



Stonefly Lodge - Case Study

As an accommodation provider operating off the national grid, meeting all its energy needs with alternative power sources, Stonefly Lodge's application for an Enviro Award was a stand-out.

The business has made a commitment to use only natural resources available within the 156 acre property, with an investment in technology to ensure these energy sources are individually controlled and regulated for maximum efficiency. A monitoring system provides detailed information minute by minute on performance of the hydro turbine, wind turbine, solar panels, battery bank storage condition and energy consumption. The temperature of hot water storage and flooring heating is also monitored by this system at multiple points, with effective building design and energy conservation measures keeping the lodge at a comfortable internal temperature all year round.

Nearly all the timber used to build the lodge was milled from plantation trees grown on the property and over 4000 river stones were also sourced on-site, reducing transport and environmental costs of construction. All contractors' suppliers for the building were also locally sourced where possible.

Initiatives

Energy
Stonefly Lodge has been built to operate solely on alternative power sources and is not connected to the national grid system. All power required is generated on site within the 156 acre property.
A micro hydro turbine was built on site using a motor from a washing machine attached to a Pelton wheel and driven by water from one of our on site springs.
Photovoltaic cells are used to capture the sun's energy to convert power to our battery storage.
A wind turbine was installed to capture the wind's energy to convert to our battery backup.
Using the latest in technology these energy sources are individually controlled and regulated to provide the maximum charge to the battery storage. The battery power is then converted to - 240v standard power source for the Lodge to run normal electrical appliances.
A small backup generator is on site to compliment the alternative power sources in case of any breakdowns or during maintenance.
The lights run on a separate low voltage feed to the Lodge direct from the battery bank thus saving 15% in energy by removing the losses of a conversion to higher voltage. The added advantage is that during the event of a power failure the lights would always be functional.

<p>We have used the latest in technology LED lights which draw 3-5 watts instead of the normal 60 - 100watt incandescent bulbs.</p>
<p>The entire concrete pad has been thermally insulated from the ground with high density insulation installed under the floor and the edges of the slab have been capped with a timber thermal break.</p>
<p>The entire concrete pad has been installed with 900 metres of water pipe to keep the slab at a constant temperature warming the interior of the house.</p>
<p>The heating of the floor is done by a wood fired boiler attached to our wood stove. Hot water can be pumped to all rooms separately and thermostatically controlled.</p>
<p>A centrally located wood burning fireplace has been designed to provide additional heat to all central facility areas. The specifically designed fireplace is double sided providing additional radiant heat from the glass and also the heat passing the hot fire box is captured inside the chimney and re- distributed back into the living area effectively doubling the heating capacity.</p>
<p>A heat transfer system can distribute the warm air from the hottest part of the building (above the fireplace) to each of the guest bedrooms.</p>
<p>Solar panels on the roof are used to heat a 500 litre tank for domestic hot water (this can be backed up by the wetback from the wood stove if required).</p>
<p>All wood is sourced from the property and is plantation grown.</p>
<p>The sunroom has been designed to allow the winter sun to heat the floor and stone pillars and add to the central heating system. In the summer the sun does not penetrate into the living area or stone pillars. The stone pillars and stone fireplace act as heat storage in winter releasing the heat during the cooler evening allowing for a more constant room temperature throughout.</p>
<p>All windows are double glazed and the use of low E glass adds a further 40% efficiency to the insulating properties.</p>
<p>All external walls are lined with NZ Wool insulating batts. All external walls have been made 50% thicker than normally required to gain extra insulating properties.</p>
<p>Excess heat build-up in the summer months can be released via electric motor operated windows at the hottest points of the building, creating a cooling draft throughout the interior.</p>
<p>A cloths line is used to dry washing. The 500 litre water tank is also used as a heat source to dry clothes.</p>
<p>Unused appliances are turned off each night to conserve energy.</p>
<p>Specially designed fridges and freezer have been purchased which run extremely efficiently and are designed for alternative power. Our dishwasher was selected to be able to use existing external hot water rather than heat the cold water internally. All cooking is done by wood stove or gas (no electricity used).</p>

The following energy monitoring systems are in place and can be monitored any time of the day instantaneously:

- Energy consumption of Lodge
- Energy generated by the hydro turbine, wind turbine, and solar panels (separately)
- Battery bank storage condition
- Temperature of solar panels on roof
- Temperature of hot water storage tank at entry level
- Temperature of hot water storage tank in the centre
- Temperature of water going into concrete floor
- Temperature of water coming out of concrete floor
- Room temperature in main hallway
- Temperature of each fridge and freezer

Water

All water is sourced from a spring on the property, no water brought in or used from external sources.

All storm water from gutters, car park and driveway is diverted to a specially made duck pond which also can be used for a fire fighting reserve storage.

Hot water is conserved by using a ring main plumbing system whereby the hot water pipes going to guest bathrooms are preheated therefore negating the need for guest to waste water down the drain waiting for the water to warm up to temperature.

Dual flush cisterns throughout.

Linen policy in place, offered in compendium plus bathroom notice.

Waste

All waste from the kitchen is separated in four waste bins next to the sink. Food for free-range chickens, plastic, tin and glass, all recycled.

All waste water (grey and sewerage) is treated on site by the Biolytix system which uses a wet soil ecosystem of worms, beetles and microscopic organisms reducing the waste to a quality fit for watering our future permaculture garden. Dispersment pipes are laid two metres apart to allow for fruit tree planting in watered rows.

Environmentally suitable detergent is used in the kitchen and laundry – biodegradable products.

We recycle ink cartridges from our printers.

Community

Whilst our time has been devoted mainly to building and developing the Lodge and surroundings we have donated several prizes for charity auctions to the Local Fire Fighting operation and to Garin College.

All contractors' suppliers for the building were locally sourced where possible.

Conservation
Large areas of the river frontage on our property have had noxious weeds removed and native plants are being planted. (approximately 5 acres have been cleared)
A long term project is to remove all weeds from the river bank along our driveway (2 km) and plant natives where required. The cleaning of the river bank has had approval of the local council.
Plantings being carried out are orientated around attracting the native bird species.