



Mount Peachy

The Setting

This case study looks at Syd and Connies' house. One of three located in Mount Peachy, a remote community 90km south of Alice Springs.

Mt Peachy has been established for approximately twelve years. While the lifestyle of the occupants does not require a high demand for energy, one of their major problems has been securing a reliable and affordable source of energy.

Prior to Bushlight the three houses relied on generators for their power supply. Even though Syd has considerable mechanical experience, having worked as a bore mechanic for many years, he could not get the generators to operate well and they broke down frequently.



Bushlight's Approach

Bushlight has designed a participatory process called the Community Energy Planning Model (CEPM). This involves both community and household discussions.

Bushlight's knowledge about the community's history, structure and aspirations is gained through interactive meetings and discussions. At the same time the community builds up a broader understanding of how the energy services they use are an integral part of their lives.

The second phase of interactions involves a progressively more detailed assessment of energy service options at a household and/or community level, this includes:

- Energy Service Profile - Reviewing and assessing existing energy services
- Energy Budget - Analyse the existing and future electrical energy needs
- Demand Side Management - Consider human and technical methods to maximise the efficient use of energy

By raising the community's awareness and knowledge, they are able to make informed decisions to influence the design of improved energy services.

Pre-Bushlight Energy Services

In the initial discussions it was determined that Syd and Connie used:

- Firewood for winter space heating using an indoor fireplace and for outdoor cooking on a freestanding wood BBQ
- Gas for cooking on an indoor stove and supplied via one 108kg bottle that costs \$105 to refill
- Solar thermal to heat water for domestic use
- Electricity produced by diesel generator, one to two jerry cans of diesel a week were used at a cost of \$35/week

Bushlight assessed all the issues regarding existing energy services before determining how they could assist in securing more reliable and sustainable energy sources. The following issues were discussed:

Firewood

Firewood is plentiful and free, and there were no concerns. The fireplace has a flue that is appropriately installed so health risks are minimised, and cooking occurs outdoors away from the building and veranda so there is minimal risk of smoke inhalation.



Gas

Initially a number of concerns were expressed about the use of and access to gas:

- As there is only one bottle there is down time when it needs to be refilled
- To transport the bottle to and from town required a tray back or utility vehicle
- If a readily available supply of electricity was available Connie would have preferred to use alternative appliances such as a rice cooker and electric frypan

Through discussions it was determined that down time and transport were not regular inconveniences, as a bottle of gas would last up to one year. This was due to Syd preferring to cook on the wood BBQ. They could also get access to a utility vehicle through family.

In later discussions during the Energy Budgeting activity both Syd and Connie quickly picked up on how much electrical kitchen appliances increase the budget. With this increased awareness Connie agreed that they should continue to use gas for cooking and that electrical kitchen appliances would not be used.



Solar Thermal

The solar hot water unit is a double panel 300lt system. They very rarely needed the electric booster, when they did they found it would “drain the generator”.

Diesel

A generator was used as the source of electrical energy. While three generators were recorded during initial visits, only one was operational.

- The first inoperable generator belonged to the Titjikala (the Resource Agency), who soon after took it away to be fixed
- The second inoperable generator had been made up from spare parts by Syd
- The operable generator belonged to Syd Junior, who lives in one of the other houses at Mount Peachy

Titjikala provided support for the generator they owned but Syd and Connie had to pay fuel and servicing costs, in addition to all costs related to the other units. Syd could not say how much this costs but “it used a noticeable amount of money up.”

Syd stated that when there was a working generator, he usually ran it for about 4 hours a day in winter and 6 to 8 hours a day in summer. He said that he often “ran it till the fridge gets cold, and then turns it off”.

Due to the distance between the three houses, and the on-going problems that had been endured, it was concluded a Bushlight Household System was the best way of improving Syd and Connies' access to a reliable source of electrical energy.

Energy Service Goals

By accessing improved energy services Syd and Connie expressed a hope to gain the following improved livelihood changes:

- Better entertainment due to being able to use the TV, DVD and play station more regularly
- Through better entertainment a more inviting place for kids to stay, keeping them safe from “traps” found in town
- Continuous power for a fridge and a chest freezer would allow food to be stored for longer periods
- Due to 24hr food storage and available power to use a washing machine fewer trips into town would be required
- Connie would be able to use her computer at the house, allowing her to improve her computer skills

Energy Budgeting

Discussing daily activities and carrying out a house audit helped to build up a realistic Energy Budget of Syd and Connie’s electrical needs.

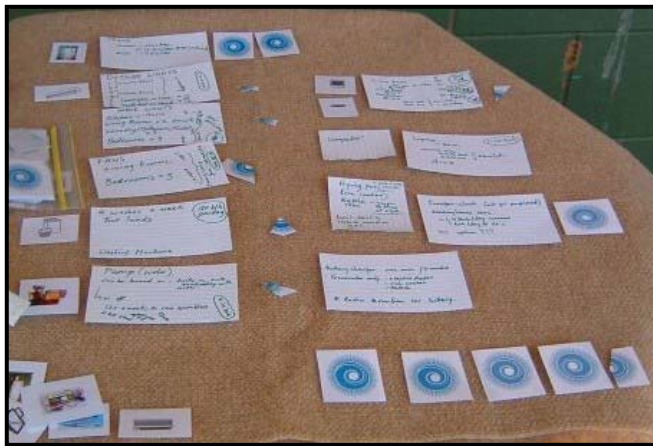


Bushlight staff member helping Syd and Connie to draw up a detailed plan of their house

This included looking at the following groups of appliances and how they used energy:

- Appliances that need to run all the time
- Appliances that run for a long time and do not use much energy
- Appliances that run for a short time and use a lot of energy
- Appliances that run for a long time and use a lot of energy

Syd and Connie were able to make informed decisions about how they would use electricity that would be available from a new Household Bushlight System. The Energy Budget was drawn up using blue sun symbols to denote how much energy each appliance would require.



