



Project Background

The Sunbird house was conceived as a working project to demonstrate use of sustainable materials, energy saving technology, low emission living and passive design principles in tropical Queensland. It was built at a time when even roof insulation was still an optional extra for many Cairns builders.

You can use some or all of these principals when building or renovating a home to improve its coolness, water and energy efficiency and sustainability.

Keep it Cool - Passive Design

The first step in a comfortable house and in energy efficiency - keep the house cool so air-conditioning is not needed. Air conditioning of houses is a significant and rapidly growing part of Queensland's energy use and greenhouse gas emissions.

Big, insulated roofs keep the heat out and the sun off the windows and walls. Additional awnings to east and west assist with lower sun angles.

Walls are painted a light colour to reflect heat, and have a reflective foil lining for further insulative effect.

The house is of 'lightweight' construction, being built of timber. This lack of 'thermal mass' means it will cool down very quickly in the early evening, unlike a masonry house.

Passive design principles focus on orientating the house to prevailing south-easterly winds (all bedrooms and living areas face these breezes). Cross ventilation is combined with convection currents (hot air rises) through the house by the use of ridge vents, slatted ceilings, high level louvres and strategic window placement.

Outdoor living is an integral part of the Cairns lifestyle and always cooler. Outdoor areas also help shade the house.

Window systems such as awning and louvre windows are designed to be left open even in rainy conditions, thus ensuring constant airflow through the house. Westerly windows are glazed with tinted glass to further reduce solar heat loads.

Lots of natural light - houses can be quite dark in the wet season leading to increased light use

The vegetation of the yard area provides further shading and temperature modification.

Save Energy and Greenhouse Gas Emissions - Energy Efficiency & Production

Mechanical cooling is limited to ceiling fans. No air-conditioning is needed.

Energy efficient appliances such as dishwasher, washing machine and refrigerator (five star ratings) reduce energy use.

Energy efficient lighting, especially compact fluorescents can make a surprisingly large difference.

A covered drying area negates the need for a clothes dryer.

A solar hot water system with a manual boost switch only needs boosting a few times a year during the cloudy wet season.

Gas cooking has lower greenhouse gas emissions than electricity from coal fired power.

Solar panels on the roof produce all the day time energy needs. This energy is exported to the Grid during the day and drawn back at night. There is more information on this by Planetary Power.

Save Water - Efficiency & Production

All appliances are five star rated for water efficiency

All taps and showers are rated for water efficiency as is the dual flush toilet

A composting toilet as a second toilet further reduces water consumption

An extensive array of rainwater tanks intended to meet up to 75% of annual household water consumption

The site has been revegetated to restore endemic vegetation which will survive with minimal irrigation.

Materials Selection

Materials were selected on the basis of life cycle costing and environmental impacts including toxicity, mining and processing impacts and embodied energy

High embodied energy concrete and steel were limited to footings and stumps

There is very minimal use of PVC which has a possibly toxic life cycle with sanitary drainage in HDPE instead.

Copper, which is damaging to mine, has been reserved for electrical - for which there no alternative, while alternative plastics have been used for water supply.

The house is constructed mostly of timbers that were sustainably harvested on the Atherton tablelands, including structural framing, linings, cladding, flooring, joinery and windows

The roof is fully insulated with a non-fibrous insulation product

Local employment was considered with timber, joinery and metalwork all sourced locally.



SUNBIRD HOUSE

Builder: Max Bryant Constructions
 Consultants:
 CMG Engineering
 Gilboy Hydraulic Solutions
 SPA Engineering
 Solar Installations:
 Planetary Power

studio mango
 457 Draper Street
 Paramatta Park
 Cairns QLD 4870
 tel: 4041 1394
 email: info@studiomango.com.au
 http://www.studiomango.com.au