



Kitty's Well

The Setting

Kitty's Well is homeland community located in Western Australia's Kimberly region. It is approximately 200km south east of Broome and is situated on the coast. The local word for Kitty's Well is Brunbrunganjal, which is the name of a soak in the mudflat area. Kitty's Well is located 15 km from the bigger neighbouring community of Bidyadanga where the residents purchase their food, diesel and other necessary items.

Kitty's Well residents have as their main goal the "quiet enjoyment of their country" and having a place where their grandchildren can call their own. Now that people have title of their land they are free to use their skills in go fishing, hunting and gathering and feeding their children bush foods. This is the way of life that people at Kitty's Well enjoy.



*Community Elder
Edna Hopiga*

The Kullarria Region (Broome) has two organisations delivering to Homelands, Kullarria Regional Indigenous CDEP INC.(KRICI) and Mamabulanjin Resource Centre who deliver essential services of power and water.

This case study looks at the two Bushlight Household Renewable Energy (RE) Systems installed at Kitty's Well. One system, commissioned on 15th November 2004, provides power to the main house, and the other provides power to the new double shelter and outbuildings. This later system was commissioned on 4th November 2005.

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 members and work 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.

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 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

Kitty's Well main energy service goals consisted of:

1. 24 hour reliable power
2. Reliable refrigeration
3. Washing facilities
4. Reducing diesel use
5. Use diesel savings to direct into community vehicle maintenance

Residents aspired to having 24-hour a day reliable power. People at Kitty's Well desired dependable refrigeration to store fish and beef, particularly during the bad weather. The Kitty's Well families also wanted to be able to do their laundry during the day and not only at night when the generator is operating.

The people of Kitty's Well were very interested in reducing their dependence on diesel for the generator. Renewable energy will dramatically reduce diesel consumption and thus free up financial resources.

People at Kitty's Well were keen to use the fuel and money saved from reduced generator use to fuel and maintain community transport which is a critical community asset.

Pre-Bushlight Energy Services

Prior to the installation of the Bushlight System, Kitty's Well families were using:

1. Diesel for power generation and transport
2. Gas for cooking
3. Firewood for cooking
4. Solar thermal hot water service
5. RE powered bore pump

Firewood is the major source of fuel for cooking and it is also used for space heating. There is plenty of firewood around and the community collects this with a vehicle and trailer.

Gas was also used in the main house for boiling the kettle and sometimes for cooking. It costs \$ 120 for every gas bottle and these last about a year at Kitty's Well.



Kitty's Well cook mostly on an open fire

The main source of power was a diesel generator. Kitty's Well has a 9kVa Lister generator with reticulation running underground from the powerhouse shed to the main house. The generator runs for 12 hours every night, from 6pm to 6am, using 24 litres of diesel for the 12 hour period. People at Kitty's Well were using over \$10,000 on diesel a year for the generator. Kitty's Well pays for diesel for the generator out of the community's CDEP on costs and from individual members 'chuck-in'. Diesel was transported from Bidadanga by truck and involved no costs on top of diesel price per litre.



Kitty's Well Generator

The main house has a solar thermal hot water service with an electric booster. The hot water is used for showering and for the washing machine. A RE powered bore pumped water to the community header tank.

Energy Services Planning

During the Energy Services Planning stage of the CEP, Bushlight provides education about energy service options and finds out about the community's

energy needs and issues, social structures, mobility, household members and daily activities. Bushlight looks at all the energy sources available to the community in order to assist people with making decisions about what would be the best energy options for their homeland.

The end result of the process is the Community Energy Plan (CEP), a document that details the most appropriate sources and uses of available types of energy. The CEP also included details of the proposed RE systems.

Bushlight developed the Kitty's Well CEP in consultation with the community and Mamabulanjin Resource Agency.

It was decided that a mix of energy sources would be used at Kitty's Well:

- RE for refrigeration, lights, fans and entertainment appliances. The washing machine would also be run from the RE system when enough energy was available.
- Firewood and gas for most cooking
- Diesel for power tools, kitchen appliances, air conditioning, water pump. As the Kimberly area commonly has several cloudy weeks in a row during the wet season, it was anticipated that the generator may be needed to back up the RE system during these periods
- Solar thermal for hot water

Bushlight undertook the following work to assist in reducing energy demand. They approached Mamabulanjin and the ICC office seeking a new higher water tank stand, making the existing pressure pump obsolete. They also assisted the community to replace an old, inefficient refrigerator.



Energy planning with Bushlight staff

System Specifications

It was decided that two Bushlight Household Systems would be installed at Kitty's Well. At this stage Bushlight had not developed its Community RE system. One system, commissioned on 15th November 2004, provides power to the main house,

and the other provides power to the new double shelter and outbuildings. This later system was



Kitty's Well ground mounted PV array and Bushlight Household RE System 2

commissioned on 4th November 2005.

The two systems provide a maximum daily AC load is 12.8kWh/day. There are no DC loads.

