

Pollution Prevention (P2) for Retail Stores

P2 Opportunities

Only 200 chemicals out of 80,000 registered for commercial use have been fully screened for health and safety. Only five chemicals have ever been restricted. Childhood diseases linked to chemical exposures—asthma, cancer, lead poisoning and learning disabilities cost the U.S. \$55 billion every year. Many of these impacts and costs are preventable.

Many consumers are intentionally seeking out safer products free of hazardous chemicals and patronizing businesses that provide them. Smart companies have taken swift actions to replace some of the worst chemicals in many products and in some cases adopted broad corporate policies that encourage their supply chains to phase out many hazardous materials.

The retail industry has many opportunities to reduce waste. By reducing waste, you are in turn reducing expenses and providing mutual benefits to the environment. The success of retail facilities is determined by the commitment of the facility and employees. This resource summary provides useful information as well as links that are focused on P2 for the retail industry.

Reducing Hazardous Waste

Pharmaceutical Waste

- Conduct an inventory analysis and waste audit to prevent surplus and expiration of pharmaceuticals.
- Meticulously count the residue in warfarin containers.
 - Only the residue is considered a P-listed hazardous waste, not the container. Show that warfarin concentration in the residue is below P-listed concentrations.
 - If Warfarin residues are less than or equal to 0.3 percent, then the residue would not be considered acute hazardous waste.

Consider applying EPA's formula:

Warfarin concentration of the residue (expressed as a percent) = ((weight of warfarin in the residue/total weight of the residue remaining in the container) x 100).

Reducing Universal Waste Lamps

- Retrofit mercury containing lights to Light Emitting Diodes (LED) to lower hazardous waste volumes.
- LEDs can lower overall energy consumption and reduce maintenance and air conditioning costs by as much as 15 percent.
- Damaged lamps should be handled carefully, placed immediately in a sturdy container and brought to a universal waste storage area per EPA guidelines.

Sustainable Electronics Management

Electronic devices and technologies continue to advance and increase in number. These technologies have become critical to our way of life and to our growing economy. With these technologies, however, comes the increasing challenge of protecting human health and the environment from the potentially harmful effects associated with their improper handling and disposal.

- Preventing waste in the first place is preferable to any waste management option, including recycling. Donating used (but still operating) electronics for reuse extends the lives of valuable products and keeps them out of the waste stream for a longer period of time.
- If donation for reuse or repair is not a viable option, households and business can send their used electronics for recycling.

Sustainable Fleet Truck Transportation

Many companies are already taking steps to reduce their transportation fuel use because they understand that reducing carbon dioxide pollution protects the health and well-being of the communities they serve and contributes to a more sustainable environment.

Since about a third of our nation's petroleum use and one fourth of our nation's climate emissions come from transportation, implementing sustainable transportation options can help reduce dependence on fossil fuels and reduce greenhouse gas emissions.

Fleet trucks are designed to perform best when maintained according to the instructions found in the owner's manual. A poorly maintained fleet truck can pollute more and be less fuel-efficient than one that's well maintained.

- Remind truck drivers to be mindful of their speed.
 - Obeying highway speed limits can save fuel, as well as prevent pollution.
- Fleet trucks should be at a 100 percent load capacity.
- Night shipping and receiving can reduce emissions, cut travel time and can be easier on fleet trucks mechanically.
- Replace conventional gasoline and diesel fleet trucks with advanced technology vehicles or ones that use alternative fuels, such as electricity, natural gas, biodiesel, ethanol, hydrogen, or propane.
- Refuel at night to reduce greenhouse gas emissions.
- Re-evaluate shipping routes
 - Use the most efficient route. Check the route before leaving for traffic delays and try to avoid unnecessary idling to conserve fuel.
- Have a mechanic regularly inspect fleet trucks for the following:
 - Properly inflated tires; low tire pressure reduces fuel economy.
 - Clogged air filter; this can significantly reduce fuel economy.
 - "Service Engine Soon" light; this could indicate an emissions problem.

