



Fact Sheet 10

November 2004

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## Ngupangapa

### The Setting

This fact sheet provides information about the two Bushlight Household systems installed at Ngupangapa. The systems were commissioned on 13<sup>th</sup> October 2004.

### Background

Ngupangapa is a remote outstation located approximately 90km west-north-west of Tennant Creek. Prior to the Bushlight systems being installed, the community relied on a 10kVA generator for power generation. This was a significant drain on the community's financial resources, and problems with carting fuel during the wet season also meant community members often moved to town during the summer months.

### Community Energy Planning Process

Bushlight has developed a participative approach to energy planning called the Community Energy Planning Model. Facilitated by regional Bushlight staff, this process assists householders in making informed decisions about their specific energy needs, including generation and consumption, which ultimately influences the design of appropriate systems.



### Basic Technical Information

The two systems have been designed for maximum daily AC loads of 3.5 and 3.7 kW hours. There are no DC loads.

The systems comprise the following major components:

- Roof mounted PV arrays of 1.5 kWp capacity. Both arrays contain 20 x 80W panels.
- Battery Banks with the following capacities; 800 Ah and 850 Ah. Both systems are 24VDC and provide ~2 days of storage at a 50% maximum depth of discharge.
- Inverters rated at 1.5kW @ 40°C. The maximum expected peak and surge loads are 1.3/0.9kW and 3.9/3.9kVA respectively.
- The total cost was approximately \$166,000. This includes system supply, installation, data logging equipment, two service visits in the first 12 months, some modifications to the existing house wiring and fixtures. The Northern Territory Government Renewable Energy Rebate Program provided a rebate of \$66,898 on the total cost

## Monthly Load Variations

The maximum daily power consumption is expected to occur during the summer season. The most significant contributors to the higher summer load are:

- Ceiling fans: it is assumed that fans will be used significantly during the months from October to April
- Refrigerators: fridges use twice as much power during the summer season when the ambient temperature is higher

## Technical Demand Side Management

To minimise the risk of excessive power usage the following strategies have been implemented in consultation with each household:

- Low amp circuit breakers are used to prevent the usage of high power demand appliances
- Light and general power circuits from both systems have been fitted with centrally controlled timer switches. The duration of these timers have been set to meet residents needs
- Individual timer switches are used on all fans and lights in the toilets, bathrooms and laundry rooms

In addition to the technical demand side management measures described above, Bushlight staff have facilitated a range of education and training activities to assist residents to manage their power consumption appropriately.

## Appliance Acquisition & Replacement

Where appropriate, Bushlight organises the replacement of inefficient appliances. At Ngupangapa the following items were supplied with the system:

- Two 390L Westinghouse fridge/freezers to replace the existing units
- Compact fluorescent light globes to replace existing incandescent light globes.

## Agreed Deferred Loads

During the Community Energy Planning process it was agreed with each household that some specific appliances would be treated as deferred loads. This means the appliances will only be used when the batteries are fully charged and excess power is being generated. In the case of the Ngupangapa houses, it was agreed that the use of washing machines would be deferred until excess power is available.

## Generator Only Circuits

The following situations where the generator may be required to provide additional power were identified:

- During cloudy periods there may not be sufficient excess power for the use of the washing machines
- When the community wishes to use electric kitchen appliances
- When power is needed for the weekend house

## Other Energy Services

In addition to the energy being supplied by the Bushlight systems, each household relies on a range of additional energy sources such as:

- Firewood for outdoor cooking
- Gas for inside cooking
- Solar thermal for hot water



## Contact Bushlight

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