Light and Life in the Bush

BUSH LIGHT

Case Study 4 **September 2005** **www.bushlight.org.au**

Chuula

Introduction

In the late 1980s the Kaanju people returned to their traditional homelands on the Wenlock and Pascoe Rivers of Cape York Peninsula, Queensland. Chuula Homelands was the first permanently occupied contemporary Kaanju community. The families there have undertaken considerable planning to ensure that the reoccupation and development of their homelands is sustainable and in line with land and resource management principles of the Kaanju people. Currently, Chuula Homelands has a permanent population of 7 people with regular family visitors who travel from around the region.

Chuula has an aspiration of becoming self governing and have already set themselves up as an incorporated body, Chuulangun Aboriginal Corporation. In line with their land and resource management principles they have set up a range of plans to operate sustainable homeland based economic enterprises.

The residents of Chuula stay on their homelands year round, including during the wet season. At this time of the year they are cut off from service access for up to 6 months. They have become well coordinated and efficient in organising provision of supplies, food and fuel, to ensure they can stay on the homelands through this period.

This case study looks at the installation of a Bushlight Household Renewable Energy (RE) System that was installed and commissioned at Chuula on 19th December 2004.

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 meet with community families and work through this process.

The process helps the community to choose and manage the most appropriate range of energy services. This is in part achieved by providing residents with technical and educational information so they can choose sustainable, i.e. affordable, consistent and reliable, RE services that will meet their current and future energy needs.

In view of Chuula residents' existing knowledge and understanding of issues related to energy services, and their demonstrated ability to effectively manage resources, the initial stages of the CEPM were in this case able to be fast tracked.

Energy Service Goals

The residents of Chuula had been advocating for funding and support for the development of RE services at their homelands since 1998. In May 2004 Bushlight began working with the community to help them achieve their aspiration of securing 24 hour RE power. Energy Service goals that were hoped to be achieved through obtaining 24 hour power included:

- Alleviate the community of the burden of costly and time consuming generator power
- Make for a more sustainable community and support the land and resource management principles of the Kaanju people
- Bring peace and quiet back to the community's country
- Allow the community greater flexibility in attending to daily chores and work that required power, e.g. business communications through computer and internet access

> *"With the generator we felt under pressure to get everything that needed power done quickly in order to make the best use of the available fuel and not 'run the generator for nothing'."*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

Pre-Bushlight Energy Services

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

- Firewood for heating water
- Gas for cooking and keeping food fresh
- Electricity for both domestic and livelihood related activities

Firewood is used to operate a chip heater to provide hot water. Being situated on a wooded sand ridge plateau there is plentiful firewood. However, the community already had plans to purchase and install solar water heaters.

Gas was being used for cooking and also to power a refrigerator and freezer. The community has six 45kg bottles, and estimated that they used one bottle a month at a cost of $120. The community are therefore able to stock up on sufficient gas to last them for the wet season.

The Resource Agency, Coen Regional Aboriginal Corporation (CRAC), provides transport to take the gas bottles to and from Coen for filling. This is done when vehicles and drivers are available and CRAC charges a fee for this service.

Diesel and petrol generation provided power 6 hours a day pre-Bushlight

The community has two generators. A 5kVA petrol generator has been primarily used to run the community's water pump. It was identified that the water pump was in poor condition and regularly broke down. The community had a number of rainwater tanks and the water stored in these were found to be sufficient to cover pump downtime.

The second generator, a 5kVA diesel generator, provided power for approximately 6 hours a day for both domestic and livelihood needs. Power was primarily used for lights, fans, computer, fax, printer, TV/DVD, broadband modem, satellite decoder, electric hand tools and a compressor.

The community arranged the purchase of petrol and diesel fuel through CRAC. Ten 200 litre drums of fuel were purchased at a cost of approximately $240 per drum, and delivered by CRAC. This quantity would last about four and a half months and the annual fuel consumption was estimated at 5,400 litres; of which 2,000 litres were supplied through CRAC's Community Development Employment Projects (CDEP) Program. As such the community was spending about $4,000 per annum of their own funds on petrol and diesel.

Chuula residents participate in the CRAC CDEP program by working on their own homelands providing basic infrastructure support, i.e. maintaining water and power supply infrastructure and undertaking rubbish disposal. They have taken on servicing and maintenance responsibilities of their equipment for two main reasons:

- The wet season dictates this necessity as the community is cut off
- It is more expedient, as CRAC is a town-based agency and there can be a delay of several weeks in responding to call outs

Therefore community members have built up a good working knowledge of servicing and maintaining generators and water pumps. They also have some electrical experience.

