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From left, Brad Hess, Mel  
Stoltzfus and Carl Longenecker at  
Mercedes-Benz of Lancaster (Pa.).

# Service with a green smile

*Oil reuse heating system highlights Pennsylvania car dealership's sustainable footprint.*



Photos by Carl Longenecker/ATI Systems

Above: The Mercedes-Benz of Lancaster (Pa.) dealership benefits from the use of a waste oil heating system. Inset: The dealership is outfitted with more than 45,000 sq. ft. of radiant floor heat, including a large service facility. Walkways and perimeter aprons of the building feature a snow-melt system.

Used motor oil from serviced automobiles must be properly disposed of, but that removal often comes at a cost to a maintenance facility.

The Mercedes-Benz of Lancaster (Pa.) dealership decided to go a different route by using its waste oil as an alternative fuel source to heat the majority of its building.

The use of motor oil as a heating source is just one of many sustainable technologies used in this adaptive reuse project that converted a former Yellow Roadway Corp. freight trucking terminal into a state-of-the-art high-end car dealership.

"The waste oil is a byproduct of their service business," notes **Carl Longenecker**, the owner of Conestoga, Pa.-based ATI Systems, a specialty radiant floor heat and hydronic distribution company that was the design engineer on the project. "They can either pay to get rid of it or use the oil onsite for what is essentially free heat for the building."

ATI Systems specializes in offering contractors and building owners comprehensive design packages that include both specified products and design services.





The mechanical system benefits from the use of Webstone Valves isolation flanges on the circulators, as well as Webstone air eliminators. The air eliminators significantly reduce installation and startup time by extracting air out of the system much more quickly.

"We put together complete packages rather than selling standalone services," Longenecker says. "A contractor or engineer will come to us with a set of blueprints for a project and we'll do all the load calculations and a complete design from A to Z. These services are included in the quotation for a complete package of all the necessary components required to do the job. We aim to give them a simple and seamless project."

### Yellow to green

The retrofit brought with it some challenges, mainly due to an existing loading dock from the building's Yellow freight days. ATI Systems provided the hydronic design engineering on the project and **Mel Stoltzfus** of Intercourse, Pa.-based Mel's Heater Service was the radiant floor heat contractor.

"There is always a challenge working around integrating an existing building and a new building, especially when it comes to things such as existing floor slabs," Longenecker says. "Initially, there was some concern about reusing the freight terminal for the dealership. As it turns out the freight dock now is used to display cars and is one of the most architecturally interesting features of the building. They ripped part of the original structure down and incorporated a new front showroom into the existing building.

"The biggest green feature was the reuse of about 28,000 sq. ft. of existing structure. This saved a large amount of construction material, and the existing space accounts for almost half the building."

With the waste oil heating system, used motor oil is pumped via a central collection system into a 5,000-gal. vertical holding tank, which then feeds two 375,000 Btu Energy Logic boilers. The Energy Logic boilers are integrated in the design and backed up with three Baxi wall-hung 379,000 Btu condensing gas boilers. A tekmar Controls system ensures equal runtime by rotating the five boilers as well as resetting the supply water temperature of the system based on outdoor temperature.

"The waste oil heating system is utilized when the fuel is available and supplemented with the gas boilers," Longenecker says. "This setup with the waste oil significantly reduces the annual heating costs of the building."

Stoltzfus points out there is an environmental benefit to reusing the motor oil. "There is no way to really get rid of used motor oil," he says. "Sometimes they put it in asphalt. The Environmental Protection Agency likes it when you burn it onsite so you're not hauling it around and risking a big spill."

### Comfortable environment

The dealership is outfitted with more than 45,000 sq. ft. of radiant floor heat that encompasses the showroom, offices, parts center, car wash and a large service facility. Half-inch ATI radiant tubing is installed on 12-in. centers throughout the space and broken up into more than a dozen different zones.

The walkways and perimeter aprons of the building feature a snow-melt system using 1/2-in. ATI radiant PEX tubing on 6-in. centers using short loop lengths. When snow begins to fall, a tekmar snow-melt control center activates the system and heats the walkways so there is no buildup of ice or snow.

"From a liability standpoint you don't want people slipping and falling while walking into the building," says ATI's **Brad Hess**, who designed the entire mechanical system for the dealership. "There is a moisture sensor embedded in the walkway that provides feedback to the control. You can program the system so that even when it's 36° F and snows, the system automatically turns on."



Used motor oil is pumped via a central collection system into a 5,000-gal. vertical holding tank, which then feeds two 375,000 Btu Energy Logic boilers.

