GEOTHERMAL ENERGY: LIQUID GOLD FROM THE SOIL?

By: Jouke Campen, Wageningen UR Greenhouse Horticulture

Heating accounts for 40 percent of the annual energy consumption in the Netherlands. Geothermal energy, warm water from subterranean layers, could supply part of this heating demand. But what does this involve and how much will it cost? Greenhouse horticulture companies are finding out.

Many growers wonder whether they should switch to geothermal energy as a new source of energy to heat their greenhouses. Answering this question involves many aspects. The subterranean structure, which plays an important part, is an area that IF Technology has collected a lot of knowledge based on former oil extraction wells. The complex process of the licensing trajectory, subsidies and contracting geothermal projects is one of the key activities of Agro AdviesBuro. The technical realisation of a geothermal source also requires a lot of new expertise, which Arend Sosef has acquired in several projects. The three companies provided an overview of the practical aspects of geothermal energy for greenhouse horticulture companies.

Pros and cons

The use of geothermal energy has two main benefits: It is a sustainable energy source and, once functioning, the heating costs can be determined for years to come. A positive extra effect of geothermal energy is that gas is extracted from the well in addition to heat; and quite a lot of it: 1 m^3 of gas per 1 m^3 of water. A cubic metre of water contains approximately 210 MJ plus another 32 MJ of energy from the gas. Energy is, however, required to pump the warm water from the well and pump the cold water back; 1 kW of electricity is needed to extract between 10 and 40 kW of heat.

The costs for the maintenance and depreciation of a geothermal source are high (80,000 euros a year). As a result the source must be used optimally to be profitable. To achieve this, the greenhouse sector uses geothermal energy for the basic heat demand, and a boiler or a combined heat and power system for the additional heat demand. This makes matters more complex. Another disadvantage of the use of geothermal energy is that less CO_2 is available for the crops due to the reduced gas consumption. There must therefore be alternative CO_2 resources available. And finally, it is impossible to say with absolute certainty whether the well will actually supply the required heat, which makes the considerable investment risky.

Not free, but profitable

By late 2012 there will be eight locations in the Netherlands using geothermal energy to heat greenhouses, and a large number of new projects are scheduled.. Greenhouse horticulture is a ideal sector for the application of geothermal energy as the heat is supplied to a limited number of end users, making the procedural issues relatively simple. The geothermal heat source must, however, be exploited to the max to be able to compete with the use of natural gas.

Partners in this HortiSeminar: IF Technology, Agro AdviesBuro, Arend Sosef