
Sustainable and efficient supplement to boiler heating

Solar energy is an ideal cost-saving supplement to a conventional hot water and heating system. But the challenge is to get the two systems to work seamlessly together to get the most out of the sun even on the cloudy days.

Wisconsin-based Hot Water Products was asked to incorporate such a system for heating and domestic hot water at a local nursing home. The challenge for Service Manager Dan Movrich was to find a pump that could adjust to the ever-changing sun conditions in the solar panel arrays.

Movrich considers the solution based on the variable speed Grundfos TPE to offer “the most energy efficient hot water system on the market today.” Grundfos TPE automatically regulates flow to maximise available solar energy – no matter how much or little the sun is shining.

The Situation

A Wisconsin nursing home asked distributor of heat transfer products, Hot Water Products, to renovate the facility’s boiler-based heating and domestic hot water system. Care center management wanted to consider solar heating in order to shield the center from increases in energy costs and to help the center gain energy dependence.

The nursing home uses domestic hot water for the laundry, residence rooms and the kitchen, averaging 400- 500 gallon/ hour (1500-1900 l/h). Solar water heating would provide a supplemental hot water source for the indirect water heater, which is coupled to a new high-efficiency boiler.

TOPIC:

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LOCATION:

USA

COMPANY:

Wisconsin

The first step was to find an energy-efficient pump that could operate cohesively with a solar hot water system designed for 1.8 gallon/minute with a 12° F (7° C) differential temperature (DT). The biggest challenge was the variable flow and a means to control the flow to maintain the differential temperature.

The Grundfos Solution

Dan Movrich's top choice of pump was the Grundfos TPE in-line circulator. Integrated variable frequency drive (VFD) and differential temperature sensors mean that the pump can automatically regulate flow according to the weather conditions. The system's heat exchanger can then maximize the availability of solar energy.

In full-sun conditions fluid on the arrays is heated relatively quickly so the pump runs at maximum speed using 4000 W. When the energy available from the sun drops, the pump reduces speed, using only 400 W. The slower flow allows the arrays to transfer more energy to the fluid.

The Outcome

Since the TPE continuously matches flow to the sun's intensity, the plate heat exchanger operates at optimum efficiency no matter how much or how little the sun shines. "The energy obtained by the arrays reduces boiler run time and results in lower utility bills," explains Dan Movrich. "So scraping every bit of temperature difference from the arrays is vital."

For Hot Water Products, installation was "plug-and-pump" as all the sensors and the controller are integrated into the Grundfos TPE.

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