



## Use solar radiation for snow-melt systems

**W**E DISCUSSED THE potential of waste heat recovery as an alternative to conventional heat sources for powering commercial snow-melt systems in last month's column (November, pg. 40). In this month's column, we'll begin looking at solar thermal energy as an alternative to conventionally heated systems.

One of my earliest exposures to the idea of turning excess solar radiation into snow-melt energy came in one of my classes from a student who had completely retrofitted his home with hydronic radiant floor heat. During the course of construction, he also added an oversized two-car garage. In the floor of this garage, with its excessively deep center slab and extra insulation below the slab to act as thermal mass and heat storage, the student had incorporated PEX tubing. The walls of

the garage were 2-by-6 construction and insulated to an R-19, with the roof being R-30.

He then covered the whole south side of the garage with a lean-to style of

digs for his cars, he told me that he wasn't doing it for the cars as much as he was doing it for the red earthworms that he was raising in bins along the sides of the garage. He actually had a

**Solar has been the default snow-melt system since the invention of paved surfaces.**

flat-plate solar collectors. In addition to this, he incorporated PEX tubing and insulation into the concrete slab on the north side of the garage, where the automobiles would be parked and brought into the garage. When I asked why he was providing such palatial

business based on vermicomposting earthworms. The solar collectors and radiant floors were to accommodate his worm production facilities. Of course, climbing into a warm car had its side benefits.

Operation is quite simple. When the solar collectors are hotter than 90°F, pumps turn on and solar-heated glycol circulates between the solar panels and the PEX circuits buried in the floor of the garage. When the actual garage temperature exceeds 60°F and the solar collectors are still warm, then a two-way diverting valve directs the excess solar capacity out to the north-facing parking area that is typically in shadow for the majority of the winter season. The whole hydronic/solar system is filled with a 50% solution of propylene glycol.

When I asked him how well his system had been working, he said that earthworms cannot handle temperatures of less than 40°F or they begin to die. In three years of operation since construction, he had not lost a worm and he had never had to shovel snow or ice out of the shadows of his garage on the north side of the building. Fairly impressive for a system whose parasitic cost of operation is less than a 100W bulb during daylight hours!

This got the gears rolling in my head. Why not take advantage of one of the cleanest energy sources to strike the face of the earth? After all, solar has been the default snow-melt system since the invention of paved surfaces.

One of the biggest problems facing the solar industry is that demand and available energy don't coincide, meaning, when you need it the most, you

get it the least, and when you need it the least, you get it the most. If you don't have any means of dissipating the solar heat in summer, it becomes problematic for fluids and flat-plate solar collectors stagnating at temperatures approaching 350°F at the absorber.

A solar array can be maintained at reasonable operating temperatures in the summer by dumping the excess summer radiation into the snow-melt system. Depending upon how much the array is oversized, there is the real possibility that excess Btu may be available even during the winter months.

Obviously, I am speaking of our solar availability here in sunny Colorado, and, as they say in the automobile business, "Your mileage may vary." In Colorado, we get an average of 300 days of sunshine, as compared to Washington, where they average only 200 days of sunshine. Too many black clouds following politicians around? In any case, you can see that you'll need to check solar availability in your climate before making a decision whether this might be an option. Summer stagnation is still a problem, regardless of your locale.

I have seen this system work, and the benefits are obvious. With the reintroduction of solar thermal collectors ("More heat, less fuel," November, pg. 24), this is an area that warrants thinking outside the box. What the heck, the energy is relatively free and plentiful. We might as well use it.

In closing this last column of 2006, I'd like to take a moment to thank all those people who are spread out around this wonderful globe protecting our rights as free citizens. I'd also like to thank their families for allowing their loved ones to perform this necessary job, and ask all our readers to say a prayer of thanks and protection for those people serving our country. Merry Christmas, Happy Chanukah and tune in next year as we continue our journey towards a cleaner, safer happier environment. Until then, Happy Hydronicing!

