



# Energy in greenhouse horticulture: From saving to producing

## Wageningen UR Greenhouse Horticulture

Energy represents an ever-increasing part of production costs in modern glasshouse horticulture. The successful introduction and application of new energy-saving products and measures is complex. It requires the right know-how to be deployed in the right fields during the phases of development and introduction to market. This is why Wageningen UR Greenhouse Horticulture works together with business on new technologies and the optimisation of existing systems for energy savings and energy conversion.

### Cost price

Leading entrepreneurs in greenhouse horticulture keep a close eye on our innovations in the field of energy conservation. After all, energy remains an important component of the cost price, especially with the current tendency of growing energy prices.

### Energy conservation

Wageningen UR Greenhouse Horticulture has studied, developed and made applicable numerous innovations in the field of energy conservation and novel energy conversion techniques. Concrete examples are greenhouse covering materials that keep a good transparency while improving insulation and the development of improved strategies for using thermal screens to save energy without the risk on problems with pests and diseases.



The recent introduction of geothermal energy in the sector is the result of extensive preliminary work of Wageningen UR Greenhouse Horticulture and our partners.

In addition to innovations with respect to hardware for greenhouse, we also provide companies with ways to reduce their energy bill by supporting the strategic and operational decision-making. Examples are freeware software for customised computations on energy conservation and the development of energy-saving cultivation strategies.

### Towards energy production in greenhouse horticulture

The worldwide tendency towards open energy markets creates opportunities for the sector as an energy supplier via cogeneration and returning power to the grid. In the long term however, the glasshouse industry will need to make further savings and increase its independence from fossil fuels. This will make horticultural profits less dependent on energy prices and the image of greenhouse horticulture, now being 'energy wasting', will improve hugely.

To achieve this objective, Wageningen UR Greenhouse Horticulture is working together with many partners from the business community and the government on various projects that aim to make the concept of the energy-supplying glasshouse feasible. Thanks to the broad and up-to-date expertise available, we are capable of assessing and optimising the concept in terms of energetic, horticultural and economic aspects.

#### For more information:

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### Energy-saving climate regulation

Advanced greenhouse climate control offers many possibilities to achieve good yield while saving energy. Examples of innovative and economically feasible climate control strategies include improvement of humidity control while using the thermal screen, the use of weather forecasts for computing optimal setpoint trajectories, and a CO<sub>2</sub> dosing optimiser, nominated for the 2006 Innovation Award. These developments were all fruits of close cooperation with horticultural industry.

Partners: Priva, Hoogendoorn, HortiMaX, Ludwig Svensson, the Dutch Ministry of Agriculture, Nature Management and Fisheries, the Dutch Product Board for Horticulture, Novem/Senter



### Energy-producing greenhouses

The design for an energy-producing greenhouse was realised at Hydro Huisman in Bergerden in cooperation with various partners. Wageningen UR Greenhouse Horticulture will be examining the climatologic, energetic and physiological effects during the two-year demonstration phase.

Partners: Lek/Habo, HSH, FiWiHEx, Hydro Huisman



### Software for calculating the effects of energy-saving measures and closed greenhouses

A freeware software program (EOM: *Energiebesparing Op Maat*, or tailor-made energy saving) was designed in order to provide promptly and tailor made insight into the effects of different energy-saving measures and climate control strategies. The program computes yield and energy effects of four different crops and is currently used as a basis for the development of a tool for comparing various systems for (semi) closed greenhouses.

Partners: The Dutch Product Board for Horticulture, the Dutch Ministry of Agriculture, Nature Management and Fisheries, Agricultural Economics Research Institute

