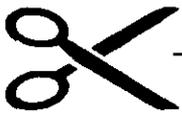


You can cut it!

A Complete Guide to Reducing
Indiana's Solid Waste at the Source

October 1993

*A joint project of
the Indiana Department
of Environmental Management
& the Indiana Recycling Coalition*



You can cut it!

A Complete Guide to Reducing
Indiana's Solid Waste at the Source

The Indiana Department of Environmental Management

Office of Pollution Prevention and Technical Assistance

P.O. Box 6015, 105 S. Meridian St., Indianapolis, IN 46206-6015

For more information, call 317-232-8172 or 800-451-6027

Indiana Recycling Coalition Inc.

P.O. Box 20444

Indianapolis, IN 46220-0444

For more information, call 317-283-6226

October 1993

Printed on recycled paper:

50-percent recycled fibers,

10-percent post-consumer waste

Acknowledgements

"You Can Cut It!" was written and developed by Susan C. Lawson of Information Architects, under the direction of the Indiana Department of Environmental Management and the Indiana Recycling Coalition. Melinda Carpenter of the IDEM served as editor.

A review committee commented on drafts of this document and provided suggestions for improvements. Their commitment to seeing this guide to completion is greatly appreciated. The committee included:

- Thomas High, City of Kokomo Wastewater Treatment
- Joe Kittleson, Bev-Pak Recycling
- Janet Fox Neltner, Indiana Recycling Coalition
- Thomas G. Neltner, Indiana Recycling Coalition and Environmental Management Institute
- Nancy Rawlings-Booth, Indiana Recycling Coalition
- Jill E. Schultz, IDEM
- Thomas Seeley, individual
- Matthew P. Waldo, IDEM

Additional advice and comments were offered by Jane St. John, Monroe County Solid Waste Management District; and Cindy Clendenon, Cheryl R. Miller, Edward L. Cohen and Elizabeth San Miguel, all of IDEM.

This is the fourth publication co-sponsored by the IDEM and the coalition. Other publications include the "Indiana Recycling Handbook," the "Citizens' Participation Manual" and the "Indiana Yard Waste Solutions Manual."

Contents

 **Using this guide.....1**

 **Chapter 1:
Starting at the source.....3**

 **Chapter 2:
Public education strategies..... 17**

 **Chapter 3:
How Hoosiers can reduce.....23**

SOURCE REDUCTION FACTS:
Get familiar with source reduction.....25

PACKAGING FACTS:
Packaging contributes most to waste.....27

HOUSEHOLD FACTS:
Find ways to reduce around house.....29

FACTS FOR SHOPPERS:
Examine your shopping habits.....31

FACTS ABOUT DIAPERS:
Take your pick—cloth v. disposables.....33

INDISPOSABLE FACTS:
Throw-aways that won't go away.....35

FACTS ABOUT CARS:
Source reduction and your car.....37

FACTS ABOUT YARDS:
Strategies save money, benefit lawn.....39

FACTS ABOUT JUNK MAIL:
Take an active stand.....41

 **Chapter 4:
Cutting hazardous materials.....43**

HAZARDOUS WASTE:
Coming clean when you clean.....45

HAZARDOUS WASTE:
Chasing down indoor pests safely.....47

GARDENING FACTS:
Growing your garden organically.....49

GARDENING FACTS:
Reducing chemical dependence.....51

FACTS ABOUT HERBS:
Herbs provide safe substitute for toxics.....53

GARDENING FACTS:
Lawn care impacts environment.....55

MAINTENANCE FACTS:
Building and grounds can help reduce....57

FACTS ABOUT PAINT:
Brush up on paint.....59

FACTS ABOUT BATTERIES:
Get all charged up.....61

 **Chapter 5:
How institutions can reduce.....62**

GOVERNMENT FACTS:
Government should be model.....64

FACTS ABOUT SCHOOLS:
Schools can teach 4th 'R'—reduction.....65

FACTS ABOUT SCHOOLS:
Colleges: graduate to reduction.....67

FACTS ABOUT HEALTH CARE:
Hospitals have million+ ways to cut.....69

CORRECTIONAL FACTS:
Correctional facilities can reduce.....71

 **Chapter 6:
How businesses can reduce.....73**

ENVIRONMENTAL ETHIC:
'Chartering' your course.....75

PACKAGING FACTS:
Packaging guidelines set
state standard.....77

<i>PLANNING FACTS:</i>	
Investigate buying, waste habits.....	79
<i>PLANNING FACTS:</i>	
How to get to the source of your waste...81	
<i>SOURCE REDUCTION</i>	
<i>PLANNING CHECKLIST</i>	82
<i>MEASUREMENT FACTS:</i>	
Make measurement choice early.....	83
<i>FACTS ABOUT TRAINING:</i>	
Employee input helps program.....	85
<i>AUDITING YOUR WASTE:</i>	
Businesses—Do step-by-step analysis.....	87
<i>SOURCE REDUCTION</i>	
<i>WORKSHEET FOR BUSINESS</i>	89
<i>SOURCE REDUCTION OPTIONS</i>	
<i>FOR BUSINESS</i>	94
<i>PURCHASING FACTS:</i>	
Use supplier relationships to reduce.....	95
<i>COMMUNICATION FACTS:</i>	
Think green when you communicate.....	97
<i>FACTS ABOUT OFFICES:</i>	
Cutting waste at the office.....	99
<i>SOURCE REDUCTION CHECKLIST</i>	
<i>FOR BUSINESS: Options</i>	
for reducing office paper waste.....	101
<i>SOURCE REDUCTION CHECKLIST</i>	
<i>FOR BUSINESS: Storage</i>	
and maintenance options.....	103
<i>RESTAURANT FACTS:</i>	
Restaurants can affect waste line.....	105
<i>SOURCE REDUCTION</i>	
<i>CHECKLIST FOR BUSINESS:</i>	
Food-service/restaurant options.....	107



Chapter 7: **How industries can reduce..... 109**

<i>ENVIRONMENTAL ETHIC:</i>	
Gaining an environmental outlook.....	111
<i>FACTS ABOUT WASTE:</i>	
Reductions for industry in 5 easy steps....	113
<i>FACTS ABOUT WASTE:</i>	
Assessment answers questions.....	115
<i>INDUSTRY WASTE-ANALYSIS</i>	
<i>WORKSHEET</i>	117

<i>FACTS ABOUT WASTE:</i>	
Inspection—Seeing is believing.....	120
<i>FACTS ABOUT WASTE:</i>	
Do step-by-step options analysis.....	121
<i>MEASUREMENT FACTS:</i>	
Use method that gives correct results....	123
<i>HAZARDOUS WASTE:</i>	
Preventing hazardous waste pays.....	125
<i>PRODUCTION FACTS:</i>	
Industries—Cut waste, add profit.....	127
<i>SHIPPING/STORAGE:</i>	
Look for a 'package' deal.....	129
<i>EXCHANGE FACTS:</i>	
Turn your trash into treasure.....	131
<i>FACTS ABOUT REUSE:</i>	
Reuse can reduce industry waste.....	133



Chapter 8: **Resources..... 135**

<i>GENERIC FACT SHEET</i>	143
<i>LOGO SHEET</i>	145
<i>AWARD CERTIFICATE</i>	146



Glossary..... 147

newsletter for updating participants about your solid waste district's source reduction efforts.

- Chapter 8 also has a blank certificate you can copy and use to recognize organizations or individuals in your jurisdiction who contribute to the source reduction effort.

You are the vital link in solving Indiana's solid and hazardous waste problem. If the source reduction efforts outlined in this guide succeed, less garbage will be sent to landfills and incinerators, and the state will achieve its waste-reduction goals.

More importantly, you will have played a part in leaving our children something more than a legacy of waste. You CAN cut it!

The Indiana Department of Environmental Management and the Indiana Recycling Coalition welcome any comments or suggestions you may have to expand upon, clarify or correct any information in this publication.

Please contact the IDEM Office of Pollution Prevention and Technical Assistance, 105 S. Meridian St., P.O. Box 6015, Indianapolis, 46206-6015, 317-232-8172, or the Indiana Recycling Coalition, P.O. Box 20444, Indianapolis 46220-0444, 317-283-6226.

Let us know how *you've* cut the trash!

Chapter 1: Starting at the source

Source reduction is defined in P.L. 10-1990 (House Enrolled Act 1240) as “a reduction in the amount of solid waste generated that is achieved through actions affecting the source of the solid waste.”

True source reduction means not generating waste.

For the purposes of this manual, however, source reduction is defined as any action that reduces the volume or toxicity of material entering the waste stream. This definition is more inclusive than the legislative definition, encompassing not only source reduction, but also choosing reusable and durable products rather than single-use products, using fewer resources to manufacture a product and substituting less toxic or non-toxic ingredients or products.

Technically, reuse belongs in the same position in the waste-management hierarchy as recycling, while source reduction stands alone at the top of the hierarchy. Distinguishing between reduction and reuse can be difficult, though. For example, creating notepads from paper with printing on only one side is actually reuse—not source reduction or recycling. True source reduction would involve choosing an option like electronic mail or a phone call to avoid using paper altogether. Recycling, on the other hand, would involve collecting and reprocessing used paper into an entirely new product.

For the purposes of this manual, we have chosen to discuss source reduction, reuse and backyard composting. While reuse doesn't prevent the generation of discards, it does

extend the useful life of products. By extending the useful life of materials, fewer total products are used, thus indirectly preventing waste generation. Likewise, composting organic materials in backyards keeps potential waste from ever entering the municipal waste stream.

Source reduction may be accomplished at the manufacturing level through product and packaging changes, at the retail level by the type of products displayed for sale and at the consumer level through changes in purchasing practices and waste disposal decisions. This manual will provide detailed information regarding a variety of source reduction strategies that have been successful at each of these levels.

Most solid waste directors or planners will find there are many source reduction activities already occurring in their communities or districts. Product manufacturers have felt consumer pressure already and have made significant strides in reducing the amount of packaging and increasing the durability of products. Retailers are also responding to public demand by stocking items with less packaging, bulk items or products made from recycled materials.

Media attention over the past several years has increased the general public awareness regarding “environmentally friendly” products. Newspaper and magazine articles have offered source reduction tips to readers. Books that give “earth-saving” techniques have become very popular. This increased environmental awareness is evident in opinion polls that indicate up to 90 percent of the population is predisposed to environmental actions.

While most communities already are reducing, activities are not occurring in a planned manner. They are taking place sporadically, with many missed opportunities. The job of the solid waste planner, then, becomes two-fold. First, the planner must identify existing source reduction activities and maximize the impact of these activities. Second, the planner must create and implement new strategies where gaps exist.



The solid waste challenge

Solid waste poses a challenge because of

two pressures exerted on our solid waste management infrastructure—rapidly increasing solid waste generation and a dramatic reduction in disposal capacity.

The United States generates more solid waste per person than any other nation, totaling over 530,000 tons per day and about 196-million tons per year. In 1992, about 8.4-million tons of solid waste were disposed in Indiana's sanitary landfills.

Before the year 2000, 27 states will face an even greater challenge as landfills reach capacity and close. In Indiana, according to the Indiana Department of Environmental Management, our 150 landfills in 1980 shrank to only 79 by 1989. At the beginning of 1993, about 70 remained. That number could drop to as few as 50 by year-end as Federal Subtitle D requirements become effective.

All the while, Indiana's population continues to grow—5.4 percent from 1970 to 1980 and another 3.5 percent from 1980 to 1990, according to U.S. Census figures.

We have several choices for dealing with the amount of waste we throw away, as illustrated by the Waste Management Hierarchy diagram on Page 5. Notice that source reduction is listed at the top.

The best choice for our children's future is to cut the amount of waste we set out at the curb on "garbage day" or toss in the commercial dumpster at work for pickup. However, some drastic changes of habit will be required to incorporate these cuts.

In order to effectively manage our solid waste, we must either increase our ability to handle the solid waste generated or reduce the amount of solid waste generated. An integrated solid waste management system actually does both. Recycling, composting, incineration and landfilling are methods we can use to increase our capacity to handle the solid waste generated. Unfortunately, these methods are costly, and the total cost increases as the volume of material increases.

Source reduction is a solid waste management method that reduces the amount of waste generated. Source reduction strategies are often less expensive than other solid waste management methods and can reduce the cost of the other methods by reducing the volume of material that must be managed.



Why is source reduction preferred?

As part of an integrated waste-management program, recycling makes sense. It has the same basic goals of environmental protection and resource conservation as that of source reduction, and it can also help reduce disposal costs, but recycling differs from source reduction in practice.

Recycling is a process by which materials otherwise destined for disposal are collected, reprocessed and remanufactured. Recycling can have energy and natural-resource savings when compared to manufacturing similar products from virgin materials. Source reduction, however, prevents waste from being generated and occurs before recycling. Source reduction goes further than recycling by:

- Saving money in waste hauling, recycling and disposal costs.
- Conserving more disposal capacity.
- Conserving more energy and natural resources.
- Decreasing pollution.

In addition, recycling is dependent on the availability of markets for the collected recyclable materials. While recycling can be beneficial because it can create jobs, the economic development potential should be balanced against the benefits of source reduction.

Rethinking the way we look at "waste" and prioritizing our reduction options toward preventing waste in the first place is a far more effective strategy than coping with the aftermath. The adage "an ounce of prevention is worth a pound of cure" is as true in reference to garbage as it is to health.

As the most desirable method for managing waste, source reduction should be the cornerstone of any waste-management program. In addition, purchasing durable and reusable items generates less waste to recycle, compost, incinerate or landfill, and it lowers waste-handling costs.

The diagram on Page 5 helps show the relationship between reduction, reuse, recycling, composting and disposal. Naming these options from most- to least-preferred brings them into better perspective.



Does the hierarchy make sense?

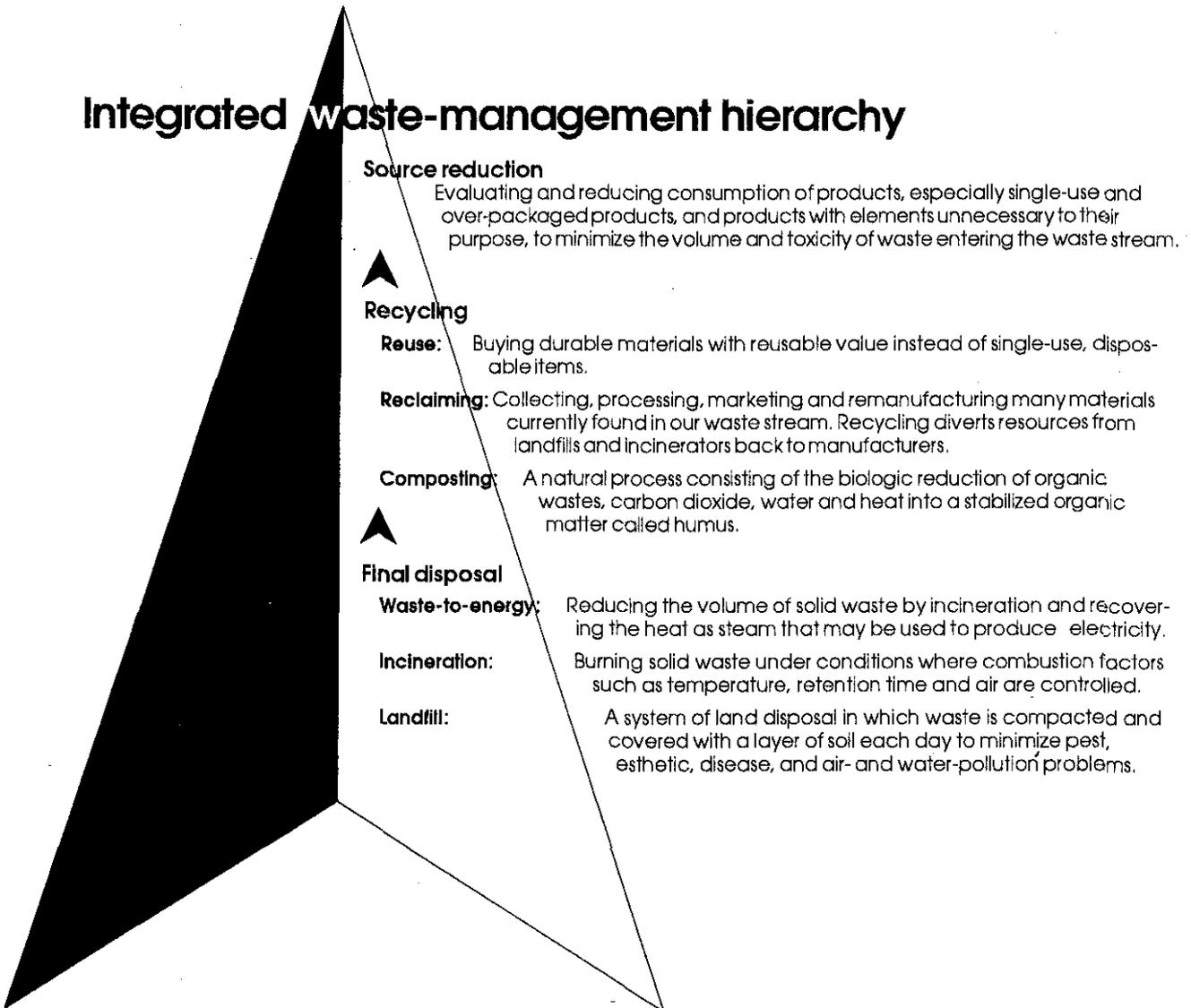
A very informative article, "Does the Hierarchy Make Sense?" by John Schall, was published in the January/February 1993 issue of MSW Management. The article is a condensed version of a larger working paper of Schall's, which can be obtained by contacting Reid Lifset at 203-432-3253. The premise of the article revolves around the question, "Does the solid waste management hierarchy of reduce, reuse, recycle, compost, incinerate with energy recovery, and *then* bury, make sense?"

The author concludes the hierarchy does rest on a firm technical, economic and environmental foundation. Schall cautions, however, that the impacts of source reduction and recycling must be understood from a produc-

tion perspective, as well as from a solid waste perspective.

"We must examine not only landfills, incinerators and recycling facilities, but also mines, factories and mills to understand the full impact of alternative methods of managing waste," he writes. "We must think about solid waste within a framework that includes production level issues—decisions about what to produce and what to use in terms of raw materials inputs into those production processes...We can no longer just manage solid waste...Solid waste managers must participate in the larger endeavor of managing all of society's resources by helping to develop an overall national materials policy that would include source reduction provisions and secondary utilization requirements."

Integrated waste-management hierarchy





Now more than ever

According to a study by Franklin Associates, Ltd., the typical U.S. resident produces over 60 percent more waste now than 30 years ago—4.3 pounds per person per day instead of 2.7 pounds.

However, recovery of waste through recycling and composting has increased—from 7 percent in 1960 to 17 percent in 1990—as society has become more conscious of waste's effect on the environment. Of the 4.3 pounds generated per day per person, 0.7 pounds is being recycled or composted. As we approach the 21st century, integrated waste management with a focus on source reduction and recycling is clearly the solution to our growing waste-management needs.

Through source reduction, recycling and composting, we can reduce waste generation, increase recovery and, in turn, reduce the quantities of waste that must be managed by incineration or land disposal.



Why are we consuming more?

Franklin Associates attempts to answer that question with a 1992 study that explores reasons behind today's growing abundance of solid waste. To better understand the underlying reasons for this pattern, Franklin Associates studied demographics and waste-management trends from 1972 to 1987 in depth. The 15-year period represents the most detailed census data available, and what Franklin found was surprising. Study results show some significant changes in the way we live and work that have led us to produce more waste.

One reason solid waste is increasing is because population is growing. In addition, new living patterns brought about by two-career families, smaller households and more appliances means we throw away more per person per year.

● Demographics and discards

During the period from 1972 to 1987, our population grew 16 percent, but total discards went up 28 percent after recycling.

At the same time, due to delayed marriages, more divorces and a larger elderly population, the number of households grew 34 percent, about twice as fast as the overall population. In 1993, twice as many people live alone as in 1970.

The corollary to more households is more yard waste, which also grew 34 percent. Most of this waste—leaves, grass and trimmings—still goes to landfills or incinerators.

Home furnishing discards increased 80 percent, while discards of major appliances like dishwashers, refrigerators and washing machines increased 74 percent—4.5 times faster than population. Microwave ovens, virtually non-existent in 1972, were present in 90 percent of households in 1987. Clothing and footwear discards grew 260 percent in the period from 1970 to 1988.

"So not only are we spread out among more households, we're better equipped and change fashions faster," the study concludes.

● Employment

Major change was evident in employment, too. The total workforce increased 38 percent, but office workers grew by 72 percent—4.5 times faster than population.

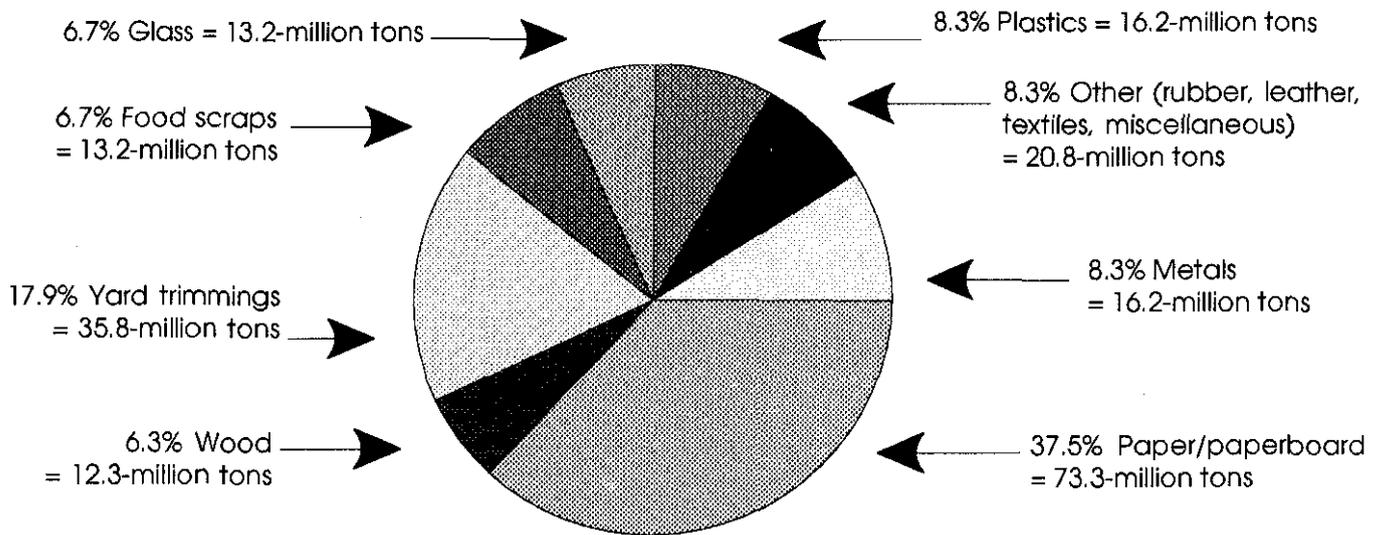
This was most likely driven by the shift from a manufacturing to a service-and-information economy and by the rise in the number of two-career families as more women joined the workforce.

Some individuals choose to spend less time on activities such as cooking, cleaning and shopping as free-time dwindles and income increases. This has brought about an increase in the purchase and disposal of time-saving products—prepackaged food and shop-by-mail catalogs.

● Employment/paper discards

The shift from a manufacturing economy to a service-and-information economy fueled the generation of still more paper. Printing- and writing-paper discards increased 73 percent, office paper 87 percent and copier paper 150 percent.

Total book tonnage increased 24 percent—50 percent faster than the population—with technical books alone increasing 211 percent. Magazine tonnage went up 38 percent,



**A Year's Worth of Trash in the Municipal Solid Waste Stream
= 195.7-million tons (1990 figures)**

SOURCE: For EPA by Franklin Associates, Ltd., 1992

and commercial printing—brochures, catalogs, junk mail—increased 133 percent.

● **Food and beverage**

It's true that Americans eat more meals away from home (up 34 percent) and spend more on easy-to-prepare meals (up 58 percent). However, the weight of food packaging and utensils in the trash increased only about half as much as population.

The reasons for this are twofold, Franklin Associates said—*reduced packaging and recycling*. The food industry has dramatically reduced its packaging in many categories, and almost all materials collected in curbside recycling programs, except newspapers, come from food and beverage containers.

For instance, although beer and soft-drink consumption increased 52 percent during the study period, the weight of these packaging discards went down 28 percent. Thinner, light-weight materials were used more frequently and recycled more.

● **Summary**

While the shift to an information-based service economy has brought about a generally increased quality of life, the by-product of the shift has been an increase in trash created.

Without additional source reduction, projections say the amount of waste generated

in the year 2000 could reach 222-million tons, when each of us may generate as much as 4.5 pounds of waste per day.

The chart above offers a breakdown of the different types and quantities of waste materials present in our municipal solid waste stream. Fifty-five percent to 65 percent of the municipal solid waste stream comes from residential sources, and 35 percent to 45 percent comes from commercial sources. The municipal solid waste stream does not include industrial waste. Another important fact is that this chart represents municipal solid waste *generated*. Of this, 66 percent was landfilled, 16.3 percent was incinerated, and 17.1 percent was recovered through recycling and composting.

Changing habits so we can reduce these numbers is a tough assignment. If we fail to reduce waste, however, the economic and social costs of waste disposal will increasingly impact our lives.



Strategies for source reduction

A comprehensive approach to source reduction requires the participation of all sectors generating waste:

- Residential

- Business
- Industry
- Institutional
- Local, state and federal government

Many source reduction strategies require legislative and regulatory initiatives for action on the state or local level. Other strategies require aggressive public-education programs to assure success. A discussion of both types of strategies follows.

Regulated strategies for source reduction

Variable-rate programs, or volume- or weight-based waste collection

In most cities and towns, waste collection fees are assessed either as flat fees or indirectly as part of property taxes. These systems do little to encourage source reduction since they provide no penalty for generating too much trash and no reward for reduction, reuse and recycling. Over time, these systems have actually led people to believe disposal is free.

The purpose of a variable, volume- or weight-based rate is to give citizens an economic incentive for reducing waste generation. The logic is that people will practice source reduction if they know and must pay the true cost of disposing of their waste and can reduce those costs through their own efforts.

Variable rate programs can be administered as can systems, bag systems, tag systems or a combination thereof. Variable can systems charge residents fees for the size of can used and/or the number of containers set out. Standardized container rental makes the program somewhat easier to administer.

Santa Maria, Calif., uses this type of system. Residents can choose a 40-, 60- or 90-gallon can for weekly collection. The can size is then entered into the trash hauler's computer system and used to calculate sanitation fees.

While most Santa Maria residents opted for the smallest can, variable-can programs have the disadvantage that customers have no incentive to set out less trash than the amount the smallest can holds.

Bag and tag systems have this sort of incentive built in. These volume-based programs charge residents for the number of bags disposed. Residents either purchase special bags

or attach special tags to ordinary garbage bags.



In Indiana, Huntingburg

became the first Indiana community to adopt volume-based rates in November 1990. The Dubois County town of 5,400 uses a bag system. Special 33-gallon bags are sold for 68 cents each—or \$34 for a 50-bag roll, so residents are paying for disposal costs when they buy bags.

According to Mayor Connie Nass, the system rewards people for recycling and source reduction. "Users pay only for what they throw out, and small users don't subsidize large users," she says. "We've reduced our trash loads to the landfill by 75 percent. Our program was so successful that Dubois County initiated a similar system just six months later."

Mayor Nass echoes what the experts say, though: Volume-based systems work better if residents are first exposed to recycling options.

"Huntingburg was the third town in Indiana to do citywide curbside recycling," she explains. "So residents already knew ways they could reduce how much trash they actually set out for collection."

Education helped get people used to the idea of volume-based rates, and it is still an important aspect of their program, she says.

"Before the program went into effect, we spoke to community groups and schools. We took the bags with us and had them look at and handle them. We also took a full bag so they could see how much it held. We explained, too, what was involved in disposing of that trash and how much it cost the town. Most residents have adjusted well."

The town focuses much of its continuing education efforts on schoolchildren and the elderly. "We distribute films, and hold coloring, essay and drawing contests related to reducing trash. That's supplemented with advertisements on the town's transit vans. You have to keep people constantly aware of what you're doing and why."

For more information on Huntingburg's program, call Mayor Nass at 812-683-2211.

Other Indiana communities—like Crawfordsville—are implementing volume-based approaches. State and local govern-

ments remain interested in variable fees because they:

- Discourage generation of trash through increased source reduction and backyard composting.
- Make trash fees more equitable as the costs of waste management escalate.
- Design fees to raise some of the revenue needed to pay for waste-management systems.
- Provide a non-legislated choice and economic incentive to the public to change its habits.

Some operational difficulties may exist with variable programs, though:

- Effectively involving multi-family households, such as apartment dwellers.
- Changing old flat-rate habits through public information and education.
- Implementing meaningful variable-based fee structures in open trash-hauling communities as opposed to organized- or contract-hauling areas.
- Imposing weight limits on volume-regulated bags and cans.
- Dealing with frequent household service changes in a subscription-service setting.
- Monitoring and successfully halting illegal dumping and trash burning.

Implementation of a variable rate program is easier when a city or town controls the collection of waste, either directly or through contractual agreement with a waste-hauler. Such systems also need to be tailored to suit the community's needs.

A solid waste management district will have to analyze its individual communities to determine the effectiveness of a variable-rate program. Considerations should include available recycling markets, rural versus urban geography, density and demography, short- and long-term landfill fees, existing systems and programs, and residents' current waste disposal habits.

However, any community that provides its own collection and bills residents directly on a quarterly or monthly basis is capable of developing a residential variable-rate system without major program modification.

The commercial and industrial sectors already have variable rates for collection of solid waste, since private haulers provide collection based on the size of containers or number of collections. Additional economic incentives or disincentives for source reduction would be more effective if implemented at the state or national level. Local governments can help by supporting such initiatives.

Advanced disposal fees

While some materials like aluminum and computer paper command good prices in the recycling market, most materials do not provide significant sales value to cover collection and recovery costs.

However, some states are creating economic change by means of advanced disposal fees (ADFs), often referred to as product disposal charges. The theory is that consumers or manufacturers will pay the costs of progressive solid waste management up-front for specific products, for example, tires or major appliances.