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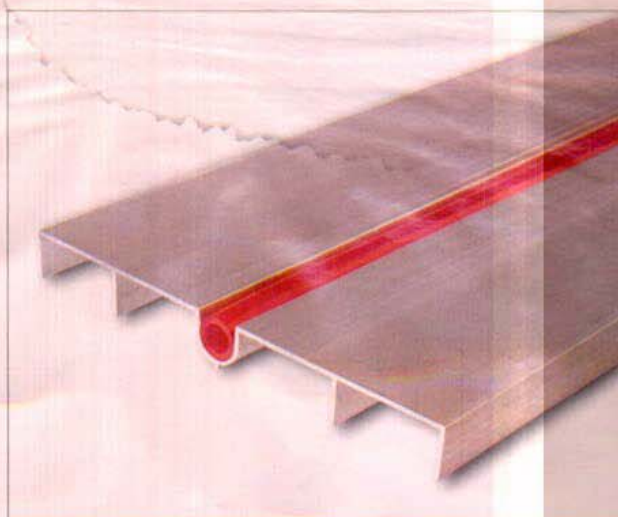
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## Make my (Christmas) Day

**D**O YOU FEEL lucky? Well, do ya, punk? And, of course, as you know, the bank robber wasn't lucky. What in the world does Dirty Harry have to do with this column, you and Christmas? More than might meet the eye.

I had the privilege of spending several hours with Soren Markussen and Bill Boss who both work with Danfoss. Soren was visiting the United States from Denmark to research how we heat and cool our homes. Bill works with Danfoss-USA. Danfoss is fascinated with our Northeast, where hydronic installations are more concentrated. The conversation was lively as we dissected the many types of hydronic systems we service and newer high-efficiency hybrid radiant systems.

The restaurant where we ate lunch is nestled into the historic district of York, Pa., where steam systems from the early 1900s are the norm. The restaurant owner stopped by to greet us and welcomed Soren to the United States. Their conversation turned immediately to heating and air conditioning for the

owner's intended move to the two upper floors above his restaurant.

He wants to invest in the highest efficiency equipment available. I felt like we should have taken a quick detour to the basement where the old steam boiler resides - encased in gobs of thick asbestos. "Feeling lucky, punk?"

Our district steam was turned off in the early 1970s.

we might have asked the beast!

Fossil fuels are too cheap in the United States. We live in Never-Never Land when it comes to waking up to the reality that most of the rest of the world faces. Where we pay less than \$3 a gal. for gasoline, Soren pays more than \$5 a gal. Because of the higher costs for gas, their cars get much better mileage rates: Soren's car gets slightly more than 50 mpg! He was quick to point out that his 1.1-litre engine and car are much smaller than the vehicles we drive in the United States.

Where our homes belch Btu to the atmosphere, homes in Denmark are now rated for their energy efficiency - the whole house, not just the heating, air conditioning and domestic hot water. Higher ratings enhance a home's resale value, and Soren noted there's been a definite increase in business for trades-

the atmosphere while cooling the nuclear-fried water!

"Feeling lucky, punk?" Not really; more like we're all staring down the barrel of that 44-caliber fossil-fuel-energy reserve trying to decide if it was five or six shots. We too had district heating at one time. Ours, however, was distributed as live steam via iron piping that was installed inside hollowed-out tree trunks, which served as insulation. The condensate was discharged to the sanitary sewer line and metered so that the electric plant could charge for steam used in that home or business. Our district steam was turned off in the early 1970s, which made for a booming business installing steam boilers!

Where Soren lives, energy-efficient homes are approaching the point where it may no longer be economically feasible to incorporate district heating into a home's design. As much as the Danes love radiant heating, newer homes are approaching an energy-usage-threshold where the heat loss is so low that even radiant heating may become obsolete!

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# Software makes PDFs from CAD drawings

**E**NHANCED COMMUNICATION in the office and in the field can make everybody's day easier. Here are three programs with distinct capabilities.

