

Green Farming's demo-project for sustainable energy

Olij Roses uses solar energy for heat and electricity in Kenya

In 2012 the Olij Group built a new nursery in Naivasha, Kenya. The nursery has a sustainable energy system based on solar power and was set up together with various Dutch suppliers and advisors.

The Dutch rose grower is specialised in breeding, propagation, production and the marketing of cut- and pot roses. The company has been breeding roses in Africa for several years. At the beginning of 2012 it sold the old nursery in Kenya and bought a piece of land on which it has been built a new 3 ha nursery that is suitable for propagation and production.

"We didn't have any propagation facilities at the old location. At this new nursery we've included 1 ha for propagation. On the other 2 hectares we test new varieties, have a show room and we grow a larger amount of those varieties with market potential. We grow young rose rootstock and varieties for the local market", says Ruud Olij, group director.

Heat and electricity

Energy is expensive in Kenya, around 20 euro cent per kWh. The propagation greenhouse needs a lot of heat and light. "Therefore we use solar collectors to generate the necessary heat and solar panels for electricity, both of which are on the roof of the shed", says Olij.



Gerard Peek (left), Ruud Olij and Marco Braam (right): "We use one hundred per cent of all the energy we 'harvest'."

The heat generated during the day by the solar collectors is stored in the heat storage tank (HST), which has a capacity of 150 m³. The power from the solar panels mainly ends up in the battery, which has a capacity of 3000 amps (A). When that is full the remainder goes to the electric boiler, where the excess electricity is converted into heat which is then also stored in the HST. No heat and electricity is supplied during the night. The power stored in the batteries runs the pumps, computers and lighting for the entire greenhouse complex. The heat from the HST is used only to heat the propagation greenhouse.

A generator creates electricity for eight hours of assimilation lighting. The heat that is released also goes into the storage tank.

New combination

"Solar collectors, in combination with a heat storage tank, and photovoltaic-panels are already being used separately in Africa. What's new is combining the two and the storage of solar energy in batteries", says Gerard Peek of Van Zaal. His company installed the energy related equipment: The collectors; solar panels; and batteries.

Peek worked with Marco Braam of the Dutch company Bosman, who as well has installed the complete irrigation system, also supplied the irrigation and climate computer. This includes new software within the existing climate control, which on the basis of the local weather forecast determines at which moment energy should be used or



This project shows how it's possible to bring horticulture in Kenya to a higher level.

stored. This energy management module has been developed specifically for the African market.

High import duties

Braam describes the reason for the project. "This project allows us to show the opportunities and savings that can be made and so bring greenhouse construction in this country to a higher level."

The necessary equipment is brought from the Netherlands in sea containers. And that was the first hurdle that the company encountered: Very high import taxes. "Kenya wants to produce more sustainably. We are importing products that are not yet known to horticulture in this country. Therefore the import taxes at the border are raised far too high. Encouraging a smoother flow of imports is also one of our goals."