Reducing Solid Waste

- Buying green involves not only proper end-of-life disposition of obsolete equipment, but also purchasing new equipment that has been designed with environmentally preferable attributes.
 - A *cradle to cradle* approach consists of manufacturing a sustainable product so it can be recycled or reused for other purposes at the end of its life.
 - A *cradle to grave* approach consists of manufacturing a product to be used and then disposed of.
- Conduct a life-cycle analysis of store-brand products that are creating the most solid waste.
 - Determine if any of those products can be redesigned to be more environmentally friendly.
- Conduct a waste audit to identify what happens to each waste stream.
 - Investigate if recyclable goods are actually being recycled or just disposed.
- Purchase trash compactors for both recyclable and non-recyclable goods to consolidate large quantities of solid waste.
 - This results in fewer scheduled pick-ups and less trash bags being used, which ultimately saves your facility money.
- Consider implementing a recycling program for packaging materials such as cardboard boxes, polystyrene peanuts, pallets and bubble wrap for re-packaging purposes.
 - Also, consider donating bubble wrap, packing peanuts, and other packing materials to your local postal and shipping companies.
 - Visit <https://www.azdeq.gov/enviro/waste/solid/recycle.html#local> to locate the nearest recycling center.
- Invest in printers that print double-sided receipts.
- Consider sending electronic receipts to customers via email to reduce paper waste.
- Install hand dryers in restrooms to reduce paper waste.
- Place signs above disposal and recycle bins to remind customers and employees where to place their trash.
- Re-evaluate the size of warfarin containers relative to use.
 - Talk with your supplier to see if smaller containers are a viable option. A cost-benefit analysis would show if there are significant savings to be made.

Food Waste

- Reduce food waste by improving product development, storage, ordering, marketing, labeling and cooking methods.
- Recover food waste by connecting potential food donors to hunger relief organizations like food banks and pantries.
- Recycle food waste to feed animals or to create compost, bioenergy and natural fertilizers.

Employee Training

- Regularly schedule employee training that demonstrates how to properly dispose of solid waste.
 - Clear and concise communication is key when presenting both sustainable challenges and goals. Effective messages should be conveyed in visual presentations, which provide employees with new ideas, clearer messages and a better understanding of any problems.
 - If your facility already has an existing recycling program, encourage employees to recycle more by creating posters or sending e-mails, explaining the cost savings and environmental benefits of recycling.
- Create a readily-accessible hazardous waste management program.
 - Ensure employee training highlights work zones with hazardous waste.
 - Instruct employees on the proper regulations when dealing with hazardous waste.
 - Employees should be aware of how to dispose of hazardous and non-hazardous waste. They should know that once a non-hazardous waste is mixed with hazardous waste, all the waste has to be counted as hazardous waste. Proper segregation practices should be encouraged.
 - Display relevant signs and information to remind employees the importance of properly handling hazardous waste.
- Educate employees and building occupants about how their behaviors affect energy use. ENERGY STAR has plenty of materials to help in the communications toolkit.
- Ensure that team members from every department are trained in the importance of energy management and basic energy-saving practices. Hold staff meetings on energy use, costs, objectives and employee responsibilities.
- Develop an energy team and assign responsibilities to pursue energy efficiency in all departments.
- Set goals and a methodology to track and reward improvements.
 - Reward energy-efficient behaviors and habits to engage employees in helping your organization save energy. For example, you might host a competition and throw an ice cream social for the building or office that achieves the greatest improvement in energy performance.
- Educate employees on water conservation techniques.

Water Conservation

Reduce Water Consumption

- Install low-flow water treatment systems such as aerators in sinks, ultra-low flow or dual flush toilets and motion activated faucets.
- Implement xeriscape landscaping and irrigation timers to conserve water.
- Institute a maintenance plan and ensure that leaks are detected and repaired in a timely manner.

Rainwater Harvesting

- To reduce water consumption by almost 50 percent, incorporate rainwater harvesting systems to divert water from gutters or air conditioning units, which can be used for landscaping, plumbing, or other non-potable purposes.
 - Rainwater harvesting tanks can be placed above or below the ground and come in many different shapes and sizes.
 - Rainwater harvesting systems are relatively easy to install and most tanks come equipped with a tight fitting lid, which prevents mosquitoes, insects and other debris from entering the tank.
 - Water storage tanks also act as fire protection reserves.
 - For every 1" of rain, 1,000 square feet of roof area can collect about 600 gallons of water.

Energy Use

Parking Lot Solar Panels

Investigate the feasibility of installing solar panels. In addition to energy savings, solar panels can provide shaded parking, safe and well-lit areas at night, reduce the urban heat island effect and preserve parking lot surfaces. The electricity generated by these panels can be used to power charging stations for hybrid or all-electric vehicle owners.



