Solverter system in SOLVERO Halls

The idea of the Solverter heating system used in SOLVERO Halls is based on the use of an innovative absorber of thermal energy from air and solar radiation, integrated into the infrastructure of the building. The energy obtained by the absorber is transported to the heat receivers in some part directly and in some part indirectly with the use of a heat pump.

The roof of the building, made of energy-saving Thexpan panels, plays the role of an energy absorber. Thexpan panel consists of an upper cladding (steel sheet), insulation core (PUR), bottom cladding (OSB board or steel sheet) and a coil (PEX 16 pipe) integrated with the upper cladding. The coil is hidden inside the panel, so the roof is a smooth, aesthetic covering without any additional elements visible from the outside. The lack of additional technical devices on the roof and in the vicinity of the building eliminates noise and vibrations characteristic of heating systems based on air heat pumps.

Thexpan panel as a standard roof covering, both with and without a coil, has been manufactured by us for several years and is a covering that meets the current and planned requirements for thermal insulation without the need to use additional insulation layers.

The idea mentioned earlier is the use of renewable energy to a large extent as a direct source of heat. The Solverter system makes this possible because it produces heat directly all days of the sun, analogous to the solar collectors currently used, only on a larger scale. This direct energy can be used both for the preparation of domestic hot water and for space heating and the preparation of "technological heat" in industrial facilities that have such a need.

The costs of obtaining this energy are very low and will be reduced only to "transferring" the heat from the absorber to the receivers. Increasing its share in the energy balance significantly affects the operating cost of the entire system.

The autumn and spring period of the heating season is full of sunny days, when it is possible to heat directly without the heat pump. In the case of lower temperatures of the absorbing medium (below 35 degrees), insufficient for direct heating, the resulting increase in the temperature of the medium will have a positive effect on the heat pump's COP (Coefficient of Performance), i.e. its energy efficiency. The Solverter solution enables the use of a heating system with a heat pump without the need for drilling and excavations and without the need to install additional devices on the site or within the facility.

It is a system that meets the need to use ecological, economical heating systems that can be used in most new and modernized facilities.

In modern energy-saving construction, where appropriate insulation of building partitions is used, it has become possible to reduce energy losses for heating the building. While the amount of energy for heating the facility can be limited, the amount of energy for domestic hot water (DHW) does not change - it even increases due to the way of life of modern man. Therefore, in the energy balance of the facility, the share of energy for DHW increases in relation to energy for central heating. Meanwhile, the heat needed to prepare DHW costs much more than that needed for heating. This is due to the flow temperatures.

The Solverter system provides free DHW energy during sunny days, with greater efficiency than traditional solar collectors. A sufficiently large surface of a sunlit roof ensures a dynamic increase in temperature and energy even in short-term daily periods of sunlight, which is not ensured by traditional solar collectors.

An additional advantage of the Solverter system is the so-called dual solar energy storage, as the Solverter system includes a glycol buffer and a DHW buffer. These buffers are a large storage of thermal energy and protect the facility in DHW even on sunless days.

The high power of the roof ensures high DHW temperatures on sunny days, which also reduces the consumption of electricity or gas for heating DHW to a temperature above 65 degrees Celsius in order to eliminate Legionella bacteria.

The maximum temperatures achieved in the entire installation do not exceed 80 degrees Celsius, so there are no problems related to overheating of the installation typical of solar collectors.

Currently used heating systems based on heat pumps or solar systems require the installation of additional infrastructure on the roof or walls of the facility (external heat pump unit, flat or tube collectors with structure, piping with insulation). Such installations require making openings, penetrations in the roof or walls. Installing and then servicing equipment installed on the roof is dangerous work. Their proper performance requires appropriate equipment and a qualified, trained and properly authorized and tested crew. The labor costs of highly qualified people are very high, and so are the costs of servicing. The owner of the facility is responsible for securing works on the site, which investors often do not know, and unfortunately they allow so-called specialists to perform dangerous works on any roof.

The Solverter system eliminates all the above-mentioned difficulties and risks related to installation, operation and servicing.

Solcraft offers ready, comprehensively prepared heating systems with selected and parameterized devices for a given facility, after prior analysis of the facility in terms of its needs and possibilities resulting from the location and structure of the building. The effectiveness of the applied solution can be assessed at the level of this analysis without the risk of the efficiency of the ground source, in the case of ground pumps depending on the quality of the soil. The combination of the possibility of obtaining energy from air and direct radiation in one absorber is the first solution of this type in the world.

The sum of these energies makes this system the most effective as it is the system with the highest share of free renewable energy. It also has other functions to use, including snow removal from roofs in the inverted heat pump system.