



Energy Save is testing:

Heat pump for green houses

In early March, Asker is gripped by cold, but within one of the greenhouses at Ravnsborg Gård we find a nice combination of warmth and a pleasant smell. The aroma comes from basil, and the heat from the sun and a heat pump from Energy Save AS.

Text and photo: Dag Eivind Gangås

Not heard of Energy Save AS? Maybe it is no wonder, because they really haven't hit the market for greenhouses yet. The heat pump they have installed at Ravnsborg Gård is a test to reveal what special challenges the greenhouses present with this technology, but they have a lot of experience with heat pumps in other types of building stocks. Among other things, they have cooperation with UCO, which is a

large company that, among other things, operates in rental of machines and equipment such as cranes and construction machinery.

ASKER

Energy Save AS is based in Asker. They are a subsidiary of ES Heat Pumps AB, which has its head office in Alingsås in Sweden. The parent company supplies

air/water heat pump solutions throughout Europe, with focus on solutions for large installations, with both mobile and fixed installations.

HEATBOX 90 KW EVI

The facility being tested at Ravnsborg Gård is a Heatbox 90 kW EVI (2x45 kW). One prefabricated unit that delivers up to 90 kW, divided between two equally sized



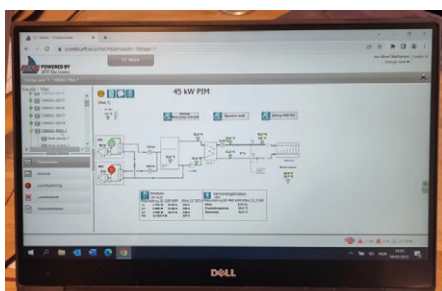
Basil thrives well at 25 °C.

pumps. It is a so-called "Plug-and-Play" machine, so it is easy to connect it on existing facilities, and you can in principle get it as powerful as is needed. This particular one gets a place in a 10 ft container, but with larger machines it will probably be more appropriate to build a house for it.

– There have actually been minimal adaptations to connect our solution to this greenhouse. There was a hatch in the wall where we wanted to go in with cables and hoses, so all we had to do was get welded on the ring line. If this were to be a more permanent heating solution, we would have had to do something with the current, because the machine was supposed to actually had 63 amp. as a source, but we only had access to 40 amp. Therefore, the machine runs with limited capacity in the test, says Jon Aksel Mathiesen, technical manager in Energy Save AS.

INSPECTION

Together with Johnny Bjørn Herheim, general manager of Energy Save AS, Calle Gabinus, Key Account Manager for ES Heat Pumps in Norway and Sweden, Jan Tore Andersen Ravnsborg, Ragnar Strand and Arek Kocjan, respectively main shareholder, general manager and operations manager at Ravnsborg



Schematic layout of the system, with good control of all factors.

Gartneri, in addition to energy advisors Martin Knoop and Espen Vagstein from NGF, Mathiesen takes us on one round to show how the system works.

He says that the heat pump was installed for just over one month ago (Beginning of February), and that they have already harvested many good experiences. The two 45 kW pumps are connected against a greenhouse that is initially a bit small for the full the capacity of the pump, but it is not important for the test. With access of 63 amp. the pump could have heated a volume which is twice as large, and the entire horticulture at 8,000 square meters could have been covered 100% by just under five corresponding pumps. In practice, four would be plenty, since they would cover a large part of the hea-

ting needs, and only use an alternative heat source for the highest peaks. The way this heat pump is set up now, mainly one of the two heat pumps is running, while the other one kicks in when needed. Two different pumps also make it possible to defrost them one by one, without stopping the heating supply to the greenhouse.

ES NORDFLEX

In the container there is also space for a buffer tank of 500 litres, and the pump can deliver water at 60 °C. It is set up as a primary and secondary system with heat exchanger in between. The greenhouse's own piped heating system is the secondary side. The heat pumps regulate according to a temperature sensor that hangs in the middle of the greenhouse, about. 30 cm above the tables. Desired temperature is set to 25 °C and the heat pump delivers the correct temperature on the secondary side water circulating inside the greenhouse. This means that the heat pump delivers a variable temperature that is in proportion to the temperature in the room. If a higher water temperature is needed on the secondary side, the heat pump opens up the shunts in the greenhouse's main heating system and add warmer water. Energy Save use a self-developed control



From left: Jan Tore Andersen Ravensborg, Ragnar Strand and Arek Kocjan, respectively main shareholder, general manager and operations manager at Ravensborg Gartneri, Jon Aksel Mathiesen, technical manager at Energy Save, Calle Gabinus, Key Account Manager for Norway and Sweden at ES Heat Pumps, Johnny Bjørn Herheim, daily manager of Energy Save AS, and energy advisers Martin Knoop and Espen Vagstein from NGF.

system called ES NordFlex. ES Nordflex can control many heat pumps at the same time. Furthermore, it can bring in peak loads from other energy sources for optimal energy operation.

– In this case it has not yet been necessary with a peak heat source, but that is thus built into the system. The control unit of course makes it possible to monitor the system and control the temperature from anywhere preferably, both by us at Energy Save and by the customer, Mathiesen explains.

The patented system works well down to -25°C , and has a good effect (COP) far down below this temperature. COP shows the relationship between how much energy the heat pump uses and how much energy you get out of the heat pump, and the annual heating factor

(SCOP), i.e. the effect over an entire year is calculated to be at 4.21. During this test in winter operation the COP value so far is 2.34, but at full capacity and a more realistic area, the COP would be around 3.

SHORT PAY BACK TIME

If Ravensborg Gård were to buy four such heat pumps for its 8,000 square meters greenhouse, it would cost around 175 000 Euro, including installation. With today's electricity price (mid-March) they would likely to be repaid in two to three years. Now there are several reasons why they won't. One is that Energy Save has not decided whether they can sell directly to Veksthusnæringen or whether it is to be rented out. But the main reason is that the property on which the greenhouse is located has been sold, and the herb pro-

duction must be moved out of the greenhouses during next year.

– We will soon come back to what happens next. We can say that the plan is to continue with herbal production under the brand name Ravensborg Gård, but in premises in another place, central in Eastern Norway, reveals Ragnar Strand. Energy Save's heat pump trials will continue some months, a little depending on how long the herbal production will continue on this property. ■

Simple Plug'n'Play connection. A cable for electricity and two water lines for inlet and outlet water. The hole in the wall was already there, so all Energy Save had to do was to weld onto the ring line.

