

Purchasing for Pollution Prevention

Purchasing Cleaner Vehicles – Questions and answers for fleet buyers and vehicle purchasers

The automotive industry contributes 6.6 million jobs to the US economy, including manufacturing, sales, service, and other jobs dependent on automobiles.¹ While most people are aware of the air pollution and global warming consequences of today's automobiles, fewer are aware of the enormous environmental impacts of the production and disposal of cars.

Vehicles contain mercury and lead, highly toxic chemicals that persist in the environment and can build up to dangerous levels in the food chain. Approximately 12 million cars are junked each year in the US and Canada, and these dangerous chemicals can be emitted by smelters that recover metals from vehicles at end of life. In addition, incineration of car parts made from polyvinyl chloride (PVC) can generate emissions of dioxins, a group of toxic chemicals that result from combustion and certain manufacturing processes.² Mercury, lead, and dioxin contamination contribute to a number of ongoing environmental and public health threats in the US.³

Below are purchasing strategies recommended for reducing three hazardous substances found in vehicle parts — mercury, lead, and PVC (vinyl) — as well as recommendations pertaining to fuel economy.

MERCURY — Why is this a concern in vehicles?

- The 12 million vehicles disposed of annually in the US and Canada contain an estimated 8.8 to 10.2 metric tons of mercury. Because virtually none of this persistent and toxic chemical is recovered during the recycling process, much of it enters the environment during smelting or shredding.⁴ Reducing the use of mercury is a priority at the state and federal levels in the US and around the world.
- Fish consumption advisories are one of the most well-known consequences of mercury pollution. Over 12

million acres of lakes and 473,000 miles of river in 45 states — including four of the Great Lakes — contain fish that are so heavily contaminated with mercury that residents are warned to limit their consumption of fish from these waters.⁵

- Mercury may pose a safety hazard for auto recyclers, since it generally ends up back in the environment when cars are crushed, shredded, and smelted down by iron and steel manufacturers.

Which vehicle parts contain mercury?

- Lighting switches
- Antilock braking systems (ABS)
- Ride control switches (adjust suspension)
- High-intensity discharge (HID) headlamps (those with bluish beam generally contain mercury)
- Backlit flat-panel LCD displays, such as navigational displays

¹ Sean McAlinden *et al.*, *Economic Contribution of the Automotive Industry to the U.S. Economy – An Update*, 2003, <http://www.cargroup.org/pdfs/Alliance-Final.pdf>.

² Charles Griffith *et al.*, *Toxics in Vehicles: Mercury*, Ecology Center, Great Lakes United, and University of Tennessee Center for Clean Products and Clean Technologies, 2001, <http://www.cleancarcampaign.org/reports.shtml>.

³ For more information on these chemicals, see <http://www.epa.gov/mercury/>, <http://www.epa.gov/lead/>, and <http://www.epa.gov/opptintr/pbt/dioxins.htm>.

⁴ Griffith *et al.*, *Toxics in Vehicles: Mercury*.

⁵ US EPA, "Update: National Listing of Fish and Wildlife Advisories," fact sheet, EPA-823-F-03-003, 2003, <http://www.epa.gov/waterscience/fish/advisories/factsheet.pdf>.

INFORM developed this fact sheet jointly with the Ecology Center and the Clean Car Campaign. For more information on the Clean Car Campaign, contact Jeff Gearhart at jeffg@ecocenter.org.

What is being done to remove mercury from vehicles?

- Foreign automakers phased out mercury-containing lighting and ABS switches in the early 1990s, and US automakers will have phased out these same mercury-containing switches by the end of 2003. While relatively smaller amounts of mercury are used in the other vehicle parts mentioned above, they remain a concern because the use of mercury in these applications is on the rise, primarily in higher-end vehicles or as options in some midrange vehicles. The Ecology Center estimates that vehicles currently on the road in the US contain 172 to 200 metric tons of mercury.⁶

What can vehicle purchasers do?

In the bid solicitation:

- Require vehicles that are free of mercury-containing HID headlamps.
- Notify manufacturers that you intend to phase out the acquisition of vehicles containing all remaining mercury components by the following year. (Alternatively, require manufacturers to describe their plans for phasing out the use of these materials.)