One problem the community has encountered with storing generator fuel has been its susceptibility to water contamination during the wet season. The drums are stored outside and water has been prone to leak into the drums. There has been ongoing and regular service and maintenance problems for the generators, due to the water contamination of fuel and the resulting damage to the equipment.

Energy Services Planning

The Energy Service Planning stage of the CEPM enables Bushlight to understand the community's energy needs and issues, social structures, mobility, demographics and daily activities. During this process community members build up a greater understanding of issues associated with energy provision and use. The end result of the process is the Community Energy Plan (CEP), which documents the agreed use of available types of energy and details specific information about the community's electrical energy use.

David Claudie and Jane Errey plan Chuula's energy needs

The residents at Chuula already had a good understanding of energy service issues in relation to access, finance and energy efficiency. They had good existing knowledge of electrical power and RE services and had been investigating RE service options since 1998.

In view of the community's knowledge, and the work they had already undertaken, they were able to provide a detailed breakdown of their energy requirements. As such the CEPM could be condensed and it was agreed that:

- Gas would continue to be used for cooking and to power the refrigerator and freezer
- Firewood would be used to heat water, until the solar hot water services were available and installed
- Petrol would run the generator to power the bore pump water
- The diesel generator would provide power for the power tools, air compressor and outside ablution block lights and appliances
- The diesel generator would also be used as a back up for the RE system in the event of a system failure and/or during prolonged cloudy periods
- The RE system would provide power to the main house for the lights, fans, computer, printer, internet connection, fax, TV, DVD

Chuula residents recognised the limited capabilities of RE systems and were happy to include their generators as an energy source in times of heavy electrical loads or extended cloudy weather. They also agreed to use power from the RE system to run the washing machine only when the batteries were fully charged and there was plenty of sun.

Chuula residents requested that energy services be provided in a second house within the community which was occupied on a semi permanent basis (e.g. at various times during the dry season). The community eligibility criteria agreed between Bushlight and the funding providers requires dwellings to be 'permanently occupied' to be eligible for infrastructure investment and a decision was made by the Bushlight regional team that the second house did not meet this criteria. A decision was therefore made not to include the provision of energy services to the second house.

System Specifications

A Bushlight Household RE System has been located at the main house and is designed to provide an average daily AC load of 6.4 kWh/day. A cement slab and skillion veranda were extended from the building's west wall to protect the system. These works were contracted out as part of the installation and were carried out by CRAC.

The solar array was mounted on a free standing frame as the house roof was not a suitable location.

Free standing solar array

Additional works to the main house included modifying wiring to match the new circuit configurations; additional wiring to accommodate extra lighting and the installation of light timer switches. The CEP identified that generator power would be required to provide back up power during the wet season, therefore reticulation to the proposed generator site was also incorporated.

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 disconnected when the battery charge drops below a predefined level.

The installed Household RE System

Costing Information

The total installed cost of the energy system was $120,000. 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, construction of the concrete slab and extension of the veranda to the existing house. The Remote Renewable Power Generation Program (RRPGP) provided a rebate of approximately $50,200 on the total cost.

The total diesel offset by the provision of 24 hour RE power to the community is equivalent to 7,800 litres per annum. This equates to an annual cost saving of approximately $9,400, and greenhouse gas abatement of 23 tonnes.

Major System Component Specifications

PV Array	3.4kWp (40 x 80W)
Battery Bank	2,400Ah @ 24V
Inverter	2.2kW @ 40°C
Charge Controller	3 x 60A @24VDC

Community Service Agreement

The Community Service Agreement (CSA) is an agreement between Chuula, CRAC and Bushlight, whereby each party agrees to work together, in a spirit of cooperation, to maintain and sustain the energy services at the community. The agreement details service and maintenance responsibilities in relation to all energy services, however it provides greater detail in relation to the RE system.

David Claudie signs Bushlight's Community Service Agreement

A recent review of the CSA revealed that while all three parties have signed the CSA it has not been fully implemented:

- Community members have been using the system in accordance with the training provided, monitoring and recording meter readings and keeping the solar panels and area around the system clean.
- As this installation is still in its defects liability period, CRAC has not been required to undertake its maintenance and service responsibilities under the agreement.
- Bushlight has overviewed service visits, undertaken quarterly inspections, monitored system operation and use and supported the community and CRAC during the maintenance period.

