

Groundbreaking energy system for PA hotel

Heating and air-conditioning coming straight from the earth

SARAH-JANE BRADFIELD

A four-star boutique hotel in Port Alfred has become the first place in South Africa to use energy generated by the earth's own heat.

MyPond Hotel, a R9-million project overlooking the Kowie River, is operating all its heating and cooling devices through geothermal energy: heat that is captured below the earth's surface and harnessed via a specialised pump.

The state-of-the-art system is expected to provide energy savings of up to 70% compared to conventional heating, ventilation and air-conditioning (HVAC) systems, and will significantly reduce the hotel's carbon footprint.

MyPond manager Hugo Slater said the system, switched on at the end of April, has already brought their monthly power bill down to R700.

"The geothermal system heats water eight times faster than electricity using about one-tenth of the power," said Slater.

Geothermal power requires no fuel, and is therefore immune to fluctuations in fuel costs, but capital costs are high. MyPond's installation cost R1.9-million, but this was "mighty worthwhile" Slater says. "In the current climate of electrical cuts, increased electricity prices and a larger electrical draw on the system, this has to be a very good thing."

In addition to the geothermal plant, MyPond has installed rain tanks to capture rainwater which is stored and filtered on site for drinking.

Most of the hotel's electrical light fittings have low-energy bulbs and the design of the building has incorporated as much natural light and ventilation as possible.

Even the hotel's lampshades are environmentally friendly: they were handcrafted from recycled yoghurt cartons by Slater's wife Amanda, a Fine Art graduate from Rhodes University.

"Many, many hours went into them. They are beautiful," says Slater.

All paper used at the hotel is 100% recycled and their pencils are made from wood from sustainable forests and are certified by the Forestry Stewardship Council.

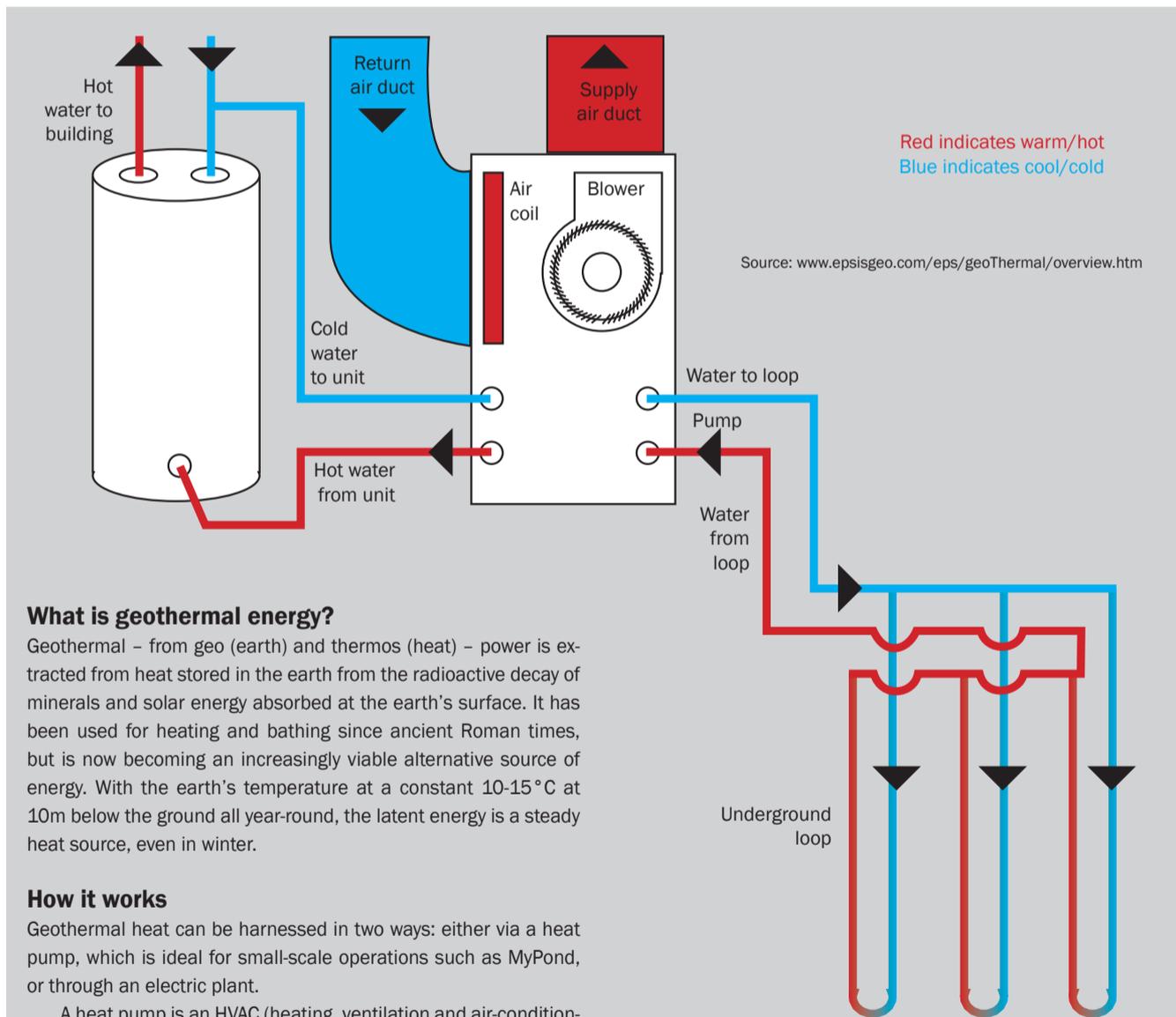
MyPond is one of a few local businesses in the Eastern Cape that has invested in alternative energy sources, alongside biogas and wind power initiatives. The person spearheading Grahamstown's own wind-turbine proposal, Garth Cambray of Makana Meadery, said the investments in alternative energy were "a good sign" and that there is "a lot happening" locally in this regard.