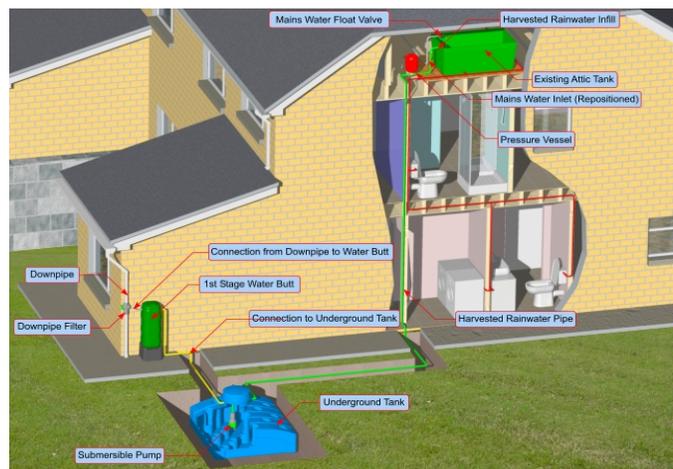
Solar panels with the generation capacity of 24.1 MWdc (megawatts) can eliminate 23,267 metric tons of carbon dioxide, which is the equivalent of eliminating 4,804 passenger vehicles on our roads.

Some solar agreements have a fixed electricity rate and with increasing utility rates, businesses with solar panels could save money in the long term.

- The State of Arizona offers a \$2 million dollar tax credit for eligible renewable energy producers.

Lighting

- Implement a regular lighting maintenance program.
- Use task lighting where feasible.
- Maximize and minimize daylight by:
 - Turning off lights when not in use or when natural daylight is sufficient.



We only drink about 20 percent of the water we use. The other 80 percent can be used for irrigation, plumbing or cooling needs.

- Using shades and blinds to control direct sun through windows during both the summer and winter to prevent or encourage heat gain.
- Taking advantage of skylights or other natural daylight to reduce lighting expenses up to 40 percent.
- Depending on your facility, options such as "solar screens," window tint, awnings and vegetation can help.
- Trees can attractively shade your facility and help clean the air.
- Consider upgrading to energy efficient lighting such as LEDs or using motion sensor lights.
- Revise janitorial practices to reduce the hours that lights are turned on each day.
- Remove unnecessary lamps (de-lamp) in overlit areas.
- Check your light levels against standards from the Illuminating Engineering Society (IES) to see if you have areas that are over- or under-lit.

Energy Saving Tips

According to ENERGY STAR, the average commercial building wastes 30 percent of its energy. By employing the energy saving tips below, you can cut your energy usage by 10 percent with little or no cost.

- Ask your utility provider if they offer free or inexpensive energy audits and/or equipment rebates.
- Perform a day and nighttime energy audit to identify energy savings opportunities.
 - Optimize start-up time, power-down time and equipment sequencing.
- Find new ways to conserve energy by conducting a benchmark energy performance evaluation. This compares energy performance to "something similar", like your energy usage last year.
 - According to the EPA, buildings that were benchmarked consistently reduced energy use by an average of 2.4 percent per year, for a total savings of 7 percent.
 - Buildings that started out as poor performers saved even more.
- Adjust your thermostat by a few degrees, according to the season.
 - Calibrate thermostats to ensure that their ambient temperature readings are correct.
 - Set back the thermostat in the evenings and other times when the building isn't occupied.
 - Allow each facility to control their own thermostats as opposed to the corporate office managing thermostats. This allows each facility to individually adjust store ambient temperatures.
- Visually inspect insulation on all piping, ducting and equipment for damage (tears, compression, stains, etc.).
- Enable the power management function on office computers, which automatically puts monitors to sleep when not in use. To enable this function, visit www.energystar.gov/powermanagement.

- Activate sleep settings on all printers, copiers, fax machines, scanners and multifunction devices so that they automatically enter a low-powered sleep mode when inactive.
 - Use the owner's manual to make the setting changes yourself, or ask your service vendor to ensure your machines are configured to take full advantage of these features.
- Consolidate stand-alone office equipment to achieve a ratio of one device (typically a networked multifunction device) per 10 or more users. Typical cost savings can reach up to 40 percent for electricity, hardware, consumables (paper, ink and toner) and maintenance.
- Plug electronics into a "smart" power strip that let you designate which electronics should always be on and which ones do not need power when they're not in use.
- Keep exterior doors closed while running your heating, ventilation and air conditioning (HVAC). It sounds simple, but it will help avoid wasteful loss of heated or cooled air.

