

## The Lakes by Yoo from The Raven Group and Yoo

The Lakes – a private 650 acre estate of clear water lakes and woodland near Lechlade, with a choice of contemporary homes designed in a number of unique styles and finishes by Jade Jagger, Tom Bartlett and the Yoo Design Studio.

A selection of stunning lakeside second homes with 4, 5 or 6 bedrooms options – or even bespoke – designed to blend harmoniously into the woodland landscape.

Keen to minimise any impact on the country retreat feel of The Lakes, Yoo are collaborating with GreenTec Systems to make available energy-efficient heating and temperature control systems – but with no negative effect on the buildings' appearance or the environment. The primary source of heat will be Solar Panels, backed up by a Heat Pump that will provide all hot water, heating and cooling via the ventilation system. The GreenTec System produces no local fossil fuel emissions and has remarkably low running costs. Owners will be offered further options – solar photo-voltaic power and wind turbines – that will take their house closer to being truly carbon neutral.

The Lakes is a joint venture between The Raven Group plc and Yoo, founded by Phillippe Starck and John Hitchcox. The Lakes philosophy is simple:

***“we want you to notice the trees and water before you notice the people and buildings”***



## GreenTec Systems at The Lakes

● **Heating:** The initial source of heat for hot water and the Underfloor Heating will be Solar Panels; when demand exceeds their capacity to supply, the Heat Pump kicks in, providing heat harvested from the boreholes beside the property and from 800M loops of sealed pipe submerged in the lakes. Incoming air is first warmed by Ground Energy Pipes, then by the Heat Recovery Ventilation, both of which cost absolutely nothing to run.

✿ **Ventilation:** The ventilation system extracts stale air from wet areas – kitchens and bathrooms; it is replaced by fresh, filtered air fed into the living areas. The air in the house is completely changed every two hours; the environment created is often beneficial to asthma and hay fever sufferers.

● **Cooling:** As the outside temperature rises, the Ground Energy Pipes begin to cool the incoming air; then the GreenTec System turns off the Heat Recovery Ventilation and the Underfloor Heating. If the house temperature continues to rise, the system begins to circulate the fluid in the lake loops in order to cool incoming air. Cooling the whole house will cost approximately 1p per hour. And what ever the weather, the wine cellar stays at a constant 14°C.

● **Environment:** Each home uses 60-80% less energy than a conventionally-powered property, and, under normal running conditions, there are no local CO<sub>2</sub> emissions.

✿ **Remote Access** will enable monitoring and adjustment of the system over the Internet – for example, the house can be set to hibernation mode as the owners leave, then re-awakened (by sending a text, if preferred!) as they set off for their next week-end of leisure.

GreenTec –equipped homes on The Lakes will have a supremely comfortable, healthy living environment within a minimal carbon footprint. And with **very** low running costs.

## The GreenTec System: a year at The Lakes

Homes on the The Lakes are built to very high standards of insulation, which means they are much less affected by changes in ambient temperature than older properties. Part of this insulation is that houses are built as air-tight as possible to reduce heat losses; but ventilation is essential - so fresh, filtered, temperature-controlled air (great for asthma and allergy sufferers) is piped into living areas, while stale air is extracted from wet areas.

Obviously, the extracted air contains heat; on cooler days, the System recovers that heat, using it to warm – at no cost - the incoming air.

### 28°C; Hot, Sunny Summer Day

Hot water is required for sinks, showers and baths. It's too warm even at night for the Underfloor Heating.

- During the day, the Solar Panels heat the Underfloor Heating buffer tank and the Domestic Hot Water tank. There are no water heating costs; the Heat Pump will probably not be needed – the Solar Panels supply all that's needed.

- The Ground Energy Pipes cool the air supplied to the Ventilation System from 28°C down to 17°C – with no cooling cost. If the house temperature continues to rise, the fluid in the lake loops is circulated through a Heat Exchanger in the Ventilation System, further reducing the incoming air temperature; running the required pump costs around 1p / hr.

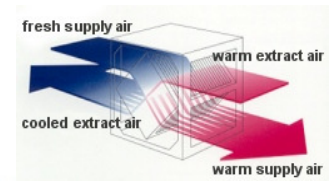


### 18°C; Warm, Cloudy Autumn Day

Hot water is required for sinks, showers and baths; typically, there are peaks in demand in the early morning and evening. As the overnight temperature dips, the Underfloor Heating may switch on in the coolest rooms, supplying gentle heat till the morning sun starts to warm the building.

- During the day, the Solar Panels heat the Underfloor Heating buffer tank, then supply heat to the Domestic Hot Water tank. The Heat Pump will circulate water from the lake loops, topping up the Domestic Hot Water tank as required.

- The Ground Energy Pipes cool the air supplied to the Ventilation System from 18°C down to 12°C; Air Heat Recovery – which costs nothing to run - swaps enough heat from the stale extract air into the incoming fresh air, raising it to the required temperature.



### 5°C; Cold, Cloudy Winter Day

Hot water is required for sinks, showers and baths; typically, there are peaks in demand in the early morning and evening. The Underfloor Heating is on all day and night, keeping the house up to the owner-selected temperature.

- During the day, some heat is supplied from the Solar Panels to help top up the Underfloor Heating buffer tank. The Heat Pump will circulate water from the boreholes and the lake loops, topping up the Domestic Hot Water tank and the Underfloor Heating storage tank as required.

- The Ground Energy Pipes are now heating the air supplied to the Ventilation System from 5°C up to 10°C, again, too cool – but the Air Heat Recovery swaps enough heat from the stale extract fresh air into the incoming air, raising it to the required temperature.



### Minimal impact on the The Lakes' environment

- By harvesting heat from the sun and utilising the temperature of the ground and the lake water, the GreenTec System maintains a comfortable, healthy environment in each Lakes home with no local CO<sub>2</sub> emissions, and no unsightly boiler flues or air-conditioning units. Best of all, tapping in to the latest technologies reduces the energy requirement – and running costs – of each house by somewhere between 60 and 80% compared to a conventional gas-boiler + air-conditioning setup. Very green, very lean – totally in keeping with the Yoo ethos.