Fees are deposited in state solid waste trust funds and used to support recovery of the product. States continue to pursue ADFs because they represent the true cost of an environmentally sound waste-management solution, rather than merely covering the costs to landfill or incinerate.

Indiana has developed a method of funding source reduction and recycling with a 50-cents-per-ton surcharge on all waste dumped at public landfills and incinerators. The money is deposited into the Indiana Solid Waste Management Fund and eventually disbursed via matching grants and loans to help finance recycling programs and market development. Implementing an ADF program could provide even more funding to support aggressive implementation of waste-reduction programs at the local government level.

At the time of this printing, however, there is no ADF legislation in Indiana.

Disposal bans

Disposal bans prohibit landfilling or incineration of specific wastes. In Indiana, the only disposal ban currently in place is for lead-acid (automotive) batteries, although yard

trimmings will be prohibited beginning in September 1994.

As a source reduction method, enforced disposal bans encourage efficient packaging constructed from recyclable materials. They are one mechanism for significantly reducing the volume of waste disposed in landfills or incinerated.

HEA 1240 allows for disposal bans or restrictions on recyclable materials with effective dates to be determined by the Solid Waste Management Board. However, for such bans to be effective, the public, commercial sector and waste haulers must have alternative recovery mechanisms available for banned materials. Without a fully developed infrastructure of processing and marketing services, the generator or waste hauler may resort to illegal dumping.

Extensive education to inform the public about unacceptable waste materials and appropriate management methods is also needed, along with strict enforcement, including substantial fines and prohibitions against unloading mixed loads of waste containing banned materials.

Product bans

Local governments may also seek to ban the sale of certain items within city limits. The desirability of product bans, however, is a hotly contested issue.

Product bans typically lead to substitution of one type of material for another and, as such, do not generally reduce the generation of solid waste.

Mandatory product or packaging requirements and restrictions can act as catalysts when the private sector doesn't respond sufficiently to market mechanisms. Used selectively, they can increase the reusability and recyclability of products and help to reduce environmental impacts.

Get involved

Local solid waste management districts and local governments can work together with regional and state organizations to lobby for and coordinate legislation to promote source reduction. To get involved, contact:

- Gov. Evan Bayh, State House, Indianapolis 46204, 317-232-4567.

- Indiana Legislative Services Agency, 230 State House, Indianapolis 46204, 317-232-9856.
- Indiana House of Representatives—Democratic phone, 800-382-9842; Republican phone, 800-382-9841.
- Indiana Senate, 800-382-9467.

Education-based strategies for source reduction

A starting place for solid waste planners might be the distribution of source reduction education materials included in this booklet, targeting consumers, businesses, industry and institutions. A public-education and promotion campaign for source reduction should focus on changing the values and behavior patterns of individuals and organizations.

Just because an individual or group is already recycling does not necessarily mean the transition to reducing will be automatic. The common belief has been that recycling is a necessary stepping stone to source reduction and that people who aren't already recycling won't reduce their wastes. Recent research findings by Eco Solutions—a non-profit, public-education and research organization—casts doubt on this common belief. "Waste surveyors" provided one- to two-hour workshops in the homes of volunteer households in a project funded by the Environmental Protection Agency, the state of Minnesota and four foundations.

One hundred homes in two neighborhoods took part in a detailed survey that included an explanation of source reduction opportunities, promotion of some simple reduction options and written information. One of the neighborhoods was in a low-income area, while the other was higher income.

Three weeks after the survey, each household was contacted again to determine which, if any, of the suggested source reduction options was implemented. Researchers found that, on average, each household implemented 57 percent of the recommended actions, regardless of which neighborhood they lived in. Neither gender, home ownership, size of residence, income,

nor number of units in a building explained why some people adopted source reduction steps and others did not.

Even more startling, no correlation was found between recycling participation and source reduction behavior, even though half of the residents in both neighborhoods took part in recycling already.

Based on this experience, for greatest potential citizen impact, highlight the following values in solid waste management programs:

- Environmental protection and pollution prevention.
- Energy and resource conservation.
- Cost-effectiveness.
- Ingenuity.
- Simplicity.
- Pursuit of community spirit.

Local governments can promote voluntary corporate source reduction by:

- Informing industry leaders of the local government's goal and source reduction's position in the hierarchy of solid waste management options.
- Issuing statements in support of consumer groups working to promote changes in product design and packaging that reduces the generation of waste.
- Encouraging industry efforts to reward employees for useful suggestions that lead to source reduction.
- Providing technical assistance to businesses developing source reduction programs.
- Alerting the business community to potential legislation that could be enacted if voluntary industry measures in support of source reduction prove inadequate.

These are steps that require little time and effort, yet can help create a business atmosphere that favors and enables greater source reduction. For those groups or individuals interested in doing more, highlights of specific programs that are of particular interest follow.

Guides to repairing, reusing and renting goods

Reusing materials in-house at the residential, commercial or industrial level slows the

rate of discards entering the municipal waste stream. Thus, the community avoids collection and processing costs.

Local guides that promote source reduction through repair, reuse and rental can be effective. Kokomo is in the process of producing a guide. Called "The Community Recycling Network" it was funded by an Indiana Recycling Grant from the IDEM. It is expected to be out in the spring of 1993. **For more information, call Tom High, superintendent of the Kokomo wastewater treatment plant, at 317-457-5509.**

Seattle, Wash., already publishes a guide that lists businesses involved in the repair, reuse and rental fields. Using the yellow pages of its phone directory as a source, the city sent surveys to businesses listed under such headings as "rental," "repair," "consignment," "used goods," etc., asking if they wanted to be included. Responding businesses were placed in the guide under appropriate headings.

In Seattle, the goals were to make the booklet attractive, easy to use and functional as a handy supplement to the yellow pages so residents would be convinced to refer to it regularly. Here are the steps to follow, based on Seattle's experiences:

1. Pull all relevant categories from your community's yellow pages and make a list of all businesses under these categories. Many businesses appear in more than one category. Some categories, like home repair and car repair, may be too lengthy and complex to include. Instead, you could include information about how to select a repair shop or contractor.

2. Send each business a letter, asking owners or managers to fill out a short form and return it by a deadline. This verifies that businesses still exist and allows you to check the business name, address and telephone number. It also serves as a formal agreement with the business for a listing.

3. Maintain a log to track return of information forms, and make follow-up calls after the deadline passes. Multiple calls or a second letter may be necessary to contact the business manager or owner.

4. To provide easy access to the directory, create two guides for accessing information:

- A table of contents organized by categories of repair, rental and used or second-hand (e.g., "Repair, Major Appliances").
- A product index organized by the item to be repaired, rented or purchased second-hand (e.g., "Bicycles, Rental").

5. Include a disclaimer in your book, stating that the solid waste management district has not investigated and does not endorse the services listed. The disclaimer should also state that an attempt was made to include all relevant businesses, but not all responded. Have your legal counsel review the disclaimer.

6. Prepare introductions for the various sections that give source reduction reasons for using the services.

7. Prepare brief annotations before each section that support renting or buying used products. For instance, Seattle's "Bridal Dress Rental" section began with this:

"A bridal dress isn't cheap and probably will be worn only once. Be extravagant and rent the dress you really want but can't afford to buy."

8. Consider contracting with a public relations and design firm to lay out and package the guide.

9. Send out a partial directory in the proofing stage to any businesses that declined inclusion. If they gain a better understanding of what you are trying to accomplish, they may be more likely to take part.

10. To save money in the long run, contract with a printer to produce as many copies as you think you will need at the same time. Seattle's 48-page booklet had a second print run of 65,000 copies, which gave it a lower, overall per-booklet cost of 40 cents.

11. Develop a distribution strategy that includes book stores, libraries, community centers, neighborhood service centers, businesses and other groups that agree to stock and sell it for you. Consider providing display racks to retailers who request it. Make arrangements to keep racks stocked. Make sure the person at the distribution point knows who to call for additional stock, and that delivery is prompt. Seattle used a city department that provided delivery services for a flat fee.

12. Publicize the directory. Make use of local newspapers, televisions and radio stations. Sending out press releases with copies of the book could get your district director interviewed in local papers and on TV. Also ask broadcast media to run public-service announcements. If your budget allows, consider buying advertising space. Do not forget to ask city utilities to print messages on bills or include bill inserts promoting the books.

Environmental shopper programs and/or tours

Commonly called "precycle" programs, this effort provides consumers with suggestions or tangible examples of products or packaging that support source reduction goals.

The League of Women Voters of Indianapolis, the Indianapolis Clean City Committee and the Kroger Company have teamed up to provide "environmental shopper" tours in selected Indianapolis store locations. The goal of the environmental shopping program is to encourage consumers to use resources wisely and reduce solid waste as much as possible. Participants are asked to weigh the benefits of products against the amount of resources and waste generated by their production and use.

In addition, local reduction, reuse, recycling, composting, tox-away and disposal programs are highlighted.

When making buying decisions, shoppers are asked to keep in mind the product's quality, price, convenience and environmental impacts. The program also seeks to help shoppers better understand the complexity of our solid waste stream and the cooperation necessary among business, government and consumers to manage it.

Tour guides are encouraged to stress that answers to environmental problems are seldom "black and white." For example, a coffee can might be the least-waste solution for someone who recycles. For a non-recycler, however, a vacuum pack of coffee would produce less waste. While the information provided can help consumers be part of the solution, they need to use their own best judgment to "vote for the environment" with their shopping dollars.

For more information on starting an

environmental shopper tour in your district, call the League of Women Voters at 317-925-4757.

Consumers can also call the Pennsylvania Resources Council's National Environmental Shopping Hotline—800-GO TO PRC—for answers to questions about packaging and labeling issues. The hotline also offers suggestions on how to shop in the least environmentally detrimental manner.

The Cooperative Extension Service of the University of Illinois has produced training materials for preparing educators, recycling coordinators and others to teach people about the environmental effects of the purchasing choices they make. The teaching packet is available for \$30, and an hour-long video will be available in fall 1993. **Contact Brenda Cude at the Cooperative Extension Service, College of Agriculture, University of Illinois at Urbana-Champaign, 271 Bevier Hall, 905 S. Goodwin Ave., Urbana, IL 61801, 217-244-2858.**

Environmental roundtables

Roundtables bring together key citizens and business leaders in your area to talk about source reduction on a regular basis. Roundtables offer opportunities for education, information sharing, waste exchanging and support.

Consider including representatives from school districts, local media, industries, military, college, hospitals, government, local environmental groups, scrap dealers, waste haulers and recyclers.

The Southeastern Indiana Solid Waste Management District sponsors the Jefferson County Environmental Roundtable in Madison. The group of 25 to 30 citizens meets once a month for lunch and to talk about source reduction programs and activities.

Here are some highlights of positive results the roundtable has experienced:

- A local industry received a shipment of 9,000 small mirrors that were slightly defective. Rather than landfilling them, the industry contacted the local developmental services shelter. The shelter used the mirrors to make Christmas ornaments and other items to sell as fund-raisers.
- A plastics manufacturer was complaining about the high cost of landfilling Gaylord

boxes. Other people at the meeting expressed interest in the boxes, and now recyclers are using them as drop-off containers.

- Madison Consolidated Schools shreds some of its confidential papers. Now, instead of disposing of this paper or recycling it, the school gives it to a local industry, which uses it as packing material.
- A beauty salon started buying its shampoo and other hair-care products in bulk and allowing customers to bring back original bottles for refills.
- The local newspaper attends meetings and then highlights source reduction activities at local businesses or industries in weekly newspaper articles.

For more information on the Jefferson County Roundtable, call Dave Adams at 812-273-1622, extension 580.

Communitywide garage sales

The Greene County Solid Waste Management District sponsored a communitywide garage sale to promote reuse. Only used items or articles made from used items were sold. For instance, one booth offered grandfather clocks made from scrap lumber.

Proceeds from raffle ticket sales and booth rental were designated to be used for cleaning up illegal dumps in the county.

For more information, contact the Greene County Solid Waste Management District at 812-384-9231.

Other activities for solid waste management districts

- Work with non-profit organizations and others to locate material drop-off donation sites for used clothing, furniture, books, magazines, appliances and other items that could be collected, repaired, reused, resold or given to needy individuals.
- Sponsor periodic swap meets for used items at a municipal parking lot during a low-use time.
- Provide assistance to technical or trade schools, sheltered workshops and senior-citizen organizations to develop repair programs for durable goods.
- Provide support for non-profit organizations primarily involved in materials reuse.

- ❑ Support community groups that reclaim old building materials for use by low-income residents.
- ❑ Develop a public-education and publicity campaign that identifies problem substances and their less toxic or non-toxic alternatives.
- ❑ Encourage residents and business to use no more than recommended amounts of toxic substances and share the remainder with someone else who needs it.
- ❑ Promote on-site mulching and composting as the least expensive way of managing yard trimmings.
- ❑ Develop flyers, brochures and other how-to literature to encourage home or business composting.
- ❑ Establish compost demonstration sites where residents and business managers can view different composting methods, bin construction materials and end products.
- ❑ Support a “master composter” program, in which residents are trained by experts to teach other residents and business managers proper techniques of composting.
- ❑ Distribute compost bins, accompanied by instructions and follow-up efforts. See Page 142 for references on where to get more information about composting.
- ❑ Encourage low maintenance lawns by promoting ground covers that do not require mowing.
- ❑ Develop a “data base” of local area contacts, types of programs and business supporters.
- ❑ Develop a peer match program within and across district lines.
- ❑ Contact the Central States Education Center about the Model Community program, a comprehensive waste reduction program. Model Community trains volunteers to help transform ordinary businesses, governments and civic organizations into “models” of waste reduction. Call 217-344-2371.

More ideas from around the state

- ❑ Consider incorporating variable rates for residential collection of waste, providing for disposal on a per-unit basis.
- ❑ Support, incorporate and utilize the “Guidelines and Recommendations for Packaging Waste Reduction,” developed by the Indiana Packaging Waste Reduction Task Force,

and “Goals, Objectives and Strategies for Recycled Paper in Indiana,” developed by the Indiana Recycled Paper Task Force and present them to your business community. **For copies, write or call IDEM, OPPTA, P.O. Box 6015, Indianapolis 46206-6015, 800-451-6027, extension 8172.**

- ❑ Develop a media campaign designed for maximum public outreach that addresses the needs and benefits of viable source reduction practices. Be sure to include strategies for newspaper, billboards, radio, television, bus and cab signs.
- ❑ Establish an educational clearinghouse to share source reduction information with citizens, businesses, industries, government and other institutions.
- ❑ Develop a residential mailing list to target with a source reduction brochure advocating purchase of products with minimal packaging and the sale or gift of “shop smart” reusable grocery bags.
- ❑ Prepare a “green buyers guide” for distribution that explains where and how to purchase environmentally friendly consumer goods and where to get them repaired.
- ❑ Work with local newspapers to start a weekly source reduction column.
- ❑ Provide regular, source reduction public-service announcements to radio and television stations.
- ❑ Start campaigns to support use of public and rural transportation services to minimize fuel consumption, toxic emissions, road degradation, tire wear and the number of spent vehicle bodies.
- ❑ Prioritize the transportation policy to support this hierarchy: walking, bicycling, riding buses, car pooling and driving automobiles.
- ❑ Work with business, government and industry to develop a source reduction ethic.
- ❑ Conduct workshops to help businesses initiate in-house source reduction programs.
- ❑ Develop a business newsletter to highlight companies making significant contributions to district reduction and reuse and to give more information about source reduction. Although a newsletter may be free, have businesses sign up to receive it.
- ❑ Share information about the **Indiana Waste**

Exchange with area industries. Call Jim Britt of the Recyclers Trade Network, 317-844-8764.

- ❑ Encourage businesses, industry and institutions to conduct waste audits, use electronic mail, practice more efficient copying and reuse scrap paper.
- ❑ Recognize businesses that successfully reduce waste at the source by awarding a window sticker.
- ❑ Work with the local chamber of commerce and area businesses to identify "model" businesses and use examples to encourage other businesses to move ahead with source reduction efforts.
- ❑ Identify source reduction success stories from among local businesses and industry. Write up and publish in an attractive format to give out as examples for other businesses.
- ❑ Utilize financial incentives and disincentives to encourage source reduction by linking economic benefits to implementation of source reduction activity.

Some source reduction activities by state government agencies include:

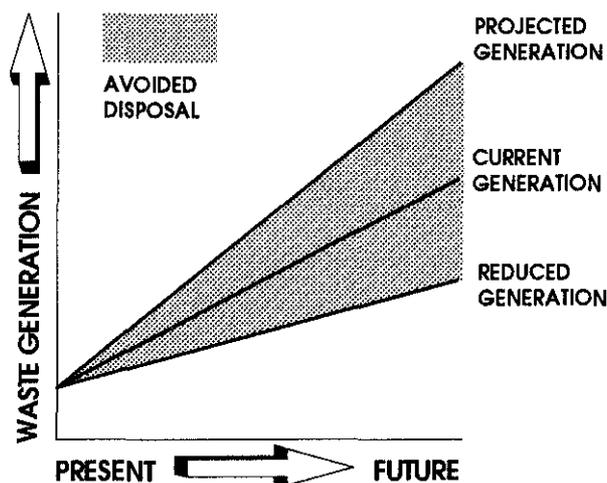
- When purchasing new carpet for its facilities, unworn sections of old carpet are made into walk-off mats for use in hallways and entryways.
- Double-sided copying is available and promoted.
- Electronic mail and routing slips are used to reduce paper consumption.
- Reuse of file folders, manila envelopes and binders is encouraged.
- Reuse is encouraged in state cafeterias through the sale of reusable coffee mugs, sports water bottles and plastic stadium cups—all imprinted with the state seal. If state employees bring in one of these items for a refill, they get a large beverage for the price of a medium.
- State cafeterias charge extra for take-out containers.



Keeping track of source reduction

Measuring, or at least estimating, the

Quantifying source reduction



effect of source reduction is important for at least three reasons:

- Measuring the diversion and cost of various source reduction initiatives provides feedback necessary to improve program effectiveness.
- Knowing the cost-effectiveness of source reduction programs assists decision-makers at all levels in allocating funds among various waste management efforts.
- Measuring source reduction will assist local governments in meeting state diversion goals.

Quantifying source reduction, though, is difficult because total and per capita waste generation rates are on the rise. To reflect this, reduction should be considered in terms of reduction below projected rates as well as below existing rates, as shown in the illustration above.

Also, certain source reduction programs may not lead to changes in individual purchasing and waste-generation behavior until a few years after they've begun. It takes residents time to develop new purchasing practices and manufacturers time to redesign products.

Indiana allows districts to claim a maximum reduction of 5 percent of the municipal solid waste stream. To claim additional source reduction credit, districts with aggressive education/promotion programs must clearly demonstrate, through a survey or its equivalent, that more than 5 percent of potential solid wastes are being diverted from disposal. These

claims for additional source reduction credit will be assessed on a case-by-case basis.

To better illustrate source reduction activities, the Indiana Department of Environmental Management recommends all districts break down waste reduction estimates into two major categories:

- residential/commercial
- industrial/other

The IDEM regards source reduction, on-site recycling and on-site reuse as preferred methods of solid waste management and remains committed to maximizing the practices statewide.

As such, activities such as using a mulching mower, letting grass clippings remain on lawns, shredding and using leaves or other yard debris as soil conditioners, and using yard trimmings as landscaping mulch may be credited as source reduction or reuse. Backyard and municipal composting should be credited as composting.

Here are some suggested methods of measuring specific activities as surrogates for measuring actual source reduction:

- **School curriculum development**—Documentation of curricular materials being used, recorded by grade.
- **Materials exchange register**—Log of register activity, successful exchanges.
- **Merchant/commercial/government education**—Number of merchants contacted personally, number of merchants receiving recognition status, sample of waste audits, changes undertaken (determined through interview method).
- **Community forums**—Log of presentations, including number, dates, estimated attendance.
- **Newspaper coverage**—Log of articles, advertisements, relevant columns.
- **Ordinances**—Status of governmental units purchasing policy.



Bibliography

- Allaway, David. "Does Source Reduction Work?" *Resource Recycling*, July 1992: 52.
- Buchanan, Robert D. "Reduction, Reuse, Waste Volume Reduction and the Purchase of Recycled Products." *Reducing the Waste Line...Food Service Recycling Program*. 17 Nov. 1992.
- Fishbein, Bette K. and Caroline Gelb. *Making Less Garbage*. New York, INFORM, 1992.
- Franklin Associates, Ltd. *Analysis of Trends in Municipal Solid Waste Generation, 1972 to 1987*. Prairie Village, Kan., 1990.
- Franklin Associates, Ltd., for the U.S. Environmental Protection Agency. *Characterization of Municipal Solid Waste in the United States, 1992 Update*. Prairie Village, Kansas, July 1992.
- Institute for Local Self-Reliance. "Waste Prevention Strategies." *Technical Information for Indiana Solid Waste District Planners*. Washington, D.C., February 1993: 1-9.
- Jones, Liliias. "In-Home Education: A Viable Waste Reduction Tool." *Resource Recycling*, January 1993: 81.
- Krivot, Dan, and Susan Schmidt. "Variable Fee Systems in Minnesota." *BioCycle*, September 1992: 50.
- Maine Waste Management Agency. "Fact Sheet: Waste Reduction." April 1991.
- Michigan Office of Waste Reduction Services. "Fact Sheet: Waste Reduction Overview." Lansing, December 1989.
- Minnesota Office of Waste Management. "Fact Sheet: Source Reduction." St. Paul, August 1992.
- North Carolina Office of Waste Reduction. *A Source Reduction and Recycling Guidance Document for North Carolina Communities*. Raleigh, March 1992.
- Seattle Solid Waste District. "Use It Again, Seattle!" *Resource Recycling*, December 1992: 51.
- Skumatz, Lisa A. and Philip Alan Zach. "Variable Rate Initiatives at the State Level." *BioCycle* December 1992: 67.
- U.S. EPA. *The Consumer's Handbook for Reducing Solid Waste*. Washington, D.C., August 1992.
- World Wildlife Fund & The Conservation Foundation. *Getting at the Source: Strategies for Reducing Municipal Solid Waste*. Washington, D.C., 1991.

Chapter 2: **Public education strategies**

Most source reduction programs will be developed with the involvement of local units of government and, in particular, solid waste management districts.

For most services local government provides, public education to convince residents to take advantage of the service is not needed. Residents take advantage of police protection, fire protection, utilities and trash collection without convincing, and compliance is generally obtained through ordinances or regulations.

However, source reduction creates a new public-education challenge for local government. Reduction programs require transmitting significant amounts of information to citizens just to secure their participation. When you study successful reduction programs, however, one factor that stands out is an aggressive, well-conceived public-education program.

While specific reduction methods may vary among Indiana communities, development and implementation of an effective public-education program is critical to each community's success. Effective public education involves a realistic view, an understanding of the political aspects of an issue and knowledge of how people learn.

The success of your program depends on the public gaining a clear understanding of the value of source reduction. If citizens are convinced of the value of reduction, they will

support it through their participation. Consider your source reduction program a product that must be sold to the public, and apply some basic marketing techniques to its development.



Understanding your audience

The first step in developing a public-education program is identifying audiences and determining what information will convince each of source reduction's value.

Three distinct audiences for a source reduction program emerge—local elected officials, the media and the general public. Each group has different informational needs, so your program should include a strategy for reaching each that takes into account level of expertise and audience limitations.

Local elected officials may allocate funds for the program and develop legislation needed to implement it. The media will require different information so it can report on the programs. The general public will need specific information to show them how and why to participate.

Each of these audiences has unique informational needs related to its responsibility and role, and understanding them up-front will make your program run smoother. It's up to solid waste planners, then, to determine and provide the level of detail, scope and method of presentation best suited to each group. Pre-planning will provide a carefully crafted message with the right information to fit each group's need.

Local elected officials will also likely be program participants and, in as much, will need to receive the same information transmitted to the general public. However, because they will vote on various program funding needs, these officials need supplemental information. Provide them with the details that will help them answer questions during a public debate of the issue. Elected officials appreciate openness and thorough preparation by the solid waste planners developing and implementing programs.

The media sees itself as a watchdog of government and values openness and preparation, too. Provide this group with complete

information in a clear and easy-to-understand format. If the information you provide is too complex or confusing, the members of the media will attempt to clarify these issues on their own.

The general public also needs a clear and specific message so it knows how to start reducing. This group needs to feel its contribution is recognized and appreciated. Many times the public is supportive of waste minimization but does not know what to do to help. Positive reinforcement in the form of recognition and reward will help convince the general public to keep reducing.



Know your business

Once you have defined your audience, start developing your message. It is essential that program planners have a thorough understanding of the program they are attempting to implement.

If, for example, reducing disposable diapers and/or their associated problems in the municipal waste stream is being encouraged, planners should understand all the facts. A pilot or demonstration program could be set up to gather facts on operations, costs and other important factors. Only after the details have been well thought-out should the message be communicated.

Present both the advantages and disadvantages to each audience. Today's audience is far more knowledgeable regarding environmental issues than audiences of just a few years ago. If the positive side is the only side presented, it's likely the public, media or elected officials will locate and present the negatives.

Openly recognizing problems and making a case for well-devised solutions increases your credibility with the audience. However, glossing over negatives can leave the impression the audience's decision-making ability is not respected or the program is not well thought-out.

For example, switching to reusable diapers should not be promoted without taking into consideration how the switch will impact parents. Both parents may work and lack time for laundering, and they may patronize day-

care facilities that require use of disposables. They also may not be able to afford the up-front costs of reusable diapers, or they may not have enough technical information on the alternatives and associated costs of each.

Some of these limitations can be addressed by the program while others cannot. Perhaps providing comparative information on the cost of diaper services in your area would help. Or maybe the parent just isn't aware that removing the fecal material from the disposable diaper before throwing it out would benefit the solid waste management system. Technical assistance could be provided by a hotline or other mechanism.

To improve the chances of retention, your message should also be repeated in a variety of ways. People remember about 20 percent of what they hear, 30 percent of what they see, 50 percent of what they see and hear, and 80 percent of what they do. Let this principle help you devise a strategy that reaches all your audiences often with a clear, consistent and involving message.



Establishing program value

It is not enough that you explain how to participate in a source reduction program. To ensure program success, elected officials, the media and the general public should recognize its value to themselves and to the community. Clearly demonstrate how changes in behavior and expenditure of funds (either personal or public) will improve the quality of life.

Public opinion polls show a growing concern among American citizens about the environment. These individuals should be predisposed to take part in a solid waste reduction program. However, it is a little like having the home court advantage in a basketball game—it's a nice advantage but it doesn't guarantee a win. Likewise, developing a successful source reduction program will require you to convince potential participants there is a valid reason to make appropriate behavior changes.

Citing generalized environmental benefits will not give most individuals the necessary incentive to change. The benefit must be much more personal. Look to the automotive

industry's marketing of small, fuel-efficient cars for a good example of how this works. Advertising for these vehicles does not try to convince consumers to buy because their purchase can help solve global air pollution. Instead, advertising focuses on the cars as a way buyers can save money on gasoline.

While consumers may consider environmental impacts secondarily when they make a purchase, their primary decision to buy is probably made with a more individual concern, such as saving money, in mind.

Audiences will also be more likely to react positively if you address those concerns they consider "closest to home." For example, a program to promote letting grass clippings remain on a lawn could highlight the following personal benefits:

- Lawn health and appearance can be improved.
- Home owners will save time not bagging clippings.
- Home owners will save money because purchased fertilizer requirements will be reduced.

Local community benefits could include:

- Avoided disposal tipping fees based on local costs.
- Increased life of the local disposal methods.
- Returning some control and responsibility for waste management (i.e., yard wastes) to residents.

An individual deciding whether to take part in the program can personally relate to these benefits and gain a clearer understanding of the program's value.

Also significant to communicate is the importance of one individual's effort. However insignificant it may seem at first glance, it adds up, and the combined efforts of many individuals can have a monumental impact. Examples based on reasonable assumptions and local statistics can be important tools in making that impact real and encouraging program participation.

For example, Kokomo has 15,600 residences generating more than 20,000 tons of residential solid waste each year. Comparatively, one individual's effort to reduce waste generation from 40 pounds per week to 20

pounds hardly seems worthwhile. Over the course of a year, though, this reduction adds up to 1,040 pounds of waste. If each of the 15,600 home owners took a similar action, a total of 8,112 tons of waste could be diverted from landfilling in a year.

While highlighting advantages, don't forget to also discuss what problems may arise and how they can be remedied with the least amount of effort.



Presenting the message

A variety of channels can be used to distribute your message to its targeted audiences.

Elected officials have the responsibility of voting on programs and providing funding, so they need information to help make their vote an informed one. Present program specifics for them at committee meetings, through program reports or summaries or by testifying at meetings or hearings.

As programs are approved and move toward implementation, try to reach as large a segment of the general public as possible. The message can be targeted to various groups, based on degree of community involvement. Local media are one effective avenue for reaching the larger public.

Use press conferences to announce milestone events during program implementation, and send out press releases in between to publicize specific events or awards. If you are unsure about whether a press conference is justified, ask yourself these questions:

- Is the news really important?
- Is equal treatment of all competing media imperative?
- Is it essential that all reporters get the news at the same time?
- Are reporters likely to ask questions?

If the answer is yes to *all* these questions, a press conference is most definitely in order. To increase coverage amount and favorability, prepare press kits for those who will attend. Consider including some of these items in kits:

- A press release describing the event and its significance.
- Statements attributed to top officials.

- Historical information.
- Technical background information.
- Charts and graphs that support the information presented.
- Black-and-white glossy photographs appropriate for use with the story. These should be taken with 35-millimeter film and printed no smaller than 5 by 7 inches and no larger than 8 by 10 inches.
- Pre-written captions attached to the photos. Make sure the information in the captions explains what is going on in the photo.

If the event does not merit a press conference, you may still want to send out a press release and possibly attach some of the kinds of information found in press kits. Be sure your press releases are clear, concise, free from opinion and in the proper format so messages are communicated accurately. Follow the guidelines in the box on Page 22.

News articles, including releases prepared for media use, are generally written in an "inverted pyramid" style. That simply means the most important information goes at the beginning and, as the story progresses, the information gets less and less important.

News articles are written that way for readers and for editors. Most people skim their newspapers, reading selectively. If the most important information is at the very beginning, they will see it even though they are skimming. Editors have varying space needs and may need to cut stories as a deadline nears. If the most important information is at the beginning, they can cut from the end without worrying about what is left out.

