

Light and Life in the Bush

BUSH LIGHT

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UKAKA

The Setting

This Fact Sheet provides information about the Bushlight Hybrid System installed at Ukaka. The system provides power for seven houses, a school, a store/clinic, three shelters, a laundry and a workshop. This system was commissioned on the 26th July 2007.

Background

Ukaka, is situated 230kms South West of Alice Springs. Prior to the Bushlight System being installed the community used a 28 kVA generator when diesel was available and when the generator was working. The estimated diesel cost per year was \$23,400 .

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 residents to make informed decisions about their specific energy needs, including generation and consumption, which ultimately influences the most appropriate energy service options.

Basic Technical Information

The maximum daily AC load of the system is 100kWh/day. There are no DC loads.

The following major components are:

- PV array - ground mounted with a capacity of 20kWp
- Battery bank - Capacity of 3400Ah @ 120VDC providing 2 days of storage at 25% average daily depth of discharge
- Inverter – 10kW @ 40°C
- 20kVA automatic start single phase diesel generator
- 100A continuous capacity battery charger
- Energy Management Units (EMU) - electricity metering and management devices that replace household switchboards.
- The total project cost was \$719,023. This included system mobilisation and installation, two service visits in the first year and additional works such as reticulation, installation of ceiling fans, timer switches and replacing switchboards with EMUs. The Northern Territory Government Renewable

Energy Rebate Program provided a rebate of \$261,611 on the total cost.

Monthly Load Variations

The design load allows for the maximum daily power consumption to occur during the summer months when fridges and freezer are cycling more frequently and ceiling fan use is greater.

Demand Side Management

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

- An EMU has been installed at each of the 7 houses and the school and clinic/store. The primary purpose of the EMU is to control the total load on the system, and ensure a fair and equitable distribution of power by providing each household with a predetermined amount of energy (the 'energy budget') each day. If this budget is exceeded, power is lost to discretionary circuits.



Energy Management Unit

- Each EMU incorporates an intuitive user interface to aid energy management
- Low amp circuit breakers have been installed to prevent the usage of high power demand appliances
- Individual device timers have been installed for certain lights. The duration of these timers have been set to meet residents' needs
- Centrally controlled timers have been installed for light, fan and general power

circuits. The duration of the timers have been set to meet residents' needs

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

During pre-installation discussions residents agreed to use certain appliances, such as washing machines, only when there is enough power available. The best time to use them is in the morning, before the EMU resets the energy budget at midday.

Appliance Acquisition & Replacement

As part of the overall approach to demand side energy management, inefficient appliances are identified and replaced as the community is able to do so. At Ukaka two new energy efficient and appropriately sized fridge/freezers and five new chest freezers were purchased and supplied. Energy efficient lighting fixtures have also been fitted.

Generator Use

Estimated generator run-time, including load from the school is 1.2 hours/day, equivalent to ~1800 litres of diesel a year.

The community generator is designed to run when the system senses the batteries need charging. When there is less than full demand placed on the system then the expected generator contribution to the total load will be less.

Other Energy Services

In addition to the energy being supplied by the Bushlight Systems, the Ukaka residents continue to rely on the following additional energy sources:

- Firewood for cooking outside
- Gas for cooking inside
- Thermal solar hot water service

Contact Bushlight

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