House no.	House Name	Suburb
1	Efficient, solar-powered home in Manunda	Manunda
2	Eco sensitive resarch station in Cape Tribulation	Cape Tribulation
3	Solar-powered stone house in Mareeba	Mareeba
4	Aquaponics in Bungalow	Bungalow
5	Kuranda rainforest house	Kuranda
6	Aquaponics in Edmonton	Edmonton
7	Architect designed sustainable home	Smithfield Heights
8	Passive design home in Redynch Valley	Redlynch Valley Estate
9	Naturally cool home in Tully	Tully

House 1.
Efficient solar-powered house
Manunda 4870

We export more than twice the amount of electricity that we use, have piped hot water from the sun and fresh organic vegetables from the garden. We live in the tropics but need no air conditioning - we have ceiling fans, insulation (R4.5), whirly birds, and a white-painted roof and external walls making the house very comfortable in summer. We compost our food scraps, mulch the gardens to save water, grow the lawn long to keep in moisture and reduce weeds. Bike riding is a major form of transport in our family. We minimise food miles and recycle what we can.

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House 2.
Eco-sensitive research station
Cape Tribulation 4873

This 'house' is actually a research station which is home to staff and volunteers who live on the property. It consists of four separate cabins (each with two rooms) and two residences, plus communal buildings – a laundry/shower/toilet block, two laboratories and a workshop.

All buildings are constructed with as high a proportion of re-used materials as possible (cabins 100%), labs and workshop about 30%). Power is supplied largely from a 30 panel PV array supplemented by a generator (we are hoping to have heat scavenging fitted by September to heat water).

Laboratories are of our own design, sealed cool room panel construction with dehumidified filtered air using passive counter-current air-to-air humidity exchangers of our design to recover about 50% of the dehumidification energy.

Hot water for showers is supplied by a pumped solar hot water system. The toilet is a composting system, the grey water (used water) from the kitchen is processed by a high-surface-area digester which removes fats, and produces a water-based curd that flows in to an absorption pit.

Water is provided by a spring for most of the year, and by a solar bore pump for the dry periods. Water is shared with the neighbours.

The garden is a slowly developing permaculture garden with an emphasis on 'Fijian' food items such as taro, manioc and tropical greens – which grow well in this climate. There are also chickens on the property, which eat food scraps and produce eggs.

House 3.
Solar-powered stone house
Mareeba, 4880

We are landscapers and specialise in stonework. We designed, drew plans and were owner builders and did all the stonework, tiling and painting, artwork and landscaping ourselves. The house is four years old and we used an Indian method feng sui consultant. The external walls are stone inside and out, with clay and block around windows and doors.

The direction of the house is most important for us, with afternoon sun hitting only garage and guest room. Casement windows on the east side guarantee a breeze through the house almost every day of the year.

The solar 2.5kW system is great. We get credit through the wet months and low electricity bills. We've never once had to turn on the booster for the solar hot water system.

The induction stove is fantastic and is as fast as gas. The Ready Hot pump is successful for two bathrooms and the hot water takes about 3 seconds to come through. It's great for bathrooms that are a long way from the hot water system.

Our main aim was for energy efficiency with low maintenance and long life of materials used. We have vanities and solid doors which will not need to be replaced in our lifetime, lami panel ceilings in bathrooms and clay roof tiles which last over 50 years (barring cyclones, of course).

Our organic garden is a balance of bird-attracting native, hardy succulents, ornamental plants, and food-producing trees and vegetables. We are about 70% self sufficient.

We moved here from an organic fruit farm and no behaviour changes were required. The house is easy to clean and very comfortable to live and entertain in. It was especially enjoyable to build and a great avenue for our creativity.

House 4.
Aquaponics – backyard fish and vegetable production
Bungalow 4870

For the last five years Len and Wendy have been aiming toward sustainable food production using aquaponics to grow fish and vegetables and recently added wicking beds as a complementary production method, all in their back yard.

This is the third year the systems have been displayed in an attempt to show how easy and sustainable these methods of food production can be.