Try to write your news releases in the same fashion so editors do not have to hunt through the article to find the main point. Make sure your release answers these questions:

<i>Who?</i>	<i>When?</i>	<i>Why?</i>
<i>What?</i>	<i>Where?</i>	<i>How?</i>

Smaller, weekly papers may run your news releases word-for-word. Daily newspapers, if they use the release at all, will generally use it only as a basis for questions. If they decide they want to pursue it, they will likely assign a reporter to get more information and write the story from a detached perspective.



Keep that in mind when you draft press releases, and do not try to include everything known about the subject. Limit the release to one or two pages, and write it so that it draws attention to the program or event.

Every news story contains one or more of the elements cited in the illustration above. The more of these elements your release can legitimately incorporate, the more likely it will be used and expanded upon.

Good media relations means much more than sending out releases and scheduling press conferences, however. Here are some "dos and don'ts" for dealing with the media:

- Do help reporters. They will be grateful.
- Do not beg, bribe or accept a bribe. It lowers your status.
- Do tell the truth. It builds trust.
- Do not ask a reporter to kill a story. It is unethical to ask and unethical for the reporter to do so. It is highly unlikely your request would be granted anyway.
- Do be frank. Reporters will appreciate it.
- Do not be evasive. It only stimulates more probing.
- Do be available. Trying to avoid reporters never works to your advantage.
- Do not twist facts. The truth will come out eventually.
- Do expect to be quoted. Then there will be no surprises.
- Do not say "this is off the record." Realize that everything you say and do in the presence of the media is very much "on

record" and act accordingly. Even if you go ahead and specify something is "off the record" or "not for publication," do not be upset when you see it in print or on the air.

- Do not be windy. Reporters dislike hot air.
- Do protect reporter "exclusives." A writer who digs and develops the story deserves to print it first and get full credit.
- Do not play favorites. It creates resentment.
- Do balance the news breaks, giving those with morning and evening deadlines an equal chance.
- Do not complain about minor errors. Many cannot be helped.
- Do be careful with facts, names and figures.
- Do not ask to see the article before it appears in print. While it is certainly common practice within your own organization, the law considers it a "prior restraint" of the media's constitutional right of free press and, thus, a highly offensive request.
- Do not try to mislead. It will not succeed forever and will eventually create ill will.
- Do protect your sources of information. If you do, you will get more.
- Do not complain if your story is not used. The next one may be.
- Do trust reporters. Very rarely do reporters abuse trust.
- Do not waste reporters' time. Have the facts or story ready.
- Do be willing to give all the news—bad as well as good.
- Do not get into an argument with a reporter or a paper. The pen *is* mightier than the sword. You, your organization and your programs will lose.

To start trying to establish good relationships with your local media, send some educational information to news editors, followed by a personal visit or a telephone call. Your initiative might result in an interview or news article and could be the beginning of a long and beneficial relationship. After you get better acquainted, consider offering to write a regular column in the local newspaper.

Program coordinators can also reach the public through television and radio talk-shows, local "theme events," paid advertising and public-service announcements.

Presentations to civic and community organizations are a good way to reach a segment of the general population. Send a letter to such groups offering to speak about a source reduction topic that is likely to be important to the group or the community it draws its membership from. Be sure to prepare an interesting and informative talk when the opportunity to speak arises.

You might even consider developing a speakers bureau, with prepared talks on a variety of environmental topics and several speakers who can present them. Publish a brochure of what you have available and send it to local organizations with a number to call to request speakers. Schools, churches, senior-citizen groups and other community groups have a recurring need for interesting speakers and programs.

Parade floats and special characters can also be used to spread the word in a more general way. Specific seminars, exhibits at community centers, events and fairs can show techniques and provide take-home literature. If a booth is not staffed, be sure to have a covered box where take-home literature and a contact phone number are supplied.

Another good idea is to have an easily accessed source of information so citizens can get questions answered quickly. Offering a telephone hotline number may be especially helpful. If possible, choose an easily remembered number like "2-REDUCE" or "NO-TRASH."

Developing a well thought-out project logo or slogan to include with every piece of promotional or educational material is an important part of presenting a consistent message. If you use the fact sheets included in this book and print them on your letterhead, you have a consistent look and a pre-developed logo in the "You can cut it!" or "Reduce, Indiana...then recycle" slogans. A logo sheet in *Chapter 8: Resources* provides art for each of these logos in various sizes you can reproduce and use in ads and other promotions.

The fact sheets present information in easy-to-understand, non-technical language. Use them and other educational literature to distribute at libraries, farmers' markets, local retailers, schools and other appropriate locations. Direct mailings or mailbox stuffers can

also be utilized, perhaps in conjunction with related information, such as recycling schedules.

In addition:

- Develop posters to publicize your program and distribute to local businesses. Consider that many businesses will not want to display large posters in their windows, so it may be wise to print smaller posters.
- Broadcast radio public-service announcements.
- Post notices on area streets four to five days prior to a particular event. However, check whether local laws allow posting signs before planning a sign campaign.
- Feature source reduction options in targeted issues of newsletters, bulletins or other regular publications.



Evaluating educational efforts

Be sure to consider how you will measure the success of each method used when you are planning your strategy, then be sure to measure it.

What kind of response was elicited? Did it reach the audience it was designed for? Was the effort worth its cost in terms of participation? Evaluating results will help in developing future educational approaches.

One feedback approach to consider is directly asking participants how they heard about the program they are participating in. For example, if a hotline or information office is part of the program, the hotline answerer can keep a log and record all caller questions and answers. Caller statistics can then be tabulated and used to help evaluate specific educational methods.

Another way to evaluate your success is to develop a code of some kind for any brochures requiring a mail-in response. For example, if the program requires a mail-in form to receive a low-cost or free home composting bin, use different color forms or one form with different code numbers that will tell you where and how the respondent got the request form. This will give you solid data on how people are hearing about the program.

When you find what works well, keep doing it. To expand and build on a successful



News release checklist

- 1-2 typed, double-spaced pages.
- Print on organization letterhead.
- At top, indicate when to release and who to call for more information.
- Begin story one-third of the way down the page.
- Include a sentence-style headline.
- If more than one page, type "-more-" centered at the bottom of the first page.
- Type "-30-" at the very end.
- Write in third-person active voice.
- Use quotes liberally.
- Attribute any subjective statements.
- Develop "boilerplate" information to promote understanding about what your organization does and use it as the last paragraph of *all* news releases you send out.

promotion, keep the same basic message but with one change. For example, if a brochure is deemed successful, try changing the brochure heading or illustrations. Compare results that the changed brochure elicited to that of the original. By continually testing and modifying, promotional materials can be better focused to generate the greatest response.



Bibliography

Antin, H. Brad and Alan J. Antin. *Secrets From the Lost Art of Common Sense Marketing.* The Antin Marketing Group, Clearwater, Fla., 1992.

High, Thomas, city of Kokomo recycling and composting coordinator, interview and research information submitted, November 1992.

Nolte, Lawrence W. *Fundamentals of Public Relations.* New York, Pergamon Press, 1979.

O'Rorke, Maureen, "Creative Brainstorming: Writing a Slogan that Works," Resource Recycling, Portland, Oregon, December 1990.

Sheehan, Paul V. *Reportorial Writing.* New York, Chilton, 1972.

St. John, Jane, city of Bloomington recycling coordinator, interview, November 1992.

Chapter 3: How Hoosiers can reduce

For individuals, cutting Indiana's waste at the source—or source reduction—means:

- Deciding not to use some items.
- Using less of other items.
- Opting for longer-lasting products.
- Choosing less toxic products.
- Selecting products with the least amount of unnecessary packaging.

For industries it means that and more:

- Redesigning its products or packaging so the amount of waste produced is less.
- Cutting the toxic content in its products.
- Increasing the durability or reusability of its products.
- Conserving all resources that go into the production of goods.

Why haven't I heard about source reduction before?

Few local governments have invested seriously in source reduction, largely because of low public awareness and lack of proof of its effectiveness. Relatively few case studies of successful source reduction programs are available.

Source reduction is not a new concept, though. It is just harder to quantify than some of the other methods of waste management—recycling or even landfilling. Costs and benefits of landfills and waste-to-energy plants are easy to calculate, and recycling results can be measured by how many households take part and by how much recyclable material is collected.

Without proof that source reduction can work and be cost-effective, local governments understandably shy away from committing to it. The few communities that have tried to monitor source reduction and quantify program results have produced mixed results.

Another reason source reduction may be unfamiliar has to do with our market economy. Consumption is seen as good for the economy. In such an atmosphere, source reduction may be criticized as anti-prosperity or anti-progress. Making better use of our resources is really a test of our ingenuity. We should be able to sustain economic growth while using less by creating better, not more, products. Businesses can become more competitive and individual consumers more prosperous by using resources more efficiently and creating less waste.

No doubt about it: Cutting Indiana's waste will improve the quality of life and make our state a more desirable place to build a business and a future.



Source reduction happens at several points

Source reduction strategies can be used at any of three stages to cut solid and hazardous waste:

Manufacturers can...

- Design the manufacturing process to reduce waste.
- Design the product for long-term use, not disposal.
- Use material efficiently in the product.
- Avoid over-packaging a product.

Retailers can...

- Make items available in bulk or concentrated form.
- Make refillable containers available.
- Minimize repackaging (for example, fruits and vegetables in the grocery).

Consumers can...

- Choose products in refillable containers and return them for reuse.
- Choose longer-life, repairable products and maintain them to prolong usefulness.
- Be careful while using a product to avoid wasting it.

- Extend the life of used items by redistributing them through second-hand stores, garage sales and donations to charitable organizations.



How one solid waste management district is helping Hoosiers reduce

One of the cost-effective source reduction programs the Northeast Indiana Solid Waste Management District has going is its effort to promote backyard composting and proper lawn-clipping management.

The NISWMD has conducted a series of four workshops on backyard composting and lawn care, with one held in each of the four counties in the district. The workshops were a cooperative effort between the NISWMD and the respective Purdue University extension office.

The workshops were held at permanent backyard compost demonstration sites, located at four district-run community compost facilities. At each of these locations, examples of commercially available compost bins, as well as do-it-yourself models, were displayed.

Workshop participants were taught basic principles of lawn-clipping management and "grass-cycling," an overview of the solid waste dilemma and the impact of Indiana's yard waste ban for landfills, principles of composting, advantages and disadvantages of various compost bin designs, and uses of compost and mulch around the home.

To further educate and increase participation, a more comprehensive session on other lawn-care practices was also conducted at each workshop. The session included a demonstration and discussion of mulching mowers.

As an incentive to put their new skills to work, workshop participants entered a drawing for a free compost bin, compliments of the solid waste district.

For more information, call Barry Bender, education coordinator, NISWMD, 219-925-4857.

Get familiar with source reduction

If you're not familiar with the subject of source reduction, it's time to learn about what may become our next cultural imperative.

Source reduction is defined as any activity that prevents solid or hazardous waste from entering the waste stream, where, if not reused or recycled, it eventually ends up in a landfill or incinerator. The best way to minimize the environmental and financial impact of waste is by *not* creating it.

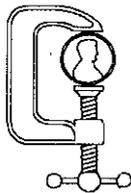


What does source reduction involve?

Source reduction activities include:

- Reusing products in their original form.
- Increasing product life.
- Reducing the amount of material used in manufacturing and packaging.
- Changing buying and consumption habits.

Source reduction encourages us to redirect attention and resources to increasing efficiency, substituting materials or changing processes so that fewer waste materials are produced. This will lessen the strain on Indiana's disposal facilities, and, therefore,



it may also reduce escalating costs of waste transportation and disposal.

Source reduction is at the top of the waste-management hierarchy, illustrated on the back of this sheet. That means it's preferred to the more familiar concept of recycling, even though both are important. The difference is that reduction *prevents* waste, while recycling *uses* existing waste in place of virgin material to manufacture a new product.

Eliminating hazardous wastes at their point of generation involves reducing toxicity of waste by phasing out highly toxic chemicals in manufacturing and seeking less chemically intensive processes for the future.

Eliminating solid waste also includes options such as production changes to reduce creation of scrap and considering how a product can be disposed of before it's put into production.

Source reduction can happen at several points

Source reduction strategies can be used at any of three stages to cut solid and hazardous waste:

Manufacturers can...

- Design the manufacturing process to reduce or reuse waste.
- Design the product for long-term use, not disposal.
- Use material efficiently in the product.
- Avoid over-packaging a product.

Retailers can...

- Make items available in bulk.
- Make refillable containers available.
- Minimize repackaging (for example, fruits and vegetables in the grocery).



- Minimize the use of bulk mail (junk mail) and promotions, and streamline mailing lists.

Consumers can...

- Choose products in refillable containers and return them for reuse.
- Choose longer-life, repairable products and maintain them to prolong usefulness.
- Be careful using a product to avoid wasting it.
- Extend the life of used items by redistributing them through second-hand stores, garage sales and donations to charitable organizations.

Reducing your waste

- **Reduce material used to perform any task.**
 - Buy in bulk or economy-size packages.
 - Buy concentrated liquids and mix in reusable containers.
 - Photocopy on both sides of paper.
 - Buy products with little or no packaging.
- **Reuse items in their original form.**
 - Reuse packing containers, bags and envelopes.
 - Refill printer and copier toner cartridges.
 - Exchange waste with others—your waste

may be useful to someone else.

- **Buy reusable instead of single-use products.**
 - Use reusable instead of single-use cups, plates and tableware.
 - Use cloth instead of paper towels, paper napkins and disposable diapers.
 - Use rechargeable instead of disposable batteries.
 - Use refillable instead of single-use bottles.
- **Buy for increased durability and repairability.**
 - Select products with long warranty periods.
 - Buy upgradable products with interchangeable parts.
 - Use refillable ink pens and dispensers.
- **Reduce toxicity of processes or products.**
 - Use non-toxic cleaners.
 - Use non-toxic varnishes and paints.
 - Use propylene glycol instead of ethylene glycol antifreeze.
 - Use hand-operated versus motorized gadgets, such as can-openers, pencil sharpeners and screwdrivers.

SOURCE: *The Consumer's Handbook for Reducing Solid Waste*. Washington, D.C., U.S. EPA, August 1992.

Integrated waste-management hierarchy

Source reduction

Evaluating and reducing consumption of products, especially single-use items, over-packaged products and products with elements unnecessary to their purpose, to minimize the volume and toxicity of waste entering the waste stream.

Recycling

Reuse: Buying durable materials with reusable value instead of single-use, disposable items.

Reclaiming: Collecting, processing, marketing and remanufacturing many materials currently found in our waste stream. Recycling diverts resources from landfills and incinerators back to manufacturers.

Composting: A natural process consisting of the biologic reduction of organic wastes, carbon dioxide, water and heat into a stabilized organic matter called humus.

Final disposal

Waste-to-energy: Reducing the volume of solid waste by incineration and recovering the heat as steam that may be used to produce electricity.

Incineration: Burning solid waste under conditions where combustion factors such as temperature, retention time and air are controlled.

Landfill: A system of land disposal in which waste is compacted and covered with a layer of soil each day to minimize pest, esthetic, disease, and air- and water-pollution problems.



Packaging contributes most to waste

Packaging is currently the largest single contributor to municipal solid waste, but manufacturers are working on the problem.

According to the U.S. Environmental Protection Agency, packaging waste accounted for 33 percent of the more than 195-million tons of municipal solid waste generated in 1990—or 64.4-million tons.

From a volume standpoint, it was responsible for 32.7 percent of municipal solid waste, and its share of the municipal solid waste stream is expected to grow 11.7 percent by the year 2000. In fact, nearly \$1 of every \$10 Americans spend for food and beverages goes to pay for packaging.

Why package?

There are some very good reasons for packaging, and certain kinds of packaging on certain products are quite necessary. Packaging serves five major functions for consumers:

- **Containment**—Provides a means of carrying or holding a product.
- **Protection and preservation**—Keeps food or materials free from contamination, spoilage, deterioration or damage. Some packages, particularly medicines, are designed to resist tampering, while others maintain sterility for medical use.
- **Information**—Tells what's inside the container and how to use it.
- **Convenience**—Helps the user consume the product easier. This

may involve design—handles on gallon jugs, spouts to control flow on dry goods. Or it may involve size—large containers for institutional customers and small containers for travelers or singles.

- **Theft reduction**—Design can make it more difficult to steal the product—blister packs and oversized containers are examples.

Solutions to reduce packaging

Source reduction is considered the most important method for reducing the amount of municipal solid waste, and its practice conserves natural resources.

The ultimate source-reduced package is the one most preferred—no package at all. Stores often sell hand tools and outer garments with just a simple price tag or bar code.

Another way to achieve source reduction is by minimizing packaging. Examples of this include redesigning boxes to hold more product and removing paperboard dividers in shipping cases.

Concentrating a product is also a common source reduction technique. Concentrated products, such as orange juice, require a smaller package than ready-to-pour alternatives. Some laundry products are also marketed in a concentrated, ready-to-use form or as a refill requiring dilution with water.

Another important source reduction method is light-weighting—altering the manufacturing of a package to use less raw or recycled material per unit. This must be done without sacrificing the package's functionality or decreasing the volume it can hold.

Besides cutting back the amount of solid waste, light-weighting provides cost savings in materi-



als and shipping. Enhanced technologies, compounds and designs have brought considerable weight reductions in many commonly used packaging materials:

- **Aluminum**—In 1972, one pound of aluminum produced 22 beverage cans. Today that same pound can produce nearly 29 cans, which is a 30-percent weight reduction.
- **Glass**—Since 1980, improved manufacturing technologies reduced the thickness and weight of container glass by as much as 30 percent.
- **Paper**—Manufacturers are using lighter caliper and smaller paperboard cartons to ship the same weight and volume of products.
- **Plastics**—An HDPE gallon milk jug produced in the early 1970s weighed 90 grams. Today that same jug weighs 60 grams. Two-liter PET beverage bottles use 21 percent less material than they did when introduced in 1979. The development of new resins and process technologies has led to lighter grocery sacks, retail merchandise bags, ice bags and trash bags. Depending on the specific products, weights have been reduced 20 percent to 40 percent.
- **Polystyrene**—Resin technology has improved to make stronger products with less material. New production methods for foam products have resulted in lighter weight, too.

- **Steel**—Today's steel can requires one-third less steel than one made in the late 1970s. At the same time, tin coating on these cans has been reduced almost 50 percent.

Other source reduction options include consumable and returnable packaging. Consumable packaging is eliminated in the process of using the product so that no packaging remains. Returnable packaging is a container returned to a business or industry for reuse or distribution.

Source reduction trade-offs

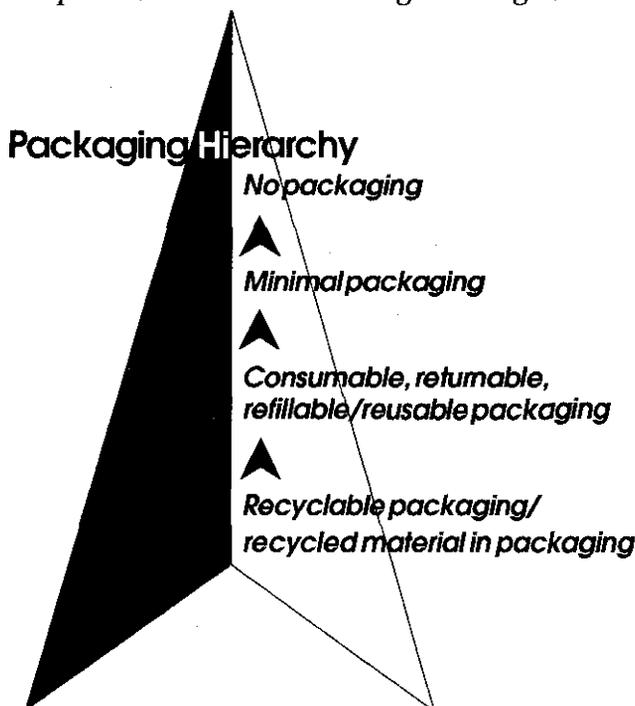
A particularly difficult issue connected with packaging waste is the matter of switching from a recyclable package to one made of non-recyclable material to achieve a source reduction. Source reduction is widely recognized as a preferable method to reduce waste, but it can sometimes be incompatible with conventional recycling efforts.

Clearly, the most favorable switch of materials for a source-reduced package is from one recyclable material to another. The next option would be a change to a material that has considerable recycled content. The least desirable source reduction switch is one that results in a non-recyclable package.

When recycling is not widespread, however, a packaging change that substantially reduces the size, weight or volume of the package can result in a considerable reduction in the amount of material going to final disposal.

No matter what the recyclability of the new packaging material, any change should result in a net decrease in the amount of waste destined for landfills or incinerators.

Consumers also have a role in the issue of switching packaging materials. When purchasing a product packaged in different containers, the buyer should choose the package that minimizes material going to final disposal. If a larger package can be recycled by the buyer, it is preferable to the smaller, non-recyclable package



SOURCE: Indiana Packaging Waste Reduction Task Force. *Guidelines for Packaging Waste Reduction in Indiana*. Indianapolis, IDEM, January 1992.



Find ways to reduce waste around house

The choices you and your family make in the daily operation of your household provide many opportunities to reduce solid and toxic waste.

Keep in mind, though, that most environmental decisions aren't black or white. For instance, a less toxic alternative might consume more energy or create more solid waste. Think through what will work best for you as you consider these room-by-room source reduction ideas.

In the kitchen

- **Choose cloth over paper**—As long as the water supply is adequate, use cloth napkins at the dinner table and sponges, cloth rags or dish towels instead of paper towels to clean up spills and wash or dry dishes.

- **For dishes and tableware**—If possible, limit your use of disposable plates, cups and tableware.

Opt for reusable dishes and cups.

- **To store food**—Consider biodegradability, recyclability and reusability when deciding whether to use wax paper, aluminum foil, plastic wrap or plastic bags. Whenever possible, put food in reusable containers. If only 25 percent of American homes used 10 less plastic bags a month, there'd be 2.5-billion fewer

bags sent to landfills every year.

- **For coffee filters**—Consider trying unbleached paper filters, or cloth or metal reusable filters instead of disposable paper.

- **Grains, fruits and vegetables**—Remember that growing them consumes 95 percent less raw material than producing meat. Bringing one pound of beef to market eats up 16 pounds of grain and soybeans, 2,500 gallons of water and the energy equivalent of a gallon of gasoline.

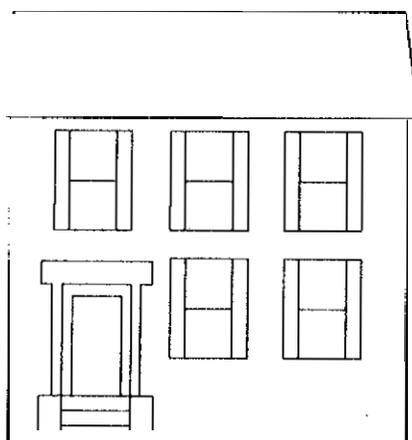
- **Consider growing your own food or patronizing local farmers' markets.** Locally grown produce is typically fresher, cheaper and has less pesticide residue than produce shipped long distances.

- **When buying a stove**—There are often trade-offs when making environmental decisions. A self-

cleaning oven will allow you to stop using toxic oven cleaners, but it uses more energy than a conventional oven. You might want to consider using a non-toxic scouring powder, such as baking soda, while the oven is still warm to make

oven easier.

- **When buying any appliance**—Get the highest-quality, longest-lasting, most energy-efficient one you can afford. For advice on purchasing new appliances, send \$3 for "Saving Energy and Money with Home Appliances" to: The American Council for an Energy-Efficient Economy, 1001 Connecticut Ave.





NW, Suite 535, Washington, D.C.

In the bathroom

- **For shampoo**—Buy the largest bottle you can find and use it to refill a smaller container or pump dispenser you already have. You'll save money and have fewer containers to recycle or dispose.
- **For shaving**—Manufacturing disposable razors consumes high quantities of energy. They won't degrade in a landfill, and incinerating the plastic can pollute the air. Consider switching to a metal razor and replacing only blades, or invest in an electric razor. Also, shave with brush-on soap or shaving cream instead of a canned foam.
- **For soap**—If you choose to use bar soap instead of liquid soap you won't have to throw away the plastic dispensers. If you do prefer liquid soap, buy bulk-size containers and refill the smaller dispenser.

In the laundry

- **Use less detergent**—More will only coat your clothes with a soap film. Softened water may require as little as one tablespoon of detergent and no fabric softener.
- **Always wash full loads**—You'll use less detergent, water and energy.
- **When drying clothes**—If you have available space, dry small loads on an indoor drying rack year-round. Hang larger loads on an outside line in good weather.
- **Dry clean less**—The dry-cleaning process uses hazardous chemicals. When you shop, look for clothes that don't require dry cleaning. Some clothes usually thought to be dry cleanable can be hand-washed in a mild soap.
- **Choose natural fibers**—For clothes and linens, stay away from permanent press and synthetics with chemical-treated finishes.
- **For laundry baskets**—Choose natural wicker or recycled plastic.



When cleaning out closets and drawers

- **Try consignment shops or classified ads** to sell clothing and other items still in good condition. For a free copy of the Indiana Resale Consignment Shopping Guide, contact the Central Indiana Resale Association at 317-849-5437.
- **Have a garage sale.** Your trash is often someone else's treasure.
- **Make rags out of worn clothes.** Cut up worn cotton items like sheets, towels and underwear, to reuse as household rags.
- **Donate unwanted items to charity.** In 1988, Americans sent 135,000 tons of used clothing to Third World nations. Many charities will also find new homes for your unwanted items in your own community. Check the yellow pages of your telephone directory under "Clothing, used" or "Second-hand."
- **Repair and resole shoes.**



For Christmas celebrations

- **Choose a live tree** that's balled and bagged for outdoor planting. It's a great way to landscape your property gradually.
- **Choose an artificial tree** that you use year-after-year if it's not possible to plant your Christmas tree later where you live.
- **If you get a cut tree,** have it chipped into mulch after the Christmas season ends.
- **Find alternatives to throw-away wrappings.** Stencil holiday designs on kraft paper packages rather than using ribbon. Decorate reusable tins and baskets instead of using traditional boxes and papers. Let your imagination be your guide!
- **The city of Kokomo** teamed up with a local waste hauler and a consulting firm to distribute reusable coffee cups to citizens at their Twelfth Night ceremony. The cup's holiday theme was "You Did Myrrh," and the logo was a wise man recycling a Christmas tree. **For more information, call Thomas High, superintendent of Kokomo's Wastewater Treatment Plant, 317-457-5509.**



SOURCE: *The Consumer's Handbook for Reducing Solid Waste.* Washington, D.C., U.S. EPA, August 1992.

Examine your shopping habits

Precycling—examining your purchases at the store *before* you make them—is the front line of defense for source reduction.

Give each purchase plenty of thought by asking yourself:

- ☞ What resources were used to make—and package—this product?
- ☞ Where will this product go when I'm done with it?
- ☞ Can I rent, borrow or reuse this?
- ☞ Am I buying more than I really need?
- ☞ What's the most environmentally sound product I can buy, given my need for the product and the lack of another alternative?

Follow these guidelines

- **Buy only the items you need.**

Plan ahead by making out a list. This will help you avoid impulse purchases.

- **Buy in bulk.**

Buy grains, cereals, etc., from bulk bins. Buy other non-perishable products in the largest available size you can reasonably use. Economy-size products generally use less packaging per unit and cost less per ounce.

- **Read the label.**

Choose products made from non-toxic ingredients.

Buy unbleached papers products like coffee filters, paper towels, toilet paper and milk cartons.

Avoid colored toilet paper or tissues. The dye creates an additional environmental burden.

Ask your solid waste district official for a fact sheet that tells about non-toxic substitutes for many household products.

- **Avoid over-packaged or multi-packaged products.**

Look for thinner, lighter packaging and single layer packaging. Avoid products that are a "a box in a box in a box."

At the grocery, choose fresh meat that's single-wrapped rather than pre-packaged cuts that come with polystyrene trays in addition to the wrap.

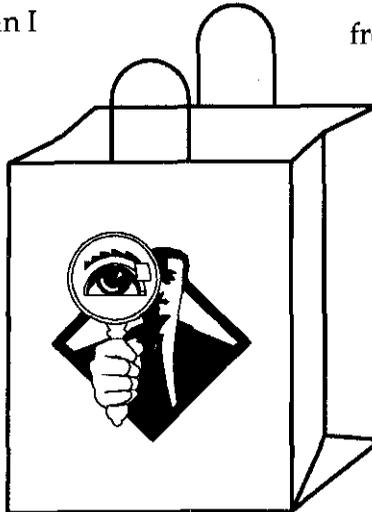
- **Avoid disposable products.**

Whenever possible, steer clear of throw-away razors, pens, lighters, diapers, batteries, plates, cups and napkins.

- **When you can, refuse shopping bags.**

Consider investing in some sturdy string or canvas shopping bags, then keep them in your car to have with you when you make a shopping trip.

Buy carrots, onions, tomatoes, mushrooms, potatoes and other produce loose rather than in a plastic bag. If you must use a bag, leave behind the bag ties and clips in the produce or bulk-food section.





Secure any bags by knotting corners instead.

- **Consider not using a shopping bag.**

It's really not that troublesome to load purchases straight from the cart to your trunk to your pantry shelf. Keep an old cardboard box in your car to help handle the smaller items.

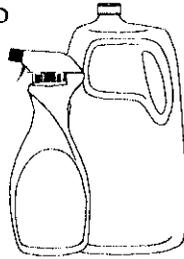
- **Buy durable, high-quality goods, then maintain and repair them properly.**

Look for well-built products with good warranties. They'll serve you better, cost less in the long run and have a longer life outside the landfill.

- **Buy concentrated, multi-use items and products in returnable or refillable containers.**

Some soda comes in returnable containers, and in some areas, so does milk.

Many cleaners come in spray bottles and in larger-size refills without the nozzle. Other cleaning products are available in concentrated mixtures you dilute with water in your own larger container.



A detergent and bleach or detergent and fabric softener combination cuts packaging waste.



Speak up!

Talk to store managers and ask them to stock products and packages that are safe for the environment and help cut down on waste.

Each purchase you make, or don't make, sends a message. Let industry know you're concerned about the environment.

