

Geothermal Hot House for Gerberas

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PlentyFlora's gerberas are grown with the help of geothermal energy utilised to heat the greenhouse.

For Rotorua gerbera growers, Harald and Connie Esendam of PlentyFlora, making use of the area's geothermal energy is key to offsetting the harsh winter conditions.

"To grow gerberas successfully for a commercial operation a main requirement is to avoid too many, or too fast, fluctuations in temperature. Gerberas are a sub-tropical plant from South Africa so creating a similar climate in the greenhouse is vital."

"We are fortunate to have ready access to geothermal energy which assists in creating the right environment for the flowers," says Harald.

Commercial gerbera growing operations are mainly in Auckland and while Harald says they too require heating, there it is not as cold as in Rotorua.

"The majority of other gerbera glasshouses around New Zealand would use waste oil as the source for their heating requirements."

PlentyFlora's greenhouse is heated by geothermal energy from two shallow geothermal bores.

The original, older bore produces 100°C geothermal fluid. This fluid is fed through a heat exchanger, heating water that is circulated through small iron pipes adjacent to the plants in an internal closed heating system.

The new bore, drilled two years ago, produces 65°C geothermal fluid that is used directly in the greenhouse, predominantly for air heating in an overhead system. Cooled geothermal water is then injected back into the shallow geothermal reservoir.

In addition, a bio diesel peak-heating system on a fan coil unit forces hot air on the plants when needed.

Key Benefits:

- Geothermal energy provides heat to keep the temperature above the minimum essential temperature of 14°C
- Reduced cost for heating requirements

Key Features:

- More than 600,000 gerberas grown annually at PlentyFlora
- Two geothermal bores are the main heat source for glasshouse all year round



This geothermal bore produces 100°C water that is fed through a heat exchanger, heating water circulated in an internal closed heating system.



Water is circulated in small iron pipes adjacent to the plants to provide heat to the plants.

Geothermal energy is an ideal base load provider and most of the time it is sufficient to keep the temperature above the minimum essential temperature of 14°C.

Harald says a big challenge with glasshouses is the heat loss through the glass.

“At night we require the temperature to remain at 14 degrees in the glasshouse and frequently during winter it can be as low as -3 or -4 degrees outside. So while geothermal can heat the glasshouse up, it is difficult to keep it at the set temperature.”

Each year PlentyFlora produce more than 600,000 cut-flower gerberas of both standard size and the more recently developed mini-gerberas, with more than 60 colour varieties available.

The gerberas are harvested by being pulled out rather than cut. They are then sleeved, boxed and sent directly to 60 florists around the North Island. Any surplus stock goes to flower auctions in Wellington.

“We predominately supply florists locally and in Taupo, Tauranga, Hamilton, Hawkes Bay, Whakatane, Palmerston North and Wellington.”

Harald has been involved with breeding of gerberas since the 1980s in Holland. With his wife and family, he immigrated to New Zealand in the mid-1990s and worked for Carter Holt Harvey in Tokoroa and Rotorua. In 2002 the opportunity to purchase the glasshouse arose.

“It had previously been used for orchids, so we have had to build everything internally from scratch to make it suitable for growing gerberas in a commercial setting.

“We have set up central rows and a watering system. The gerbera plants are hanging in tables at convenient heights according to the latest cut-flower growing technology. We now have the system fully computerised so the flowers receive the appropriate water and fertiliser, or feed, depending on requirements.”

In the future Harald is keen to better utilise the geothermal energy he has available and is always looking at new options for increasing the efficiency of his glasshouse.

“A great benefit for us was the geothermal bore that was already in existence when we came here so it was a matter of tapping into this and utilising it for our needs.”

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Harald & Connie Esendam
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New Zealand requires reliable, renewable energy sources into the future. The Government is supporting GNS Science in fostering increased use of renewable resources. By 2025, the Government's Energy Strategy aims for direct use of geothermal energy to account for more than 12 PJ/year.

For more information visit our website:

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