The Energy Budget drawn up with Syd and Connie. (It includes the additional freezer that had not yet been purchased and also the old inefficient fridge. This was agreed later to be replaced with a new DC fridge)

Examples of the informed decisions made by Syd and Connie include:

- A pressure pump used to assist with watering the garden would only be used when there is plenty of sun and the batteries are fully charged
- The solar hot water booster would be placed on a generator only circuit
- If kitchen appliances were ever used they would be powered via special power socket on a generator only circuit
- The old inefficient fridge was replaced by a new DC fridge, the smaller budget reduced the size of the system required
- They would buy a new chest freezer to increase food storage and reduce trips to town. This was included in the budget

From the Energy Budget it was derived that a system capable of delivering an average of 3.6 kWh/day would be required. This system was designed for January when the ratio of ‘available solar energy’ to ‘required electrical energy’ is the lowest.

Syd and Connie were consulted and were happy with the system design before it was finalised.



The New Bushlight Household System was commissioned on 26th December 2003

System Use and Performance

Operation and maintenance training was provided with the aid of a pictorial based User Manual. The training included basic troubleshooting and system monitoring skills.

Both of the following issues were resolved within a few days, as these new skills were effectively used when:

- A high surge load from an old TV kept tripping the circuit breaker. Syd managed to identify the source of the problem and contacted Bushlight. The issue was easily resolved by safely increasing the circuit breaker rating
- As the new chest freezer and washing machine were yet to be bought Syd reconnected the old fridge. During several days of cloudy weather Syd noticed the battery levels were getting low, by checking the gauges. After discussions with Bushlight Syd knew the old fridge could not be used and it was removed from the house.

Identified Outcomes

Satisfaction: Syd and Connie said they were “very happy with the system”, stating that it “gives them whatever (power) we want”. An example they gave was when “grandchildren were staying and it was very hot, we could use the fans all day and the batteries did not go down”. The reduced noise pollution was another benefit that took a little time to get used to.

Reliability: Both Syd and Connie are very aware of the system capabilities and check the gauges regularly. They know of other communities with renewable energy system and Connie says they “won’t have troubles like others”. Syd explained that they “know what it (the system) can and cannot do”.

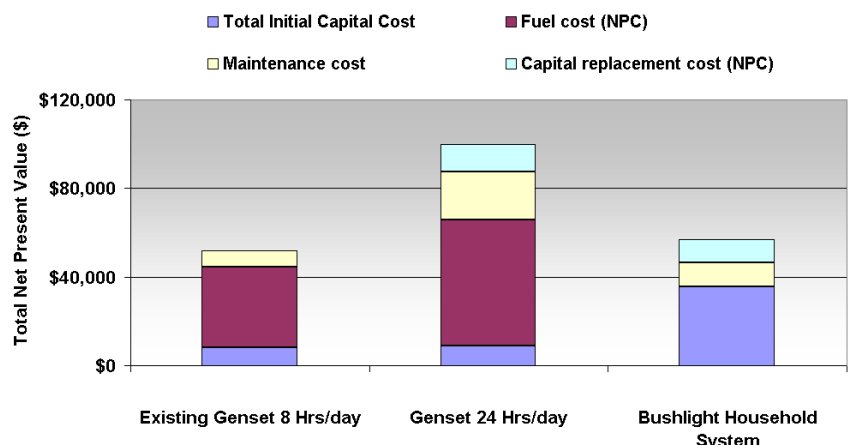
Reduced Costs: Syd and Connie both have “more money for things we want”. Connie noted that there was now “no need to buy candles or batteries for torches”. The generator has not been run since the system was commissioned, saving \$35 a week for fuel. Connie made the remark that “it is great not to have to try and fill diesel in that little shed at night in the dark”.

Energy Service Goals: Most of the goals relied on receiving 24hr power. Connie mentioned they “don’t have to run to town every few days to get fresh tucker” and that her son “Edward was very happy” to have more entertainment. Connie also noted that when the other houses have systems installed, “Syd Junior’s kids will want to live out bush rather than in town”.

Saving for the Future: The community is conscious of the need to put money aside to help pay for service and maintenance costs. They are currently making arrangements to have contributions of \$10 a week taken from their weekly CDEP payments.

Life Cycle Costs: The design included a ten-year life cycle cost analysis. Various scenarios are graphically shown below. The Bushlight Household System is comparable in terms of costs against the previous energy supply option, and for 24hr power is considerably more cost effective.

Total Life Cycle Cost Comparison (NPV)



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