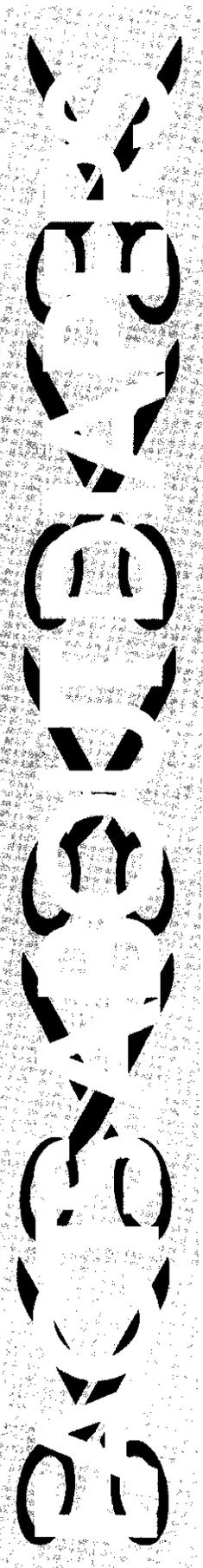
Many product labels display a toll-free telephone number to encourage consumer comments. Call the company and urge it to be environmentally responsible in producing and packaging its products.

To help you purchase products from non-polluting companies, write: **Council on Economic Priorities**, 30 Irving Place, New York, NY 10003. For a copy of the guide "Shopping for a Better World," enclose \$5.

SOURCE: *The Consumer's Handbook for Reducing Solid Waste.* Washington, D.C., U.S. EPA, August 1992.



YOU CAN CUT IT!



Take your pick: cloth v. disposables

In the last 30 years, disposable diapers have become at once the symbol of modern convenience and a modern disposal dilemma.

There doesn't seem to be a clear-cut answer which diaper choice—disposable or cloth—takes less toll on the environment. In areas where disposal concerns take a high priority, reusable options are suggested. In areas where water is in short supply, the disposable may actually be the better choice for the environment.

How bad is the problem?

Every year, parents and baby-sitters throw away about 18-billion disposable diapers.

Flushing them down the toilet clogs sewer lines and creates 43,000 tons of extra sludge. Throwing them in the trash burdens landfills with 84-million pounds of raw fecal matter, which is, itself, a public health hazard.

The Environmental Protection Agency says disposable diapers comprise 1.6 percent of our solid waste stream. In the United States alone, these single-use items consume nearly 100,000 tons of plastic and 800,000 tons of tree pulp. Just one child will use 8,000 to 10,000 diapers before being fully toilet-trained.

Disposables hit our pockets hard, too. We all pay an average of

\$350 million annually to deal with their disposal, whether we have children or not. The parent with children in disposable diapers pays even more. An average child will go through at least \$2,000 worth of disposable diapers before being toilet-trained, compared to \$70 worth of reusables.

Reusable, cloth diapers have their critics, too. They're much less convenient. They also carry an environmental burden—it takes a lot of water to wash and re-wash them. Using a commercial diaper service helps, but delivery trucks use up a lot of energy on their routes, critics say.



So what's the right decision?

In 1991, the National Association of Diaper Services published a study on the environmental impacts of diapers, along with a life-cycle analysis of both disposables and cloth diapers. Here are its conclusions:

- **Disposable diapers create more solid waste than cloth diapers.**

The study concluded disposables created at least seven times more post-consumer solid waste and

at least three times more solid waste in the manufacturing process.

Overall, cloth diapers create 87 percent less solid waste than disposables.

- **Disposable diapers consume more energy in their life cycle than cloth diapers.**

On a per-diaper-change basis, manufacturing disposable diapers uses almost six times more energy



than manufacturing cloth diapers.

A diaper service uses half as much energy to launder cloth diapers as consumers would laundering them at home and one-third the energy used to manufacture disposables. Washing, drying and treating the water needed to launder cloth diapers at home requires 20-percent less energy than manufacturing disposable diapers.

- **Laundering cloth diapers at home consumes more water than using disposables.**

Cloth diapers laundered at home use about 77 percent more water than it takes to manufacture disposables. However, cloth diapers laundered by a diaper service use 40-percent less water than that used to manufacture disposables.

Diaper laundry services have lower resource and environmental impacts than home laundering because of economies of scale. Home-laundered cloth diapers use more than 2.5 times as much water per diaper change.

- **Wastewater created by manufacturing and using cloth diapers is more benign than that for disposable diapers.**

Waste water from growing cotton and manufacturing cloth for reusable diapers is high in volume but low in environmental impact compared to waste water from manufacturing disposables.

Waste water from the plastic and pulp industries used to manufacture disposable diapers contains hazardous constituents, such as dioxins, furans, chlorophenols and other pollutants.

Waste water created by laundering cloth diapers is similar to other domestic waste waters—high in chemical oxygen demand, biological oxygen demand, total dissolved solids, and nitrogen and phosphorus with little or no hazardous constituents.

- **Both types of diapers consume large amounts of natural resources.**

Cloth diapers, however, conserve resources and energy through reuse.

- **Disposable diapers are more expensive for the consumer.**

Home-laundered cloth diapers have the lowest out-of-pocket expense for the consumer—66 percent cheaper than disposables. Cloth diapers from a laundry service are somewhere in-between—about 50 percent cheaper than disposables.

- **Recycling of disposable diapers is so far ineffective and not cost-effective.**

One disposable diaper is being marketed as biodegradable. Made of cornstarch-based plastic, biodegradable elastic, tissue, wood pulp and rayon, these chemical-free diapers decompose in two to five years in a laboratory.

However, due to the compaction of garbage in a landfill, along with the lack of sunlight, water and oxygen, they really aren't much of an improvement over their cousins. Instead of actually decomposing, the plastic just breaks down into smaller pieces.

- **The solid waste disposal system is better equipped to handle cloth diapers than disposable diapers.**

Each cloth diaper can be reused 80 to 200 times, and usually gets reused some more as a cleaning rag.

Sending disposable diapers to the landfill means that along with the diaper we'll be storing untreated human fecal material in our landfills, where it could seep into groundwater and spread disease.

Try these compromises

- If you choose a diaper service, find one that uses a non-chlorine bleach and minimizes the amount of chemicals used.
- If you can't give up disposables entirely, use them only on trips or at day care.
- When you do use disposables, flush your baby's fecal material down the toilet and put only the diaper in the trash.



Throw-aways that won't go away

We live in a throw-away society where just about everything—from contact lenses to income—have been termed disposable at one time or another.

Avoiding single-use, throw-away products as much as possible is a good strategy for reducing waste. This fact sheet discusses some disposable items that are a particular nuisance in the waste stream and some easy alternatives.

Light makes right

Every year, Americans buy more than a billion incandescent light bulbs. That's three acres of bulbs a day!

The energy implications are significant—lighting accounts for one-fifth of all the electricity consumed, says the World Resources Institute. But there's another rub: Light bulbs can't be recycled like most glass, and end up taking up space in landfills.

There are several solutions that, when used in combination, can help you reduce the number of light bulbs you throw away.

- **Replace some bulbs with compact fluorescents.**

They use less energy and last much longer. A 60-watt incandescent bulb lasts about 750 hours, compared

to 7,500 to 10,000 hours for a compact fluorescent generating the same amount of light.

Check bulb measurements against your light fixtures before buying. Compact fluorescents are especially great for garages, basements, outdoor fixtures and other places where lights are left on at least two hours a day.

Hardware stores are starting to carry them, and some electric utilities have purchase or rental programs.

- **Use one large incandescent bulb in place of two small ones in a multi-bulb fixture.**

- **In light fixtures that use several bulbs, use one less bulb.**

Keep a burned-out bulb in the empty socket for safety's sake.

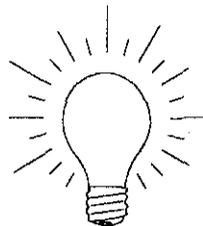
- **In multi-bulb fixtures where bulbs show, use lower-wattage bulbs.**
- **Try more efficient incandescents, like krypton-filled, tungsten-halogen or infrared-reflective coated.**

Home improvement

In colonial times, people were thrifty because materials were scarce. Nails, especially, were so precious that before settlers moved west, they burned down their houses to reclaim the nails.

Not so today. If you've ever built a new home, you probably were astonished at the waste. Scads of leftover nails, shingles, bricks, dry wall and wood

scraps are either sent to landfills, burned by builders or buried in the lot



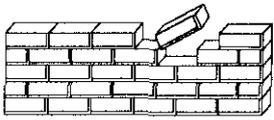


where they were being used.

Even more materials get scrapped through repair and improvement projects on existing homes. It's a terrible waste. But if it's your home, you can have an impact:

- **Pick out and keep items you think you can use.**

Bricks make great edging for flower beds. Leftover shingles might roof a storage shed or doghouse. Scrap lumber can be used in any number of woodworking projects. Sort screws,



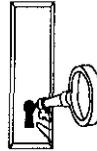
bolts and nuts by size and save for a future project.

New carpet scraps and unworn portions of old carpet make great

mats at entrances, in garages and in basements. Save linoleum and wood flooring scraps for patching in case of damage.

- **Call a salvage operation.**

Look in your telephone directory yellow pages under "Salvage Materials," "Used Lumber," "Building Materials" and "Restoration."



Some old windows can be salvaged and reused. Even if an aluminum window can't be reused as is, the frame is valuable as scrap aluminum. Many old, solid-wood doors are valuable.

Metal doorknobs, hinges, copper or brass plumbing and electrical fixtures are considered prize salvage.

For more information on reusing building materials, ask for the fact sheet "Reuse can reduce industry waste," or contact **Rehab Resource Inc.**, 253 W. Merrill St., Indianapolis 46225, 317-637-3701.

- **Some nurseries grind up scrap wood for mulch or composting base.**
- **Ask relatives, friends and neighbors if there's anything they want.**
- **Have a garage sale.**

At the end of the day, put any unsold items on the curb with a "free" sign attached.





Source reduction and your car

The 140-million cars in America are driven an average of 10,000 miles each in a year, according to the Department of Transportation. Collectively, Americans log a trillion miles behind the wheel annually.

We all know the toll cars can take on the environment because of the fuel they burn and the pollutants they emit, but there's more to the story. Cars can be solid waste headaches, too, because they use a lot of products that are either disposal problems or hazardous.

You can minimize the effect your cars have on the solid waste problem by buying the most reliable, efficient vehicles you can afford and maintaining them properly.

Buying a new car

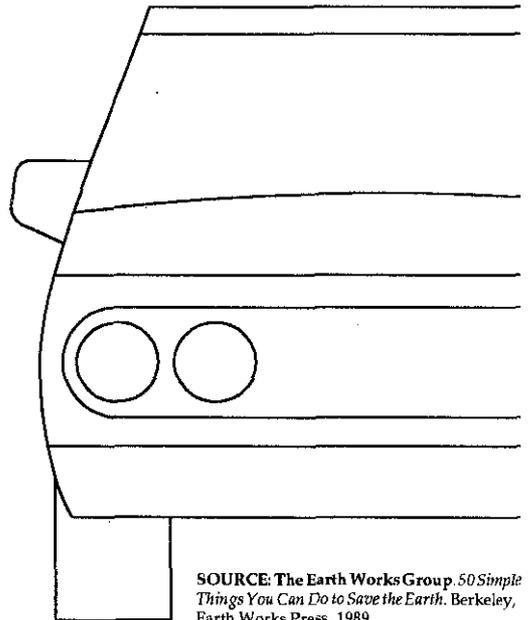
- **Do some research** on how consumers rate models currently on the market for reliability and efficiency.
- **Weigh options carefully.** Most options—automatic transmission, power steering, power windows—add weight to the car, which will someday make it a heavier disposal burden. The extra weight also acts as a drag on fuel efficiency.
- **Reconsider air-conditioning.** Because of its weight, air-conditioning cuts your car's fuel efficiency even when it's not running. The chlorofluorocarbons in the refrigerant also contribute to depletion of the ozone layer in our atmosphere if they leak.

Caring for your car

- **Keep it tuned.** If only 100,000 car owners started tuning their cars regularly, some 90-million pounds of carbon dioxide could be kept out of the atmosphere. A well-tuned car also uses as much as 9-percent less gasoline. Overall, keeping your car well-tuned can add to its life.
- **Keep track of gas mileage.** The first sign of a mechanical problem may be a drop in gas mileage. Keeping track of mileage will tip you off early so you can get the problem fixed quickly.
- **Keep fuel filters clean.** Clogged filters make your car work harder.
- **Check fluids regularly.** Make sure water, oil, antifreeze, and brake, power-steering and transmission fluids are topped off and changed according to the schedule in the owner's manual.

Car-related concerns

 **Tires**—Every two weeks, Americans wear almost 50-million



SOURCE: The Earth Works Group. *50 Simple Things You Can Do to Save the Earth*. Berkeley, Earth Works Press, 1989.



pounds of rubber off their tires. And every year, they throw away 250-million tires—about one for every person in the United States.

Producing tires pollutes the environment and depletes our natural resources since they're made mostly of petroleum. As much as a barrel of crude oil goes into the production of just one truck tire.

When tires hit the trash heap, they cause even more problems because they don't decompose. Many landfills won't accept them because they provide breeding grounds for mosquitoes and have a tendency to trap gases and float to the top of landfills. In scrap heaps, they catch fire easily, give off toxic fumes and are difficult to extinguish.

Experimentation has provided options for recycling tires, but the most effective thing you can do to reduce tire waste is buy the best tires you can afford for your vehicles and take proper care of them to extend their life.

- **Keep tires properly inflated**, checking air pressure every two weeks, to improve gas mileage 5 percent. Steel-belted radials will improve mileage even more.
- **Rotate and balance tires** every 6,000 to 8,000 miles.
- **Keep wheels aligned.**
- **Consider purchasing re-tread tires.**

 **Antifreeze**—Americans dump more than 21-million pounds of antifreeze into the environment every year even though it's a toxic substance made with a petroleum product called ethylene glycol.

If you have your antifreeze changed, make sure your service station collects it for redistillation. If you change it yourself, buy only what you'll use, drain the old liquid into a clean container with a tight-fitting lid and take it to a hazardous waste facility that will store it for reprocessing.

You may have to pay a facility to take it, but that's better than keeping it around. Children and pets are attracted to puddles of it because of its sweet taste, and drinking it could kill them.

 **Air-conditioners**—Leaky auto air-

conditioners are the single largest source of CFC emissions in the United States.

Many people mistakenly believe it's normal for refrigerant to leak from their auto air-conditioner over time, causing the system to blow warm air instead of cold. Air-conditioning is a sealed system, though, and should never need to be recharged unless there's a leak.

Finding the leak can be tricky because of all the pipes and joints in the system, but *encourage your mechanic to be persistent*. It'll save you trouble in the long run and keep CFCs out of the atmosphere.

Fixing an air-conditioner leak without causing damage to the compressor or the environment requires first removing all the refrigerant and oxygen from the system. The Environmental Protection Agency requires use of a reclamation system to recapture refrigerant and keep it out of the air. Check to make sure the repair shop you frequent follows this procedure.

 **Oil**—Changing the oil in your car every 3,000 miles will help ensure a longer life for your car. But disposing of that oil improperly pumps a lot of toxins into the groundwater. Not only is the oil itself a pollutant, but it picks up additional toxins in your car's engine.

Oil can be re-refined indefinitely, though. A relatively new process can re-refine a gallon of used motor oil into 2.5 quarts, which can be reused in your car. This is a significant reduction from the 42 gallons of virgin oil it would take to make the same 2.5 quarts. Consider:

- **Using re-refined oil** in your car. You may have to ask which brands are re-refined.
- **Trying a synthetic oil.** They last longer than natural oil so you'll have less waste to dispose of.
- **Use a service station that collects oil** for re-refining. If your current station doesn't, ask them to begin doing so.
- **If you change your own oil, collect it for re-refining.** Drain it into a container that won't leak and has a screw-on cap—like a milk jug. Then check with service stations in your area to include your used oil with theirs for re-refining pickup.



Strategies save money, benefit lawn

Keeping your yard clippings out of the trash truck can save you money and protect the environment.

Grass clippings, leaves and tree prunings comprise about 18 percent by weight and 10 percent by volume of the municipal solid waste stream. During the growing season, they can amount to 50 percent or more of residential solid waste collected in some Indiana communities.

In landfills, yard clippings take up valuable space and contribute to methane gas production, acidic leachate production and settling problems. They also reduce the efficiency of incinerators because of their high moisture content.

Kept out of the trash and managed by property owners, yard clippings can improve the health and appearance of soil and landscaping. They can save the time required to bag waste and the cost of bags.

If the community you live in has volume- or weight-based disposal fees, source reduction of yard clippings can also lower the fees you pay.

The source reduction techniques described here can also help property owners comply with a yard-waste disposal ban that takes effect Sept. 30, 1994.

Some of the same techniques that help you reduce the amount of yard clippings you generate can also help keep your lawn

healthy. Keys to a healthy lawn are:

- Proper mowing height and frequency.
- Fertilizing only when the grass needs it.
- Leaving clippings on the lawn.
- Using your yard clippings for landscape enhancement.
- Incorporating composted materials back into the soil.

A cut above

A grass height of 2.5 to 3 inches is ideal for most lawns. Setting blades about a half-inch higher in summer improves the lawn's ability to tolerate stress.

To keep the amount of clippings at a manageable thickness, use a mower with a sharp blade and cut no more than one-third of the grass height with each cutting.

You may need to mow every four or five days in the spring to maintain the right height and amount of clippings, but you can mow less often when summer sets in.

Time it right

September through November is the principal time to fertilize





lawns so you encourage root growth instead of top growth.

This will give your lawn a lengthened period of green in the fall and earlier spring green-up without excessive shoot growth. The plant's energy reserves in the roots will remain higher during spring and summer, helping it resist disease.

Proper fertilization also helps manage clippings. Late winter/early spring fertilizing, which is common, encourages fast leaf blade growth and causes extra mowing when the growing season sets in.

Correct thatch build-up

Leaving grass clippings on the lawn all season long doesn't contribute to the build-up of thatch, a layer of partially decomposed organic matter that builds up between the soil surface and actively growing vegetation. Thatch develops if organic matter is produced faster than soil organisms decompose it.

When thatch gets too thick—deeper than one-half inch—it prevents water and nutrients from penetrating to the soil and grass roots. Soil compaction, overuse of fertilizer, lawn rolling and poor watering practices all encourage thatch build-up.

Aerating the soil in late summer or early fall is the ideal way to manage thatch. A certain amount of thatch is healthy to retain moisture and encourage root development.

An inexpensive mulch

Yard clippings also make an inexpensive mulch around your shrubs, trees and other plants. Mulches aid in weed control, lessen the need for watering, reduce shock to plants from weather extremes, reduce erosion and help keep your garden neat.

Drying your clippings before applying them to plants will help maintain the soil's nitrogen level and avoid unpleasant odors while the clippings decompose. Just remember never to use any clippings from diseased plants, including your lawn, or you're likely to spread the disease to other plants.

Backyard composting

Composting is a simple way of reducing organic wastes to humus, which, when mixed with your existing soil, break up clay and improve soil structure. Composting will also eliminate the need for bagging yard clippings for disposal.

Composting reduces materials by at least 70 percent in volume. You can incorporate the final product, humus, into soils around trees and gardens, sprinkle it on lawns or apply it as a mulch.

To compost in your backyard, you can buy a compost bin or build one yourself at least three-feet square out of scrap lumber, chicken wire, bricks or concrete blocks. Free-standing piles covered with tarps to protect against the wind will work, too, as long as the bin has enough openings to allow air to penetrate. To make compost:

- Blend wet, green, high-nitrogen materials—like grass and food scraps—with dry, brown carbon materials, like leaves.
- Don't add meat, dairy products or grease to your compost pile because it can attract unwanted pests. Also avoid adding pet feces, which can carry disease.
- Chop up larger materials to speed decomposition, and bury food scraps six inches below the surface of the pile.
- Add moisture to make a friendly home for microorganisms, and keep building the pile until it's three to five feet.
- Stir or turn when the inside gets hot or every three or four days to increase the rate of breakdown. Less frequent turning just means longer time to finished compost.
- Harvest from the bottom of the pile in three to six months.

Contact your local County Extension Service for more information on composting.

SOURCES: John Roulac, "Home Composting: The Next Wave in Recycling," *MSW Management*, October 1992. *Indiana Yard Waste Solutions*. IDEM, IRC, January 1993.



Take an active stand

One of the great advantages of living in a free society is the ability each of us has to influence others through how we live, what we say and the actions we take.

You can be an activist for the source reduction cause by putting these freedoms to work in the battle to cut waste.

We all have the power to help create the type of world we want to live in and eventually leave behind for our children.



Start by stopping junk mail

Every year, Americans receive about four-million tons of junk mail. Even though a full 44 percent is never opened or read, Americans will still spend eight months of their lives dealing with junk mail.



In fact, the junk mail all of us receive in one day could produce enough energy to heat 250,000 homes if more than half of it didn't end up in a landfill.

Often organizations you belong to, places where you have credit, periodicals you subscribe to and manufacturers you return warranty cards to sell names to other organizations, creditors and periodicals who'd also like to get

you to join their group, borrow their money or buy their products.

You can get a grip on your junk mail, though

- **Write the Mail Preference Service.**

It's a division of the Direct Marketing Association, 11 W. 42nd St., P.O. Box 3861, New York, N.Y. 10163-3861. Ask for a name-removal card. They'll put your name on a "delete" file sent out four times a year.

- **Check with credit bureaus.**

Send a written request to be removed from each bureau's direct-marketing file.

To find out which companies have already purchased your name from the credit bureau, request a copy of your credit report and look for the section called "Promotions," "PRMO" or "Companies that requested your credit report." The three largest credit bureaus are:

- Equifax Options, Equifax Marketing Decision Systems Inc., P.O. Box 740123, Atlanta, Ga. 30374-0123, 404-885-8309

- Trans Union, Transmark Inc., 555 W. Adams St., Chicago, Ill. 60661, 312-431-5101

- TRW-NCAC, Target Marketing Services Division, 12606 Greenville Ave., Dallas, Texas 75243, Attention: Mail Preference Service, 214-235-1200.

- **Don't send in warranty cards on new purchases.**

You'll still be covered by the warranty. Manufacturers only use the cards as ways to get your name and find out more information about you, which they in turn sell.

Many warranty cards go to a



marketing company. You can ask to be removed from the lists it sells to other companies. Write Chris Courtemanche, National Demographics & Lifestyles, List Order Services, 1621 18th St., #300, Denver, Colo. 80202, 800-525-3533.

- **Contact mailing-list brokers.**

Write and ask for your name to be put on a suppress file. Three of the biggest brokers are:

-R. L. Polk and Company, List Services Division, 6400 Monroe Boulevard, Taylor, Mich. 48180, 800-873-7655.

-Donnelley Marketing, 1235 N Avenue, Nevada, Iowa 50201-1419, 515-382-8202.

-MetroMail Corp., 901 W. Bond, Lincoln, Neb. 68521, 800-426-8901.

- **Get an unlisted phone number.**

A certain amount of junk mail comes from lists developed using telephone books. An unlisted number is just a few dollars more a month.

- **Print personal checks without phone numbers.**

- **Consider removing your name from reverse phone books.**

These are lists indexed by number. However, reverse phone books sometimes have a good public-safety use. Police sometimes use them in emergencies. Publishers are:

-R. L. Polk (address above).

-Haines and Company Inc., Criss-Cross Directory, 2382 E. Walnut Ave. East, Fullerton, Calif. 92631, 714-870-8151.

- **Write for information on the "Junk Mail Prevention Kit."**

Available from K.D. Enviro-Ventures, 5235 Roland Drive, Indianapolis 46208. The kit includes eight pre-written postcards and 88 return stickers.

- **Don't subscribe to magazines or order from catalogs.**

Noticing a reduction in the amount of junk mail you receive will take about six months. But if only 100,000 people took this action, we could save about 150,000 trees every year. If a million people stopped their junk mail, we could save 1.5-million trees.

Keep the momentum going

- Consider writing to companies to encourage them to reduce unnecessary packaging and the use of hazardous components in products.
- While you're making suggestions for change, be sure to take note when companies do the right thing. Call 800-555-1212—directory assistance for toll-free numbers—to see if the manufacturer has a number you can call with some positive reinforcement.
- Support legislation aimed at reducing waste and protecting the environment. Contact your state legislators and congressional representatives to let them know your views:
 - Gov. Evan Bayh, State House, Indianapolis 46204, 317-232-4567.
 - Indiana Legislative Services Agency, 230 State House, Indianapolis 46204, 317-232-9856.
 - Indiana House of Representatives—Democratic phone, 800-382-9842; Republican phone, 800-382-9841.
 - Indiana Senate, 800-382-9467.
- Consider starting a source reduction campaign in your neighborhood, church or workplace.
- Use your influence to encourage the use of efficient, long-lasting equipment at home, at work and in the larger community.
- Attend town, city or county government meetings to let public officials know your town needs access to adequate and safe solid waste management facilities, recycling programs and composting centers.
- Encourage schools to make environmental education a priority by putting together a source reduction unit for children, complete with activities to teach kids the "waste not, want not" philosophy of life.
- Get support for an all-neighborhood garage sale day to encourage reuse.
- Start your own neighborhood, church or workplace classified ad sheet to keep useful items used and out of the landfill.



SOURCE: *The Consumer's Handbook for Reducing Solid Waste*. Washington, D.C., U.S. EPA, August 1992.

Chapter 4: Cutting hazardous materials

The Resource Conservation and Recovery Act defines hazardous waste as a solid waste (including liquids and gases) or combination of solid wastes which, because of quantity, concentration, or physical or chemical characteristics, may:

- Cause or significantly contribute to an increase in mortality, serious irreversible illness or incapacitating reversible illness.
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed.

By definition, hazardous wastes are "listed," or specifically named, or may exhibit any of four characteristics. The legal definitions of these characteristics are complex. Complete definitions can be found in the Indiana Hazardous Waste Rules, 329 IAC 3.1. A copy of these rules can be obtained from your local library or by calling the Indiana Department of Environmental Management's Office of Solid and Hazardous Waste Management at 317-232-4518. A simplified definition of each characteristic follows:

- **Ignitable**—Easily flammable. Examples are paint wastes, gasoline and certain solvents.
- **Corrosive**—Dissolves metals or other materials, or burns the skin. Examples are waste rust removers, waste acid or alkaline cleaning fluids, drain cleaner and waste battery acid.

- **Reactive**—Unstable or undergo rapid or violent chemical reaction with water or other materials. An example is cyanide plating wastes.
- **Toxic**—A waste is considered toxic if it can produce injury upon contact with or by accumulation in a susceptible site or in the body of a living organism.

Two basic strategies for reducing the amount of toxic or hazardous chemicals in the waste stream are:

- Encourage the purchase and use of products containing less toxic ingredients than products commonly in use.
- Encourage people who already have products containing toxics in their homes or businesses to use them up or give them away instead of throwing them out.

The first strategy, encouraging the use of non-toxic alternatives to hazardous waste, is the most important message solid waste management districts can send. The second message, although it may keep hazardous substances out of the municipal waste stream, will not decrease the use of hazardous products.

Although household hazardous waste collection programs can be an effective tool to educate residents about what products are toxic and need proper disposal, they're not source reduction, since the household hazardous waste is collected and disposed of or recycled.

Household hazardous waste collections are also very expensive. According to the Environmental Protection Agency, participation in such programs averages less than 1 percent of households, making the costs per pound of waste collected and disposed of very high (US EPA / *A Survey of Household Hazardous Wastes and Related Collection Plans*, 1986).



Setting goals for toxics

Source reduction—or not generating toxic wastes in the first place—is the most economical and beneficial strategy for homes and businesses. However, setting source reduction goals for toxic chemicals is not as straightfor-

ward as setting goals for reducing the volume of garbage.

It is not possible to set an overall percentage-reduction goal for toxics in the waste stream because there is no accurate data as to the overall amount of toxic materials in municipal waste. Toxicity levels and environmental impacts of substances also vary widely, so it would not make sense to set the same goal for all chemicals.

The most practical way to set toxicity source reduction goals is to reduce the purchase and disposal of specific products known to contain particular toxic substances.

As you set your goals, follow these steps:

- **Identify chemicals and products of concern.**

Certain products, like batteries, can be chosen as targets. The major toxic constituents are well-known and tend not to vary over time or by brand name. For other products, like household cleaners, it may be best to target a specific chemical, since formulations change over time and within brands. Teach your audience to read product labels and avoid those products that contain the targeted chemical.

- **Identify existing alternatives that are less toxic or non-toxic.**

Alternatives may be similar products formulated with less toxic chemicals—for example, paint strippers without methylene chloride—or different types of products altogether—electric appliances instead of battery-operated ones.

A thorough knowledge of realistic alternatives is your key to setting realistic goals. You will also need to be careful when assessing alternatives that a manufacturer has not merely substituted one chemical of concern for another. Look for products that have reduced overall toxic content.

- **Set toxic-reduction goals for each product.**

Again, keep in mind realistic alternatives. That's the key to source reduction success.



Measuring reduction of toxics

To measure progress in reducing the sale and/or disposal of products of concern and

success in keeping these products out of the waste stream:

- Monitor the sales of targeted products in the municipality.
- Monitor activity at any product exchange centers that may be established to develop information on how much of unused targeted products (like paint) are being acquired and used up.
- Sample the waste stream for the targets.

Also take into account changes in population and employment, just as you would when measuring reductions in any other waste.



Take careful aim

Aim your strategies for reducing amounts of targeted products used and disposed of at purchasers and users of the products, along with manufacturers.

Purchasers and users include consumers, retailers, other commercial enterprises and institutions. Your goal is to have them use up or give away targeted products stored in their homes and offices and not to buy any more.

For product manufacturers, the aim is to encourage them to reformulate or redesign products to reduce or eliminate toxic components.



How to use this section

This part of *You Can Cut It!* can be used in educating consumers, businesses, industry and institutions. Information in the fact sheets included in this chapter falls into two categories:

- Identification of products with toxic ingredients.
- Alternatives to toxic products or processes.

Note: "Maintenance Facts/Building and grounds can help reduce" should be used for the business sector only. "Gardening Facts/Reducing chemical dependence" contains similar information but is geared toward the homeowner instead.

YOU CAN CUT IT!