In fleet operations:

- During routine vehicle maintenance, replace mercury switches from vehicle hoods and trunks with nonmercury, ball-bearing switches. The cost per switch (about 38 cents) and the time required to remove each switch (less than 5 minutes) are minimal.⁷ For more information, visit the Clean Car Campaign website at www.ecocenter.org/autoswitch.shtml or contact Jeff Gearhart of the Ecology Center at 734-663-2400 x117 or email jeffg@ecocenter.org.

LEAD – Why is this a concern in vehicles?

- Vehicles are the top user of lead and the top source of lead releases in the US. Car batteries represent the main use of this persistent and toxic metal, but lead is also used in wheel weights and as a stabilizer in PVC. Although over 93 percent of lead-acid batteries

are recycled, approximately 40,000 tons of lead were discarded in US landfills in 1999. The Ecology Center estimates that the entire North American vehicle fleet contains 50,000 to 60,000 tons of lead in wheel balancing weights, and roughly 13,000 metric tons in PVC trim components. The lead in these automotive applications often remains unrecovered at the end of a vehicle's useful life, thus presenting further hazards to human health and the environment.⁸ Emissions of lead contribute to the contamination of our environment and have significant health impacts, particularly among children. Low-level lead exposure can cause reduced IQ and attention span, impaired growth, learning disabilities, hearing loss, and other health and behavioral effects. Lead poisoning is estimated to affect an estimated 434,000 preschoolers in the US.⁹

Which vehicle parts contain lead?

- Lead-acid batteries
- Wheel weights
- Vibration dampers
- Surface treatments and coatings
- Cable wiring and harnesses (lead is used as a heat stabilizer)
- Electronic circuit boards and other electrical equipment

What is being done to remove lead from vehicles?

- The application in which alternatives show the most immediate promise is lead-free wheel weights. Substitutes include tin, steel, plastic (thermoplastic polypropylene), and ZAMA (an alloy of zinc, aluminum, and copper). Tin wheel weights are recommended for alloy wheels (to minimize corrosion).

⁸ Jeff Gearhart *et al.*, *Getting the Lead Out: Impacts Of And Alternatives For Automotive Lead Uses*, 2003, Ecology Center, Environmental Defense, and the Clean Car Campaign, 2003, <http://www.environmentaldefense.org/pdf.cfm?contentid=2887&filename=leadbatteries.pdf>.

⁹ US Centers for Disease Control and Prevention, "Surveillance for Elevated Blood Lead Levels Among Children - United States, 1997-2001," *Morbidity and Mortality Weekly Report*, Vol. 52, No. SS-10, September 12, 2003, <http://www.cdc.gov/mmwr/PDF/ss/ss5210.pdf>.

⁶ Griffith *et al.*, *Toxics in Vehicles: Mercury*.

⁷ Ibid.

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Injecting plastic beads into the tire is also being considered as an alternative to wheel weights. Several of these options are now commercially available in Europe. Furthermore, the European Union has required that manufacturers phase out lead wheel weights and other lead-containing components by July 2005.¹⁰ This is expected to further increase the availability of lead-free alternatives and expand the US market for these products.

What can vehicle purchasers do?

In the bid solicitation:

- Require manufacturers to disclose their current and anticipated use of lead in vehicles so that government fleets can assess future opportunities for purchasing vehicles with reduced lead components.
- Notify manufacturers that you intend to phase out the acquisition of vehicles containing lead wheel weights by 2006. (Alternatively, require manufacturers to describe their plans for phasing out the use of lead wheel weights.)

In fleet operations:

- Consider implementing a pilot program to replace lead wheel weights with lead-free alternatives during routine maintenance. For more information, contact Jeff Gearhart of the Ecology Center at 734-663-2400 x117 or jeffg@ecocenter.org.

VINYL – Why is this a concern in vehicles?

- Harmful heavy metals, such as lead and cadmium, are used as stabilizers in PVC products.¹¹

¹⁰ Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on End-of-Life Vehicles, http://europa.eu.int/eur-lex/pri/en/oj/dat/2000/l_269/l_26920001021en00340042.pdf; and European Commission Decision of 27 June 2002, amending Annex II of Directive 2000/53/EC of the European Parliament and of the Council on End-of-Life Vehicles, http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l_170/l_17020020629en00810084.pdf.

