Beyond Fluid Recycling to a Greener Operation

*By Sue Schauls*

*Reduce, Reuse and Recycle*, the P2 Act of 1990 set for the mandate for environmental stewardship using this mantra. Those inside the automotive recycling industry know that there are many aspects of the work we do that are inherently green. Recycling metals and automotive fluids is an obvious aspect. All reputable salvage yards capture, contain and manage fluids such as motor oil, brake fluid, transmission fluid, gasoline and antifreeze. For many of these fluids the pollution prevention hierarchy comes in to play as matter of doing business.

**Reduce** – Fuel and antifreeze are great examples of reducing waste. These byproducts of fluid recovery generally do not become wastes, the ultimate reduction goal is to prevent problems by not generating the waste at all. Used fuels and used antifreeze are usable products that are sold and/or used on-site. Zero waste is generated.

**Reuse** – Used oils such as crank case oil and hydraulic, brake and transmission fluids are a classic example of reuse. The Used Oil Management Standard (40CFR269) actually exist for this very purpose to encourage shops to recovery and reuse the energy content of the byproduct as heating fuel or to be re-refined into new lubricant.

**Recycle** – Metals of course are the most recycled byproduct in history. Worldwide, over 400 million tons of metal is recycled each year. (reference = <http://www.recyclemetals.org/whatis.php>)

Many new technologies are emerging in this green era. Better yet, technologies that have been available for many years are becoming more mainstream and cost effective options. And some tried and true technologies are still a good idea. The biggest opportunity to reduce a business’ environmental footprint lies with the heating of the facility.

Heating the shop is a big expense and at the same time is an opportunity to look to green technology that can cut cost and improve comfort levels. Basically heating choices are forced air or radiant heat. Both delivery methods are traditional heating methods developed over time. Forced air heating is still the most widely used technology for heating shops and homes. Radiant heat such as the old boiler system you may have experience in school or the radiators of your first apartment likely do not conjure up visions of advanced technology. Radiant heat employed these days is a more systemic approach as radiant floor heat. Either of the choices can become green technology depending on the source of the energy used to operate the system.

**FORCED AIR Used oil furnace**. The used oil furnace is a savy investment for any auto salvage yard that isn’t already using one and has cold season heating requirement. Generating as little as 500 gallons of used oil per year can realize a good return on investment (ROI). For capital equipment expenditures an ROI of less than three years in almost a mandate.

Used oil furnaces come in a variety of sizes, however none can exceed the regulatory maximum of 500,000 Btu per hour. A used oil furnace purchase can be based on the amount of oil that is routinely generated each year or it can be based on the size of the facility. Either plan will cut the amount of energy purchased from the utility company. Used oil furnace technology has advanced providing FREE, reliable, safe and low-maintenance heat in an environmentally friendly manner.

**RADIANT Used Oil Boiler**. A handful of used oil furnace manufacturers have developed used oil boilers. In new building construction projects, radiant floor heat driven by a used oil boiler can be very energy efficient. Radiant floor heat can be a healthier environment too. Radiant heating does not blow dirt, dust, bacteria, and viruses around the shop all winter long. When your floor is warm, your feet are warm too.  The air that you breathe can be a little cooler and more refreshing.

Studies conducted by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) indicate that with radiant heating systems people can be comfortable at temperatures 6°F to 8°F lower than with convective systems. With convection, heat loss to the ceiling is significant. With radiant heat, the temperature varies only about 2°F to 4°F between the ceiling and the floor.

Other benefits of looking at used oil energy exist but are difficult to quantify. Shops that have gone to used oil as an energy source or as a secondary energy source also claim that worker productivity goes up when you can affordably heat the shop on chilly spring mornings and fall evenings when you would not normally have the furnace running. It’s free energy courtesy of salvage vehicles.



**Passive SOLAR** technologies use sunlight for useful energy without active mechanical systems. Such technologies convert sunlight into usable heat (water, air, thermal mass). A common example is a solarium on the south (equator) side of a building. Passive cooling is the use of the same design principles to reduce summer cooling requirements.

Passive solar buildings aim to maintain interior thermal comfort throughout the sun's daily and annual cycles while reducing the requirement for energy-consuming heating and cooling systems. Passive solar building design is one part of green building design. The goal of implementing a passive solar design into a business is to use solar radiation to augment heating in cold climates/seasons and reduce cooling demand in warm climates/seasons.

Direct gain is the simplest passive solar heat design technique. Sunlight enters the building through west and south-facing windows (opposite directional in the southern hemisphere). The sunlight strikes floors and walls which absorb and store the solar heat (thermal mass). Dark colors usually absorb more heat than light colors. At night, as the room cools, the heat stored in the thermal mass radiates into the room. Low-E glass helps to reflect the heat back into the room in the winter months and deflect heat gain in the summer or warm climates.

It makes little sense to save money on winter heating just to spend it on summer cooling. So in most climates, a passive solar design must provide summer comfort as well. The solar heat gain in the summer must be blocked by an overhang or awning.

Window awnings or overhangs can reduce solar heat gain in the summer by up to 65% on south-facing windows and 77% on west-facing windows. A light-colored awning will reflect more sunlight. Awnings require ventilation to keep hot air from becoming trapped around the window. Retract or remove awnings in the winter to let the sun warm the building. The angle of permanent awnings or overhangs must be calculated to make sure the low angle winter sun shines on the window to maximize heat gain in cold seasons and to shade the window in hot seasons to avoid passive solar heat gain. A solar professional can determine the appropriate angle and pitch of an awning.