The main outstanding issue with the CSA is that CRAC has not commenced collecting community contributions to help pay for future service and maintenance costs. However, the people of Chuula advise that they have been making personal savings of $20/fortnight as a supplement towards their

contributions. Bushlight has undertaken to facilitate a meeting between CRAC representatives and CRAC homelands communities, who are to receive RE systems, to clarify all aspects of the CSA and come to an agreement as to how to set up and manage user contributions.

Chuula is working towards becoming self governing and one of their underlying principles is to have greater access and control over the community's funds and resources. They have informed Bushlight that they would prefer to be the RE system owners and have control of the assets financial management, including their contributions.

"We understand that this was due partly to ATSIC/ CHIP policy where outstation funding must go through CRAC, and also to enable deductions from the CDEP pay of the permanent residents to pay for repairs/maintenance of the system. However, we argue that we are in a better position here on homelands to raise funds for repairs/maintenance of the system, and have the necessary means and financial experience to do so."

David Claudie, Chuula Resident
CEP Review July 2005

Community Training

Bushlight delivered user training 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.

David Claudie and his family receive RE training from Bushlight's Jane Errey

At Chuula all three stages of the training were delivered after commissioning. This was due to:

- The oncoming wet season, where access to the community would be cut off for up to 6 months
- David Claudie's knowledge of electrical services and prior experience working with electricians and at the Lockhardt Power Station

There is strong evidence that the training objectives at Chuula have been achieved. The community has never lost discretionary power and has shown an excellent understanding and ability to manage energy. Even during extended cloudy periods during the wet season the community did not need to use generator power as a back up.

"Even during the wet season when there were overcast days we managed our power use and never ran out of power."

David Claudie, Chuula Resident
CEP Review July 2005

Maintenance issues

There has only been one major maintenance issue with the RE system, which arose from the presence of a natural disaster. On 9th March 2005 Cyclone Ingrid passed directly over the community. For safety purposes the community carried out a 'shut down' of the system, and having access to the inverter also turned this off as a further precaution. Once the cyclone's path had moved on the community turned the inverter back on and then carried out the 'start up' procedure, but power was not restored.

David Claudie checked the system gauges and went through the user manual to asses what may be causing the problem. After satisfying himself that there were no more checks he could make he rang Bushlight for assistance. The problem was caused by the inverter being turned off and then going into standby mode when turned back on. Through verbal direction over the telephone David was able to reset the inverter and power was restored. By having been made aware that it is not necessary to turn the inverter off when a shut down is carried out, the chance of this issue reoccurring has been minimised.

There has been a technical issue relating to the pneumatic timers installed to control the laundry and toilet lights. Over time these timers have been found to reset themselves to a shorter duration, meaning that the light has to be turned on multiple times during the use of these rooms. These timers were adjusted when the system contractor made their six

month service visit. In hindsight and based on feedback from the community these timers, and other central circuit timers, were not really needed.

> *"The timed light in the bathroom/laundry is becoming an issue. It was initially set for about 6-8 minutes. This is inconvenient especially when bathing children. A normal light that can be turned on and off would be much more convenient. We do switch lights off when we do not need them and the timed circuit (for TV. computer etc) is probably not needed for our household. When the timer goes off, we usually put it back on straight away anyway if we need the power. For our household the timed circuit (that has to be reset) is more a small inconvenience than a strategy for energy conservation."*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

Community Outcomes

> *"…… the Bushlight project is important in that it focuses funding and services on homelands, thereby supporting homelands development, and the permanent re-occupation of homelands by Aboriginal people."*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

While the community has been permanently occupied for over fifteen years, the installation of the RE system onto their homelands has improved their livelihood by freeing up finances and time to allow the community members to concentrate on their aspiration of self governance and economic and land sustainability.

Previously the generators provided electrical power for 42 hours a week for all domestic and business requirements. Since the RE system has been installed the use of the diesel generator has been extremely low, and only for occasional use of power tools and the compressor. The petrol generator is still used to power the water pump, which at the time of writing this Case Study was inoperable. The estimated combined weekly run time for both generators is now 5 hours a week. This has enabled the community to reduce their annual fuel consumption from an estimated 5,400 litres to 300 litres.

With additional time and funds the community has been able to assess and implement infrastructure improvements to make living on their homelands more comfortable. Recently concrete paths were laid by the community to connect all the main buildings. These were not only for a resident who used a wheelchair, but mostly for the older members of the community who regularly visit.

Reduced generator use and associated noise pollution has also improved the living environment in the community. The tranquillity of living on their homelands has been returned and this environmental harmony is in keeping with the wishes of the traditional owner and the principles of land management, as held by the Kaanju people.