¹¹ US EPA, Locating and Estimating Air Emissions from Sources of Lead And Lead Compounds, EPA-454/R-98-006, May 1998, <http://www.epa.gov/ttn/chief/le/lead1.pdf>, <http://www.epa.gov/ttn/chief/le/lead3.pdf>; Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Cadmium," July 1999, <http://www.atsdr.cdc.gov/toxprofiles/tp5.html>.

- A variety of phthalates are used in vinyl auto parts to make the plastic soft and flexible. Since phthalates are not chemically bound to vinyl, they can leach or off-gas from these products and possibly expose vehicle occupants. While further research is needed, there is evidence that certain phthalates may cause infertility or birth defects.¹²
- In North America, the auto industry uses over 359 million pounds of PVC each year.¹³ When vehicles are scrapped, PVC components are shredded and sent to incinerators, smelters, or landfills. When PVC is burned, it can generate emissions of dioxins, which have been linked to cancer.¹⁴ When PVC components are landfilled, the lead, cadmium, and phthalates they contain can leach out.¹⁵

What types of vehicle parts contain vinyl?

- Underbody coatings and body sealers
- Instrument panels and interior/exterior trim
- Cable wiring and harnesses

What is being done to reduce the use of vinyl in vehicles?

- Some manufacturers are already using PVC-free alternatives, including polyethylene insulated wiring, non-PVC instrument panels and interior trim, and plastic underbody panels that replace underbody coatings. These alternatives are viewed as more environmentally benign because they do not contain chlorine or phthalates and often require fewer stabilizers than PVC. Toyota's website expresses the com-

¹² US Agency for Toxic Chemicals and Disease Registry, Toxicological Profile For Di-n-butyl Phthalate, 2001, Toxicological Profile for Diethyl Phthalate, 1995, Toxicological Profile for Di-n-octylphthalate (DNOP), 1997, <http://www.atsdr.cdc.gov/toxprofiles/#-D->.

¹³ American Plastics Council Automotive Learning Center, "Frequently Asked Questions," <http://www.plastics-car.com/glossary/faq.html>.

¹⁴ US Agency for Toxic Chemicals and Disease Registry, "Toxicological Profile For Chlorinated Dibenzo-p-dioxins (CDDs)," December 1998, <http://www.atsdr.cdc.gov/toxprofiles/tp104.html>.

¹⁵ European Commission, "The Behaviour of PVC in Landfill," final report, February 2000, <http://www.europa.eu.int/comm/environment/waste/studies/pvc/landfill.htm>.

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pany's commitment to replacing PVC resin in roof molding and other parts: "The volume of PVC resin in the Premio and Allion has been reduced to 1/2 or less than that in conventional vehicles. Toyota has also developed a wire harness that does not use any PVC resin or brominated fire retardants in the wire harness shield."¹⁶ Other auto manufactures are beginning to follow suit, an indication that alternatives are gaining acceptance.

What can purchasers do?

In the bid solicitation:

- Require manufacturers to disclose their current and anticipated use of vinyl in vehicles so that government fleets can assess future opportunities for purchasing vehicles with reduced vinyl components.
- Require manufacturers to describe their plans for phasing out the use of vinyl cabling and interior/exterior trim.

FUEL EFFICIENCY -- What are the pollution concerns?

- The EPA estimates that more than one-quarter of global warming emissions comes from transportation in the United States.¹⁷ The more fuel burned, the more emissions that contribute to global warming.

What is being done to increase fuel-efficiency?

- The average fuel economy of vehicles sold is declining, even though technological advances have increased engine efficiency.¹⁸ This is partly because of the current popularity of larger, more powerful vehicles and the lack of effective fuel efficiency standards for all classes of vehicles.

¹⁶ Toyota, "Recycling and Sales/After Sales," http://www.toyota.co.jp/IRweb/corp_info/eco/recycle.html.

¹⁷ Figure is for carbon equivalents. US EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2001, final version, EPA-430-R-03-004, April 2003, <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2003.html>.

¹⁸ US EPA, Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003, April 2003, EPA420-R-03-006, <http://www.epa.gov/otaq/fetrends.htm>.

- However, some fleets are beginning to focus more on boosting their purchase of fuel-efficient vehicles. According to a recent report from the American Council for an Energy-Efficient Economy (ACEEE), Los Angeles, Denver, and Portland (Oregon) are among those leading the way.¹⁹

What can purchasers do?

