

Commercial BUILDING PRODUCTS

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Solar Heating is Ready For Its Day In The Sun

Eneref Institute reports on how solar heating provides extraordinary opportunities for cost efficiency, the environment, and the U.S. economy.

Here's a riddle: What retrofit can pay for itself within just a few years, has very attractive financial incentives, is instantly green and has a history of success longer than most Americans have been alive?

If you said "solar heating," not only would you be right, but you'd be among the few facility executives aware of the advantages of using the sun's energy to heat water.

Although solar photovoltaic (PV) is the better known solar energy technology, solar heating is four times as efficient at one fourth the cost. In fact, a recent survey by the Eneref Institute (eneref.org), a research and advocacy group, cited "lack of awareness" as the greatest impediment to solar heating sales. But with recently enacted renewable energy incentives and innovative solar heating technologies, coupled with unpredictable fossil fuel prices, solar water heating should become mainstream within the decade.

How it works

Although solar heating, or "solar thermal," encompasses various technologies, the best technology for a given building is determined by the task required of the system – e.g. whether

heating tap water vs. heating water for sanitizing food processing equipment. The building's exterior environment plays a role as well; Boston's weather may warrant a different system than that used in Miami. But all systems work on the basic principal of converting incoming solar radiation – sunlight – into heat.

Solar water heating systems simply circulate liquid through rooftop heat-

absorbing panels warmed by the sun. The solar heated liquid – water or food-grade antifreeze – transfers the heat to storage tanks that feed heated water into the conventional hot water system. Although the rooftop solar panels heat up surprisingly fast, solar water heating require a conventional backup system for very cloudy days. Still, a solar heating system can provide the bulk of the heat energy needed over the course of the year.

To get the most bang for your buck, the best applications match the solar heat supply to your hot water demand; for example, situations where most of the heat is required during the daytime, and where hot water is needed consistently for the better part of the year. Commercial systems vary in size from 250 sq. ft. to 5,000 sq. ft. of solar collectors, or "panels." The building also requires adequate rooftop space and support for the system, with a



Solar water heating panels installed at the St. Paul River Centre, MN

southerly exposure and minimal shading from obstacles such as trees or other buildings.

An extremely adaptable technology

The American solar heating industry began to rapidly expand in the mid '70s, however not until the last decade has significant growth resumed – and the manufacturers that have remained have learned quite a lot from the ups and downs of the last thirty-five years. In the US, solar heating systems are typically installed on or close to the customer's facility. Usually the systems are customer-owned, however "energy service companies" can offer packages where the equipment is owned and maintained by them, and savings are passed on to the customer. Ideal applications include buildings or other facilities which use a fair amount of hot water; residential apartments, laundries, health clubs and restaurants are good examples. While solar water heating is usually the easiest solar thermal application to justify economically, new technologies for wider applications are now available.

Solar thermal for space heating is just gaining traction in the US. The economics for solar space heating will make the most sense in areas with relatively cold but sunny winters; however system configurations are available for any climate. Some of the world's most successful solar heating markets are in cold, cloudy northern European locations. And new incentives now available in the US are helping put solar space heating on the map.

Solar thermal air conditioning – a brand new solar industry – is the holy grail of all solar applications, working best on hot, sunny days when both demand and efficiency are high. The return on investment varies greatly depending on the availability of incentives, the local price of conventional energy, and the cost of financing for project construction.

Food and beverage manufacturers use solar-heated water for everything from cooking to equipment sanitiz-

ing. Like other solar heating projects, "process heating" applications are eligible for the federal government's Investment Tax Credit (ITC). Hospital laundry rooms are excellent candidates for solar process heating, provided the facility has the space for collectors and tanks appropriate for the load. Agricultural livestock businesses, wineries and dairy farms are commonly cited as ideal candidates for solar heating. Even though process heating is eligible for ITC, the accumulated positive cash flow over the 30-year life of the system is especially attractive.

Look for a Solar Rating and Certification Corporation (SRCC) certificate on solar heating products. SRCC is an endorsement that certifies durability and performance, but its most important function is that it establishes eligibility for federal tax credits. Numerous new solar thermal products are currently undergoing a rigorous set of tests to receive SRCC certification, and many innovative, high quality products are already certified, and listed on solar-rating.org.

Expect to see it more often

In many other countries, solar heating is common – with Western Europe alone representing a \$4 billion market. However the US is starting to catch up. In fact, solar heating is being specified in new construction on a regular basis, indicating that engineers and architects are increasingly recognizing the value of the technology. Hotels, restaurants, colleges, residential complexes, military bases, correctional facilities, fire stations and even breweries have all started to come on board in the last year. Many took advantage of incentives.

Across the US, solar heating sales are anything but uniform. Naturally, where rebates and tax credits are coupled with high energy bills, sales are strongest. But that too will begin to change because federal law requires that all federal construction incorporate solar water heating in new projects and major renovations. The US Depart-

ment of Energy plans on issuing compliance guidelines in the fall of 2011.

The increased interest in solar heating is seeding more diverse financing options. One option that is becoming increasingly available is linked to the traditional energy service company (ESCO) model, where the ESCO pays for and maintains ownership of the solar system while selling the energy to the facility at a discount from their actual utility bill.

Incentives help drive sales

To compete with taxpayer-funded oil and natural gas extraction, solar heating projects may require incentives to drive sales. A state-level incentive for commercial installations would typically be based on a percentage of the installed cost of the system, or on the square footage of the installed collectors. Many states offer incentives, however while some new programs are being developed, other state programs are disappearing. The best resource for learning about current incentives is managed by the North Carolina Solar Center, www.dsireusa.org.

The most ambitious state incentive program is the recently created California Solar Initiative (CSI). Launched in October of 2010 for commercial buildings, (residential in May, 2010) the entire solar heating industry has its eyes on the opportunities created by the ambitious \$350 million rebate program.

On top of state programs, solar heating is eligible for the 30% Federal Investment Tax Credit (ITC). The combination of the ITC with any local or state incentives can sometimes cut the cost of a thermal system by more than half. Congress recently extended the ITC until 2016. Eligible technologies include water heating, space heating and cooling, and solar process heating. For commercial customers without a federal tax obligation sufficient to make

use of the ITC, the Treasury Grant Program provides an equivalent incentive and is available until the end of 2011.

In Europe, where solar heating is commonplace, the most established solar heating markets are those that have significant political support, including Germany and Austria, rather than countries further south that have more solar radiation. The U.S.-based Solar Energy Industries Association (SEIA) works to help ensure that solar energy enjoys competitive policies and incentives as those of other energy sources. Visit www.seia.org to find state chapters – like CAL SEIA in California or New York’s NY SEIA. Local chapter are a great resources for getting started in solar energy.

Building owners and specifiers are attracted to solar heating and cooling (SHC) technologies because they substantially reduce energy costs – but they shouldn’t overlook the fact that SHC is also a unique opportunity to promote American jobs, American manufacturing and American energy independence while at the same time investing in a cleaner environment. That’s why SHC is becoming an integral part of today’s solution to the energy riddle. ●



This article is part of
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demonstrate the benefits

of solar heating and cooling.

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(www.enerref.org) a non-profit research
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reports regularly on ecologically
sensible innovations.