

# Showcasing sustainable island management on the Great Barrier Reef

## Energy audits on Low Isles and Lady Elliot Island

### Summary

Island communities of the Great Barrier Reef Marine Park are living in uncertainty in the face of climate change. In response to this particular situation, two Great Barrier Reef islands have taken the opportunity to trial some innovative environmental initiatives. Low Isles and Lady Elliot Island have been working with the Great Barrier Reef Marine Park Authority (GBRMPA) to develop energy and carbon dioxide reduction schemes.



### Background

Low Isle lies in the northern section of the Great Barrier Reef, offshore from Port Douglas. Lady Elliot Island is the southernmost island within the Great Barrier Reef Marine Park. These islands have significant natural, cultural and heritage value, and are also important sites for research, tourism and recreation. Existing structures on these islands include a lighthouse and research station (Low Isle) and an eco-tourism resort (Lady Elliot).

In 2007, both Low Isles and Lady Elliot Island underwent energy audits by Tropical Energy Solutions. The reports from both audits found that there was scope to reduce the energy consumption of each island by 35 per cent and 40 per cent respectively. In the following two years, the islands have made significant changes toward increased energy efficiency with support from the GBRMPA.

### Objectives

The aim of this project was to determine if the energy management strategies were improving energy efficiency. The sustainable energy use initiatives on Low Isle and Lady Elliot Island will be showcased as examples of best practice island management.

### Actions

Tropical Energy Solutions conducted A follow-up energy efficient audit and report on both islands in May and June 2009.

- Energy audits were conducted in accordance with the Australian Standard (AS/NZS 3598:2000), to identify any increase in energy efficiency. The report set an energy-rating target for any future audits.
- Carbon dioxide (CO<sub>2</sub>) emission analyses were done for the 2008/2009 year using both the GBRMPA's Tourism Emissions Calculator and the Department of Environment, Water, Heritage, and the Arts (DEWHA)'s "Greenhouse Challenge Plus" Emissions Calculator.

- Reports detailed the results of the audit and proposed new energy and emissions management strategies with an associated cost analysis.

### Outcomes

#### Low Isles

The report found that Low Isles has benefited from a significant 'green' makeover. The island has adapted its operational procedures to accommodate the new solar powered energy system.

The move towards energy efficiency was done in phases. In 2008, the diesel generators were switched to biodiesel and the solar energy system was refurbished and upgraded. In addition, a number of changes were made to the sewerage treatment system resulting in a reduction from around 15kWh/day to around 7.5kWh/day.

#### Lady Elliot Island

As of June 2009, Lady Elliot Island has also recorded a reduction in electricity use of 32 per cent (since October 2007). Taking a pro-active approach, Reef Resort Management Pty Ltd has upgraded their facilities and fostered a change in energy use behaviours.

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In 2008, three diesel generators on Lady Elliot Island were replaced with a Hybrid Power System. This system derives power from solar energy and a diesel generator during the day, which in turn charges a large battery bank to supply power at night. This has resulted in a saving of 65 per cent in diesel use and CO<sub>2</sub> emissions. As of May 2010, 8000L of diesel had been saved per month of operation (excludes one month not in operation due to storm damage). A large portion of that electricity is now being produced from renewable sources.

#### Box 2: Emissions reductions activities

Examples of CO<sub>2</sub> emission reduction activities include:

- Replacement of electric hot water with gas hot water systems
- Removal of eight clothes dryers from the resort, leaving only two. These have timers, limiting use to between 6:30 am and 9:00 pm only.
- Fitting the desalination plant with improved membranes, allowing more efficient fresh water production
- Replaced kitchen's electric stove, with a gas powered model
- Installed more efficient air-conditioning models in two suites.



#### Box 3: Emissions

GBRMPAs Tourism Emissions Calculator and DEWHA's "Greenhouse Challenge Plus" Emissions Calculator both recorded the following results (the total annual emissions in tonnes of carbon dioxide (t CO<sub>2</sub>-e)):

**Low Isles** - 0.374 t CO<sub>2</sub>-e per year. This is a very low figure and equivalent to the emissions output of one average Queensland house for only 17 days.

**Lady Elliot** - 374 t CO<sub>2</sub>-e per year. This is the equivalent yearly output from 46 average Australian houses. Lady Elliot Island houses an average of 25 staff per day and 130 guests daily.

(Based on an average of 8000kg CO<sub>2</sub>-e/year, Queensland's Energy Future: Queensland Department of Mines and Energy 2008)

## Future Directions

### Low Isles

Investigations into possibilities for further reductions only identified scope to reduce electricity consumption by another 3.6 per cent. Given the very low CO<sub>2</sub> emissions of the island, these modifications would not prove cost-effective.

### Lady Elliot Island

The Lady Elliot Island management team has implemented a policy of continued energy efficiency, providing an excellent example of best-practice sustainable management.

The 2009 report identified that, in addition to the previous reductions, there is potential for a further 25 per cent reduction in energy use. These reductions could result from:

- Further investigations of the energy efficiency of the kitchen refrigeration system and cool room

- Installation of further gas hot water systems
- Installation of additional efficient air conditioner systems
- replacement of all non-water saving taps and shower heads

A recommendation is for the island to undergo a study of domestic waste to determine the full CO<sub>2</sub> emissions generated from human activity. The study would investigate the type, volume and destination of all waste.

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