Coming clean when you clean

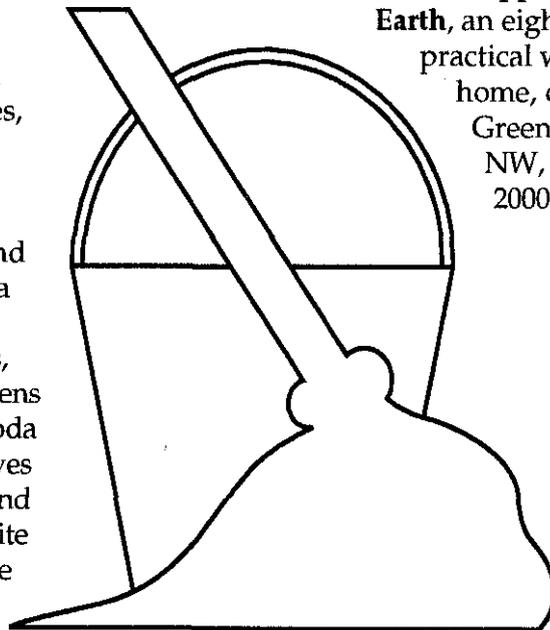
You can play a crucial role in easing the hazardous-waste problem by selecting cleaning products that don't give off toxic emissions or accumulate as household hazardous waste.

Changing the hazardous-waste patterns of industries comes at great expense and effort and often involves lengthy political and legal battles. Changing your purchasing patterns at home, on the other hand, is simple, thrifty and healthy. It can also support those industries that don't add to the toxics problem.

What's the alternative?

A basic stock of baking soda, borax, washing soda and white vinegar—all easy to find in your grocery store—can tackle many household cleaning jobs.

Baking soda cleans, deodorizes, softens water to increase sudsing and cleaning power of soap, and it can be used as a cleanser. Borax cleans, deodorizes, disinfects and softens water. Washing soda cuts grease, removes stains, disinfects and softens water. White vinegar cuts grease and freshens.



In the laundry, experiment with using less detergent. Softened water may clean a full load of clothes with as little as one tablespoon of detergent.

The back side of this sheet lists common substitutes for specific cleaning jobs. Use a magnet to tack it up on your refrigerator or in your utility closet for reference.

For more information

- **Cheaper and Better: Homemade Alternatives to Storebought Goods**, written by Nancy Birnes and published by Harper and Row.
- **Compassionate Consumer catalog**, for pre-mixed, non-toxic household products, 141-44 25th Ave., Whitestone, N.Y. 11357.
- **EcoBella catalog**, for pre-mixed, non-toxic household products, 125 Pompton Plains Crossroad, Wayne, N.J. 07470.
- **Nontoxic, Natural & Earthwise**, written by Debra Lynn Dadd and published by Jeremy Tarcher. Hundreds of alternatives to household toxics.
- **Toxics: Stepping Lightly on the Earth**, an eight-page guide on practical ways to detox your home, offered free by Greenpeace, 1436 U St., NW, Washington, D.C. 20009.

SOURCE: The Consumer's Handbook for Reducing Solid Waste. Washington, D.C., U.S. EPA, August 1992.



Mix your own safe cleaning substitutes

Air freshener:

- Herbal mixtures and potpourri.
- Scented candles.
- Cotton balls soaked in vanilla.
- Boil cinnamon and cloves in a small amount of water.
- Simmer small amount of cinnamon, orange peel and cloves on stove or in small ceramic saucer over a candle.
- For refrigerator, an open box of baking soda.
- For garbage pail, borax or baking soda sprinkled in bottom.

All-purpose cleaner: Mix one-gallon hot water and one-fourth cup vinegar.

Bathroom cleaner: Baking soda.

Bathroom deodorizer: Vinegar or lemon juice.

Blood stains: Club soda and cold water.

Brass cleaner:

- Rub with catsup and rinse with warm water.
- Rub with worcestershire sauce.

Chrome cleaner: Apple-cider vinegar or baking soda and rub with soft cloth.

Countertops: Mix vinegar with warm water and salt.

Copper cleaner:

- Rub with catsup and rinse with warm water.
- Dip in warm vinegar or lemon juice, then sprinkle with salt and scrub with a soft cloth. Rinse with clean water.

Deodorizers: Vinegar or lemon juice.

Disinfectant: Mix one-half cup borax with a gallon of warm water.

Drain cleaners:

- To prevent clogs, install a drain sieve or hair trap.
- To prevent clogs, once a week mix one cup baking soda, one cup salt and one-fourth cup cream of tartar. Pour one-fourth cup of mixture into the drain, followed by a pot of boiling water. Also eliminates odors.
- Open clogs by pouring one-fourth cup baking soda down the drain, followed by one-half cup vinegar. Let sit until fizzing stops, and flush with boiling water.
- Open clogs with a plunger or metal snake.

Floor polish: Club soda.

Garage floors: To remove grease, sprinkle spot with fresh cat litter. Let stand for a few hours, then sweep up.

Glue/decal remover: Soak in white vinegar.

Ink stains: Pump hair spray and water.

Laundry aids:

- Instead of liquid bleach, try borax or washing soda.
- For stains, soak the spot in a mixture of one-fourth cup borax and two cups cold water prior to washing.
- For greasy stains, rub corn meal and water into stain and rinse with lemon juice before washing.
- For deodorant stains, rub lightly with white vinegar and launder as usual.
- For wine or coffee stains, put stained material in glass, enamel or stainless steel pot. Cover with mixture of milk and water. Bring to boil and simmer two to four minutes until stain disappears.
- For coffee and tea stains, use equal parts moist salt and vinegar, or a solution of three tablespoons baking soda and one quart water.
- For spots, try: a paste of washing soda and water; club soda, lemon juice and hot water; or borax and cold water.

Leather cleaner: Vinegar.

Linoleum floor cleaners:

- Vinegar and water.

- Mix two to three teaspoons each of borax and liquid dish soap in two quarts of hot water.

Mildew cleaner: Mix borax with warm water.

Oven cleaners:

- Dampen the spill and sprinkle salt on it while the oven is warm. Scrape spill away when cool.
- For greasy spots, use a vinegar-soaked rag.
- For really tough spots, use baking soda and water, rubbing tough spots with a fine, steel-wool pad. If this doesn't work, add salt and try again, as long as the oven doesn't have continuous-clean or self-cleaning features.

Pet stains/odors: Mix one-fourth cup vinegar in one-fourth cup liquid soap. Rub in the mixture, blot the stain and rinse with water.

Pewter cleaners:

- Rub with fine steel wool dipped in olive oil, wash in soapy water and dry.
- Polish with cabbage leaves.

Rug spot-cleaner: Dishwashing liquid.

Rug or upholstery all-over cleaning: Vacuum, then sprinkle with dry cornstarch, baking soda, borax or cornmeal, and vacuum again.

Rust remover: Warm vinegar and scrubbing will remove rust from dishes, sinks and teapots.

Shoe polish: Try olive oil, walnut oil, beeswax or lemon juice.

Silver:

- Boil two to three minutes in a quart of water that contains a teaspoon of baking soda, a teaspoon of salt and a piece of aluminum foil. Rinse well with water and dry with a soft cloth.
- Soak in baking soda and water.
- Soak in buttermilk.
- Brush jewelry gently with non-abrasive toothpaste.

Sinks: Mix vinegar with warm water and salt.

Stainless steel cleaner: Wash with one quart warm water and three tablespoons baking soda. Rinse with hot water.

Stains: General household stains can usually be cleaned with borax.

Toilets: A strong solution of a natural acid, such as vinegar, will remove most lime scale.

Tub and tile cleaner: Baking soda and water.

Window cleaners:

- To avoid streaking, wash only when sun isn't shining on windows. Sun makes the cleaner dry too fast, causing streaks.
- White vinegar and water.
- One tablespoon of vinegar or lemon juice in one quart of water. Spray on and use newspaper to wipe dry.
- Two tablespoons borax or washing soda in three cups water. Spray on using a pump sprayer. Squeegee off to avoid streaks.

Wood floor cleaners:

- One teaspoon lemon juice in one pint mineral or vegetable oil
- Three parts olive oil to one part vinegar

Wood furniture polish: Mix one part lemon juice to two parts mineral or vegetable oil.

Wood scratches: Mix one teaspoon each of lemon juice and mineral oil.



Chasing down indoor pests safely

The manufacture of all household pesticides creates massive quantities of toxic and potentially carcinogenic chemicals that can end up in our air and water supply. Once in your home, these products can cause even more concern.

No point of entry

Your first line of defense is to stop pests from getting in your house:

- Repair holes in walls and window screens.
- Caulk around windows, doors, cracks and crevices.
- Weatherstrip windows.
- Install sweeps on bottoms of outside doors.
- Reduce moisture by repairing leaks, cleaning gutters and maintaining good soil drainage around your house.
- Staple sheets of plastic beneath buildings to create vapor barriers and block insect paths.

If the pests still make it inside your home, try the least toxic solution you can find—boric acid, silica aerogel or diatomaceous earth. Diatomaceous earth is the fossilized remains of tiny sea creatures called

diatoms. All three substances are effective against indoor crawling insects like roaches, ants, silverfish and termites and can be found at most lawn and garden centers.

Or request "Facts About Herbs" from your solid waste management district for an entire list of pest repellents that come right from your garden.

Other easy pest remedies

Ants:

- When they first appear, wipe them away with a soapy sponge
- Ants will also avoid lines of powder and sharp crystals, so sprinkle barriers of talcum powder, chalk, bone meal, cayenne pepper, cream of tartar, red chili, paprika, dried peppermint or boric acid across their trails.

Cockroaches:

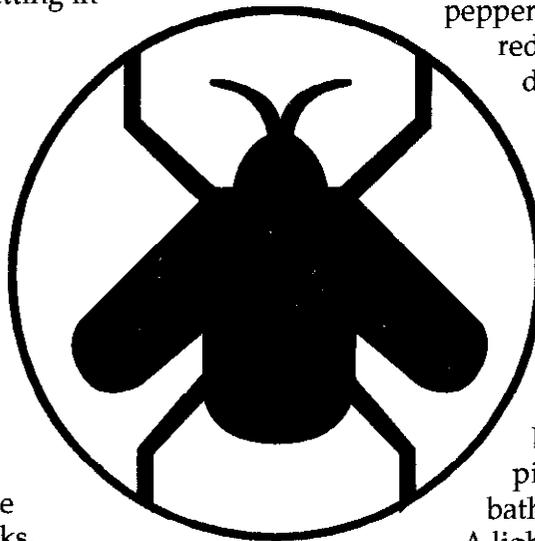
- Plug or caulk small cracks along baseboards, wall shelves, cupboards, around pipes, sinks and bathtub fixtures.

A light dusting of borax around the refrigerator, stove and ductwork will help, too.

- For a trap, lightly grease the inner neck of a bottle and put a little stale beer or raw potato inside.
- Mix sugar, flour and boric acid into a powder that cockroaches will take back to their nests and poison their colony.

Moths:

- Susceptible clothing includes wool, fur, hair and feathers, and





cotton, rayon, paper and straw to a lesser extent.

- In summer, store woolens in a cedar chest, cedar closet or tightly sealed bag.
- If items aren't stored, shake, brush and air outdoors in the sun.
- Try cedar chips, lavender flowers, rosemary, mint or white peppercorns.

Flies:

Install screens or close windows before the sun hits them. Flies usually enter homes through sunny windows.

- Don't spray, swat.
- Non-insecticide fly paper still works, too.

Insects on houseplants:

- Spray houseplants with used dishwater or soap and water solution, then rinse.
- Blend six cloves of crushed garlic, one minced onion, one tablespoon dried hot pepper, and one teaspoon pure soap in one gallon water. Let sit one to two days, strain and spray on plants.

Especially for pets

With more than 100-million dogs and cats in America, is it any wonder 50-million flea collars are thrown away every year? That's a solid- as well as a toxic-waste problem.



Some side effects of three common flea-collar compounds—piperonylbutoxide, dichlorvos (or DDVP) and carbaryl—include potential nerve and liver damage, cancer, mutations and birth defects in animals.

The pet absorbs the chemical until it reeks of the toxin, and that, in turn, paralyzes the bug. Try these alternatives instead:

- **Prevention is best.** Keep the pet's bed laundered. Regular vacuuming will help.
- **Sprinkle herbs**—fennel, rue, rosemary or eucalyptus seeds or leaves—around animal sleeping areas.
- **Add brewer's yeast and garlic** to your pet's food. For some reason, fleas hate it.
- **Rub citrus-oil sprays into your pet's fur.** You can make your own by running orange or grapefruit skins through a blender or food processor, then simmering with some water. After the mixture cools, rub into your pet's fur. Be sure to use only fruit *skins* to avoid making fur sticky.
- **To chase away both ticks and fleas**, wash pets well with soap and warm water and dry thoroughly. Add one-half cup fresh or dried rosemary to one quart boiling water. Steep 20 minutes, strain and cool. Then spray or sponge this herbal rinse evenly onto your pet. Allow to air dry, as toweling down will remove the residue. Make sure pet is completely dry before going outside.
- **Look for flea preparations containing methoprene**, a growth inhibitor that interferes with flea-larvae development.

For more information

The National Pesticide Telecommunications Network is a toll-free, 24-hour information service available by calling 800-858-7378.

Operators can provide a wide range of information about health effects of pesticides and assistance in dealing with pesticide-related emergencies.

SOURCE: The Earth Works Group, *50 Simple Things You Can Do to Save the Earth*. Berkeley, Earth Works Press, 1989.





Growing your garden organically

Whether you plant vegetables, flowers, shrubs or trees, your garden and the larger environment benefit from an organic approach.

Gardens are, by and large, a better choice for the environment than a vast expanse of lawn, and they can give back so much more. If you landscape and plant with wildlife in mind, too, your garden can help make up for the loss of their natural habitat.

Choosing the right plants can attract birds, bees and a host of insects that keep more destructive pests under control without the use of chemicals.

If you garden organically, you can keep a great deal of solid waste out of the waste stream and make your yard a much richer place for life. Your own sense of enjoyment will also flourish.

What is organic gardening?

Organic gardening is much more than gardening without the

use of pesticides. It's a way of building and rebuilding the soil to encourage populations of desirable insects and birds that will sustain plantings year after year.

How do I garden organically?

Prepare the soil.

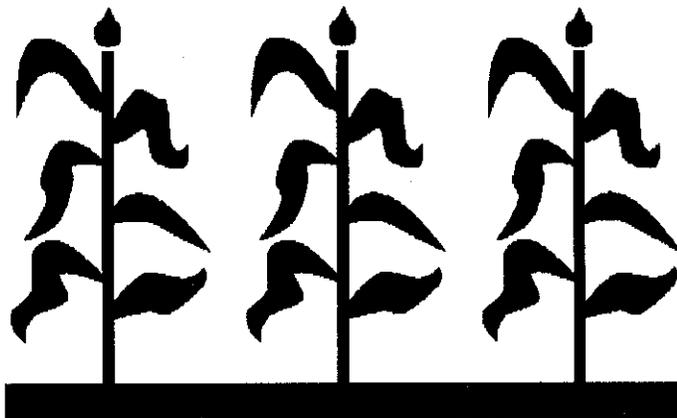
- It should be loose and airy and resemble fluffy bread crumbs. If the soil is too dense, plant roots won't be able to penetrate it as freely and growth may be stunted.

Feed the soil.

- This is the secret of organic fertilization. Bacteria present in the soil digest decaying plant and animal matter. The digestive process produces acids that dissolve plant nutrients from rocks and soil particles and makes them available to nourish the plant.

So it's important to feed these bacteria, as well as the plants. Compost feeds both, while synthetic fertilizers feed only the plant.

The concentrated nitrates and other substances they contain can't be completely utilized by plants. The excess leaches into the soil, where it drives away or destroys earthworms and other helpful soil organisms and can pollute groundwater.





If you haven't started a compost pile or yours isn't ready to draw from, blend together an organic fertilizer of four parts blood meal, two parts bone meal and one part kelp, green sand or ground rock phosphate—all of which can be found at your local garden center or nursery.

Adding peat moss, organic peat, manure or decomposed leaves will also boost the level of organic material in your soil. To find your soil's pH (acid/alkaline) balance, along with any major elements it may lack, send a sample to your county extension agent or an agricultural school. You can also buy soil test kits to do this yourself.

- **Mulch after planting.**

Mulch will save you the most work in your garden by controlling weeds, soaking up rain and holding moisture like a sponge. It'll mean you water less frequently and can protect your plants during drought.

- **Water.**

In dry periods, apply the equivalent of one inch of rain once a week. Early morning or early evening watering is generally best. Drip irrigation systems or soaker hoses do a better job than sprinklers because there is less evaporative loss to the air.

- **Control bugs.**

Develop a tolerance for bugs first. You can lose up to a third of the leaf area of many plants without harm. Expect some damage and plant a little more to compensate.

The first line of defense against bugs is to pick them off by hand or spray them off with a hose. If you need something stronger, try insecticidal soap, a liquid household soap,

quassia, pyrethrum or copper fungicide, depending on the pests you need to eradicate.

- **Clean up after harvest.**

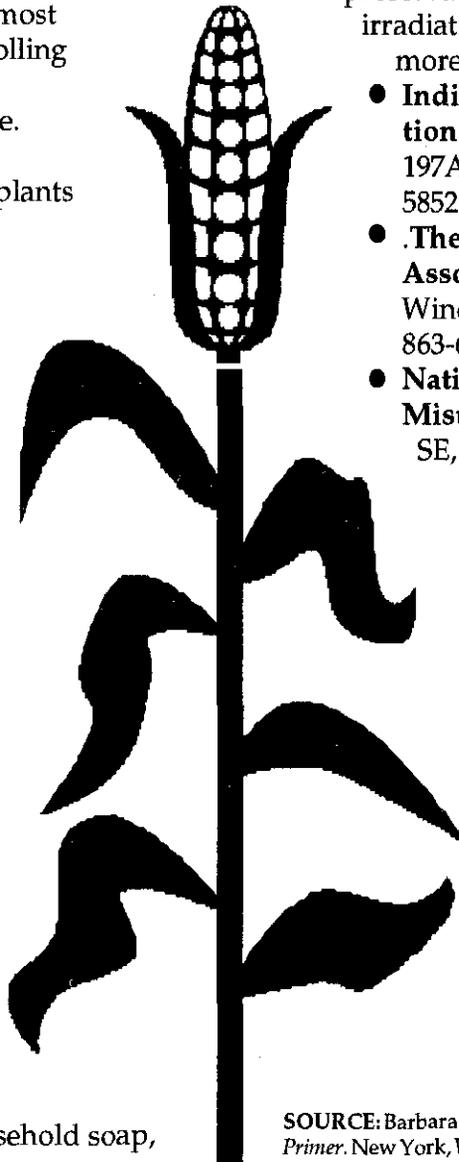
Remove any remaining plant debris at the end of the season, or till into the soil any undiseased parts. Mulch again to begin rebuilding the soil for next spring.

Buy organic, when you can

If you don't grow your own food, buy pesticide-free foods, foods in season, locally grown product or organically grown food.

Organic food is processed, packaged, transported and stored to retain maximum nutritional value without the use of artificial preservatives, coloring or additions, irradiation or synthetic pesticides. For more information, contact:

- **Indiana Organic Growers Association** in care of Steve Beers, Route 4, Box 197A, Morgantown 46160, 812-597-5852.
- **The Organic Foods Production Association**, 125 W. Seventh St., Wind Gap, Pa. 18091. Or, call 315-863-6700.
- **National Coalition Against the Misuse of Pesticides**, 530 Seventh St., SE, Washington, D.C. 20003.



SOURCE: Barbara Damrosch. *The Garden Primer*. New York, Workman Publishing, 1988.





Reducing chemical dependence

Incorporating manure, plant residues, cover crops or compost into your soil should limit its need for other additives. If a soil test indicates something's still missing, you'll need to address the question of organic versus inorganic fertilizers.

Nitrogen, phosphorus and potassium are the nutrients most soils need to be fertile, and all three can be obtained from organic sources, such as animal and vegetable matter, or from inorganic fertilizers produced by the petrochemical industry.

Gardeners who favor inorganic fertilizers say they're less expensive than organic preparations, act more quickly and are often easier to apply.

Besides, this group contends, plants don't know the difference between elements from organic and inorganic sources. They absorb and use either form of the nutrient in the same manner.

Organic gardeners, conversely, refuse to use any synthetic fertilizers, pesticides or weed killers because of the toxic effect they have on the soil over time.

They say overuse of chemical fertilizers kills beneficial soil organisms so that the soil itself eventually produces no nutrients. At that point,

the only way the plants can obtain nourishment is from more chemicals, which build up residues that eventually harm the plant.

Try integrated pest management, IPM

Integrated pest management draws on biological controls, such as natural predators of pests, planting patterns, pest-resistant plant varieties, and minimal use of chemicals to stabilize crop production while limiting hazards to health and the environment.

The goal here is not to obliterate insects and weeds from your garden, but to limit their numbers so they don't do too much damage. Rather than as a first and primary line of attack, chemicals are used selectively and only when necessary.



Although no savings figures are available for backyard gardening, IPM programs practiced on nine crops in 15 different states yielded farmers collectively \$579 million more in profits in 1987.

Intercrop to control bugs, weeds

This strategy relies on attracting good bugs to prey on the bad bugs. To do this, simply plant a crop that attracts the good bugs in with another crop.

For example, planting some kinds of herbs along with your vegetables attracts insects that will prey on pests that could destroy the vegetables.

Irregularly shaped perennial beds that remain undisturbed year



after year will also provide refuge for animals and insects that'll eat pests. Mulched, with sodded or uncultivated paths between, these permanent beds provide a stable habitat so populations of beneficial animals and insects can build up.

Always having some small flowering plants, rich in nectar, will help by attracting plenty of beneficial flies and wasps. Once well-fed, these insects will lay a maximum number of eggs to hatch into pest-eating larvae.

And a bird bath or a small pond, while pretty to look at, will also be inviting to honeybees and parasitic wasps, which eat aphids.

Other strategies to prevent pests

- * **Keep your garden free of debris** that attracts insects by properly storing and disposing of garbage. Remove weeds promptly to prevent seeds from scattering.
- * **Pick up fallen fruit and vegetables.**
- * **Remove and destroy diseased plant parts** to prevent spread.
- * **Properly water your plants** so that the water doesn't pool. This places stress on plants and gives mosquitoes places to breed.

Identify your pests

If you can't beat them, at least make sure you know what you're up against before you indiscriminately apply a chemical.

Either check your library or county extension service for picture guides that help you identify pests, or show damaged leaves or branches to the extension agent.

Once you know what's causing the trouble, try the least toxic solution first. Spraying pests off with your garden hose is usually the first line of attack, followed by a diluted spray of liquid soap and water. If both of these fail, try one of the insecticidal

soaps available in many hardware stores and nurseries.

SOURCE: Barbara Damrosch. *The Garden Primer*. New York, Workman Publishing, 1988.

For more information...

Gardens Alive! sells predator bugs and produces a "Stay Organic" newsletter. Write 5100 Scheneley Place, Lawrenceburg 47025. Or call 812-537-8650.

Ringer Natural Lawn and Garden Products has a complete line of organic lawn and garden fertilizers, insect traps and bug sprays. Call toll-free for a catalog: 800-654-1047.

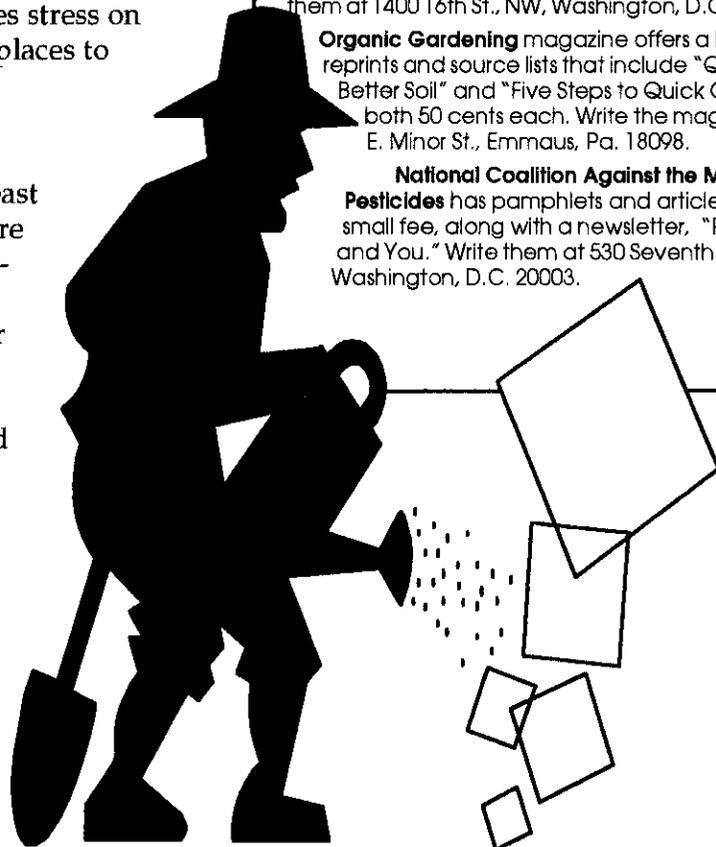
Bio-Integral Resource Center publishes "The Common Sense Pest Control Quarterly" and "IPM Practitioner." This non-profit group provides practical information on the least-toxic methods of managing pests. Write: BIRC, P.O. Box 7414, Berkeley, Calif. 94707.

National Audubon Society publishes "Banquets for Birds," a complete description of what to feed birds to keep them in your backyard. Write the society at 950 Third Ave., New York, N.Y. 10022.

National Wildlife Federation publishes "Invite Wildlife to Your Backyard." If you create a backyard garden plan showing where you'll plant, provide water and provide shelter and send it to the federation, along with \$5, they'll make recommendations and certify your yard as an official Backyard Wildlife Habitat. Write them at 1400 16th St., NW, Washington, D.C., 20036.

Organic Gardening magazine offers a list of reprints and source lists that include "Quick Ways to Better Soil" and "Five Steps to Quick Compost," both 50 cents each. Write the magazine at 33 E. Minor St., Emmaus, Pa. 18098.

National Coalition Against the Misuse of Pesticides has pamphlets and articles, most for a small fee, along with a newsletter, "Pesticides and You." Write them at 530 Seventh St., SE, Washington, D.C. 20003.





Herbs provide safe substitute for toxics

I would heartily advise all men of meanes, to be stirred up to bend their mindes, and spend a little more time and travel in these delights of herbes and flowers, than they have formerly done, which are not only harmlesse, but pleasurable in their turn, and profitable in their use.

-John Parkinson,

Theatrum Botanicum, 1640

Herbs are generally thought of today as no more than a few dozen seasoning plants. In fact, they include the entire range of plants classified as herbaceous perennials.

Herbs have always been sources of medicine. Meadow-sweet was the first documented source of salicylic acid, the main ingredient in aspirin. Foxglove gave us digitalis for treating heart ailments.

In days before dry cleaning and deodorants, herbs made life sweeter. A Victorian-era groom would have his suit stuffed with herbs so he'd smell sweet on his wedding day, and his bride would likely place herbs in cloth bags inside her shoes to make them sweet-smelling.

The Shaker communities in the 1800s were avid herbalists. Tied to the bedposts of every brother's and sister's bed you'd find small linen

bags of herbal pot pourri mixtures to ward off bedbugs and other pests.

Although some herbs have a toxic effect if ingested, the effect they have growing along other plants or crushed and laid in cupboards or among linens can be pleasant.

As substitutes for mothballs, aerosol air fresheners, harsh cleaners and chemical sprays in the garden they have no serious side effects on the environment. They provide food and shelter to animals and helpful insects, enriching the soil as they decompose at the end of the growing season.

This listing of herbal substitutes should whet your appetite for learning more. Where instructions say to "infuse," pour boiling water on herbs, cover and steep for 30 minutes. Where instructions say "decoct," bring herbs to boil in water, cool, strain and refrigerate the liquid for a few days before using.

Anise—Use as bait in mouse traps.



Artemisia—Powder or infuse leaves to make moth repellent. Deter onion and carrot flies with branches laid between onion and carrot rows. Mix weak infusion for insecticide on older plants. Grow near cabbages to deter cabbage butterfly and near fruit trees to deter fruit tree moth.

Bay—Place a few leaves in flour to ward off weevils.

Bee Balm—Attracts bumble bees.

Borage—Attracts bees. Plant near strawberries, as they stimulate each other's growth. Plant near tomatoes to control worms.



Catmint—Attracts bees. Repels rats. Plant near vegetables to deter flea beetles.

Chamomile—Grow near failing plant to revive it. Infuse and spray on seedlings to prevent "damping off" and on compost to activate decomposition.

Comfrey—Soak leaf in water for four weeks to make perfect fertilizer for tomato and potato plants, owing to high potash content. Pick leaves, allow to wilt for at least 48 hours, then apply as a mulch.

Costmary—Repels insects in fabrics.

Chives—Grow as a deterrent for aphids, apple scab and mildew.

Dianthus—Provides nectar for bees.

French Marigold—Exudes secretions that repel nematodes. Grow as protection against most non-cyst-forming eelworms. Will deaden but not eliminate cyst-forming eelworms.

Garlic—Plant under peach trees to control leafcurl and near roses to enhance scent.

Horehound—Attracts bees to gardens. Infuse as a spray for cankerworm in trees. Infuse in fresh milk and set in a dish as a fly killer.

Horseradish—Grow near potatoes for more disease-resistant tubers. Infuse, dilute four times and spray apple trees against brown rot.

Horsetail—Infuse, simmer and strain for metal polish.

Hyssop—Grow near cabbages to lure away cabbage-white butterflies. Plant near vines to increase yield.

Lavender—Protects fabrics from moths. Use leaves and flowering stems to make disinfectant.

Lemon Balm—Plant near beehives and orchards to attract pollinating bees. Add juice to furniture polish.

Marjorams/Oregano—Attracts bees and butterflies. Add to beeswax for furniture polish.

Melilot—Attracts bees to gardens. Scatter dried leaves among clothes to deter moths.

Mullein—Pollen and nectar attract bees to garden.

Myrrh—Crush seed as a furniture polish.

Myrtle—Add a decoction to furniture polish.

Nettle—Use dried leaves as a preserving wrap for apples, pears, root vegetables and moist cheeses. Keeps two to three months.

Parsley—Grow by roses to improve health and scent.

Pennyroyal—Strew in cupboards and beds to deter ants and fleas. Disturb leaves occasionally.