**Active SOLAR** heating systems are based on the type of fluid—either liquid or air—that is heated in the solar energy collectors. Liquid-based systems heat water or an antifreeze solution in a "hydronic" collector, whereas air-based systems heat air in an "air collector."

Both of these systems collect and absorb solar radiation, then transfer the solar heat directly to the interior space or to a storage system, from which the heat is distributed. If the system cannot provide adequate space heating, an auxiliary or back-up system provides the additional heat.

Both passive and active solar heating systems are based on the **solar thermal** principles of capturing heat gain from the sun and transferring it to a thermal mass storage such as a liquid medium or directly to walls, floors and furniture. Solar thermal water heaters are also an achievable small scale solar project.

The modern solar industry began with the oil embargo of 1973-1974 and was strengthened with the second embargo in 1979. The growth of the solar industry during this period of fuel shortages and high prices (1974-1984) soared from 45 solar collector manufacturing firms to 225 firms. The solar market was helped during this period by government assistance, both Federal and State. Currently, solar thermal devices do everything from heating swimming pools to creating steam for electricity generation. <http://www.eia.doe.gov/cneaf/solar.renewables/page/solarthermal/solarthermal.html>)

**Small Wind Turbines** are electric generators that use wind energy to produce clean, emissions-free power for individual homes, farms, and small businesses. With this simple and increasingly popular technology, individuals can generate their own power and cut their energy bills while helping to protect the environment.  Unlike utility-scale turbines, small turbines can be suitable for use on properties encompassing as little as one acre of land in most areas of the country. With this simple and increasingly popular technology, individuals can generate their own power and cut their energy bills while helping to protect the environment. The U.S. leads the world in the production of small wind turbines, which are defined as having rated capacities of 100 kilowatts and less, and the market is expected to continue strong growth through the next decade.

The purchase and installation of a system large enough to power an entire home costs, on average, $30,000. But, the price can range from $10,000 to $70,000 depending on system size, height, and installation expenses.  The purchase and installation of very small (<1kW) off-grid turbines generally costs $4,000 to $9,000, and a 100kW turbine can cost $350,000.  The federal government and many states have rebate or tax credit programs in place to encourage investment in small wind (see [http://dsireusa.org](http://dsireusa.org/)). (Reference = <http://www.awea.org/smallwind/>)

Unlike coal-fired power plant, wind turbines produce no particulate emissions that contribute to mercury contamination in our lakes and streams. Wind energy also conserves water resources. For example, producing the same amount of electricity can take about 500 times more water with coal than wind. (reference = <http://www.windustry.org/wind-basics/learn-about-wind-energy/wind-basics-why-wind-energy/why-wind-energy>)

Half the land mass in the United States has enough wind to power small wind turbines. Community-based policies that facilitate net metering for on-site power generation (buy back) and standardization for connectivity may just be the right combination to make the auto salvage yard the perfect place for small wind turbines to aid in local energy production.

Changing the shop heat systems may not be in your shops near future. But there are many small steps that can be implemented toward greening the salvage yard. Equipment technology is advancing at a rapid rate and most new computers, printer, copiers and other office equipment is now available in energy efficient models. Those products are labeled with the ENERGY STAR mark. Many household appliances frequently found at an auto recycler are also ENERGY STAR certified, such as thermostats, ceiling fans, refrigerators, and other appliances. Always buy ENERGY STAR qualified products for your business.

Lighting offers many affordable options for greening the auto recycling facility. Simple common sense and good housekeeping will go a long way as well as a few low-cost product substitutions.

* Turn off lights (and other equipment) when not in use. High utility costs often include paying for energy that is completely wasted by equipment left “on” for long periods while not in use.
* Replace incandescent light bulbs with compact fluorescent lamps (CFLs). CFLs cost about 75% less to operate, and last about 10 times longer.
* Install switch plate occupancy sensors in proper locations to automatically turn lighting off when no one is present, and back on when people return. Be sure the motion sensor is able to “see” an approaching person’s motion to turn on the light as they enter an unlit area.
* Adjust lighting to your actual needs; use free “daylighting.” Too much light can be as bad for visual quality as too little light – and it costs a lot more.
* Consider upgrading fluorescent tube lighting from older T12 (1.5" diameter) tubes to more efficient T8 (1" diameter) fluorescent lamp tubes. These green-tip (low-mercury) bulbs also have a cost savings advantage of being able to be dispose of in the dumpster in most locales *(check with local landfill authorities).*

Solar technology has option in lighting as well as building and water heating. Light Emitting Diodes or LED lighting technology has recently come down in price and coupled with solar powered “wireless” becomes more economically feasible. The reduced energy consumption of the LED light requires so little energy that simple photovoltaic sensors can power them overnight. Even electric powered LED lights are worth installation. A “must do” green business step is to install LED exit signs in the facility. They are ENERGY STAR qualified and can dramatically reduce maintenance by eliminating lamp replacement and can save $10 dollars per sign annually in electricity costs while preventing greenhouse gas emissions from power plants.



The future has arrived and further greening the auto recycling industry is achievable. However, beware of unproven or poorly installed project as the current “go green” mentality has also flooded the market with fly-by-night service providers. Like any investment in your business, green technology should be a long lasting and profitable endeavor. Use a professional with credentials from a recognized authority in the industry. Just like we urge consumers to use our professional services so should you when implementing green technology. The North American Board of Certified Energy Professionals ([NABCEP](http://www.nabcep.org/)) provides certification to these professionals. A complete listing of NABCEP Certified Solar PV and Solar Thermal Installers can be viewed on their website at <http://www.nabcep.org/>.

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