# Service with a green smile



The Energy Logic boilers are backed up by three Baxi wall-hung 379,000 Btu condensing gas boilers. The design heat requirement is 1.2 million Btu of gas boilers, of which 750,000 Btu is offset by the waste oil boilers.

The use of Webstone Valves isolation flanges on the circulators, as well as Webstone air eliminators, provides key benefits for the radiant floor heat and snow-melt systems.

"The isolation flanges allow the contractor to not only isolate the zones but also have the ability to easily service the circulators should that be necessary," he says. "Because we always specify Webstone isolators that incorporate built-in flow check on our projects, the contractor saves significant labor by installing one item where previously it would have taken three components (flange, flow check and isolation valve) to do the same job."

Longenecker adds the air eliminator significantly reduces installation and startup time by extracting the air out of the system much quicker.

"This is one of the most critically overlooked items in the hydronic industry today," he says. "More than 90% of the existing sys-

tems we look at have little to no effective air removal on them and correspondingly very poor system performance."

All zone manifolds in remote locations are fed underground with insulated 1-in. PEX-AL-PEX composite pipe, further adding to the project's uniqueness.

"There is approximately 10,000 ft. of underground distribution pipe that makes 'home-run' connections to the various manifold sites for the radiant and snow-melt systems," Longenecker explains. "Each of these is then connected to individual zone circulators. Often times you'll see copper piped overhead to the manifold sites. With the run-up today in the price of metals, it's a huge savings in material costs, not to mention the labor savings to run it underground."

Hess says the underground piping lessens potential future service headaches inherent in typical overhead systems that often result in multiple mechanical rooms or spaces.

"With these composite pipes under slab, each manifold has its own lines that run back to the mechanical room," he says. "From a service standpoint there is nothing overhead to work on. There are no fittings or joints in the runs with the potential to leak. All the pumps and components are back in the mechanical room. When something needs servicing, it's all right there in that one room."

Large MacroAir fans provide further energy savings during the summer. Longenecker explains by moving large volumes of air around a space, the evaporation rate of skin perspiration increases, which is the body's natural cooling methodology. This "cooling effect" corresponds to being just as comfortable at a higher temperature setting for summer air conditioning.

"It allows the dealership to raise its thermostat six or seven degrees (in the summer)," Stoltzfus says. "You're saving energy because you don't have to run the air conditioning nearly as hard."

## Still more green

The dealership employs a water-recycling system from Laser Wash in its car-wash bays, while restroom facilities are outfitted with American Standard low-flow plumbing fixtures. The use of low-VOC building materials and LED lighting further contribute to the dealership's sustainable footprint. Even the

radiant floor heat system benefits from green insulation utilizing Environmentally Safe Products' Slab Shield under-slab insulation.

Additional green products specified in the dealership include Wilo circulators, Cal-effi fill valves, a GEA FlatPlate snow-melt heat exchanger and Taco ASME expansion tanks.

Longenecker notes the facility's large size made it an easy choice to go with a radiant system. "Radiant floor heat systems are inherently very comfortable," he says. "With air-heating systems in larger spaces with 25-to-30-ft.-high ceilings you often get that temperature stratification with the upper part of the space being very warm and the bottom of the space being cold.

"People here are walking around on warm slabs and are very comfortable, plus the radiant floor heat offers operational cost advantages. You can typically set the space temperature lower than you would on an air-heating system and still accomplish a greater level of comfort. This benefit coupled with reduced air infiltration resulting from less air being moved around the space results in energy savings."

Hess notes the combination of the waste oil heating setup and the radiant floor heating system tag-team to provide the dealership with a significant reduction in gas bills.

"The design heat requirement is for 1.2 million Btu of gas boilers of which 750,000 Btu is offset by the waste oil boilers," he says. "They have a comfortable atmosphere for employees and customers and they have reduced their heating costs."

This is the second Lancaster-area car dealership the ATI team has outfitted with a waste oil/radiant floor heating system within the past year. The BMW dealership down the road generates its entire heating season's needs through the use of waste oil and had enough leftover oil to warrant the installation of a snow-melt system.

"It's amazing to see the inner-workings of these dealerships," Longenecker says. "Both dealerships feature service departments with tiled floors that are completely climate-controlled and use computer-selected automated parts retrieval systems and carousel-based tire racks. They are not only providing optimal comfort for their employees and customers, but they are doing so in a way that is protecting the environment and saving money." **pme**