Cost-Saving Maintenance and Repair

- Review and emphasize the financial and environmental results of a preventative maintenance program for major systems and components.
- Improve operations and maintenance practices by regularly checking and maintaining equipment to ensure it's functioning efficiently.
- Perform monthly maintenance of heating and cooling equipment to guarantee efficient operation throughout the year.
- Regularly change or clean HVAC filters every month during peak cooling or heating season. Dirty filters cost more to use, overwork the equipment and result in lower indoor air quality.
- Make sure that areas in front of vents are clear of furniture and paper. As much as 25 percent more energy is required to distribute air if your vents are blocked.
- Shorten the preventive maintenance intervals for replacing air handler filters. This keeps air clean and prevent equipment from using more energy to force air through dirty filters.
- Clean the evaporator and condenser coils on heat pumps, air-conditioners, or chillers.
 - Dirty coils inhibit heat transfer; keeping coils clean saves energy.
- Repair leaks and adjust pressure in compressed air systems.
- Repair steam trap leaks; replace malfunctioning steam traps.
- Repair damaged insulation and replace missing insulation with thicknesses calculated for the operating and ambient conditions of the mechanical system.

Advanced Refrigeration Technology

- Upgrade old and inefficient refrigeration systems
 - The average supermarket consumes nearly 2 million kilowatt hours per year and refrigeration accounts for nearly half of that.
 - Typical refrigeration systems run off of Hydrofluorocarbons (HFCs), which are 4,000 times more potent than carbon dioxide.

- Using carbon dioxide (CO₂) as the refrigerant and confining it to the refrigeration cycle via a transcritical booster system can reduce greenhouse gas emissions by 78 percent and lower energy consumption by 25 percent.

References

Reducing Hazardous Waste:

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<http://archive.epa.gov/region1/healthcare/web/pdf/14827.pdf>
- Managing Pharmaceutical Wastes:
https://www.azdeq.gov/environ/waste/hazwaste/download/Fact_Sheet_Managing_Pharmaceutical_wastes.pdf
- Waste Audits: <http://www.nrdc.org/enterprise/greeningadvisor/wm-audits.asp>
- Managing Universal Waste Lamps for Businesses:
http://www.azdeq.gov/environ/waste/hazwaste/download/ADEQ_FS-14-10.pdf
- Best Practices in Product Chemicals Management in the Retail Industry:
<http://sustainableproduction.org/downloads/UMassLowellRetailersReport.pdf>
- Campaign for Healthier Solutions:
http://ej4all.org/assets/media/documents/Report_ADayLateAndADollarShort.pdf
- Becoming a National Clean Fleets Partner: <https://cleancities.energy.gov/clean-fleets/>
- Sustainable Management of Electronics: <http://www.epa.gov/ssm-electronics>

Reducing Solid Waste:

- Life Cycle Analysis: A Step by Step Approach:
http://www.istc.illinois.edu/info/library_docs/tr/tr40.pdf
- Food Waste: <http://www.usda.gov/oce/foodwaste/faqs.htm>

Employee Training:

- Improving Sustainability Skills and Knowledge in the Workplace:
http://roundview.org/wp-content/uploads/2012/05/Skills_in_the_workplace_SCI_Project_Report_July20091.pdf

Water Conservation:

- EPA WaterSense:
<http://www3.epa.gov/watersense/products/flushometer-valve-toilets.html>
- Rainwater Harvesting:
http://www.azwater.gov/azdwr/StatewidePlanning/Conservation2/Residential/document/s/Harvesting_Rainwater.pdf

Energy Use:

- Benchmark Energy Use:

<http://www.energystar.gov/buildings/about-us/how-can-we-help-you/benchmark-energy-use/benchmarking>

- Renewable Energy Production Tax Credit:
<https://www.azdor.gov/TaxCredits/RenewableEnergyProductionTaxCredit.aspx>
- Energy-Efficiency Measures:
<http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/stamp-out-energy-waste>
- New Advanced Refrigeration Technology:
<http://energy.gov/eere/success-stories/articles/eere-success-story-new-advanced-refrigeration-technology-provides>

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