Pyrethrum—Sprinkle dried, powdered flowers to deter all common insect pests: bedbugs, lice, cockroaches, flies, mosquitoes, aphids, spider mites and ants. Note: It also kills helpful insects and fish.

Rosemary—Simmer leaves and small stems for disinfectant. Strain and use to clean bathrooms, sinks. Add dishwashing detergent for degreaser. Keeps in refrigerator up to one week.

Rue—Place sprigs on shelves to deter ants and disturb leaves occasionally. Hang to deter flies.

Sage—Put dried leaves among linens to discourage insects. Burn on embers or boil in water to disinfect a

room. Smoke deodorizes animal and cooking smells.

Santolina—To deter moths and other insects, lay in drawers and under carpets, hang in closets and distribute among books.

Sorrel—Use juice of leaf to bleach rust, mold and ink stains from linen, wicker and silver.

Spearmint, Peppermint—Grow near roses to deter aphids. Scatter fresh or dried leaves around food to deter mice.



*And where the marjoram once, and sage and rue,
And balm and mint, with curled-leaved parsley grew,
And double marigolds and silver thyme,
And pumpkins 'neath the window used to climb;
And where I often, when a child, for hours,
Tried through the pales to get the tempting flowers;
As lady's laces, everlasting peas,
True-love lies bleeding, with the hearts at ease;
And golden rods and tansy running high,
That o'er the pale top smiled on passer-by;
Flowers in my time which everyone would praise;
Though thrown like weeds from gardens nowadays.*



Sunflower—Burn and scatter as potash fertilizer.

Sweet Joe Pye—May drive away flies and wasps if burned in a room.

Sweet Cicely—Crush seeds for wood furniture polish.

Sweet Woodruff—Put dried leaves under carpets and among linens to deter moths and other insects.

Tansy—Grow near fruit trees to repel insects. Hang indoors to deter flies. Lay in cupboards to deter ants and disturb leaves occasionally. Dried leaves repel insects and mice.

Thyme—Leaves and flowering stems can be used to make disinfectant.

Valerian—Boosts growth of nearby vegetables by stimulating phosphorus and earthworm activity. Infuse root and spray on ground to attract earthworms.

Winter Savory—Provides nectar for bees.

Yarrow—May help nearby plants to resist disease. Deepens their fragrance and flavor. Infuse as a copper fertilizer.

SOURCES: Lesley Bremness. *The Complete Book of Herbs*. London, Viking Penguin, 1988. Arabella Boxer and Phillippa Back. *The Herb Book*. London, Octopus, 1980.





Lawn care impacts environment

You don't usually associate lawns with saving the earth.

However, as the definitive landscaping technique for 20-million acres in America, lawns suck up a lot of water and chemicals every summer. They're also responsible for a big chunk of the 35-million tons of yard trimmings that show up in landfills every year, according to the Environmental Protection Agency (1990 figures, published in 1992).

Homeowners in pursuit of the perfect lawn use up to 10 times more synthetic chemicals per acre than farmers. The average homeowner applies five to 10 pounds per lawn. That's a nationwide total of some 25- to 50-million pounds.

However, a green, healthy lawn is possible without chemical pesticides and with less waste-creating care.

Do you really need a lawn?

Lawns are the most durable ground covers available for walking and playing. Some new grass varieties (e.g., turf-type tall fescues) require less fertilizer and less mowing than conventional bluegrass lawns.

Otherwise, any number of

other ground covers will work, some of which give off lovely scents when walked on. Also try landscaping with irregular flower beds, trees, rock gardens and paths.

That sounds like a lot of work. Initially, it may involve more work and more expense. But properly mulched, this more creative form of landscaping will require less care and less money to maintain.

Beauty is, of course, in the eyes of the beholder, but landscaped gardens have an edge on vast expanses of lawn in most circles.

What if I love my lawn?

If you simply can't live without it, try living with less of it and/or caring for it differently.

First, some straight talk about the "ideal" lawn is in order. Many Americans strive to have the greenest, most weed-free lawn on the block.

If someone says your lawn looks like a golf course, you may consider that a high compliment. But lawns

like that are actually quite **unnatural and require exhausting care to keep from reverting to the natural habitat** for a particular area.

In the early 1800s, when Indiana was settled, this area was largely woodlands and wetlands. If you visit Conner Prairie, near Noblesville, which replicates an 1836 Indiana settlement, you'll be told that at that time a squirrel could travel all the way across the state without ever touching the ground.





We certainly can't return Indiana to its original state. But taking into account what is native to the area can be a starting point for landscape design. Native plants will survive with the least amount of care and help replace the dwindling habitat for birds and animals.

Still incorporating your lawn into the plan, try to adjust your idea of how your lawn should look. Develop a tolerance for some weeds, and realize that during times of drought most lawns turn brown, or go dormant, as a protection against the lack of water. They'll revive when normal rainfall resumes.

What's good for your lawn?

- **Watering**—Watering properly will help your lawn grow deep roots that make it stronger and less vulnerable to drought. Most lawns are watered too often with too little water. It's best to water only when the lawn really needs it, and then to water slowly and deeply. This trains the grass roots down. Frequent shallow watering trains the roots to stay near the surface, making the lawn less able to find moisture during dry periods. The best rule is to water only when the lawn begins to wilt from dryness—when the color dulls and footprints stay compressed for more than a few seconds. Water during the time it's most effective and least likely to cause plant fungus—the morning.

- **Fertilizers**—Generally, fertilize one to three times a year between September and November. By fertilizing lawns at these times instead of the later winter or early spring, root growth instead of top growth will be encouraged. The lawn will have a lengthened period of green in the fall and earlier spring green-up without excessive shoot growth. The plant's energy reserves in the roots will also remain higher during spring and summer, which can reduce the incidence of summer diseases. Over-feeding with synthetic chemical treatments also encourages thatch build-up on your lawn. Thatch is a layer of dead grass parts that forms just above the soil surface, and a certain amount is healthy to retain moisture and encourage root development. If you're over-feeding, the chemicals slow normal decompo-

sition, and the thatch layer builds up. Eventually, it becomes thick enough to harbor pests and keep nutrients from making their way to the roots.

- **Pesticides and weed-killers**—If you're following the guidelines listed here, consider whether you really need synthetic chemical pest-control at all. If your lawn has a strong root system, it can survive some of the nastiest pests. Many times there's a natural way to fight lawn diseases. For example, grubs, which are the larvae of Japanese beetles and June bugs, can be successfully controlled by introduction of milky-spore disease, a bacterium that feeds on the larvae but won't hurt your grass. Even though grubs sever lawn roots and make grass peel back like a carpet, lawns with healthy root systems will survive and eventually regenerate. You'll need to be patient and give the milky spore disease a couple years to work.

For more information

- Check your library for "The Chemical-Free Lawn," written by Warren Schultz and published by Rodale Press, for suggestions for maintaining a green, healthy lawn without chemical pesticides.
- Send for a copy of "Healthy Lawn, Healthy Environment," document 700-K-92-005, from the U.S. EPA, Office of Pesticide Programs, Field Operations Division (H7506C), 401 M St., SW, Washington, D.C. 20460.
- Write the Bio-Integral Resource Center for information on least-toxic methods of lawn care, P.O. Box 7414, Berkeley, CA 94707.

I'M PROUD OF
MY NON-TOXIC
LAWN!



Show your spirit

To encourage citizens not to overuse chemical lawn treatments, the Monroe County Solid Waste Management District gave away signs at a local farmers' market that declared, "I'm proud of my non-toxic lawn!" **For more information, call Jane St. John at 812-333-3866.**

SOURCE: Barbara Damrosch. *The Garden Primer*. New York, Workman Publishing, 1988.



Building & grounds can help reduce

The maintenance part of any business can help with source reduction in two specific areas: reducing use of pesticides in landscaping applications and reducing use of toxic chemicals for workplace cleaning.

The average business uses five to 10 pounds of pesticides per acre on lawns and shrubbery every year. That may be more than necessary, and it could actually weaken landscaping. The same insecticides that kill pests also destroy beneficial organisms, which prey on harmful insects, and earthworms, which help fertilize the turf.

Try integrated solution

An alternative that can help reduce a company's use of toxics and protect landscaping is called Integrated Pest Management. IPM techniques generally involve higher up-front costs to monitor and design a program. Once in place, IPM is generally less expensive.

Experts say IPM also achieves a 90 percent or better reduction in harmful pests.

Landscapers or lawn-care specialists who

practice IPM will assess the condition of the soil first and the types and numbers of pests already present.

They may apply some pesticides, but usually only in small amounts and only when necessary. Rather than a broad-spectrum application, they'll apply the right solution just as specific pests may be hatching.

IPM practitioners will use biological alternatives to chemicals, too. For example, insect-attacking nematodes are used to kill white grubs, one of the most common lawn pests. A naturally occurring bacteria can be used to control sod web worms in the caterpillar stage.

For more information:

- Talk with your county extension agent.
- Read "Lawn Care Pesticides: Risks Remain Uncertain While Prohibited Safety Claims Continue," a free report available from the General Accounting





Office, P.O. Box 6015, Gaithersburg, Md. 20877. Or call 202-275-6241.

- Send \$2 for a catalog of IPM publications available from Bio-Integral Resource Center, which also serves as an IPM information and referral source. Write P.O. Box 7414, Berkeley, Calif. 94707. Or call 415-524-2567.

Coming cleaner

According to the Environmental Protection Agency, many of the 100 chemical pollutants found in sewage systems come from institutional cleaners.

Many commercial cleaning products contain toxic, corrosive or flammable chemicals, such as perchloroethylene, naphthalene, sodium hypochlorite, toluene, benzene and chlorine.

They get the job done, but there are alternatives that require less special-handling and don't have the fumes or irritation of the commercial products.

Your local janitorial supply may not stock these products unless other businesses have requested them. Check there first, then contact the manufacturer directly if you have no luck:

- Shaklee Corp., 444 Market St., San Francisco, Calif. 94111. Or call 415-954-3000.
- Chip Distribution Co., P.O. Box 704, Manhattan Beach, Calif. 90266. Or call 213-603-1114.
- Natural Chemistry Inc., 244 Elm St., New Canaan, Conn. 06840. Or call 203-966-8761.

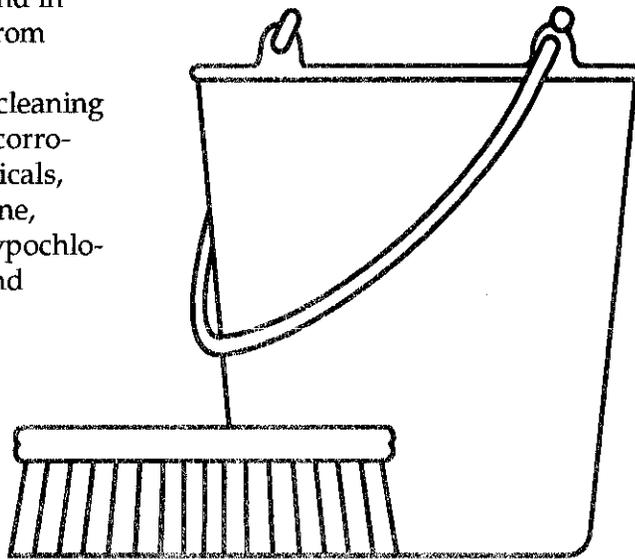
"Greener cleaners" may cost more than traditional commercial cleaning products. But since many are concentrated, they can save money in the long run.

They also work differently than traditional products. For instance, some create

fewer suds. So make sure you ask the manufacturer for educational materials on using the products. Then train your maintenance staff.

To further reduce your business waste:

- **Choose all-purpose products.** They let you buy bigger quantities of fewer products, which helps save money and reduce packaging.
- **Choose concentrated cleaners.** Concentrates give you more product for less packaging.



SOURCE: Barbara Damrosch. *The Garden Primer*. New York, Workman Publishing, 1988. *The Consumer's Handbook for Reducing Solid Waste*. Washington, D.C., U.S. EPA, August 1992.

Also ask for:

"Source reduction checklist for business: storage and maintenance options"



Brush up on paint

Americans use three-million gallons of paint every day—more than a billion gallons every year. That could fill a lake 20-feet deep, four-miles long and one-mile wide.

Everyone faces painting decisions sometime in their lives, and there's more to it than choosing a color. What kind of paint you use and what you do with it when you're done has a direct impact on the environment. Even how you clean the brushes matters.

"Paint" refers to a range of coating materials separated into two categories. If paint thinner or mineral spirits needs to be used to clean up brushes and hands, the paint is oil-based. If water is used for clean up, the paint is latex or water-based.

Oil-based paint and paint products—thinners, solvents, stains and finishes—are classified as hazardous by the Environmental Protection Agency. Oil-based paint can damage the environment and human and animal health. If the paint is thrown in the trash in liquid form, it could eventually enter the groundwater.

Lead was banned from paint in 1973 and mercury in 1990. But the average American has about four gallons of old paint sitting around in basements and garages. Collection programs still turn up lead paint, and mercury will be common for

some time to come. Before using leftover paint on interior surfaces, read the label on the can carefully for mercury content. If you're unsure, call the National Pesticide Telecommunications Network at 800-858-7378. They can tell you whether or not your paint contains mercury. The long-term solution for eliminating lead-based paint is to remove it and replace it with latex or water-based paint.

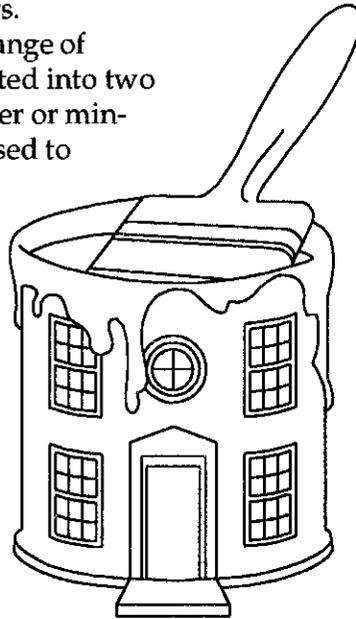
Using it up

Some areas have come up with creative ways to "share the wealth" of unused paint. For example, Monroe County Solid Waste Management District has a "paint bulking" program that collects and mixes together large amounts of latex paint.

About 45 percent of what's collected can be used. Dirty and moldy paint is properly disposed. The remainder is strained and blended. No matter what shades get mixed in, the results come out about the same shade of beige.

It has about a one-year shelf life and is distributed to community groups and the general public.

Some communities also have paint-exchange programs where people bring reusable paint to trade or give away. Santa Monica, Calif., alone has recirculated more than 600 gallons of paint this way. You could also donate unused paint to a church, school or community group.





Disposing of what's left

If your leftover paint is water- or latex-based and dries out before you can use it, it's all right to dispose of it with your other trash.

If the latex paint isn't entirely dry or it gets moldy, it can be left open outside to evaporate. Stirring in an absorbent, such as cat litter, speeds up drying. Depending on the amount of paint, the evaporation process could take several days to several months.

If the paint is oil-based, it's a bigger disposal problem because the volatile hydrocarbons it contains could ignite. Never let it sit open to evaporate—the fumes are toxic and pollute the environment.

Many oil-based paints are also pigmented with toxic metals like cadmium.

So use up the oil-based paint you have. If you can't, your next best choice is to take it to a hazardous-waste facility for disposal.

Never dispose of any kind of paint or paint product by pouring it on the ground or into a sewer. Do that, and the hazardous materials in the paint could make their way into the water supply. Brushes contaminated with water-based paints should be cleaned in a sink so the paint residue will make its way to a waste-water treatment facility. Solvent from an oil-based paint brush clean-up shouldn't be

dumped down the drain. The solvent can be saved and reused for future brush cleanings.

What about other paint products?

Paint strippers, thinners, varnishes, stains, turpentine and glues contain toxic chemicals that can cause air and water pollution and may present health risks. These products can also irritate skin. Safe alternatives for removing paint, stains and varnishes from skin include water, baby oil, butter or margarine.

When removing paint from wood and metal surfaces, consider alternatives to chemical strippers—sandpaper, scrapers, heat guns or water-based strippers. If you must use a more hazardous product, buy only what you can use up and minimize waste. If you have some left over, share it with a friend. Landscapers, railroads, nurseries, graphic artists, furniture refinishers, small auto-body or auto-repair

shops, or paint contractors may also be able to use these leftover products.

If you must dispose of these products, do it at a household hazardous waste collection center. If a collection program isn't available, label the product clearly, seal tightly and keep away from children and pets until used up.

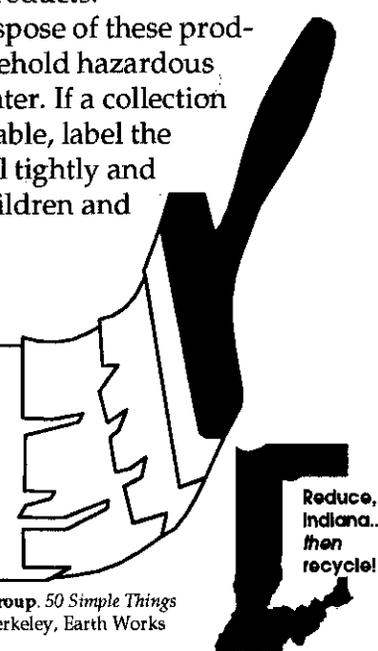
Next time around

- Choose water-based paints instead of oil-based.
- Avoid spray paints.
- Avoid exotic colors you aren't likely to reuse.
- Estimate the proper amount needed for the job and buy only what you need.
- Use it up by applying a second coat or touch up.
- Use leftovers on other projects. Properly stored paint will stay in good condition for up to 10 years.

Free paint disposal guide:

"Paint Disposal...the Right Way" is available from the National Paint and Coating Association, 1500 Rhode Island Ave., NW, Washington, D.C. 20005.

SOURCE: The Earth Works Group. *50 Simple Things You Can Do to Save the Earth*. Berkeley, Earth Works Press, 1989.



Reduce,
Indiana...
then
recycle!



Get all charged up

Americans use two-billion disposable batteries a year in everything from clocks and watches to toys, cameras, flashlights and radios.

Batteries contain toxic metals and are thus a dangerous waste. About half of all the mercury and one-fourth of all the cadmium used in the United States goes into batteries.

Yet most batteries are thrown out with the trash and end up in landfills, where they may corrode, break apart and release those metals into the soil. Batteries that get incinerated with other trash release dangerous vapors into the air and ash.

Some simple alternatives

- **Avoid products that operate only on batteries.**

Like some toys, for instance.

- **When a product uses either batteries or electricity, choose electricity as often as practical.**

The small amount of electricity used is less hazardous to the environment than the battery. Pollution created by producing electricity is highly regulated and managed.

- **Buy products with built-in recharger cells.**
- **Invest in rechargeable batteries and a recharger to handle most of your battery needs.**

Rechargeables aren't appropri-

ate for some uses, and they are somewhat more expensive than single-use batteries. However, just a few changes of regular batteries will pay for your investment.

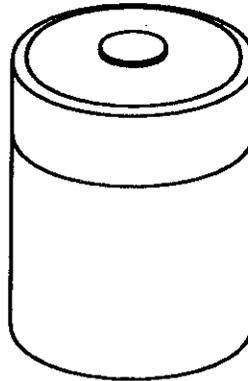
Rechargeables still contain cadmium, but they create less waste because they can be reused up to 1,000 times if used properly.

Take advantage of collections, drop-offs

The Indianapolis Clean City Committee and the Monroe County Solid Waste Management District are two examples of household battery collections. Both these entities are working in cooperation with area Target stores. In Indianapolis, the program has expanded so that residents can drop batteries off at all Marion County public libraries.

The Indianapolis program accepts AAA, AA, C, D, 9-volt, cylindrical and button-cell batteries. In the first six months of the program, 1.4 tons of used household batteries were collected for proper disposal and recycling—the mercury equivalent of 7,000 household thermometers.

Call your city or solid waste management district to find out if they have a similar program.



SOURCE: The Earth Works Group. *50 Simple Things You Can Do to Save the Earth*. Berkeley, Earth Works Press, 1989.



Chapter 5: **How institutions can reduce**

Institutions—schools, universities, hospitals, correctional facilities and other public facilities—can do much to reduce waste. U.S. Census data indicates government alone employs one out of every six workers in the United States. Franklin Associates estimates these workers are responsible for generating about 12-million tons of waste annually. While the exact amount of waste generated by other institutions is not known, a study by CalRecovery has estimated institutional waste to be 11 percent of the total municipal solid waste stream in New York City. (Marian R. Chertow, *Waste Prevention in New York City: Analysis and Strategy*, prepared by CalRecovery for the New York City Department of Sanitation, January 1992.)

Institutions are in a unique position in that they represent a composite of business, food service, home and industrial-type activities. Thus, they often generate several types of waste. For example, a correctional facility might generate office paper like a business, food waste like a restaurant and industrial waste from prison industries. Even though the challenge in targeting all these waste streams for reduction is greater, the opportunity for success is also magnified.

Become a model

One way for solid waste planners to address the needs of institutions in their area is to become a source reduction model. Put as

many of the strategies described in this guide to work as you can, document your own results and make them available to other institutions with similarly diverse waste streams.

Or, select sister agencies with food-service operations, office waste, yard waste and manufacturing operations to demonstrate source reduction in one or more of those sectors. Compile results on reducing the various waste streams found in the institutional arena and use them to help get other institutions in your area working toward the state's waste reduction goal.

Don't forget to put to work public-education strategies outlined in Chapter 2 to help get publicity for the agencies taking part. This will encourage other institutions to join in.



How to use this section

The complexity of the institutional operation will demand that solid waste planners make their consulting skills available. Most of the information industries and other businesses need to start effective source reduction programs can be found in one or two places in this guide. However, institutions may require information from all parts of this guide at one time or another.

For example, schools, which transport students in buses, and local government, which transports trash in trucks, may be particularly interested in a fact sheet on maintaining automotive vehicles in *Chapter 3: How Hoosiers can reduce*.

Correctional facilities, universities and hospitals that operate cafeterias may be interested in learning more about composting food wastes from the fact sheet entitled "Strategies save money, benefit lawn," also in Chapter 3.

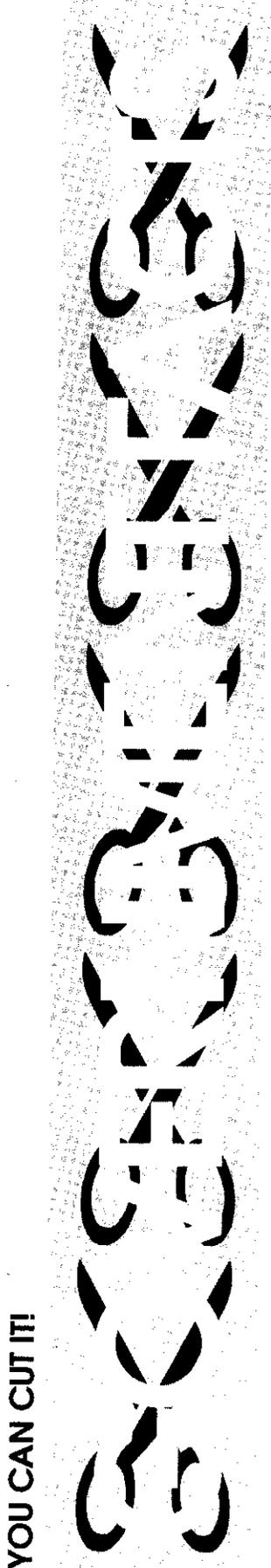
Chapter 4: Cutting toxics in municipal solid waste could also be of interest. That chapter includes suggestions for non-toxic cleaning and grounds care, and information on paint and battery use and disposal.

Correctional facilities usually have some sort of manufacturing operation they use to occupy and employ inmates. As such, these facilities could benefit from the waste-analysis

and auditing information included in *Chapter 7: How industries can reduce*.

Reducing at the office, developing an environmental ethic and using purchasing policies to reduce are included in *Chapter 6: How businesses can reduce* and could benefit any institutional operation.

In many cases, fact sheets in this section cross reference other fact sheets from *You Can Cut It!* which may help institutions develop their source reduction strategies. Solid waste planners can help by being available to aid institutions in mapping out *comprehensive* strategies to target their diverse waste streams and guide them to the proper educational materials included in *You Can Cut It!*



YOU CAN CUT IT!

Government should be a model

According to U.S. Census data, one out of every six workers in the United States is employed by federal, state or local government—a total of 19-million people. Each year, federal, state and local governments spend almost \$1 trillion—about 20 percent of the gross national product.

Reducing waste generated by this sector could have a great impact on the municipal solid waste stream. While exact figures aren't available, it's estimated that government generates about 12-million tons of waste a year.

Some specific things government can do—particularly on the local level—are outlined below.

Be model citizens

Government can serve as an institutional model for source reduction in its local offices, cafeterias, parks, public works yards and other facilities.

Source reduction activities by the state of Indiana include:

- When purchasing new carpet for its facilities, unworn sections of old carpet are made into walk-off mats.
- Double-sided copying is available and promoted.

- Use of electronic mail and routing slips reduce paper consumption.
- File folders, manila envelopes and binders are reused.
- State cafeterias sell coffee mugs, sports water bottles and plastic stadium cups imprinted with the state seal. State employees can get large drinks for the price of mediums if they bring one of these cups in for a refill.
- State cafeterias charge extra for disposable take-out containers.

Revise purchasing policies

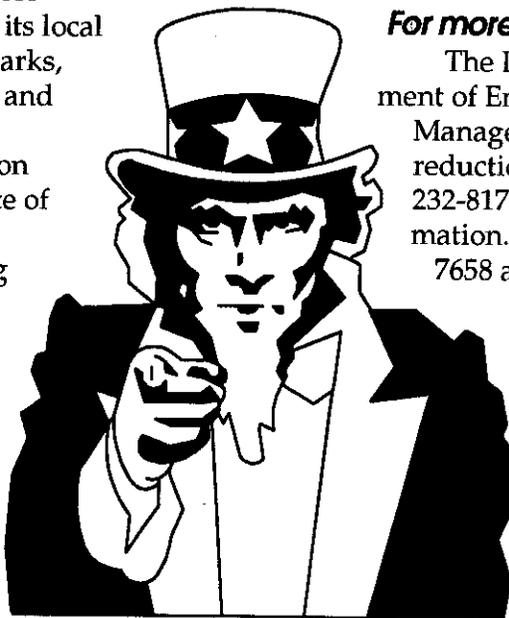
Procurement policies should reflect the reduction philosophy. Specifications for equipment, vehicles, supplies, furniture, parts and materials should help ensure local governments systematically buy durable, reusable, recycled and recyclable products.

Policies should also encourage limited use of disposable items where appropriate and discourage the use of non-recyclable products or packaging in government-sponsored activities.

For more information

The Indiana Department of Environmental Management has a waste reduction team. Call 317-232-8172 for more information. Or call 317-232-7658 and talk with Laura Dellinger, state waste reduction coordinator.

SOURCE: *Making Less Garbage*, written by Bette K. Fishbein and Caroline Gelb, INFORM, New York, 1992.



Schools can teach 4th 'R': *reduction*

Along with "reading, writing and 'rithmetic," there's a fourth "R" schools can play a key role in teaching: reduction.

On a daily basis, American schools serve 60-million students enrolled in kindergarten through college, along with school faculty and staff.

An individual student generates an estimated 160 to 240 pounds of waste per year. That's 4.8-million to 7.2-million tons of waste nationwide—2.6 percent to 4 percent of the U.S. waste stream.

Reaching children at an early age is a good way to encourage positive environmental habits, which children take home and share with their family and others in their community.

For example, a group of first-, second- and third-grade students at Highland Park Elementary School in Bloomington who went on a landfill field trip made some suggestions based on what they saw. The result has been less waste in the Monroe County area.

After a teacher-led discussion on how much waste individuals produce and how it can be reduced, the students wrote a letter to the school principal, asking if there were some way to eliminate the

stack of discarded milk cartons produced everyday in the school cafeteria.

The principal passed the message along to the food services coordinator for Monroe County Community School Corp., who worked with a local dairy to set up a pilot project serving milk in aseptic pouches, which take up less room in landfills.

The milk pouches were tested for three days, and used pouches were kept and compared with the amount of trash used milk cartons create. The school corporation adopted the pouches and cut its solid waste volume by a third. Disposal costs decreased \$5,000 and the

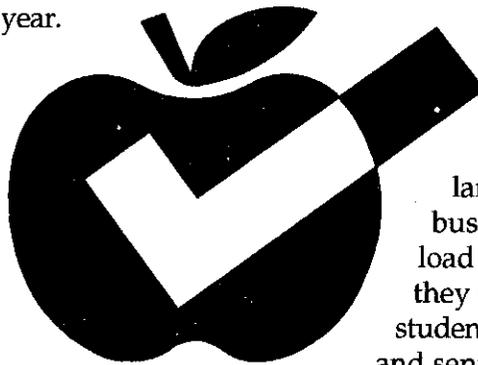
pouches produced a savings of 1 cent per serving.

While at the landfill, the students also saw a large truck from a local business dumping a load of cardboard. So they took a drawing one student made of the truck and sent it to the company, asking the company to find ways to reduce and recycle cardboard.

The children's actions send a valuable message to people who wonder what the efforts of one person or a small group can accomplish.

"I hope it makes people realize that if you ask the right question in the right way to the right person, it can effect a change," says Jane St. John, waste reduction and recycling coordinator for the Monroe County Solid Waste Management District. "That's what these children did, and they're making a real difference."

For more information, call Jane St. John at 812-333-3872.





Check out the cafeteria

Cafeterias are always good places to look for ways to reduce because they serve large numbers of people and often use disposable products.

General Electric's plastics division has developed an alternative to the plastic milk pouches Highland Park school switched to—an eight-ounce Lexan® plastic bottle. The bottle is designed specifically for school lunch programs and can be reused 100 times and then recycled.

Dairies pay about 30 cents each for the Lexan bottles, versus two or three cents for standard wax cartons. Because of washing and handling costs, a GE spokesman estimates 70 or 80 trips per bottle will be necessary for the dairies to break even.

However, the Bethlehem School District in Pennsylvania cut its waste 50 tons annually by switching to the bottle, and disposal costs went down \$44,000.

When the Chappaqua Central School District in New York switched from polystyrene trays to reusable trays in its cafeterias, about \$44,000 was spent on new dishwashers and reusable trays. The switch paid for itself in two years, though, and preliminary estimates show a 50-percent reduction in trash volume.