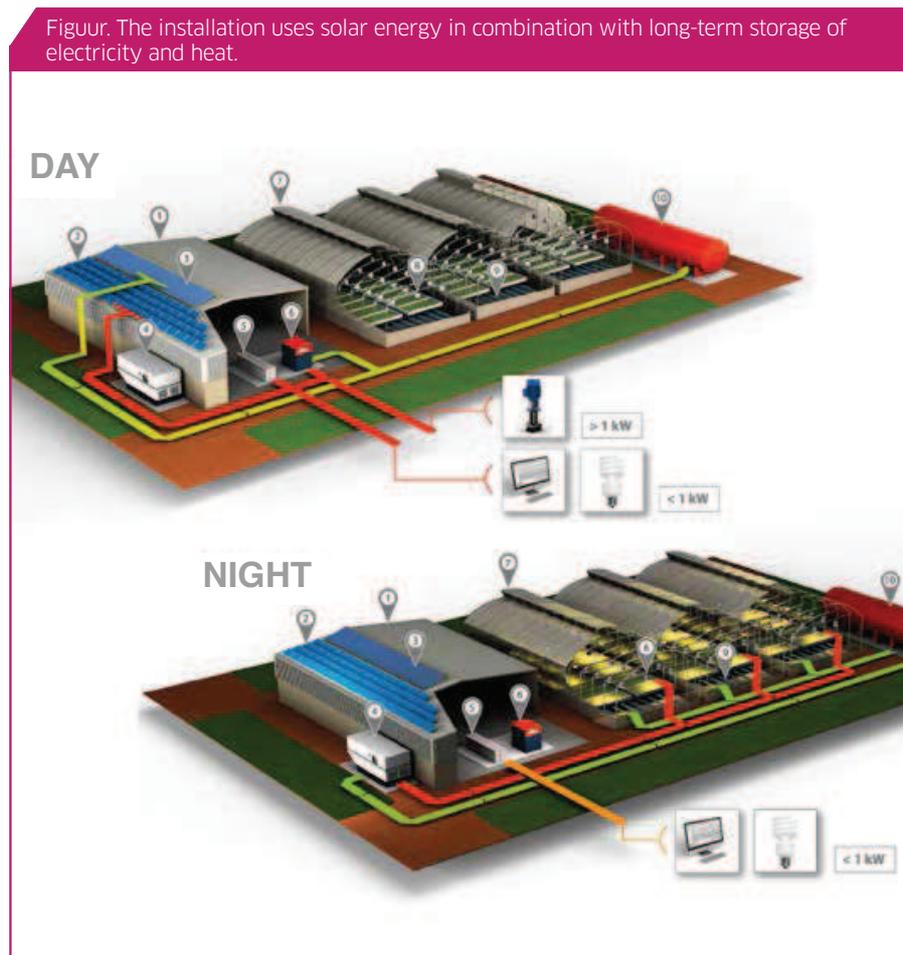
Return

Peek: "We use one hundred per cent of all the energy we 'harvest.'" The return on the solar panels is around 18%, while that from the solar collectors is higher at 55%. The size of the battery is calculated based on the nightly requirement. The capacity of the HST is sufficient to store the heat from the solar collectors and the electric boiler.

The combined heat and power generation is cost effective in Kenya at the moment because electricity costs, at about 20 euro cents kWh, are high. The payback period is less than four years. If no heat is required and only solar panels are installed the payback period is 18 months longer. Bosman expects that such an investment will become cost-effective for more African countries if energy prices continue to rise.

Advantages

The combined generation of heat and power has a lot of advantages. "The biggest advantage



1 = Processing area; 2 = PV solar panels (electricity); 3 = Solar collectors (heat); 4 = Cogenerator; 5 = Battery pack; 6 = Electric boiler; 7 = Production greenhouse; 8 = Assimilation lighting; 9 = Greenhouse heating; 10 = Heat storage tank.

is that it gives you control over energy costs. In addition it's an environmentally friendly way to generate energy. If you are producing for a European supermarket, sustainability and corporate social responsibility are increasingly important. Another advantage is reliability. Not only are there less problems with power cuts, the electricity

delivered is more stable than that from the Kenyan electricity grid. This means you can make savings on maintenance costs and/or the purchasing of new equipment", explains Braam.

The rose breeder adds that there are also fewer problems with diseases, such as downy mildew and Botrytis, when the greenhouse is heated as this removes moisture. "More trade to Africa is also positive for employment. Without horticulture, Kenya would look far less rosy", says Peek.

Cooperation promotes export

The project in Kenya was set up under the Green Farming program. This is a program for Dutch horticultural suppliers who export goods, services, knowledge and advice to the Ethiopian and Kenyan markets.

The aim is to work together to promote the export of Dutch products, to increase the market share in the Kenyan and Ethiopian markets and to intensify the cooperation between the Dutch members and foreign companies and organisations involved in research, development and production.

Branch organisations AVAG (Dutch association of greenhouse builders) and DLV Plant coordinate the program that is

financed by contributions from the members and a subsidy from the Dutch Ministry for International Trade and Development Cooperation. As well as the commercial input, Wageningen UR is also an important partner in the program.

One component of Green Farming is setting up demonstration projects that highlight the capabilities and benefits of applying high-quality horticultural products and services from the Netherlands. A demo project is now running at Van den Berg Roses in Naivasha, Kenya, to demonstrate water management. Another is being set up with regard to climate control on nurseries in places with different climate zones in Ethiopia and Kenya. This is the third project.

Summary

Olij Rozen has built a 3 ha greenhouse in Naivasha, Kenya. The nursery has solar panels and solar collectors for the sustainable generation of energy. The heat from the solar collectors is collected in a heat storage tank and the energy from the solar panels is stored in batteries. The rest goes to an electric boiler, which converts the excess electricity into heat, which is also stored in the tank.