

# Sustainability Case Studies



## Lady Elliot Island Eco Resort, Lady Elliot Island

### 1. Getting started

Lady Elliot Island Eco Resort is located at the southern tip of the Great Barrier Reef.

2007: Resort management decides to investigate options for renewable power generation and emission reductions.

Tropical Energy Solutions conducts Energy Audit and identifies opportunities to combine comprehensive load management with hybrid power system development.

Average daily fuel consumption reduced from 500l to 300l with equal reductions in the emissions and costs.

2008: Federal Government funding approval obtained to support construction of Hybrid Power Station.

Tropical Energy Solutions provides the Hybrid Power Station System Design services.

Hybrid Power Station built during November and December 2008, and was commissioned on the 20.12.2008.

### 2. Major initiatives

The resort wanted to find alternatives to their reliance upon three diesel powered generators for their electricity.

### 3. Key outcomes

Following an energy audit (Level 3) in consultation with the Great Barrier Reef Management Authority, the resort introduced a number of low-cost, energy saving measures which resulted in a 24% reduction in energy costs. The audit also identified the opportunity to develop a hybrid off-grid power station to reduce carbon emissions, noise and the reliance on fossil fuels.

The resort decided to establish a hybrid power station consisting of 130 square meters of solar panels, battery banks and inverters and a new generator that is a third of the size of the existing unit. The resort now enjoys a 40% reduction in fuel consumption and emissions, with this expected to increase further as additional solar panels or wind generators are added over time. The resort's long-term goal is to run the resort entirely on solar power and other renewable power sources thereby eliminating the use of generators except as backup. Key features of the new system include:

- State-of-the-Art Hybrid Stand Alone Power System
- Natural materials, low embedded energy
- Noise reduced, silent genset
- Reduced fuel consumption & spillage risk
- Comprehensive data logging system
- Public communication/web hosting
- Ability to remove or extend system
- On-site maintenance & repairs

- Use of natural ventilation for cooling
- Minimised eco-footprint for resort
- Use of ballast for stability
- Visitor education program

The Power Station was funded as a joint venture between Lady Elliot Island and the Australian Governments Renewable Remote Power Generation Programme.

Interpretive tours will be conducted for guests and educational groups to raise awareness on the effects of Climate Change on a coral cay, what Lady Elliot Island is doing to help slow down climate change, explore the island's history, visit the old diesel generators, calculate carbon emissions and tour the new hybrid solar power station to discover how they have managed to substantially reduce carbon emissions on the island.

#### System Details:

Free – standing hardwood timber structure 18.25m x 8.20m, 25° tilt to true north, 143m<sup>2</sup> active solar surface area

20kWp Solar PV modules (96 x Kyocera 205), 6000Ah 48V VRLA Gel Batter Bank (48 x Sonnenschein A600/3500)

64 kW encapsulated genest, AC Coupled Inverter System (6 x SMA Sunny Island + 3 x SMA SMC 7000TL)

100 kW 3-phase 415 V system capacity, datalogging and internet intergration via SMA WebBox



#### Major Achievements as at March 2009:

- Reduction of resort peak load by 42%, Reduction of annual load by 35%
- Reduction of diesel consumption and CO<sub>2</sub> emission by 40% = 73000 litre/year = 194 tonnes CO<sub>2</sub>/year
- Reduction of genset running hours by 29%, Reduction of genset maintenance cost > 50%
- Reduction dependence on fossil fuels and barging services

#### 4. Major challenges

None provided.

#### 5. Advice to operators

None provided.

#### 6. Next steps

- A target to reduce diesel consumption by a further 25% to 225 litres per day by mid 2009 resulting in a total CO<sub>2</sub> emission reduction of 55% or 267 tonnes.

- System extension, including the installation of additional solar PV and wind power generators by 2012.
- Installation of water harvesting and energy efficient desalination plant.



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