Aquaponics is a water conserving contained ecosystem, comprising fish tanks and plant growing beds. The fish-poo nutrient rich water created is pumped up to the quinken or gravel filled grow beds where it is filtered by the plants and returned by gravity to the fish tanks as clean, oxygenated water.

Len is using barramundi and jade perch as food fish, guppies and gold fish for mosquito control and growing a wide variety of vegetables.

Wicking was originally introduced as a water conserving (in or above ground) method of growing vegetables. Water is contained within a reservoir comprising of ag-pipe embedded in sand covered by a root barrier. The growing medium above this is rich in nutrient combining compost, manure or worm castings and soil with a layer of mulch to control evaporation. An outlet controls moisture levels and an inlet allows introduction of liquids. The natural wicking action of the moisture from the sand reservoir through the rich growing medium to the roots of the plants provides sufficient water and nutrition for plants to flourish.

Aquaponics and wicking provide waist height ease of gardening for individuals with physical difficulties. Water conservation, the elimination of soil born pathogens, pest and weed control, as well as natural worm action in the beds are huge advantages of both these methods of food production. Both are complimentary to conventional gardening practices.

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House 5.
Low-impact rainforest house
Kuranda 4881

The primary goal when designing this home was to achieve lower running costs as we are heading towards retirement and had become empty nesters. The home is located in rainforest at Kuranda and the impact from water treatment on the local environment was a major concern.

To achieve our goals the house has a PV Solar grid system, low energy lighting, a secondary level waste treatment system, water efficient tapware and fittings, extensive wall and ceiling insulation, louvre windows located to maximise cross ventilation and large roof overhangs not only to shade the house but to keep the rain out of the outdoor living areas.

Because we live in the tropics we also wanted a lifestyle where we could move between the outdoor and indoor areas of the house depending on the seasons, wet and dry, summer and winter. As the home is a pavilion design, the indoor and outdoor areas of the living pavilion can be easily combined by opening large sliding glass doors. There are 2 bedrooms and an open office in the second pavilion, during holiday periods the open office converts to additional sleeping space.

To reduce our ongoing maintenance, the house has been clad with a combination of Colorbond and Hardieplank. Both the Colorbond and Hardieplank are easy to maintain, long lasting, durable, lightweight and can achieve high thermal efficiencies when used correctly in the tropics.

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House 6.
Aquaponics – backyard fish and vegetable production
Edmonton 4870

I have the traditional quarter acre block and I am able to utilize it for both food and recreation without either being too compromised. The house has been involved in foster caring for some of its history and over 50 children have learned about raising some of their own food. Originally, there was a large vegetable patch and chickens, but as the family members lessened, so did the need to provide so much food. I was looking for an alternative methods that was applicable in the ever decreasing size of the suburban block.

I set up an Aquaponic System in my yard about 18 months ago. It has grown one batch of 50 Jade Perch to maturity and I am currently growing out 50 Barramundi fingerlings. I also grow in a usual style of backyard dirt garden that is fertilized by excess fish emulsion, compost, worm castings and mulch hay. Both gardens are quite productive, with the aquaponic system providing as much vegetable produce as the equivalent size earth garden, with the added value of providing fresh fish. I am also experimenting with a raft system of production.

When I first started an aquaponic system I assumed any extra vegetable area would not be needed, but after 2 growing seasons I have come to realize that both systems work better together than as separate entities, with the earth garden taking the excess fish emulsion as well as being a better growing medium for some vegetables e.g. rocket and the aquaponic system being a better area for other crops e.g. watercress.

There is also room for expansion to make it more independent, with the addition of a composting system to attract Black Soldier Fly as additional animal food and the addition of chickens for eggs and garden manures.

House 7.
State of the art sustainable home
Smithfield Heights 4870

Sustainability at its futuristic best. This eco-friendly, architect designed home has shown again why Gabriel Poole is a world renowned architect. Gabriel, now in his 70s, with over 40 years of architecture experience, has been working together with Gateway Constructions for the past 9 years.