## PDFs in a jiffy

Offering flexibility for contractors seeking an enterprise-wide PDF tech-

nology, Bluebeam Conversion Server v 2.0 file creation software (Bluebeam Software, [www.bluebeam.com](http://www.bluebeam.com), 866/496-2140) enables automatic conversion of AutoCAD and SolidWorks CAD files and Windows files to PDF (including large-format PDF), DWF, TIFF, JPEG and seven other file formats in a server environment.

The solution relieves CAD workers of having to otherwise create PDF files for communication or storage. Plus, it allows non-CAD project team members to collaborate on drawings with virtually no learning curve and enables team members to easily send clients PDF versions of CAD drawings.

Any workstation operator can access the program through a network connection, which interfaces with the "watched folder," the network PDF printer and an API (application programming interface). A watched folder is a Windows folder set up on the network drive for the purpose of periodically checking for any changes or additions to files in the folder. Whenever a DWG file is changed or a new DWG file is added to a particular folder, Bluebeam Conversion Server v 2.0 is able to recognize that and create a PDF file of it. This automatic conversion can be immediate or can occur at scheduled intervals.

The software automatically calculates the appropriate scale and rotation, paper weight and line thickness and supports line merge from overlapping drawings, eliminating the need for operator adjustments of those factors when creating a PDF file. Configuration options include page size customization, automated bookmarks, text stamps and watermarks.

In addition to the server software, Bluebeam offers desktop products, Bluebeam PDF Revu Standard Edition, AutoCAD Edition and SolidWorks Edition, which install buttons in the toolbars of AutoCAD, SolidWorks, Word, Excel and PowerPoint for one-button creation of PDF files. For all other Windows applications, the software includes a PDF printer driver that allows users to create PDF files from them.

## Speech recognition

Dragon Naturally Speaking Speech Recognition 9 Professional software accepts speech input accuracy approaching 99% at a speed (up to 160 words a minute, which is three or four times faster than most people type), without any of the script-reading or prepared-text-based training that previous versions required. Onscreen tutorials get users going with the solution almost

right out of the box.

The software can be used for letters, contracts, change orders, notes, reminders and any other words for use in Microsoft Office applications, including Microsoft Internet Explorer and almost any other Windows-based application.

The solution, which comes with a headset and is network ready, can be used in conjunction with a Nuance-approved Bluetooth wireless microphone for dictation into any Nuance-certified handheld device for automatic transcription when synched to a PC. Users can navigate Web pages by

speaking rather than typing URLs and links.

A handy vocabulary customization tool enables users to build a vocabulary tuned to contractor/construction (or any other) vernacular. The software can correct misrecognized words via voice, mouse or keyboard and "learns" from the correction, so it won't make the same mistake twice.

## Service management

SAM Pro Enterprise (Data-Basics, [www.databasics.com](http://www.databasics.com), 800/837-7574) is a proactive comprehensive service management, mobile workforce and back-office accounting solution for HVACR contractors involved in service work, construction and facilities management. The customizable software suite employs proprietary Rules-Based Management technology that aims to optimize operational efficiency by functioning on the premise of management by exception — the software handles routine situations and alerts appropriate personnel to early-stage problems. A contractor's core business "rules" are established upfront and are reinforced throughout all aspects of the organization.

The suite offers 20 modules, including dispatch board, inventory management, job costing and job-quote management software, from which management can build a solution.