All the same source reduction techniques that work for restaurants and other food services also work in school cafeterias. Ask your solid waste management district for a business fact sheet and checklist on restaurants and food services.

Lessons learned

Consider these classroom and extra-curricular activities:

- Develop environmental curriculum and provide in-service teacher training.
- Discuss non-renewable and renewable natural resources, waste-management options and costs.
- Make environmental education required.
- Have students collect daily trash to help visualize amounts generated and develop opportunities for reduction and reuse.
- Encourage student activities to reduce the

amount of paper, food, packaging and other materials used during the school day, such as using paper scraps in class and bringing food in reusable containers.

- Assign backyard composting/decomposition projects.
- Hold packaging discussions, including developing a labeling program, marketing and advertising ideas, and packaging design.
- Keep a swap box for toys, books and games.
- Develop source reduction slogans.
- Make musical instruments out of materials that would normally be discarded.
- Take garbage surveys to identify disposal habits and opportunities for reduction.
- Visit local businesses to learn how they're cutting waste.
- Sponsor coloring, poster or essay contests.
- Assign arts and crafts projects or contests using items that would otherwise be discarded.
- Take on class projects that identify less wasteful substitutes for certain products and how to encourage consumers to use them.
- Place suggestion boxes so teachers and students can relay source reduction ideas and identify any problems with existing programs.
- Start a club to make your school more environmentally conscientious. Find a faculty sponsor and a core of interested students.
- Get other clubs to adopt source reduction efforts as community-service projects.
- Encourage use of scrap paper for notepads, short quizzes and drafting assignments.
- Encourage teachers to use chalkboards, overhead transparencies, bulletin boards and double-sided handouts to reduce paper waste.
- Share newspapers.
- Collect unused materials—notebooks, pens and pencils—at the end of one year to donate to needy students next year.

SOURCES: *Making Less Garbage*, written by Bette K. Fishbein and Caroline Gelb, INFORM, New York, 1992. "Businesses Promote School Recycling," *BioCycle*, October 1992.



Colleges: graduate to reduction

Universities and colleges are an excellent setting to put source reduction strategies to work. In an atmosphere where "higher education" is emphasized, school practices can instill in students an environmental ethic they'll carry through life.

College waste facts

The waste generation rate varies at universities and colleges, depending on the percentage of students in campus housing and the time of year.

According to the University of Illinois Center for Solid Waste Management and Research, a school with a large population of students in dormitories averages 820 pounds of trash per student per year, compared to 180 pounds of trash per student per year at a primarily commuter school. Even though listed as a per-student value, these rates account for all on-campus waste generation.

Limited per capita generation rates for dining facility and dormitory settings have been measured at 0.36 pounds per student per meal and 1 pound per student per day, respectively. As school population

increases, the per student rate of waste generation also tends to drop.

Waste stream quantities tend to go up when school is in session. October is consistently a high generation month because of landscape waste and students and faculty disposing of surplus materials generated around registration. March and April also tend to be above average, probably due to spring cleanup activities.

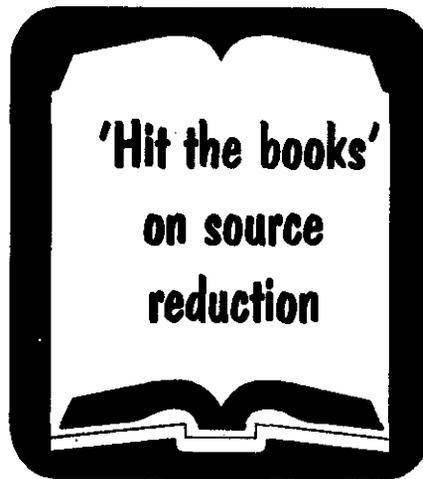
Paper is the major contributor to university and college waste, averaging 61 percent of the waste stream by weight.

Getting started with reduction

Source reduction strategies for universities and colleges need visible support from school administration. Such support brings with it endorsement of the goals of a source reduction program, financial backing and a level of priority. It also forms the basis for long term changes in waste-handling policy and procurement procedures.

Changes in work and procurement practices will likely be the primary methods of source reduction in the university setting, and each change will need to be evaluated against change in cost or services provided.

The type of waste handled within the university will also dictate the different educational, collection and processing methods used. Academic waste will likely be paper, while food-service waste will





probably be mostly food and container materials. Dormitory or fraternity/sorority waste would more closely parallel standard municipal waste with increased quantities of disposable packaging. Each setting will call for different handling considerations.

Procurement changes will involve more effective purchasing so total waste generated per product purchased is reduced and life cycle is optimized. These guidelines may help you get started:

- Review environmental impacts of products purchased. Ask for our "Source reduction worksheet for business."
- Adopt and promote criteria for making purchasing decisions—performance, durability and life-cycle cost. Ask for our fact sheet on business planning and packaging.
- Develop a network of information sources about environmental purchasing. Find out more about the Indiana Waste Exchange by requesting our fact sheet "Turn your trash into treasure."
- Add a standard clause to all requests for bids requiring vendors and suppliers to provide information on the environmental qualities of their products or their company. Ask for our fact sheet "Use supplier relationships to reduce."
- Monitor program progress annually.

Successful ideas from other colleges

To reduce paper/office waste...

- Buy copy machines capable of double-sided copying and develop a campus policy of duplexing for multiple-page documents. Charge less per copy at public photocopiers when the duplex option is chosen.
- Encourage students and staff to reduce the junk mail they receive. Request our fact sheet "Take an active stand" for suggestions.
- Look for ways to reduce junk mail the college generates. For example, distribute printed communications through kiosks rather than sending every student a copy.
- Encourage the use of electronic and voice mail whenever possible. Initiate training sessions to show staff how to use them.
- Reuse boxes, envelopes and packing materi-

als. Have reusable inter-campus mail envelopes available for students and staff.

- Reuse/remanufacture laser toner cartridges. Provide a financial incentive by making refilled/new cartridges cheaper if an empty used cartridge is returned.
- Request our fact sheet "Cutting waste at the office" and the related checklist of ideas.

To reduce food-service waste...

- Change methods of purchasing food to minimize waste. For example, consider a per-pound or per-item charge instead of an "all-you-can-eat" meal ticket.
- Avoid purchase of single-use items, if it makes sense for your situation. Replace disposable tableware with reusable dishes and flatware. Consider giving discounts to students and staff buying food and beverages in reusable cups or dishes. Indiana University's "Sugar & Spice" snack shop in the Memorial Union encourages reuse by selling insulated, 32-ounce mugs for \$1.95 and giving 20-cent discounts to customers who bring them in for refills. The school's sold about 5,000 of the mugs since September 1992. **For more information, call Mallick Wightman at 812-855-1777.**
- Request our fact sheet "Restaurants can affect waste line" and the related checklist of ideas.

Other ideas...

- Reuse or remanufacture wooden shipping pallets. For more information, ask for our fact sheet "Look for a package deal" and a related checklist of "Storage and maintenance options."
- Reuse or store furniture and other items students often leave behind. Students may not have available transportation to move these items and abandon them instead. A sales and storage program would encourage reuse.
- Sponsor collection of clothing, books and appliances for reuse. Make it part of a standard charity/recycling program.
- Reduce landscape waste by leaving grass clippings in place and grinding other yard trimmings for use as mulch.

SOURCE: Bruce A. Hegberg, Gary R. Brenniman and William H. Hallenbeck. "University and College Solid Waste Reduction and Recycling." University of Illinois Center for Solid Waste Management and Research, Office of Technology Transfer, School of Public Health (M/C 922), Box 6998, Chicago, Ill. 60680.



Hospitals find ways to cut

In 1990, the Statistical Abstract of the United States cited information from the American Hospital Association documenting 26,400 hospital beds in Indiana. The Tellus Institute, a consulting firm, estimates the hospital waste-generation rate is 3.2 tons per bed per year, a rate that incorporates all the solid waste in the hospital, including that generated outside patient-care areas. Therefore, health-care facilities offer a substantial opportunity for source reduction.

Lafayette Home Hospital was one of the first Indiana hospitals to adopt an environmental statement. Tom Barry, the hospital's senior vice president of operations, said the board decision to protect and improve the environment united the hospital in consciously monitoring the impact it had on the environment. The community has also reacted enthusiastically, citing the hospital as a leader in area environmental efforts.

Memorial Hospital of South Bend has also adopted an environmental "vision" statement, and the chairman of its environmental team was recruited to serve on a national advisory council sponsored by Kimberly Clark to discuss ways the vendor could become more environmentally safe.

Evaluate the strategies outlined here to see what will work at your facility. Remember that beginning with broad-based support from the facility's board, administration, doctors and employees will contribute to your success.

Purchasing

Buy in bulk whenever it saves packaging, and develop packaging preference criteria to support the Indiana Packaging Waste Reduction Task Force. Task force recommended preferences, from first to last, are:

- No packaging
- Minimal packaging
- Consumable, returnable, refillable/reusable packaging
- Recyclable packaging/recycled material in packaging

Estimated annual source reduction savings for 1,000-bed hospital*

STRATEGY	SAVINGS	
	Tons per year	\$ per year
Replace paper towels with air dryers	100	\$45,000
Replace disposable food-service items with reusables	200	\$500,000
Eliminate use of plastic trash liners in administrative areas	7	\$ 20,000
Replace disposable linens with reusables	150	\$200,000
Replace disposable admission kits (water pitchers, glasses and bed pans) with reusables in patient rooms	20	\$150,000
Switch from disposable to reusable containers for sharp medical instruments	17	\$175,000

*Savings include washing, laundering and other service costs, but do not include capital costs.

SOURCE: New York City Department of Sanitation, "A Comprehensive Solid Waste Management Plan for New York City and Final Generic Environmental Impact Statement," August 1992.



Improve ordering practices so that perishable products don't become outdated and unusable. A 10-percent reduction in the number of unused products discarded would save about \$10,000 annually for a 1,000-bed facility.

Renegotiate contracts with haulers of "red bag" (regulated medical) waste to provide, clean and return reusable containers.

Patient-care supplies

Floyd Memorial Hospital in New Albany considers its efforts to reduce the amount of disposable goods it uses the most important component of its extensive waste-management project. Each department systematically reviews the disposables it uses and attempts to find alternative reusable products. As a result, the facility switched to cloth towels in some areas. Although the towels aren't reusable, the hospital sells them to a rag company for recycling.

Clark Memorial Hospital in Jeffersonville started using cloth diapers in May 1990. A diaper service launders the diapers because of the hospital's limited storage space. The change caused no additional costs or savings.

Memorial Hospital of South Bend switched to cloth diapers in December 1990 and launders them in-house. Before the switch, the hospital spent about \$32,000 a year on disposable diapers for its 3,500 newborns. Initial start-up costs were \$24,000 for diapers, plastic pants and special laundry soap. Worn diapers are reused as cleaning rags.

To calculate the amount of source reduction realized when switching to cloth diapers, use this formula:

- Average annual births in your facility
- x Average number of diaper changes per baby in a 24-hour period (average is 11)
- x Average number of days a baby stays in your hospital
- = Number of disposable diapers used per year
- x 7 ounces (average weight of each soiled diaper)
- = Avoided waste in one year

Your hospital may benefit from switching to reusable products for these items: decubitus-care mattresses (this could eliminate the need for other mattress pads), patient pitchers and glasses, linens, pillows, bed pads, underpads, gowns, emesis basins, bed pans and urinals.

Medical-care supplies

Consider switching from disposable medical instruments to reusable instruments. A set of single-use instruments costs about \$800, while reusables cost \$1,500 and can be used up to 20 times. However, manufacturers of single-use instruments say their products are safer and more reliable and that sterilizing, repairing and maintaining reusable equipment can be costly.

Evaluate changing to a non-toxic x-ray developer. Itasca Medical Center in Minnesota found that x-ray image quality wasn't affected when it switched to non-toxic "T2" chemistry. The new developer contains no hexavalent or trivalent chromium, is 95 percent acid-free, has no irritating fumes and doesn't damage clothing. The fixer is borate-free, and the developer starter has a neutral pH.

Look into rechargeable batteries or rechargeable products wherever possible. Consider products with low-battery warning lights. Also evaluate the effects of switching from disposable products to reusables for surgical and isolation gowns and sterilization trays.

Cafeterias

Look into reusable tableware and dishes for cafeteria and patient service. If you're concerned hospital staff will carry dishes away from the cafeteria and not return them, you can set up collection locations near staff offices.

Sell or give staff members reusable mugs and offer a discount for beverages when they bring their own mug. Hospitals that already have such programs include Clark Memorial, Memorial of South Bend, Community Hospital in Indianapolis, Memorial Hospital in Logansport and Witham Memorial in Lebanon.

If you can't switch to disposables, start a "think before you use" campaign to get staff to use fewer disposable items—tableware, napkins, condiment packets, cups.

SOURCE: "The New Three R's: A Solid Waste Management and Recycling Guide for Indiana Hospitals," Indiana Hospital Association, 1 American Square, P.O. Box 82063, Indianapolis 46282, 317-633-4870. Call the IHA at 317-633-4870 for more information.



Correctional facilities can cut waste

Correctional facilities on the local, state and federal levels present a major opportunity for source reduction since correctional officials have a high degree of control over how much and what kind of waste is produced.

According to U.S. Census data, there were 24,918 prison and jail inmates in Indiana in 1990. Based on the EPA's waste-generation estimate of 4.3 pounds per prisoner per day, Indiana prisoners may generate more than 19,619 tons of waste each year.

The Indiana Department of Environmental Management has awarded an Indiana Recycling Grant to the LaPorte County Solid Waste Management District to devise a reduction and recycling program at the Westville Correctional Center.

Nearly 5,000 offenders reside in one of LaPorte County's two prisons. The prisons also employ 2,200 LaPorte County residents and receive about 58,000 visitors a year. Therefore, potential diversion from disposal is significant.

The solid waste management district, with the help of a consultant, has completed a waste audit of the correctional facility done from purchasing

records, and plans call for development of a six-month test program.

Since the program will serve as a model for all correctional facilities in Indiana, the solid waste management district is developing an implementation manual and training seminars. The district hopes to have the manual completed and two seminars held by the end of 1993.

For more information, call Lynn Waters, executive director, LaPorte County Solid Waste Management District, 219-326-6808.

New York state implemented an extensive prison source reduction program in 1990. At the outset, the state's 60,000 prisoners generated about 44,000 tons of waste each year. A combined strategy of source reduction and recycling reduced waste by 65 percent. The New York state department of corrections reported savings of \$1.2 million in avoided disposal costs from October 1990 to October 1991. At the 30 facilities



YOU CAN CUT IT!



with comprehensive programs, disposal costs were cut in half.

Generally, the prison waste stream consists of corrugated cardboard, food waste, tin from food containers, office paper, newspaper, polystyrene foam, plastic containers and miscellaneous materials such as wood and scrap metal. The five source reduction strategies the state of New York implemented to address these wastes are reviewed here.

On-site composting

In October 1991, an estimated 385 tons of organic material were composted, amounting to an estimated \$44,000 in avoided disposal costs, making the pay-back period for \$20,000 of equipment less than a month. The program includes composting cotton mattress filling, which diverts an estimated 50 tons of waste from disposal annually and saves the prison system an additional \$5,750 in avoided disposal costs.

Prisons with compost sites receive yard waste from the state department of transportation and local landscapers to use as a bulking agent in the composting process. Finished compost, then, is used primarily within the prison system at farm sites or in prison horticulture vocational training facilities. The prison system donates about 1 percent of its compost to community-service programs or to prison workers for home use.

Switching to reusables

About 12,000 New York prisoners are isolated for medical, safety or disciplinary reasons, and they had been receiving all meals on disposable polystyrene trays in their cells. This amounted to more than 13-million disposable trays thrown out each year. A prison study found a polycarbonate plastic tray (trade name Lexan®) to be the best option for eliminating the disposables, since it is unbreakable and can't be used as a weapon. Costs are about the same for one year of use. If the trays last three more years, the prison system saves almost \$30,000 in avoided costs. Expanding the Lexan tray program to the entire prison system will save about \$800,000 a year in purchasing costs over the four-year life-span

of each tray. Savings estimates don't take into account labor for washing the trays, costs of cleaning supplies or additional energy used.

Eliminating trash bags

Administrative office workers are encouraged to avoid using trash bags in their waste cans and in trash collection, since most waste generated is dry. To eliminate trash bags in cans that hold wet waste, such as food, prisoners are assigned to wash trash cans.

Purchasing goods in bulk

To save money and reduce waste, the prison system is moving from kitchens at each facility to four centralized food-processing centers. Under the new system, food will be prepared in one of the four centralized facilities and shipped chilled to individual prisons to be heated and served.

Centralization will help the prison system make bulk food purchases, reduce tin and cardboard in the waste stream and save money. The environmental impact and cost of additional transportation and waste associated with shipping to individual facilities hasn't been assessed.

Other bulk-purchase strategies involve a switch from single-serving cereal and milk purchases. This change cut waste from these sources in half. Other items, such as tomato sauce, are purchased in bulk refillable containers.

Reducing paper use

Reducing paper use is encouraged, along with other reduction activities appropriate for any office or business.

Prisons bind used computer printout paper to make notepads for classes. About 20 prisons are also contributing low-grade office paper and newsprint to prison farms, where it's used as animal bedding. Savings are expected to be significant since animal bedding was being purchased for \$35 a ton.

SOURCE: "Making Less Garbage: A Planning Guide for Communities," authors Bette K. Fishbein and Caroline Gelb, INFORM, New York, 1992. For more information, contact James I. Marion, recycling program manager, Sullivan Correctional Facility, P.O. Box AG, Fallsburg, N.Y. 12733-0116, 914-434-2080.



Chapter 6: How businesses can reduce

Business and industrial sectors account for 40 percent to 60 percent of the solid waste stream. It is easy to see, then, why workplace source reduction plays such an important role in the state of Indiana's goal to reduce solid and hazardous waste 35 percent by 1996 and 50 percent by 2001.

Why reduce?

Businesses have a lot to gain from starting a source reduction effort—happier customers, happier employees and lower costs.

According to the marketing firm Michael Peters Group, 89 percent of U.S. consumers say they are concerned about the environmental impact of the products they buy, and 78 percent say they are willing to pay more for "environmentally benign" products.

It is likely your firm's customers feel much the same. They like knowing the businesses they deal with are good corporate citizens when it comes to the environment.

Employees like to feel good about their employers, too. They appreciate the opportunity to help reduce waste at work, and many see source reduction programs as an important fringe benefit. How "green" a company is may help attract top people and keep them.

Employees provide the initiative to start source reduction efforts and the momentum to keep them going. Their contributions add to the well-being of the community and can provide positive publicity for their employers.

Happier employees and lower turnover

affect the bottom line, but source reduction affects the bottom line in other ways, too.

As a solid waste management technique, source reduction can have lower environmental, social and economic costs than other forms of waste management. Reducing waste at its source can result in reduction in the costs of solid waste collection, transportation, processing and disposal.

The more efficiently supplies or product ingredients are used, the more competitive a business is in the marketplace.

How to use this section

This part of *You Can Cut It!* is geared toward the business sector. Materials in this section are appropriate for office environments, restaurants, food-services operating within a business, retail stores and the service sector in general.

Use the materials as the basis for a "consulting relationship" with the businesses in your solid waste management district. One example of such a relationship exists in Monroe County, where the solid waste management district put together a special business waste reduction and recycling guidebook. More than 120 area businesses have implemented programs as a result.

The three distinct types of materials in this section used together can help reduce the waste streams of businesses in solid waste management districts. Build on these suggestions for use:

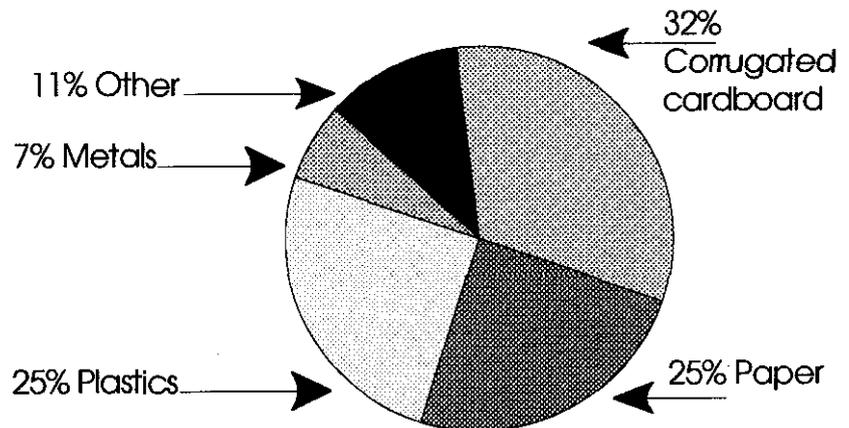
● Fact sheets

These either contain facts about a particular waste common in the business waste stream and how to go about reducing it, or they discuss a specific source reduction effort and "how-to" information.

Use the fact sheets to help educate businesses about the concept of source reduction and show them what other businesses are doing. The fact sheets should also make them aware of potential problem items in their waste streams and show them how to set up their own reduction programs.

Examples of efforts already under way throughout the state are included, along with

Waste composition in the wholesale sector



names and/or telephone numbers so that businesses new to source reduction can benefit from the experiences of others.

● Checklists

Use these once businesses have reviewed some of the fact sheets and are interested in proceeding with source reduction. The checklists give businesses a quick look at potential problem areas and help them audit what they may already be doing to prevent waste.

The checklists will get them thinking in analytical terms about what is possible and what might not be practical and will help them decide what to tackle first.

● Worksheet

Use this to help businesses thoroughly analyze their waste and come up with prevention strategies. Businesses will need one worksheet set (five pages) for each item in their waste stream.

You may want to help them focus their effort by suggesting they pick one or two of their larger or easier-to-tackle wastes to analyze first.

Eventually, though, the business should complete a worksheet for each waste. It is better to make a comprehensive list of options and include some that appear to be longshots in order not to overlook an idea which, upon further inspection, may turn out to be useful.

After the business completes an exhaustive analysis of options, they're then ready to evaluate feasibility and cost of the options for each reduction target.

● Other aids

Other sections of this guide also will be of interest to businesses:

Chapter 1: Starting at the source

Chapter 3: How Hoosiers Can Reduce Specifically—

-“Facts About Cars/Source reduction and your car” for companies with vehicle fleets or farms with agricultural implements.

-“Packaging Facts/Packaging creates most waste.”

Chapter 4: Preventing toxic waste... Specifically—

-“Maintenance Facts/Building and grounds can help reduce,” which is also appropriate for farms.

Chartering' your course

Most organizations wouldn't think of existing without a vision statement, mission statement or set of strategic goals. Your approach to creating a corporate environmental ethic should be just as structured and reflected in the company's larger strategic plan.

Corporate environmental charters traditionally take in much more than source reduction, reuse or recycling. Instead, they reflect how the company sees itself in relation to its environment and the people it employs and serves. Environmental charters serve to show investors, customers and employees your organization's commitment.

Your charter should, at the very least, cover these few basic tenets:

- To purchase durable products whenever possible.
- To minimize the purchase of single-use products and products with wasteful packaging.
- To seek opportunities to maximize the use of purchased products and the reuse of generated wastes.

Two samples are given on the back to help you start drafting a charter that suits your organization's needs.

Since a charter is likely to be the *first* first step—prior to any goal-setting or implementation—it requires commitment from the *very* top of an organization. For the program to be accepted by employees, chief executive officers need to "go public" with an endorsement.

Your CEO's part in developing corporate environmental ethic

- Adopt a corporate policy that source reduction and reuse are preferable to waste disposal, incineration or treatment.
- Select the type of waste-minimization program the company will have.
- Take a public stand against waste and pollution.
- Set a positive tone for corporate waste reduction and reuse.
- Ensure an adequate budget and staff to execute the program.
- Require various corporate subdivisions to cooperate with the program.
- Provide high visibility for reduction and reuse programs. Recognize enthusiastic participants.
- Document your firm's source reduction accomplishments.
- Document your firm's source reduction cost savings.
- Cost accounting should take into consideration the true cost of a product:
 - Avoided cost
 - + Real cost
 - = Actual savings
 - (Avoided costs are sometimes difficult to quantify, but including them will provide a truer financial picture.)
- Stimulate development and use of products that result in reduced waste.

SOURCE: Adapted from *Positive Waste Management for Ohio*, written and developed by Mark Cole for the Ohio Department of Natural Resources, Columbus, 1991.





PSI Energy Environmental Charter

Environmental stewardship statement

PSI Energy recognizes the obligation it shares with others to conduct its business in an environmentally responsible manner. Thus, we have established for ourselves the following policies to minimize the impact of our operations on the air, land and water and to encourage our suppliers, customers and competitors also to practice sound environmental stewardship.

Environmental principles

1. Incorporate environmental considerations into our planning process.
2. Consider and compare the environmental consequences of choosing certain suppliers and contractors when purchasing supplies or services.
3. Maintain and enhance internal procedures for handling environmental emergencies and meeting other environmental requirements; periodically conduct formal reviews of our activities to assure compliance with environmental regulations and internal procedures; and report results to the board of directors.
4. Educate all employees on the importance of their corporate conduct in protecting our environment, as well as their own health and safety.
5. Make environmental responsibility and innovation a guideline for measuring employee performance.
6. Make available to employees, customers and the community all relevant information on emissions, waste products and PSI's activities that may affect their health and safety.
7. Seek and implement cost-effective technologies and practices to minimize emissions, and reduce or safely dispose of waste products in our operations.
8. Pursue methods to prevent pollution and conserve raw materials, including recycling and promoting the efficient use of our product by our customers through all cost-effective means.
9. Promote sound environmental practices within our industry, including the sharing of experience with others and the continued support of research and development in environmental improvement.
10. Develop and maintain open and constructive relationships with environmental groups, regulatory agencies, public officials, customers, employees and concerned citizens.

For more information: Contact Vince Griffin, environmental stewardship manager, PSI Energy, 1000 E. Main St., Plainfield 46168. Or call 317-838-1955.

The Valdez principles

In 1989, the Coalition for Environmentally Responsible Economies (CERES) published these principles "to create a voluntary mechanism of corporate self-governance that will maintain business practices consistent with the goals of sustaining our fragile environment for future generations." For more information, contact the Social Investment Forum, 711 Atlantic Ave., Boston, Mass. 02111, 617-451-3252.

Introduction

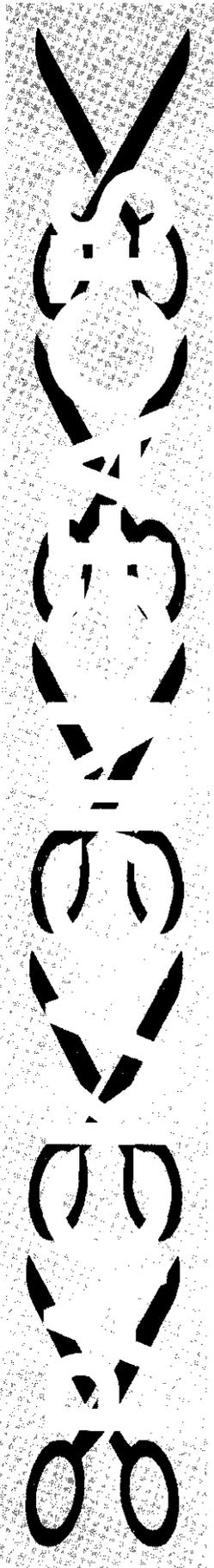
By adopting these principles, we publicly affirm our belief that corporations and their shareholders have a direct responsibility for the environment. We believe that corporations must conduct business as responsible stewards of the environment and see profits only in a manner that leaves the earth healthy and safe. We believe that corporations must not compromise the ability of future generations to sustain their needs.

We recognize this to be a long-term commitment to update our practices continually in light of advances in technology and new understandings in health and environmental science. We intend to make consistent, measurable progress in implementing these principles and to apply them wherever we operate throughout the world.

The principles

1. **Protection of the biosphere**—We will minimize and strive to eliminate the release of any pollutant that may cause environmental damage to the air, water, earth or the earth's inhabitants. We will safeguard habitats in rivers, lakes, wetlands, coastal zones and oceans and will minimize contributing to the greenhouse effect, depletion of the ozone layer, acid rain or smog.
2. **Sustainable use of natural resources**—We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve nonrenewable natural resources through efficient use and careful planning. We will protect wildlife habitat, open spaces and wilderness, while preserving biodiversity.
3. **Reduction and disposal of waste**—We will minimize the creation of waste, especially hazardous wastes, and wherever possible recycle materials. We will dispose of all wastes through safe and responsible methods.
4. **Wise use of energy**—We will make every effort to use environmentally safe and sustainable energy sources to meet our needs. We will invest in improved energy efficiency and conservation in our operations. We will maximize the energy efficiency of products we produce or sell.
5. **Risk reduction**—We will minimize the environmental, health and safety risks to our employees and the communities in which we operate by employing safe technologies and operating procedures and by being constantly prepared for emergencies.
6. **Marketing of safe products and services**—We will sell products or services that minimize adverse environmental impacts and that are safe as consumers commonly use them. We will inform consumers of the environmental impacts of our products or services.
7. **Damage compensation**—We will take responsibility for any harm we cause to the environment by making every effort to fully restore the environment and to compensate those persons who are adversely affected.
8. **Disclosure**—We will disclose to our employees and to the public incidents relating to our operations that cause environmental harm or pose health or safety hazards. We will disclose potential environmental, health or safety hazards posed by our operations, and we will not take any action against employees who report any condition that creates a danger to the environment or poses health and safety hazards.
9. **Environmental directors and managers**—At least one member of the board of directors will be a person qualified to represent environmental interests. We will commit management resources to implement these principles, including funding of a vice president for environmental affairs or an equivalent executive position, reporting directly to the CEO, to monitor and report upon our implementation efforts.
10. **Assessment and annual audit**—We will conduct and make public an annual self-evaluation of our progress in implementing these principles and in complying with all applicable laws and regulations throughout our worldwide operations. We will work toward the timely creation of independent environmental audit procedures, which we will complete annually and make available to the public.





Packaging guidelines set state standard

According to the Environmental Protection Agency, packaging accounts for nearly a third of the municipal solid waste stream nationwide and is its largest single contributor.

A Franklin Associates study updated for the EPA in 1988 projects that by 2000, packaging's share of the municipal solid waste stream will increase nearly 12 percent.