> *"David told me that he wanted to bring back the peace and quiet to the homelands so the ancestors would no longer be disturbed by the noise of the generator."*
>
> *Susan Graham, Bushlight Shared Services Site Visit, December 2004*

The community is responsible for its own essential services including generator service and maintenance. This is due to the community's proven ability to undertake these duties but also comes from necessity due to their remoteness and isolation during the wet season. The reduced generator use has freed up much of their time by minimizing:

- Time spent turning the generators on and off
- Fuel management and storage needs
- Generator service and maintenance requirements; which is considerable due to the previously high maintenance needs owing to water contamination of the fuel

> *"…… the convenience of the RE system, not having to maintain and start/shut off a generator every time we need power, is significant. This change is particularly noticeable in the evenings when the person usually responsible for the generator does not have the routine of filling it and starting/shutting it off."*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

In addition to having had time freed up by reduced generator related issues, the provision of 24 hour power has enable the community to have a more flexible approach to daily chores and livelihood related issues.

> *"…… it has made our operations in terms of running a household and running a corporation much more efficient and flexible, and less regimented"*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

Chuula is a highly motivated community and has a very clear objective of becoming self governing. They have developed an extensive website, which outlines their homelands and land management plans and projects. Business and corporate related work duties are carried out from an on site office. Due to the remoteness of the community they rely on email and the Internet for the majority of their business communications and transactions, such as grant applications.

*David Claudie and Chuula's future leaders work on the computer **

The provision of 24 hour power has improved their efficiency in responding to business and corporate related issues. This has been achieved by providing a more flexible approach to maintaining and keeping the website up to date, using the internet and responding to electronic communications.

The community has been able to work more efficiently to advance one particular project. They had previously had a grant application approved through the Commonwealth Department of the Environment and Heritage (DEH) to investigate the viability of setting up an Indigenous Protected Area (IPA) over parts of the Kaanju Homelands. Increased computer run time has allowed them to finalise a draft Management Plan for the proposed IPA. This particular project is heavily linked to their aim to ensure reoccupation and development of their homelands is sustainable and in line with land and resource management principles of the Kaanju people.

"If our homelands are not managed properly and in accordance with Kaanju law and custom, the land and people will suffer."