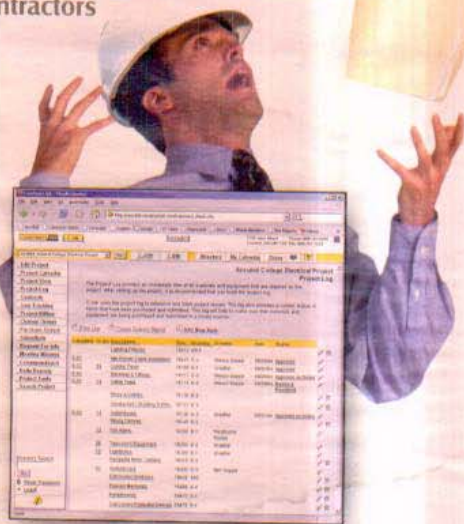
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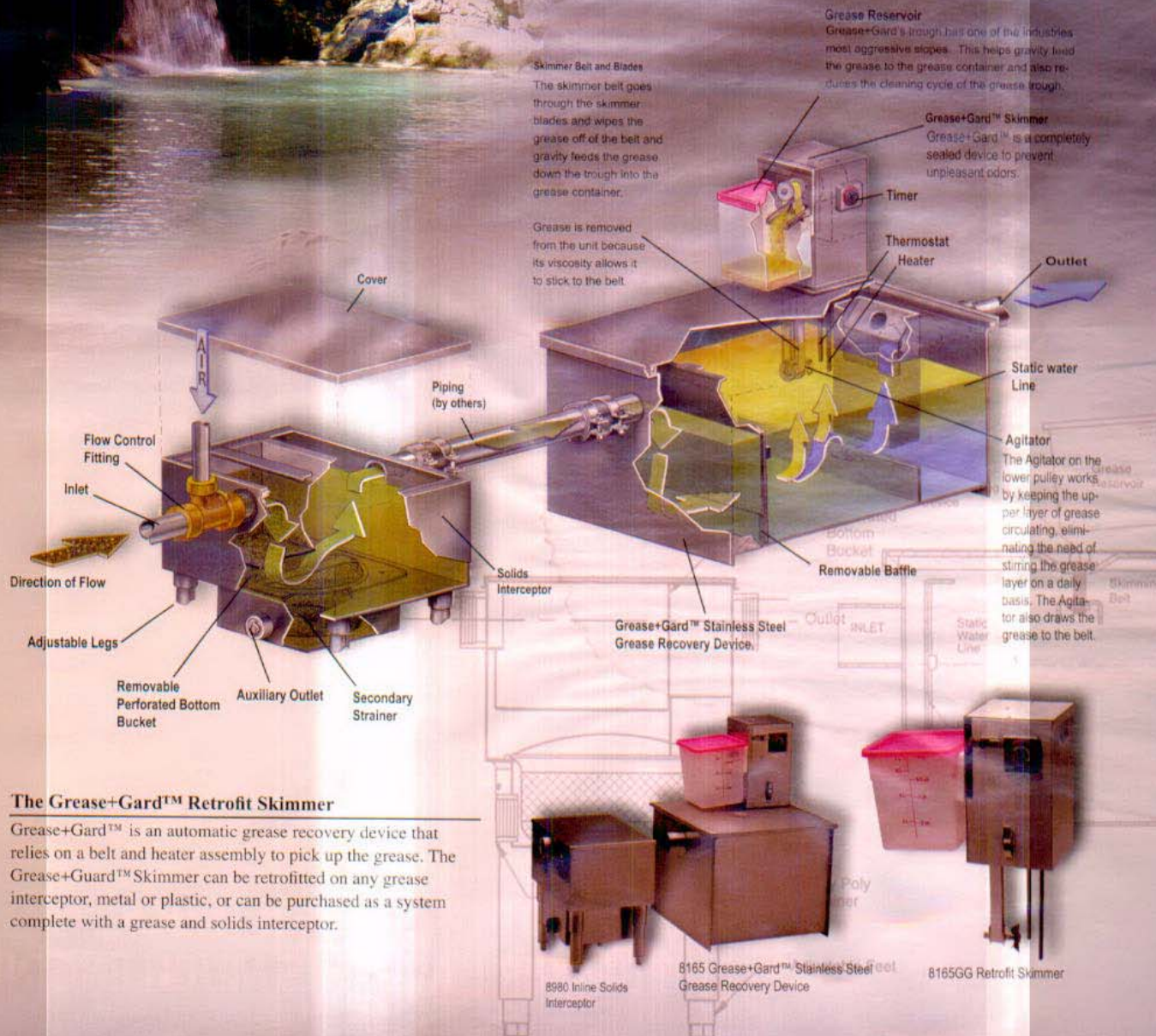


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