Success Story: s-automotion ag

Markets Served
Renewable Energy

Fully Automated Savings

Location:
Liebefeld, Switzerland

Segment:
Renewable Energy

Problem:
In-roof solar installation for a private home: This required the collection and monitoring of the data from the PV system, the solar hot water heating system and also the newly installed pellet heater.

Solution:
XV102 HMI/PLC, FAZ-C miniature circuit-breaker, DILEM-10-G contactor

Results:
The central controller system enables the optimum utilization of the special features of the individual system sections. The energy optimization of the entire process can be improved at the same time.

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The compact HMI/PLCs of the XV100 series from Eaton have given us a future-proof solution with an attractive price-performance ratio

Martin Fröhlich, as automotion

Background

When renovating older buildings, the question always arises whether to improve their energy efficiency. This is particularly the case when renovating the building shell and replacing the heating system by increasingly using biomass instead of fossil fuels. Such considerations here are also increasingly including the different systems for using regenerative energies for electricity generation. However, smaller systems, such as for private homes are mostly only offered as stand-alone systems. As a result, the control systems of different manufacturers are distributed and their subsystems used independently of each other. In this respect, a consideration of the overall energy generation would offer clear benefits, both from an ecological and also from a financial perspective. as automotion AG is a company based in Bern, Switzerland, that has specialized in its Energy Technology business unit in developing automation solutions for the central plant and energy management of multiple systems. For many years the company has relied here on the systems and components of Eaton.

Challenges

As system integrators, as automotion AG provides the full range of services from planning, development, project engineering, right through to mounting, startup and maintenance – even for large scale solar installations. "For us it's mainly a matter of achieving maximum efficiency for the particular application with the selected components," explains Martin Fröhlich, project manager and closed-loop control specialist at as automotion.

However, renovation projects are often implemented in sections and over several years, not infrequently on account of the costs involved. Systems for using regenerative energy or alternative heating technologies are relatively new sectors in comparison. They are being further developed very quickly and have as yet had little standardization. "The protocols to the controller are therefore often proprietary," Martin Fröhlich explains and adds:

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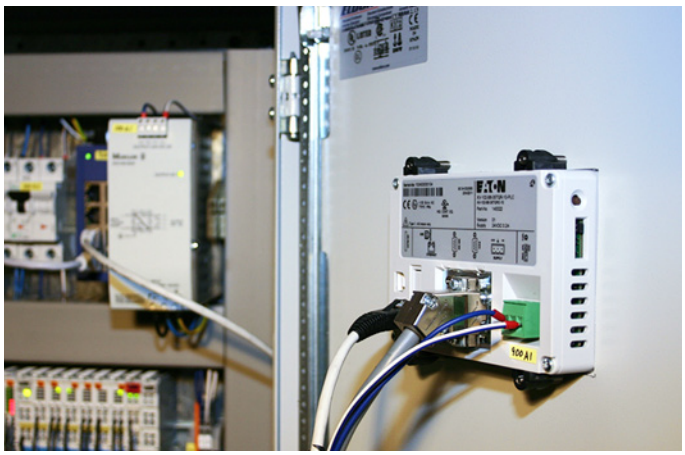
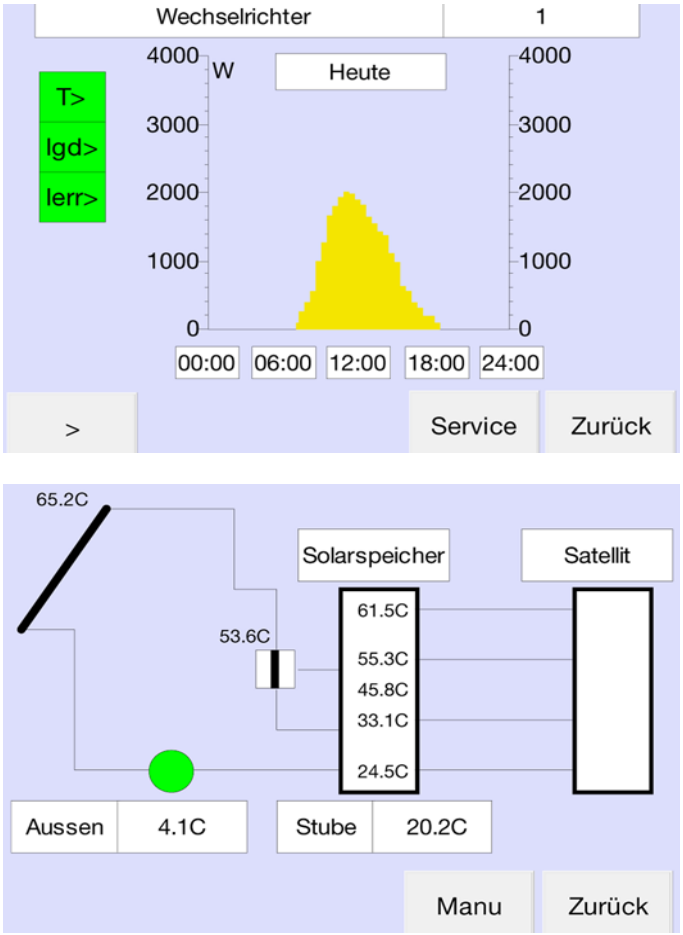