*Taken from Chuula's website www.kaanjungaachi.com.au **

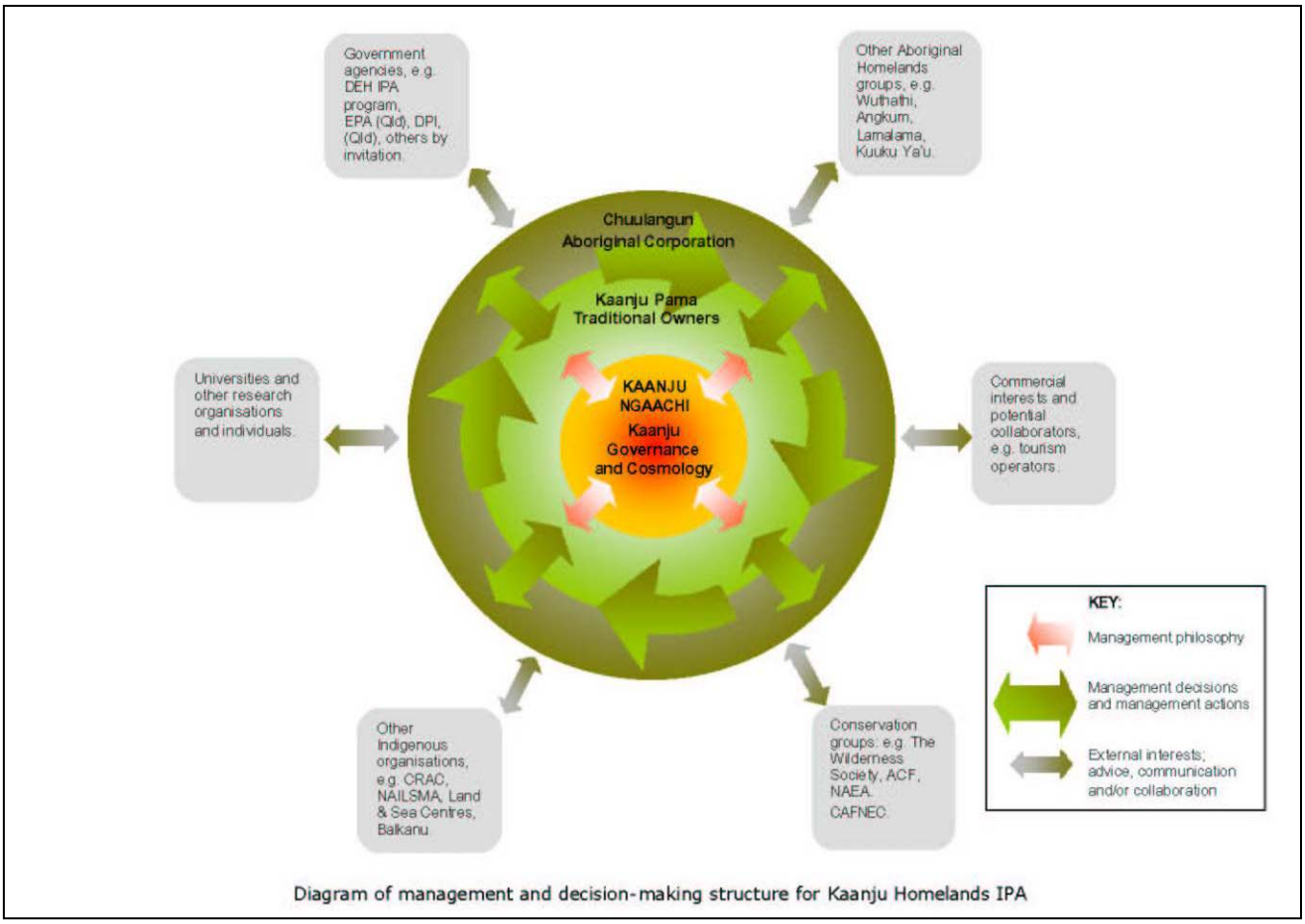

Diagram of management and decision-making structure for Kaanju Homelands IPA

Extract from Chuulangun Aboriginal Corporation 2005 - Kaanju Homelands Wenlock and Pascoe Rivers Indigenous Protected Area Management Plan

The installation of the RE system has allowed Chuula to move towards their long term goal of sustainable resource management.

> *"The residents of the main house are very happy with the Bushlight renewable energy system, we have had no problems to date, the system is easy to maintain, and we have power all the time."*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

During the early stages of the CEP process Bushlight Regional Staff carried out an assessment of the occupancy of two buildings at Chuula and made the decision to invest in energy services infrastructure for one house only. In the 9 months since the installation of the RE system, occupancy of the second house has been higher than understood or envisaged at the time of the CEP and residents of the second house have expressed a strong desire to access the same level of energy services that are available in the other residence.

> "*Other problems are associated with one mob 'having a permanent power supply', and the other mob 'not having a permanent power supply' thereby potentially creating a 'have' and 'have not' situation."*
>
> *David Claudie, Chuula Resident*
> *CEP Review July 2005*

The community's options for providing power to the second house were to use the generator or to run an extension lead between the two houses. The energy needs of the second dwelling are relatively modest, and the community deemed it would be inefficient to run the generator for extended periods. While the community is aware of the safety issues related to using extension leads for such a purpose, this was the most obvious short-term solution available to them. The biggest concern with this situation is the potential to overuse the RE system, however the community has proven its ability to manage the energy needs of both houses effectively by not having lost discretionary power and not requiring back up power from the generators.

Further complicating the sustainability of energy services at Chuula is a recent decision to build a new residence at the community. The location and energy service requirements of the new residence are yet to be finalised, however it is possible that the existing RE system will need to be upgraded or relocated, or a separate second system installed in conjunction with the new house. The cost of these options will be significantly impacted by the recent winding up of the Remote Renewable Power Generation Program rebate scheme in Queensland. Chuula residents have initiated discussions between Bushlight, CRAC, FACS to assess options available to provide safe and sustainable power to all three houses.

Much has been achieved for the community of Chuula with the installation of the RE system and residents have expressed a high level of satisfaction with the energy services now available. It is felt, however, that energy service requirements within the community as a whole have not been fully met due to the lack of services in the second house and the question mark over the energy supply to the new house. The changing circumstances at Chuula are not uncommon in remote indigenous outstations and the issues raised in this case in relation to infrastructure provision are typical of the practical and policy challenges encountered when working with these communities.

Bushlight is committed to continue working with the community to develop a final and sustainable solution to all of Chuula's energy services issues, as this is essential to enable the community to achieve their livelihood aspirations and to continue the benefits already achieved with the installation of the RE system.

*Kaanju youth **

* Images and website text reproduced with kind permission from the ancestors and traditional owners of Kaanjungaachi and Chuulangun Aboriginal Corporation

Contact Bushlight

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