Bushlight systems power non-critical appliances via "discretionary" circuits and critical appliances via "essential" circuits. In an attempt to ensure continuous power to critical appliances (like fridges and freezers), power to discretionary circuits is cut when the battery charge drops below a predefined level.

Major System Component Specifications

Bushlight Household RE System 1

PV Array	Ground mounted array of 3.0kWp (38 x 80W panels)
Battery Bank	2,400 @ 24VDC
Inverter	2.2kW @ 40°C
Charge Controller	120A @ 24 VDC

Bushlight Household RE System 2

PV Array	Roof mounted array of 2.88 kWp (36 x 80W)
Battery Bank	1700Ah @ 24VDC
Inverter	2.2kW @ 40°C
Charge Controller	120A @ 24 VDC



Community members with Bushlight Household RE System 1

Costing Information

The total installed cost of the two RE systems was \$223,730. 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 \$107,993 on the total cost.

The total diesel offset by the provision of 24 hour RE power to the community by one household system is equivalent to 9,198 litres per annum. This equates to an annual cost saving of approximately \$12,299 and greenhouse gas abatement of 26.67 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. At Kitty's Well User contributions and their management are pending a meeting of all stakeholders.

Post Installation Community Training

Community Training was delivered to Kitty's Well residents with the aid of a pictorial based User Manual and their RE systems. This training included system operations and maintenance, basic trouble shooting and energy use management. Bushlight training was designed to be broken into stages to allow time to experience system use and operations.

The community training has been successful in educating Kitty's Well residents about their RE system. The community does maximise all available power. John tells Bushlight that the RE system has never played up, we have power all the time now.

John and Lenny Hopiga manage the RE system. They told Bushlight staff during the CEP Review: "The boys know how to operate the system and both of us are showing our wives the same".

Service and Maintenance

The system has not failed to date. Determining whether the community has the capacity to problem solve when the system fails is therefore hard to gauge. However, through engagement with the community on regular visits, Bushlight has confirmed that at least two Kitty's Well members know how to operate and maintain the Bushlight system

John and Lenny Hopiga manage the RE system John says "Lenny has taught the boys how to change over the system to generator, and then show them how to check the oil level, start up the generator and switch the loads back on". The community log book also demonstrates regular monitoring.

The Bushlight enclosures are clean, tidy and free from obstacles that could make it unsafe to operate and maintain the system. John told Bushlight that the PV panels are cleaned regularly and a physical inspection confirmed this..

Community Outcomes

"we can live on our land, look after our land and teach our young kids languages and culture because we are here now"

*John Hopiga, Kitty Well Resident,
CEP Review August 2005*

Kitty's Well now has reliable 24 hour power and refrigeration. John Hopiga openly states the improved power systems has enabled permanent residents to become more established on Kitty's Well homeland.

Now that Kitty's Well families have reliable 24 hour power on their homeland they are more able to go fishing, hunting and gathering bush foods. John explained to Bushlight that in the previous school holidays, he and his brother, Lenny Hopiga, spent two weeks with a group of young people taking them out camping, fishing and teaching them about the land and language.

The Bushlight system has also resulted in greater monetary savings due to reduced community spending on diesel. Kitty's Well has already saved over \$5,000 in the 2004/05 financial year. Future diesel consumption savings are expected to average approximately \$8,300/year. Community members on CDEP wages now have more money as they don't need to contribute to diesel purchase from their wages.

"We saved a lot of money in diesel this year because we did not need to run the generator so much".

*John Hopiga
CEP Review August 2005*

The saving in the diesel budget has been used to start projects that help further develop the community. Kitty's Well has worked with Kullarria Regional Indigenous CDEP INC.(KRICI) to redirect the saving in their CDEP diesel allocation to create a "tree planting" project. The trees and plants have been purchased with the diesel savings. The community planted and now maintain an ongoing CDEP activity under the program.

The physical inspection of the community confirmed that Kitty's Well have achieved their Goals and Aspirations captured in the CEP. Talking with John Hopiga at great lengths, we have now identified new Goals and Aspirations that Kitty's Well has set.

1. Teaching law and culture to the youth within there language group.

2. Caring for the Land.

*Dave D'Antoine
Bushlight Derby Office
CEP Review August 2005*

It is not expected that transportation activities will change, especially with daily routines. In fact, there may be increased transportation with community vehicles now that cultural activities will becoming a regular program run during schools holidays.

Kitty's Well is experiencing significant changes in physical appearance. The Department of Housing and Works (DHW) have just refurbished the existing Dual shelter and Male Ablution block. DHW have also built a new female ablution/laundry block near the male ablution block.

The constructions and refurbishments have been conducted in a manner that is RE friendly. Extra concrete was laid out for the second RE installation, at no cost to Bushlight. Mamabulanjin has informed Bushlight that DHW approved funding for a water upgrade at Kitty's Well in order to complete required "essential works" to the community.

On all regular visits to Kitty's Well, Bushlight staff have described a very high level of community satisfaction with their RE system.



Edna Hopiga fishes to fill the community refrigerators

Contact Bushlight

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