside.

Although the area surrounding the main house is mostly clear of timber, plenty of wood is available on the road to the homelands.



*Heating water at Gunun Woonun*

The community generated their electricity supply from a FG Wilson Lister 10 kVa diesel generator hardwired to supply power to the main house and school building.



*Gunun Woonun's Generator*

The community told Bushlight they generally bought \$20 worth of fuel at a time. This is about 18 litres of fuel and lasted approximately 2 days. At the time of the initial CEPM, mid 2004, diesel was around \$1.30 per litre. The fuel was purchased from Gununa and transported in the communities own vehicle. The total cost of diesel generator power has been estimated at \$8,500 per year including transport costs.

The generator was mostly run at night and less often during the day. A small chest freezer provided the community with refrigeration and a small electric hot water service provided hot water.

Mornington Island Shire Council (MISC) have provided basic maintenance and service of the generator when required. However, this was limited to availability of staff and their work load, which could impact on the length of time it would take to have maintenance delivered or faults repaired.

## Energy Services Planning

The Energy Service Planning Stage of the CEP enables Bushlight to consider the outstation'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 sharing of information allows both parties to make informed decisions about appropriate energy services.



*Energy Planning with the family at Gunun Woonun*

Gunun Woonun 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 and run the hot water system and other heavy load appliances.
- The RE system would provide power to the main house for the refrigeration, lights, fans and entertainment (TV/video/stereo).

It was also agreed that only the main house at Gunun Woonun would be connected to Bushlight Household RE System due to the discontinuation of the school house and infrequent use of the shed.

For residents at Gunun Woonun, important issues about energy were its access and affordability. That is being able to afford and transport gas and diesel to their homelands.

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

Gunun Woonun residents understood that using RE would have some limitations. Some of their energy needs, such as using the electric hot water system would not be met by RE. 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 and small power tools only when the batteries were fully charged and there was plenty of sun.

Mornington Shire Council have also provided a new solar hot water service on the homelands. Residents informed Bushlight that this had been delivered some time ago and they were unaware when installation was to occur. The inclusion of this system in the outstations energy plan will provide further financial and lifestyle benefits.

## System Specifications

A Bushlight Household RE System has been located at the rear of the house under the existing verandah and is designed to provide an average daily AC load of 7.6 kWh/day. This system was commissioned in November 2004.



*The system is located under the rear existing verandah.*



*The PV arrays for the system are 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.





*CDEP Workers assisting with installation at Gunun Woonun*

Mornington Shire Council lay the concrete slab for the system to stand on.

### Major System Component Specifications

PV Array	30kW (40 x 75W modules)
Battery Bank	2400Ah @ 24VDC
Inverter	2.2kW @ 40° & 24VDC
Charge Controller	2 x 60A @ 24VDC

### Costing Information

The total installed cost of the energy system was \$112,073. 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 \$54,915 on the total cost.

The total diesel offset by the provision of 24 hour RE power to the community is equivalent to 16,435 litres per annum. This equates to an annual cost saving of approximately \$25,745 and greenhouse gas abatement of 47.66 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. Gunun Woonun have advised Bushlight that they are happy to participate with 5 people nominated as contributors.

Bushlight facilitated a meeting in late October 2005 between MISC representatives and MISC outstation Bushlight communities, to clarify all aspects of the CSA and to commence discussions to set up and manage user contributions.

At present all documentation has been provided to MISC and they are attending to the implementation of both user pay contributions and the Bushlight maintenance program.



*Aelon and Joyanne Thompson and their family*

### Community Training

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. This allows the community to become familiar with the system, before moving onto the next stage of training.

1. Operation and maintenance
2. Basic troubleshooting
3. Energy management

During the first year of installation, Bushlight undertook a 3 monthly scheduled visit program. However, due to Bushlight visiting MI for the 4 other Bushlight communities, Bushlight visited Gunun Woonun more than 8 times in the year allowing at

each of these visits, data download. This data has indicated that the community is managing their RE within its design assumptions and have understood the limitations of the system and managed their energy accordingly.

During these visits, Bushlight was also able to interact with a number of family members who did not participate in the initial levels training. This has assisted with all systems users confidence and understanding of RE systems and Demand Side Management.

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.