In the bid solicitation:

- Require that vehicles' fuel economy meet or exceed the average combined city/highway mpg for vehicles in their class, as determined by EPA.
- Prefer bid responses that include, in each relevant vehicle class, vehicles with superior mpg ratings defined by the average fuel economy of the five most efficient vehicle models in that class. (Alternatively, establish a separate category for high-mpg vehicles so that vendors are encouraged to bid vehicles with superior fuel economy.) For more information on approaches to increasing fleet fuel economy, contact Therese Langer at the American Council for an Energy-Efficient Economy at tlanger@aceee.org or 202-429-8873.

In fleet operations:

- Review vehicle requests and encourage the selection of vehicles of a smaller class size whenever possible to achieve increased miles per gallon. The City of Ann Arbor, MI, has a fleet policy which requires new vehicle purchases to be supplemented with a written justification addressing the need for a specific model and type. For example, whenever possible, full-size trucks and vans should be downsized to light-duty vehicles, four-wheel drives replaced with two-wheel drives, and large engines replaced with smaller engines.²⁰
- Stay abreast of developments under way to establish a national cooperative purchasing contract that would allow cities, counties, and states to buy hybrid electric vehicles. This effort is being coordinated by

¹⁹ Therese Langer and William Langer, "Greener Fleets: Fuel Economy Progress And Prospects," December 2002, <http://www.aceee.org/pubs/t024full.pdf>.

²⁰ Personal Communication, David Konkle, Energy Coordinator, City of Ann Arbor, October 28, 2003.

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the US Communities Government Purchasing Alliance and the Center for a New American Dream. For more information, contact: Scot Case, Director of Procurement Strategies, Center for a New American Dream, (610) 373-7703, scot@newdream.org.

COST AND AVAILABILITY -- Will implementing these purchasing specifications cost more or prevent fleets from getting the vehicles they need?

- The recommended specifications are meant primarily to hold manufacturers accountable for changes they are working toward or have already agreed to make. Furthermore, most of the specifications focus on disclosure or the eventual phaseout of toxic constituents. These proposed changes impose no foreseeable risk on purchasers.
 - Regarding more fuel-efficient vehicles, according to ACEEE, there is no fixed relationship between fuel economy and price within a vehicle class, and fuel-efficient vehicles can be relatively inexpensive. For example, a Saturn SL gets several more miles per gallon than a Chevrolet Cavalier and its average retail price is \$2000 less.²¹ Buying more fuel-efficient vehicles can also result in fuel savings and contribute to energy security by reducing the demand for imported petroleum.
 - Considerable money is spent to protect the public from emissions generated by smelters that recover metals from used cars and from emissions of global warming gases. Using these recommendations will result in the purchase of cleaner-designed vehicles, making your purchasing practices serve as a model to others while minimizing your own fleet's contribution to these pollution problems.
- Assistance with purchasing cleaner vehicles: contact Sarah O'Brien, Senior Outreach Associate, INFORM at (802) 479-5535 or obrien@informinc.org.
 - Clean Car Campaign: For additional information on the Clean Car Campaign, a national effort aimed at improving the environmental attributes and performance of vehicles sold in the US, visit the campaign's website at www.cleancarcampaign.org or contact the Ecology Center's Jeff Gearhart at (734) 663-2400 x117 or Charles Griffith at (734) 663-2400 x116.
 - American Council for a Energy-Efficient Economy (ACEEE): For additional information on the ACEEE, an organization dedicated to advancing energy efficiency as a means of promoting economic prosperity and environmental protection, visit the Council's website at www.aceee.org, review their publication "Greening Fleets" at <http://www.aceee.org/pubs/t024full.pdf>, or contact ACEEE's Therese Langer at (202) 429-8873 or tlanger@aceee.org.
 - Auto Mercury Switch Removal Instructions: <http://www.epa.gov/region5/air/mercury/autoswitch.htm>.
 - Wisconsin Mercury Sourcebook Automotive Sector: <http://www.epa.gov/glnpo/bnsdocs/hgsbook/auto.pdf>.

For more information:

- For recommended specifications see INFORM's Purchasing specifications for vehicle bids at http://www.informinc.org/fact_P3vehicles2.pdf.
- See disclosure specifications used by Minnesota at http://www.informinc.org/fact_P3vehicles.php#minnesota.

²¹ Langer and Langer, "Greener Fleets: Fuel Economy Progress And Prospects."

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