

## **DECISION SUPPORT FOR OPTIMISING ENERGY CONSUMPTION IN EUROPEAN GREENHOUSES**

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### **Abstract**

In addition to optimal crop production the reduction of energy consumption within greenhouses is one of the major aims of the greenhouse horticultural industry. The majority of greenhouses in the European Union have been built during the last 20 years or so and do not conform to current standards of low energy consumption. Investing in new low-energy consuming greenhouses is very cost intensive. Improving existing structures in terms of insulation and other features, however, could save energy with significantly lower investment costs. In the EU project Greenergy a decision support system is being developed that can be used by advisors and growers to evaluate the possibilities and effects of different greenhouse materials such as covers or screens or complete new structures on energy consumption and crop yield. The system has been constructed as an easy to use software tool based upon a set of simulation modules for greenhouse energy fluxes, crop growth and dry matter distribution. The user defines his existing greenhouse from the pre-defined menu. This greenhouse is then used as reference greenhouse that can be compared to various modifications of it. The user can change the greenhouse settings in order to create different sets of modifications of their reference greenhouse. Additional variables such as physical location (country), crop, climate set points etc. allow simulations of energy consumption and crop yield over a period of one year using reference climate data of the chosen location as input.

The system is constructed in such a way that the database of greenhouse construction materials can be updated easily to maintain its value in the long term. First tests with commercial greenhouse growers have shown that this decision support tool can be used for investment planning in small and medium sized enterprises.