



SONEVA KIRI

BY SIX SENSES



## *The Eco-villa at Soneva Kiri by Six Senses*

The eco-villa is a prototype zero carbon emissions, Six Senses hotel suite on the island of Kood. It is a forerunner to our forthcoming zero emissions brand – Evaluations by Six Senses, and is a showcase of a range of experimental environmental technologies incorporated into a bio-climatically designed luxury pool villa made from locally sourced building materials. The structure has been erected by a team of Thai craftsmen, which including mud brick experts, terracotta potters, master carpenters, and stonemasons. The structure has been created to demonstrate that it is possible to provide the same levels of service and comfort as five star luxury hotel accommodations, using modern building techniques and state of the art, zero carbon emissions, renewable energy technology combined with indigenous skills and knowledge, even in remote areas. The construction, landscaping and operation are based on permaculture design principals to ensure that waste is minimized or reused.

### *Structure*

Low embodied energy materials, recycled waste products and green building techniques that require minimal mechanical energy were used as much as possible – no cement or concrete was used in the structure. The foundations are made from sandstone boulders extracted from the excavation of other villas on the site, with post holes chiseled by hand. Most of the timber used for the post and beam structure was harvested, kiln dried and treated on site and is held together with hardwood dowels, handmade by a local boat maker. Some poles and rafters were made from locally sourced Casuarina driftwood. The remaining timber poles and beams are locally sourced, plantation eucalyptus and the roof decking is plantation rubber wood planks harvested from mature rubber plantations in a nearby province. Forestry stewardship council pine is used for the joists and reclaimed teak is used for the decked areas. The teak leaf ceiling lining gives the building a nest-like quality.

Subsoil from the site was mixed with rice husks and straw (agricultural waste products) and molded to make adobe mud bricks and plaster for the interior walls, site-sourced sandstone was used for the exterior walls, and the soil excavated from the pool was reused on the green roof. Recycled egg crates have been used in the drainage layer of the green roof, with glass soda water bottles being used as glass bricks for the shower. Human health and biophilic themes were an important motivation - non-toxic adhesives and wood treatments being used throughout the building (latex, boracare, lime mortar) and electro magnetic waves have been reduced as far as possible (no wireless technology)- the building is therefore entirely suited to guests susceptible to allergies or sensitive to electro-magnetic fields.

The building's excellent insulating properties are provided by cellulose insulation in the roof, made from recycled newspaper, heat stop glass and the thermal mass of the 1m thick walls. A green roof covering the structure provides another layer of insulation, which helps control storm water runoff and also provides a habitat for native flora and fauna, in addition to integrating the building into the surrounding landscape. During construction, a pottery kiln was built on-site to produce terracotta pipes and up spouts and downspouts for rainwater collection. The design of the kiln inspired the construction of a small wine cellar.

Copper rain chains were also made on site based on a design traditionally used in Japanese Buddhist temples.



Relax in the bamboo spaceship floating daybed



Wine cellar



Shower Area

### *Technical Elements:*

Light is provided by a central skylight for daylight and for viewing the stars at night. Super efficient lighting is provided by LED and CFL bulbs in environmentally friendly light fittings designed by Six Senses. A rainwater harvesting system linked into the resorts main rainwater collection has been installed. The water passes through a membrane filtration system before being used in the bathroom.

The building is cooled using two experimental methods – firstly, the use of a 24,000btu solar air conditioning unit from Solcool, that consumes only 1,200w peak load, and secondly, a passive cooling system incorporated into the thermal mass of the building. The fundamental idea is to cool the mass and maintain the temperature with insulating materials. A solar panel provides hot water for the showers and washbasins.

A natural pool acts as a rainwater storage system plus a wildlife magnet and a swimming pond, with the water being circulated via a pump through reed beds filled with aquatic plants that lower the nutrient content

and filter the water. A UV (ultra violet) light in the pipe system eliminates pathogens, whilst a series of water-falls aerate the water. No toxic chemicals are used; It is simply filtered rainwater.

All the building's energy is produced via a hybrid system composed of a 1.7 Kw Skystream wind turbine, 6.2kw of photovoltaic solar panels and a micro-hydro system using waste water from the restaurant above. It is stored in batteries for nighttime use and has a three-day backup. Guests and members of the local community have access to this area to learn about sustainable power generation and storage.



A reed bed (constructed wetland), receives all waste water and septic tank effluent. The treated water is reused for landscape irrigation to feed the bamboo privacy hedges with nutrient rich water and thereby provide food (bamboo shoots) and rapidly renewable construction timber.

Much of the existing on site vegetation has been preserved, with the site having been selected because a large rubber tree had fallen there and cleared many of the larger trees. The remaining landscaping is a combination of endemic, adapted and native plants for aesthetics and some organically grown edible plants (banana, papaya and herbs), and medicinal plants for guest consumption.

It is hoped that the project will receive LEED Gold or Platinum certification

The Eco-Villa is essentially an experience that allows guests to tread very lightly on the earth during their stay, and Six Senses hopes that it will serve as a model for the rest of the industry. It is another step on our path to decarbonising the group's operations.