The home is three stories with 355m2 under roof and endless practical features. The first story is guest quarters. The second story contains 3 bedrooms, 2 bathrooms and a kitchenette, and the third story has a massive modern kitchen, living and dining room with a feature Colorbond ceiling. There are multiple decked areas, where ModWood - recycled Milk cartons and sawdust - has been implemented. The roof is of contemporary, multicultural design with aesthetically pleasing, sweeping curves.

Structurally, as with the rest of the home, flooring, walls and wall lining, the sustainability signature is ever present, with only the use of plantation timber. The home is engineered to a cyclone rating of C3 (W60) and is arguably one of the strongest buildings in North Queensland.

The patented breathing wall system enhances the unsurpassed natural airflow - you can see and feel why this home achieved a one of the highest star energy rating. Other features include a 2kW Solar PV system, 5000L water tanks and a shaded pool and spa.

The package is set on 4048m2 of natural landscape including around 2000m2 of natural rain-forest with walking tracks.

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House 8. **Affordable and flexible sustainable home** **Redlynch Valley** This home features passive solar design, with the house orientated to minimise heat input from the sun, maximise cross ventilation by cooling breezes, and make use of shading to keep the house cool. It has been designed so that the living areas are north-facing, and the short walls are east-west facing. Good passive solar design minimises the need for air-conditioning. The home has 'grey glass' and R3 insulation to reduce heat input and improve energy efficiency. Ceiling fans are included throughout the house, including on the patio The 'flexible design' of the home means that the 4th bedroom can literally be deleted from building plans without changing the feel of the house. There are rain water tanks and water efficient fixtures to improve water efficiency, and lighting is energy efficient. This home has an energy rating of 6.5 stars. With the use of lighter colours on external surfaces, this design would achieve a rating of 7. This home is part of a range of designs specifically for the tropics by Kenick Constructions. They also offer a number of upgrades to improve sustainability, and staff are trained to advise on energy and water efficiency. Solar energy, low VOC paints, louvers, roof and eaves vents are just some of the optional extra's available to improve energy and water efficiency. ***Directions:*** *Northgate close is in Redlynch Valley Estate. Once in the Estate, turn left at the roundabout (Xavier Herbert Drive), then take the 5th turning on the right into Mackerras Street (ignore the 1st turning into Mackerras Street), then 1st right into Kippin Close. Northgate Close is off Kippin Close.*	Photos coming soon

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House 9.
Naturally cool home in Tully
Bulgun 4854

Our home is built on approximately 7,000 sq. m. of an acreage subdivision of a sugar cane farm. We needed to maximise cooling, cross ventilation and mould reduction due to our location next door to lowland tropical rainforest. Due to the usual rainfall in the Tully area we have chosen not to harvest rainwater at this time.

Our home is clad in light coloured colorbond steel. It is an elongated U-shaped home on 600mm concrete block stumps with an internal veranda.

The 2 bedrooms, kitchen, living-dining areas and bathrooms all have large screened louvers for ventilation. Except for the bathrooms we used Cypress Pine tongue and groove flooring for termite resistance upstairs. The bathrooms are tiled, the veranda has Kwila stained decking and the downstairs bedroom has a painted concrete floor.

The second bedroom with ensuite is downstairs adjacent to the shed and carport which are on a concrete slab.

We have revegetated half the block which is around the house using local native trees, shrubs and grasses purchased from the council nursery. Many of these natives are local bush foods from the Ficus and Sygium families as well as Cedar Bay Cherries, Bandicoot Berries, palms and cordylines.

We have an organic vegetable garden which is still experimental due to the recent weather, as well as bananas, citrus trees and paw paws in situ. There are also many hibiscus and other tropical shrubs and ground covers. We have minimised lawns. I have several family heirloom shrubs in my garden.

The other half of the block contains a semi-permanent bog area which is grassed and grazed occasionally by a neighbour's cattle. There are remnant trees from the sub-division revegetation planting, which were almost destroyed by Cyclone Yasi.