



MEDICAL CONSTRUCTION &amp; DESIGN®

*Reprint from the September 2012 Issue*

## Solar Heating Reduces Energy Costs at Gaylord

Eneref Institute examines how a solar heating system installed at Gaylord hospital is helping the 137 bed rehabilitation facility in Wallingford, CT reduce its water heating costs and carbon footprint

Gaylord Hospital's quiet 500-acre setting had its drawbacks. There were no natural gas pipelines leading to the area, and installing them would be cost-prohibitive. Instead, Gaylord relied on oil heat, an almost-equally daunting expense, especially in Connecticut winters.

But then Mark Veere, facility manager for Gaylord, came up with an idea for cheaper energy without digging up those pristine fields — harvest thermal energy the sun.

### ABOUT SOLAR THERMAL

Solar heating and cooling — a technology that was popularized in the 70's — supplies a building's hot water and can also be used to heat buildings and industrial operations.

Most people think of photovoltaic cells (PV) when they hear solar. Jeff Lendroth, sustainable energy consultant with Pat Munger Construction, the project's contractor, says solar thermal is "the best kept secret." As Eneref Institute, a research and advocacy for sustainable development, recently reported, the only reason solar water heating doesn't sell as much as it should is because

people just don't know about it.

All solar heating systems work on the basic principle of converting incoming solar radiation — sunlight — into heat. In a solar water heating system, liquid circulates through rooftop panels heated by the sun. Solar heated food-grade antifreeze or water transfers the heat to storage tanks that feed heated water into the conventional hot water

system. According to the Solar Energy Industries Association (SEIA), a properly designed and installed solar water heating system can be expected to provide 40 to 80 percent of a building's hot water needs—perfect for a large facility struggling with high bills.

### ASSEMBLING A TEAM

Gaylord Hospital quickly assembled a team of experienced engineers, contractors, and installers to put the project together. Pat Munger Construction, a commercial general contractor, subcontracted the design and installation to Consulting Engineering Services, while Legacy Mechanical Group served as the project's engineer. They chose to keep the whole system's development close to home, bringing in SolarUS, a Connecticut manufacturer of solar heating systems, to provide both equipment and expertise.



Solar water heating panels on the Gaylord hospital in Wallingford, CT

## FINANCING THE PROJECT

SolarUS, the manufacturer of the collectors, provided Gaylord a rough estimate of the system's size and costs based on load. As a not-for-profit entity, tax credits and accelerated depreciation were of no use to Gaylord Hospital. In their case, the State of Connecticut provided a \$323,000 grant toward the project to insure an adequate return on their investment. When for-profit entities invest in solar thermal systems they can expect their payback period to be 2 to 5 years.

## PROJECT PLANNING

Once the funding was secured, the team's detailed planning could begin. Pat Munger Construction installed 70 SolarUS SL-30 evacuated tubes. According to the SRCC's rating, every unit in each collector can produce between 60 and 80 gallons of hot water, though this installation's per-collector output might be slightly lower due to its location and size.

## CHALLENGES

Each panel covers approximately 8 by 6 feet of roof space. And here the team ran into an obstacle—some of Gaylord's roofs would need to be replaced within the next ten years. So the team designed racking systems to make the roof accessible for system maintenance and roof replacement.

Each roof was different, both in pitch and materials. Says Lendroth, "Each roof presented its own challenges," but the problems were "nothing new, we're kind of used to this stuff in general construction."

But the roofs did have an advantage—at only about 35 feet high, the pre-assembled collectors could easily be pulled onto the roof. With the mounting system in place, says Lendroth, "it was just a matter of simply pinning these systems right down, almost like a flat plate collector installation."

The team also replaced some of Gaylord's four boiler tanks with more efficient ones, and, in Lendroth's words, did "a fantastic job with the control system," making it streamlined and modern.

The incoming water starts at 55 degrees, and if necessary, the backup boilers kick in. However, says Jason Harris, business relations manager of SolarUS, this system can reach 160 degrees "if you play with the flow and the pumps," but that's actually "too hot for the domestic hot water usage"—the heated water would have to be mixed with cold water to be used.

## PANELS WORK QUICKLY

The system started working immediately, heating and circulating water by 9 AM on cold January

mornings. Even Lendroth was "pretty surprised at how efficient it was."

Both Gaylord and the team are pleased with the process and its bright results. According to Harris, the system replaces 60 percent of the energy formerly needed to provide hot water. Lendroth believes that the ability of the different companies to team effectively was "the real secret," with each bringing "something unique to the table." Most importantly, adds Lendroth, Gaylord Hospital, which received a New Haven Green Business Award for the installation, is "very, very happy." ●



This article is part of an ongoing initiative by Enerref Institute to demonstrate the benefits of solar heating and cooling. Seth Warren Rose is founder and director of Enerref Institute ([www.enerref.org](http://www.enerref.org)) a non-profit research and advocacy organization that reports regularly on ecologically sensible innovations.