Compact device: Eaton XV102 HMI/PLC in the control cabinet



With the 3.5" color display, all installation sections can be monitored and controlled via a central user interface.

"This is why we need an open controller solution that can utilize the different specialties of individual installation sections and is easy to expand for future applications."

Solution

"We looked for an integrated controller and HMI visualization on account of both cost and space limitations," the project manager describes the initial situation when an in-roof solar installation had to be completed for a private home in Liebefeld near Bern, Switzerland.

"This required the collection and monitoring of the data from the PV system, the solar hot water heating system and also the newly installed pellet heater."

A clear and inexpensive solution could be implemented based on the Eaton XV102 HMI/PLC. Martin Fröhlich appreciates the unrestricted CoDeSys-based programming capability of the xSoft-Codesys-2 programming system, which enables IEC61131-3 conform PLC programs to be created easily. "We also like the compact design of the XV102 and its application-friendly provision of interfaces for Ethernet, CANopen as well as a serial interface," Martin Fröhlich describes other decision criteria. At the same time, the color touch panel with a 3.5" screen diagonal ensures flexible menu guidance. As with all Eaton devices, the powerful Galileo project design environment is available for all Eaton devices. "In this application, however, we developed the operator interface with the alternative CoDeSys Target tool," explains Martin Fröhlich.

The central controller system enables the optimum utilization of the special features of the individual system sections. The energy optimization of the entire process can be improved at the same time. "Our controller activates each heating circuit of the pellet heating system separately and thus selectively optimizes the necessary recooling of the solar hot water system," Martin Fröhlich describes one of the many closed-loop control details. However, for him these kinds of process control systems are only a beginning: "We are already thinking of the predictive automation of the overall system based on an Internet weather forecast," Martin Fröhlich said. He sees here a large and as yet unexploited potential. This can for example be used to optimize the heating cycles of the pellet stove by keeping the energetically inefficient heating phases, which also produce a larger amount of fine dust, to a minimum.

It is also possible to remotely monitor the overall system, and this can be implemented easily with the Eaton controller. For this the controller specialist had to work with the protocols of the individual components such as, for example, the power inverter of the photovoltaic installation, and combine these under one operator interface. In future it will even be possible to control the costs of the electricity consumption in the home according to defined criteria: "Based on the currently applicable tariff, a decision is then made as to whether electricity generated from the photovoltaic system is to be fed into the grid or used for private consumption," Martin Fröhlich explains. Furthermore, automation could make an even greater contribution to energy efficiency: As soon as household devices are equipped with a control input, it will be possible to selectively operate devices, particularly those with a high energy consumption, such as washing machines or dryers, at the most economical time.

Results

"The compact HMI/PLCs of the XV100 series from Eaton have given us a future-proof solution with an attractive price-performance ratio," Martin Fröhlich confirmed. A high level of reliability is achieved through the use of high quality industrial components. The modular design of the energy management system of as automotion makes it a flexible solution for any requirement – from small systems to large networked installations. The owner is also impressed by the user-friendly and clear control system for the solar installation and heating system, and feels optimally prepared for the future. System extensions and the expansion to other areas of the home are already being planned.

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