*Sherie and her husband Leon take part in Bushlight's Level II Training*

Aelon, his daughter and son-in-law undertook and completed this training. Their commitment to their RE system is demonstrated by the undertaking of the Level II Course, which furthered broadened their knowledge of RE and the components of the Bushlight systems, in particular batteries and their care and trouble shooting of user problems.

## Maintenance and Service

Data has been obtained from the Gunun Woonun system from 9/02/2005 to 20/11/2005 covering a period of 196 days. Bushlight Technical Services System Performance Report (August 2005) has made an analyses of this data and makes the following observations:

- Energy consumption increased on weekends correlating with an increase in visitors
- No discretionary load loss during the period captured by the data

- Batteries are reaching float on a regular basis, with a slight drop in October when the data showed a higher energy load.
- System loads up until September were lower than design assumptions. This was due to the lack of refrigeration appliances on the outstation. From September loads increased in line with design assumptions. This is attributable partly to increased fan use, which was verified from anecdotal evidence.

During a Bushlight maintenance visit on the 22nd June, 2005, it was found that corrosion was evident in the battery enclosure. The cause of the corrosion was a faulty battery cell.

Given that ongoing corrosion could compromise the structural integrity of the battery enclosure and require that the enclosure be replaced it was determined by Bushlight that onsite assessment and remediation be carried out as soon as was possible.

The onsite assessment of corrosion was completed by Bushlight Capital Works personnel. Bushlight staff carried out remediation on site. The battery cells were supplied and installed by Planetary Power as per the Bushlight contract. The responsibility for the corrosion problem and its remediation fell on them. Further works were carried out by both Bushlight and Planetary Power to replace the affected cell. This work was completed within 6 weeks of the problem being identified.

The Bushlight CEP Review has also highlighted some issues with the design of the RE system and electrical works.

- Trees identified as potential shading of solar arrays with seasonal growth.
- Fan Timers and their setting are inappropriate in bedrooms and the lounge as the fans switch off during the middle of the night waking the residents. The family has purchased pedestal fans in favour of the ceiling fans.
- No power provided at new Toilet.
- The solar HWS needs installing
- Lack of Refrigeration

To address these issues Bushlight will undertake:

- Continuing support to Gunun Woonun by providing follow up visits whenever Bushlight staff are on Mornington Island and ensure that the trees are trimmed over the dry season.
- Investigate with MISC when the installation of the solar hot water service will occur and bring to their attention the need to connect the new toilet to the RE system
- Encourage the family to purchase a refrigerator



- Bushlight to reset lounge and bedroom fan timers at next visit.

## Community Outcomes

Bushlight staff carried out the CEP Review on a weekend. At this time there were 13 people staying at the community. The family were happy to talk with Bushlight. With most of the family present, we were able to capture a sense of the families lifestyle and experiences with the RE system. Aelon and his family told us they were very happy with their Bushlight system.

The family acknowledged that RE has assisted their ability to live on their homelands and contributed to the following outcomes:

- They have more money for food and fuel for transport. This is particularly helpful for visiting the health clinic at Gununa and picking up medicines. Since Bushlight first started working with the family, health workers have discontinued visiting homelands on a weekly basis.
- Reliable 24 hour power
- Maintaining the peace and quiet of the homelands
- Ability to run new appliances. The community now has a washing machine, TV and DVD player.
- They have not used the generator since the installation of the Bushlight system.

The young people of Gunun Woonun told the CEP Review they have a good understanding of the RE system. This has been demonstrated by the trouble free use the family has experienced with the system and their willingness to undertake training. In particular, they are happy to have more opportunity to enjoy modern entertainment such as TV, DVDs and music.



*Aelon makes a fishing spear with his grandson*

## Contact Bushlight

*Solar is better, quiet... the generator is noisy.*  
 Sherri Morehead (Aelon's daughter)  
 Bushlight CEP Review  
 September 2005



*Enjoying entertainment at Gunun Woonun powered by the Bushlight RE Household System*

The CEP Review also captured the comments of MISC staff who liaised with Bushlight and the community during the term of the project.

CDEP trainer Tim Jones told the review that:

- Bushlight staff had kept MISC well informed and worked appropriately with the community and CDEP workers.
- Bushlight's approach and the language and the resources that Bushlight staff use were appropriate and suitable in working with indigenous communities.
- Bushlight related well to the community and maintained good regular contact.
- Bushlight would continue to have further success in supporting energy services to indigenous communities if they continued working in this manner

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