Energieffektivare växthusodling genom avfuktning med VLHC

Projektering och förstudie av möjliga energibesparingar genom avfuktning och uppvärmning med "Ventilated Latent Heat Converter" för Resurshuset

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Abstract

This thesis is the result of two students master's dissertation. This took place in Billeberga, Skåne, where Lars Arvidsson is the owner of K.G Hanssons Handelsträdgård AB (market-garden). In the greenhouses they are growing different kinds of ornamental plants with focus on tulip growing. Greenhouse gardening in the Nordic parts of Europe comes with a whole bunch of difficulties, one of them is moisture, and moisture can easily damage the plants and contribute to a high level of energy consumption when trying to create a good cultivation climate.

The Israeli company AGAM are saying that they have a solution to that problem. AGAM claims to be in the front with their technology in temperature and moisture control. AGAM is providing the market with a machine called VLHC and has made a well-known technology available for the market. VLHC (Ventilated Latent Heat Converter) is a dehumidifier that uses available hot water in a absorption-cycle in the process to dry the humid air.

The grower has a heating system that can represent a typical Swedish early 1980's greenhouse. It has two boilers, woodchip and oil, which delivers hot water to 12 000 sq. meters growing surface.

VLHC needs 74°C hot water for optimal running conditions. Results from the tests are showing that the existing heat system can provide satisfying temperatures during 52% of the test period.

VLHC is keeping the relative humidity 20% lower than normal, normal is when natural draft from rooftop windows is the source of dehumidification. This comes with the negative effect of big energy losses.

To predict the effects of the use of VLHC before the actual test a model in the program IDA ICE 4 was created with real weather data. The model is later to be used as a tool for future installations, the model can give a potential customer a easily foreseeable estimation of the potential in energy savings of their facility.

Test results show that nearly 60% of the energy is saved with the use of VLHC. The rooftop windows are closed and more energy is kept in the volume. The model is showing result in the same positive trend and can easily be converted for future commercial use.

*** **Note**: Measurements were taken between December 18th and December 21st 2012 and between January 10th and January 15th 2013.