"Game farms are also pushing the investigations into alternative energy sources because they want to be internationally recognised as being environmentally friendly. There is also a huge economic incentive to become geared toward alternative energy," said Cambray.

While MyPond is making use of the heat pump option (see info box), geothermal electric plants are gaining momentum around the world. While the plants have historically been built on the edges of tectonic plates where high temperature geothermal resources are easily available near the surface, advances in technology mean they are being erected in areas that are not tectonic heat specific.



GOING GREEN... MyPond Hotel in Port Alfred has installed a R1.9-million geothermal system in an effort to be more environmentally friendly. The system is the first to be used in South Africa. Photo: Amanda Macfarlane



What is geothermal energy?

Geothermal – from geo (earth) and thermos (heat) – power is extracted from heat stored in the earth from the radioactive decay of minerals and solar energy absorbed at the earth's surface. It has been used for heating and bathing since ancient Roman times, but is now becoming an increasingly viable alternative source of energy. With the earth's temperature at a constant 10-15°C at 10m below the ground all year-round, the latent energy is a steady heat source, even in winter.

How it works

Geothermal heat can be harnessed in two ways: either via a heat pump, which is ideal for small-scale operations such as MyPond, or through an electric plant.

A heat pump is an HVAC (heating, ventilation and air-conditioning) system that actively pumps heat to or from shallow ground. It uses the earth as either a source of heat in the winter, or as a coolant in the summer. This design takes advantage of moderate temperatures in the shallow ground to boost efficiency and reduce operational costs.

The core of the heat pump is a loop of refrigerant pumped through a vapour-compression refrigeration cycle that moves heat. Heat pumps are usually more efficient than pure electric heating, even when extracting heat from air.

But unlike an air-source heat pump, which extracts or exhausts heat to or from the air outside, a ground-source heat pump exchanges heat with the ground. This is usually more energy-efficient because underground temperatures are relatively stable through the year. Seasonal variations drop off with depth and disappear below 10m due to thermal inertia. Like a cave, the shallow ground

temperature is warmer than the air above during the winter and cooler than the air in the summer. A ground-source heat pump extracts ground heat in the winter (heating) and exhausts heat back into the ground in the summer (cooling).

Ground heat exchanger

Ground-source heat pumps must have a heat exchanger in contact with the ground or groundwater to extract or exhaust heat. This component accounts for a third to a half of the total system cost. Several major design options are available for these, which are classified by fluid and layout. Direct exchange systems circulate refrigerant underground, closed loop systems use a mixture of anti-freeze and water, and open loop systems use natural groundwater.

Source: http://en.wikipedia.org/wiki/Geothermal_heat_pump

PORT ALFRED

★★★★★

MyPond hotel
AT LAST YOU'RE HERE

- on the river bank
- beautiful spacious rooms
- 6 river view suites, 9 classic rooms
- 2 family rooms
- environmentally friendly
- geothermal heating/cooling
- vibrant restaurant
- wedding/conference venue
- spa

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