In 1990, the EPA said that packaging trash amounted to 59.4-million tons. About two-thirds of that was packaging for food and beverages. Of the total amount, 68 percent was landfilled, 17 percent was incinerated, and 15 percent was recycled.

To address excess packaging the state of Indiana commissioned an advisory body of state, public interest and business/industry representatives to develop a set of guidelines that would lead to packaging source reduction.

They set a goal that packagers of industrial and commercial products in Indiana should achieve at least a 15-percent reduction in the amount of packaging per unit of goods sold by 1994, using 1988 as a baseline.

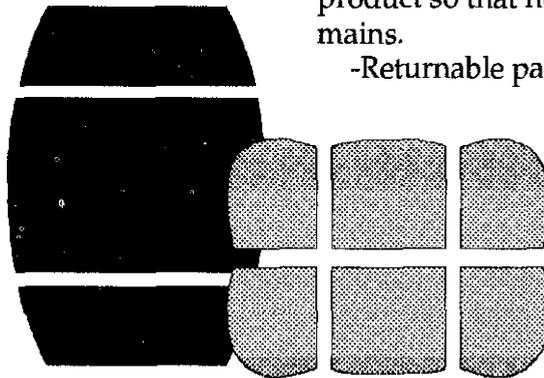
The set of guidelines the task

force issued in January 1992 include the recommendations listed below. Use them as a guide for your organization's purchasing and material management staff and consider adopting them as an official part of your source reduction strategy.

Guidelines and Recommendations for Packaging Waste Reduction in Indiana

PACKAGING HIERARCHY

- *No packaging*
- *Minimal packing*
 - Alternative methods of product and packaging design should be pursued to minimize packaging material required.
- *Consumable, returnable or refillable/reusable packaging*
 - Consumable packaging is eliminated in the process of using the product so that no packaging remains.



- Returnable packaging is a container returned to a business or industry for reuse or distribution.

- Refillable/reusable packaging is a container or package that is

refilled by a customer from bulk or large-size containers.

- *Recyclable packaging/recycled material in packaging.*

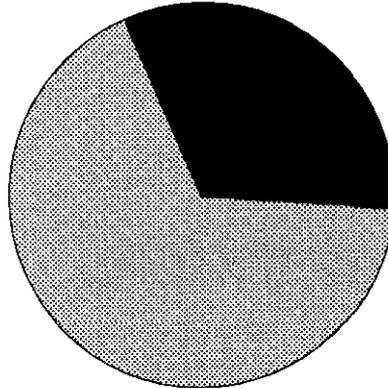
- A package is considered recyclable if there is an economically viable and widely available in-state collection, processing and marketing



Packaging share of municipal solid waste

Source: Franklin Associates, Ltd., for EPA, 1990 figures published in 1992.

195.7-million tons total



← 32.9% Packaging =64.4-million tons

← 67.1% All others =131.3-million tons

system for the material.

-Recyclability of a package is maximized when that package is made of a homogeneous material or of materials that do not need to be further separated prior to introduction into the recycling process. Permanently affixed labels, closures and seals should be made of a like or similar material to the primary package.

-Recycled content should be made up, to the greatest extent possible, from post-consumer waste materials. The use of in-plant mill scrap alone is not sufficient to be considered a recycled-content package.

PACKAGING GUIDELINES

All packaging used in Indiana, including industrial and commercial packaging, should be made so as to reduce the amount of waste from packaging being disposed of in Indiana by one or more of the following:

- **Reusable or refillable**, consistent with its original intent.
- **Composed of as much recycled material as practical**, where permissible by law.
- **Recyclable**.
- **Reduced to the minimum** amount possible while maintaining functionality. This reduction should be achieved by one or more of the following: light-weighting, concentration of product, use of multi-function products, or other demonstrated methods of source reduction. Any material switching should result in a net decrease in the amount of waste being disposed and should favor

packages that are recyclable or contain recycled material.

COMMERCIAL INITIATIVES

Retail establishments should initiate internal waste reduction and recycling programs wherever feasible. Retailers are encouraged to do the following:

● Source Reduction

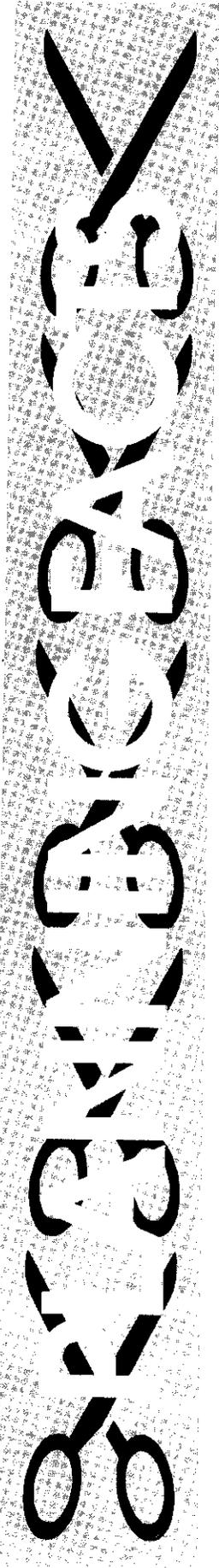
- Request minimal packaging from suppliers and/or ask suppliers to accept used protective packaging for reuse/recycling.
- Sell products in larger-sized containers, in bulk or in concentrate form.
- Adopt procedures that reduce unnecessary packaging waste.
- Institute awareness and education efforts that help consumers choose packages that minimize undesired environmental impacts.

● Reuse

- Make reusable items, such as reusable bags, available for purchase.
- Package for sale in reusable or recyclable containers.
- Treat empty storage containers as valuable commodities.
- Investigate whether empty packaging can be reused in-house.
- Test refillable, reusable or returnable containers.

For a complete copy of the task force report, write the Indiana Department of Environmental Management, Office of Pollution Prevention and Technical Assistance, 105 S. Meridian St., P.O. Box 6015, Indianapolis 46206-6015. Or call 800-451-6027.





Investigate buying, waste habits

Developing a money-saving source reduction program means you'll need to investigate your company's current purchasing and waste disposal practices.

Getting to know purchasing policies

Purchasing departments exist solely to exercise the company's clout in buying goods and services. They're there to get your business the right deal at the best price.

They know the markets, and they know many of the suppliers. So it's a good idea to have them integrally involved in your source reduction efforts. Chances are they have a good handle on where the waste comes from and will be extremely interested in cutting it.

Let them help you identify wasteful practices and what types of wastes are being discarded. Together, review those wastes and ask:

- Does the company really need to purchase items it will eventually have to pay to throw away?
- Why are these items being discarded?
- Can any of them be reused?

- Are the items available with less packaging?
- Are they available in bulk quantity?
- Are cooperative purchases with other businesses possible?

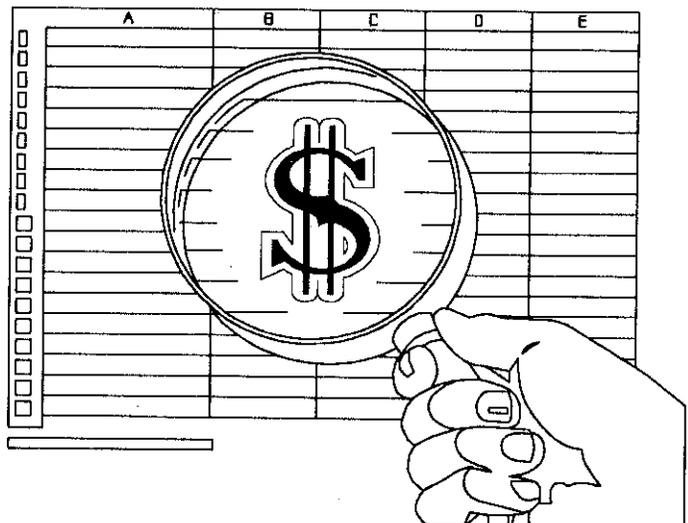
Investigate your company's current waste disposal practices

Identifying source reduction steps also means you'll need to assess your company's present waste disposal practices. Let your purchasing department help you here, too, since they probably were involved in negotiating any waste-handling agreements.

If these services are handled by employees rather than contractors, recruit your maintenance people to help in your investigation. You must have a good grip on how refuse is currently handled before you can assess your company's waste stream.

To determine present disposal costs, review the terms of the company's present waste-hauling agreement to determine use of disposal services and their costs.

- Is pricing based on volume, weight or both?
- What size trash receptacle(s) does





your company use?

- What is the frequency of pickup?
- Are receptacles full when serviced?

One way your company can save money from reducing waste is by paying less in landfill or incinerator tipping fees. If you're currently paying a flat rate for disposal rather than a rate based on weight or volume, you may want to consider renegotiating how your company is charged.

Get to know what's in your company's waste stream

The best way to determine what's being thrown away is to examine the trash.

That's right. *Dig.* Don't just *look* in dumpsters and trash cans. Do it more than once because the waste stream may vary over time due to changes in factors like season, projects and volume of work.

Also ask employees what they throw away. Especially ask the cleaning staff what they see being thrown away. Compare the information from purchasing about what your company buys

to information about what ends up in the dumpster.

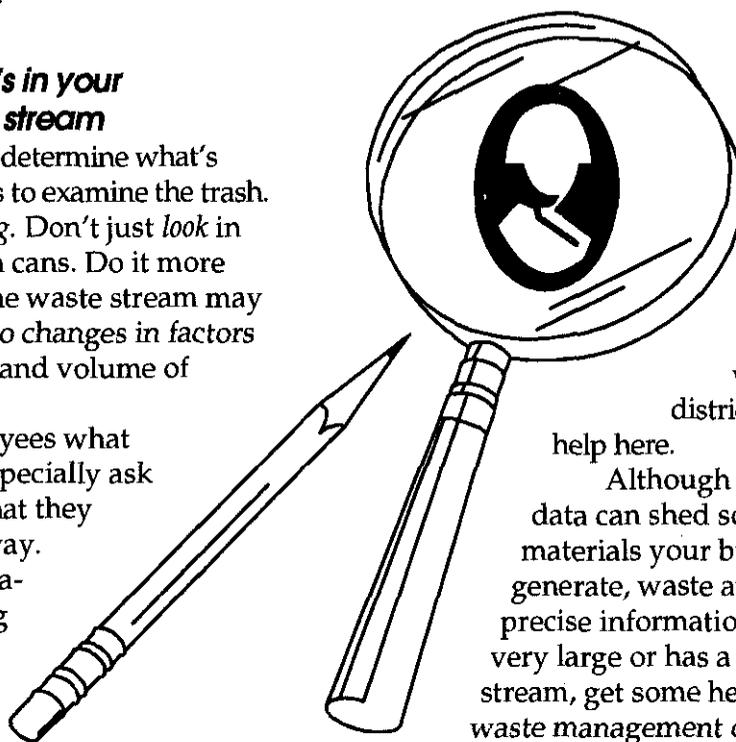
While every workstation is likely to generate some waste, like any good detective, you need to look beyond the obvious. This is where an understanding of product flow within your business may help pinpoint ways to reduce waste.

Examine the condition of the material thrown out. Could

some items be reused? For an interesting assessment of your company's waste stream, compare it to waste-composition studies of similar businesses. Your solid waste management district should be able to

help here.

Although waste composition data can shed some light on the materials your business is likely to generate, waste audits provide more precise information. If your company is very large or has a complex waste stream, get some help from your solid waste management district.



SOURCE: *The Bottom Line: A Guide to Waste Reduction for New York State Businesses*, New York State Department of Economic Development, Albany, 1992.

Help is available—just ask!

Your solid waste district has a variety of fact sheets, checklists and worksheets available to help you analyze your waste and develop a source reduction strategy.



Reduce,
Indiana...
then
recycle!

WASTE

How to get to the source of your waste

You'll need the support of top management to ensure successful implementation of source reduction policies and goals in your workplace.

The first step is to select a reduction coordinator to plan and oversee the program. Choose a leader who understands the company's structure and is able to interact well with both management and employees on all levels.

Then involve the individuals or groups most affected by operational changes you might need to make. Maintenance, materials handling and purchasing employees can help form the core of a task force or committee to review source reduction alternatives, oversee program development, recommend an action strategy and monitor program implementation.

This group should meet on an ongoing basis to identify new ways to reduce waste, which is an ever-changing commodity.

Set priorities

The first step for your task force will be to prioritize waste streams on the basis of toxicity, volume, cost and ability to segregate materials.

A thorough waste analysis will help you characterize waste streams, determine volumes of various materials produced and decide on a strategy.

Targeting an easy-to-reduce

item, the highest volume waste material or the most hazardous waste first are all good strategies.

As waste streams are assessed for reduction potential, develop accounting systems that track the hidden costs of disposal and recognize benefits of waste reduction.

This involves going beyond handling, transportation, treatment and disposal costs. Find ways to account for the value of wasted input material and lost revenue of materials that could've been sold to recyclers.

You may find you can increase operating efficiency by substituting materials or changing processes to produce less waste.

Kicking it off

An article in a company newsletter or an all-employee memo describing source reduction policies and goals will help kick off your program.

Encourage employee involvement, especially if your program will require widespread employee participation. Those who must change how they handle materials will need guidelines and training, as will new employees as they join the company.

Recognize and reward employees who make suggestions that reduce waste and save the company money. Consider incentives that reward either employees or their work groups.

Develop a regular source reduction report to monitor program success, provide feedback and identify problems.



Use the checklist on the back of this sheet to help you get started.



Use this checklist to help your business reduce waste disposal costs, improve efficiency in material management

and take part in Indiana's source reduction program. Our goal is to cut waste 35 percent by 1996 and 50 percent by 2001.

Program development

- Develop a written source reduction policy supported by top management.
- Establish ambitious and measurable source reduction program goals.
- Identify resources for technical assistance, including the local chamber of commerce, trade associations, state and local agencies, equipment vendors, consultants and other businesses.
- Designate a source reduction coordinator.
- Plan a "brainstorming" session to generate source reduction ideas.
- Conduct a companywide waste analysis.
- Identify wastes targeted for reduction.
- Evaluate alternatives, considering costs, ease of implementation, pay-back and benefit to the environment.
- Identify in-house resources, such as equipment that might be necessary to implement a reduction program.
- Develop a cost-benefit analysis that accounts for all costs of waste disposal.
- Use an accounting system that identifies waste handling, treatment and disposal expenses as direct costs of producing a product.
- Let employees know about your firm's waste disposal expenses and how goals will impact daily operations.
- Set an implementation schedule.

General planning

- Investigate waste-exchange programs for both solid and hazardous waste.
- Establish quality-assurance procedures to reduce generation of rejected products.
- Replace single-use materials with reusable materials.
- Investigate the use of returnable containers and pallets.
- Provide employee training for source separation, reuse and any other reduction

activities that will require behavioral changes.

- Establish an incentive program that encourages employees to suggest source reduction ideas.
- Explore the use of recovery equipment for reducing hazardous waste in the form of sludges, solvents, acids, degreasers and other wastes.
- Identify potential production changes to improve efficiency.
- Investigate opportunities for product or ingredient substitution that will reduce creation of hazardous waste.
- Purchase materials in bulk or larger containers, but purchase only what you need to avoid spoilage or obsolescence.
- Control inventory to reduce waste. Date stock when it's delivered, then rotate, using oldest first.
- Invest in durable products and equipment that are easily repaired.
- Ask vendors to minimize unnecessary packaging and use returnable packaging.
- Find out if outdated stock can be returned to suppliers for regeneration.
- Don't accept product samples from sales people if there's a chance the samples will become a waste that you pay to dispose.

Tips for small businesses

- Target one material for reduction when getting started.
- Work with neighboring businesses to share dumpsters and other items.
- Initially, focus on source reduction ideas that require minimal capital investment.
- Involve all employees in planning and implementation.

SOURCE: "FactSheet: Waste Reduction—Getting Started," Michigan Office of Waste Reduction Services, Lansing, December 1989.

Make measurement choice early

Measurement systems are important for effective source reduction programs because they help businesses set realistic goals for their programs, recognize accomplishments and target areas for further effort.

Although communitywide measurements on a multi-material basis have proven difficult, source reduction can be effectively measured within a business, institution or neighborhood. How you intend to measure your company's source reduction should be determined in the planning stage.

Getting started

Focusing first on quantity reduction rather than toxicity, gather basic information about the composition and source of your waste stream. Identify trends in population and business growth that affect waste generation and make choices about how to measure reductions.

Weight is the most commonly used measure of the waste stream. However, volume is a more relevant measure when you're concerned with reducing impact on landfill capacity and managing collections by truck.

Volume-to-weight ratios vary greatly for different materials. Measuring both can help you assess the trade-offs when materials are light in weight but bulky in volume,

or vice versa. However, this may be too costly and difficult if your business is already set up to evaluate by weight alone.

Collecting data

Good data collection is vital for measuring source reduction. At a minimum, collect information on:

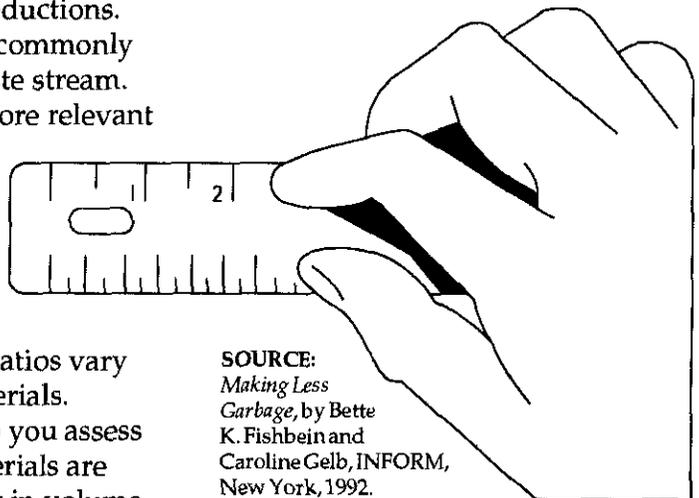
- Amount of waste
- Employee population
- Projections of change in population or activity
- Kinds of waste generated

Some problems you may encounter using this information to measure source reduction are:

- **Distinguishing changes in the overall rate of waste generation from changes in numbers of people or units generating waste.**

For the business or commercial sector, generating units are number of employees, for hospitals they are number of beds, and for schools they are number of students.

Source reduction results must be assessed by identifying a decrease in the generation *rate* rather than just a decrease in the waste stream. The decrease could be the result of fewer workers, patients or



SOURCE:
Making Less Garbage, by Bette K. Fishbein and Caroline Gelb, INFORM, New York, 1992.



students rather than source reduction.

- **Factoring out other external variables, such as the business cycle.**

Waste tends to decrease in a recession, totally apart from source reduction efforts. Seasonal variations can also have an impact. Find ways to factor out these variables.

- **Discerning small annual changes when measured by imprecise waste-generation data.**

Annual reductions in waste generation, if they occur, are likely to be small and must be measured by imprecise waste-generation data.

Two percent might be a substantial source reduction achievement for one year, but a variation of 2 percent is well within the margin of error in measuring waste generation. To compensate, measure over longer periods.

Making comparisons

The next decision is whether to measure reductions from a base-line year or from a projected increase in waste generation. For example, if your goal is to reduce waste 10 percent over a 10-year period, specify if this means a 10-percent reduction from the beginning year or a 10-percent reduction from the amount projected for the ending year.

While measuring from a projected increase shows the amount of waste that would've been generated without source reduction, the drawback is that it's dependent on the accuracy of the projections.

Solving measurement problems

How you measure may inevitably come down to what you have available to spend on data collection. While measurement is important, the money spent on it isn't available for implementing programs.

If you haul your own waste, installing scales or other measurement apparatus will do the trick. Otherwise, work with your waste hauler to establish a base-line waste-generation figure for your business.

Measuring source reductions in toxicity

The most practical way to set toxicity source reduction goals is to set goals for reducing the

purchase and disposal of specific products known to contain particular toxic substances.

For instance, a target could be the number of containers of pesticides, paints or used oil sent for disposal. Source reduction would be measured as a reduction from the base-line amount on a per capita basis.

Tangibles and intangibles

Quantifiable costs of your program include materials developed and value of the coordinator's time. Savings include avoided disposal fees, which can be calculated by tracking before and after costs.

To some extent, you can also calculate savings that result from altered purchasing practices. Good record keeping can help you track savings that result from less obvious actions, like purchasing more durable and efficient products. However, some savings might not be immediately realized.

Not all benefits of source reduction show up on a ledger sheet. Over time, employees who've been trained to reduce and avoid waste will also save your company the cost of buying excess materials and disposing of waste, since less will be created.

Decreasing landfill space and resistance to siting new disposal facilities are likely to drive up future disposal costs. Source reduction helps your company reduce present costs and manage cost increases for future planning.

Source reduction also instills a sense of pride in employees because their efforts will benefit the company, the community and the environment. You might consider trying to measure this as part of ongoing employee attitude surveys.

Make sure your customers and the public know about your efforts to reduce waste. Publicize employee contributions through awards, annual reports and other communications.

If you have a successful program, consider applying for a Governor's Award for Source Reduction and Recycling. For more information, call the Indiana Department of Environmental Management, Office of Pollution Prevention and Technical Assistance, 800-451-6027, extension 8172.



Employee input helps program

Any new workplace initiative requires a set of simple instructions to share with affected employees.

In preparation for training your company's workforce, early in the planning stages seek out individuals who are enthusiastic about source reduction.

These should be people from all levels of the company who have the ability to develop broad-based support for the program among front-line employees. A good strategy is to select one person for every work group who can serve as an official or unofficial "environmental steward."

'Focusing' on employee input

Before starting your source reduction program, consider establishing focus groups for various groups of workers within the organization.

Explain how you expect the program to develop and ask for

their input. Listening to their suggestions and concerns and incorporating what works before finalizing your program will help develop support for the program.

If employees feel they or their peers had a hand in crafting the program, they retain a vested interest in making it work.

Depending on the size of your business, separate groups may be necessary for each different classification of employee—union, clerical, technical, professional staff and management. These various groups will have different perspectives about what can be done because their view of the business and their waste streams differ.

Holding separate focus groups will also encourage open discussion. Many employees may feel too self-conscious to contribute if their supervisor or an executive is present. Each group should include about 10 to 15 employees.

Ready to 'roll'

Once you've incorporated this input into your final program, you're ready to roll the program out.

A good strategy is to introduce what's going to be happening in existing company communica-

tions—newsletters, magazines, videos, a monthly memo from the chairman, whatever is already in place at your business.

The write-up should mention that the first step in the process is to hold training workshops for managers. These workshops are held first to convey the





expectation that management is responsible for encouraging staff participation.

At the supervisors' training session, give participants some guidelines for the kind of encouragement you'd like to see. In most cases, an employee who absolutely wants no part of the program should not be forced to take part. If left alone, employees like this may eventually come around as they see how easily their co-workers adapt to the new program.

Next, work with supervisors to set up training sessions for groups of employees. Presentations should be held in the work area where the source reduction will take place so that what you expect employees to do can be demonstrated. Limit groups to 30 or less. Take about 10 minutes at the beginning to explain the program, and allow plenty of time for questions.

Supervisors should attend these workshops, too, with their employees to demonstrate their support for the program. Hearing about the program twice also increases their ability to address employee questions later on.

What to include in presentations

Presenters in these sessions should acknowledge that source reduction in the workplace is new and that changes to the initial program are anticipated.

In fact, encourage employees to let their supervisors know how some part of the effort could work better. This helps minimize their resistance to more change down the line, and it lets them know their input is welcome.

Presenters should also emphasize how easy it is to reduce, and how much better it is for the environment. Don't hesitate to also point out that if it saves the company money, everyone will be working for a healthier business that's in a better position to reward employees.

Remember to follow-up

Work with your Human Resources department to make sure an explanation of the company's commitment to source reduction is included in new-employee packets and training materials.

To ensure your source reduction program continues to flourish, consider holding periodic focus groups to find out how it's working. If employees had problems with particular practices, did they speak out and find a better way? Don't assume it.

If they don't feel comfortable resolving problems on their own, they're apt to reject the whole program because it's not working for *them*. Follow-up focus groups will give you the opportunity to get a continuous stream of feedback and make changes as needed. When employees know someone's listening, they'll speak up before they give up.

Also try to keep the program in front of employees' eyes through features in company communications—maybe a monthly report of source reduction savings or features on employees who've made valuable suggestions for changing or expanding the program.

Maybe you could institute a traveling award for the work group who reduced the most within a given period. Use your imagination and seek out the help of your corporate communications professionals.

Presentations should address:

- The company's source reduction goal.
- Planned companywide actions to meet the goal.
- Changes in procedures needed to reduce waste.
- Source reduction tips.
- Information regarding who to call with questions—the program coordinator, their supervisor or the environmental steward.
- Recognition that employees should expect the program to expand at a later date.

SOURCE: *The Bottom Line: A Guide to Waste Reduction for New York State Businesses*, New York State Department of Economic Development, Albany, 1992.





Businesses: Do step-by-step waste analysis

Step 1:

Define problem

Select a target to analyze for source reduction potential. The target could be any component of your organization's waste stream—a specific kind of paper, glass, wood, plastic or chemical.

Consider:

- How much of it you produce.
- The handling problems it causes.
- How toxic it is—either in its present form, in its manufacture or in its disposal.
- Any additional waste it generates throughout its life cycle.
- Available alternatives if you decide to stop using the product.

Target for reduction those components that appear in your waste stream in significant quantities, have a low product to package ratio or are likely to impact the environment negatively.

Step 2:

Come up with options

You have quite a few options to help reduce the waste. For non-durable goods, consider these:

- Reduce or eliminate use of the product.
- Purchase a less-toxic substitute.
- Use a "light-weighted" or reduced-volume product.
- Purchase a concentrated product.
- Purchase in bulk or larger sizes.
- Buy a multiple-use product.

For durable goods, evaluate these additional options:

- Purchase fewer models or don't upgrade and replace at all.
- Purchase long-lived products.
- Maintain products properly, then repair instead of replacing.
- Purchase a more efficient product.
- Use the product more efficiently.
- Purchase preferred complementary products.
- Buy remanufactured products instead of brand new.
- Lease products.

Step 3:

Evaluate options for effectiveness

Consider all the options that apply to the product you're evaluating. You may be surprised which ones work out to be most preferred.

As you evaluate substitutes, be sure to test their performance and consider their comparative toxicity, cost and any other environmental trade-offs. The "cure" could be worse than the disease.

Step 4:

Take obstacles into account

While you're brainstorming about alternatives that will cut your solid or toxic waste, think through what might be obstacles of using them. Some you might encounter include:

- **Technical obstacles**—Maybe more research and development is needed, or physical constraints limit the adoption of alternatives.
- **Information obstacles**—Your in-hand information may be incomplete or faulty. Possibly the information you need to make an informed decision is proprietary or expensive to obtain.
- **Economic obstacles**—Your firm



may lack the funds for initial capital investment. Or perhaps the alternative would increase your costs or liability too much.

- **Public-policy obstacles**—Government standards may dictate that some alternatives are unacceptable, or policy may encourage contradictory incentives.

- **Consumer preference obstacles**—The alternative may be less convenient, and customers or employees won't adopt it.
- **Institutional obstacles**—No infrastructure may exist to support source reduction.

SOURCE: *Getting at the Source: Strategies for Reducing Municipal Solid Waste*, World Wildlife Fund & The Conservation Foundation, Washington, D.C., 1991.

Weigh costs and benefits with this worksheet

PRESENT DISPOSAL COSTS

MONTHLY

ANNUAL

Garbage bills (\$)

Confidential destruction costs

Equipment costs (trash cans, compactor, etc.)

Labor (janitorial)¹

Revenue from any current recycling program

()

()

TOTAL DISPOSAL COSTS

SOURCE REDUCTION IMPLEMENTATION COSTS

MONTHLY

ANNUAL

Disposal costs adjusted downward to reflect reduced service²

Coordinator's time

Publicity

Adjustments to janitorial or collection labor (up or down)

Any equipment (one-time costs)

Installation (one-time costs)

TOTAL COSTS

SAVINGS

Present disposal costs

- Source reduction implementation costs

=

Net savings (costs)

¹ Assign only a percentage of your janitorial costs since janitors provide other services besides waste removal.

² Estimate how much your source reduction program will reduce your waste stream, then call your disposal company to find the cost of less frequent service or smaller bins.

CREDITS: This worksheet was adapted from the "Justification Worksheet" designed by George Luker of National Semi-Conductor, Santa Clara, Calif.

SOURCE: "Your Office Paper Recycling Guide," written by Jane Grossman for the San Francisco Recycling Program, a division of the Solid Waste Management Program, San Francisco, Calif. 94102, 415-554-6193.



SOURCE REDUCTION WORKSHEET FOR BUSINESS

A source reduction audit of your business waste can help reduce garbage disposal costs, improve efficiency in material management and make your company an

active participant in the state's source reduction program. Our goal is to reduce and recycle 50 percent of the waste generated in Indiana by 2001.

Product to be analyzed for source reduction: _____

Can you...

Reduce or eliminate use of the product? Yes No

If yes...How will it perform? _____

	Amount produced:	Current disposal costs:
Per week:	_____	_____
Per month:	_____	_____
Per year:	_____	_____

Toxicity: _____

Handling problems: _____

Additional waste generated throughout product's life cycle: _____

What will it cost? _____

What are the environmental trade-offs? _____

Any other obstacles to doing? _____

- Implement immediately. Not practical at this time.
- Study further. Not applicable.

SOURCE: *Getting at the Source: Strategies for Reducing Municipal Solid Waste*, World Wildlife Fund & The Conservation Foundation, Washington, D.C., 1991.

PART 1: IDENTIFICATION

PART 2: EVALUATION, SECTION A

USE WITH FACT SHEET "BUSINESSES DO STEP-BY-STEP ANALYSIS"



Can you...

Purchase a less toxic product?

Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

Any other obstacles to doing? _____

Can you...

Substitute a reduced-volume product?

Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

Any other obstacles to doing? _____

PART 2: EVALUATION, SECTION B

- Implement immediately.
- Study further.
- Not practical at this time.
- Not applicable.

PART 2: EVALUATION, SECTION C

- Implement immediately.
- Study further.
- Not practical at this time.
- Not applicable.

SOURCE REDUCTION WORKSHEET FOR BUSINESSES (continued)

Can you...

Purchase a concentrated product? Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

Any other obstacles to doing? _____

- Implement immediately.
- Study further.
- Not practical at this time.
- Not applicable.

Can you...

Buy in bulk or larger sizes? Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

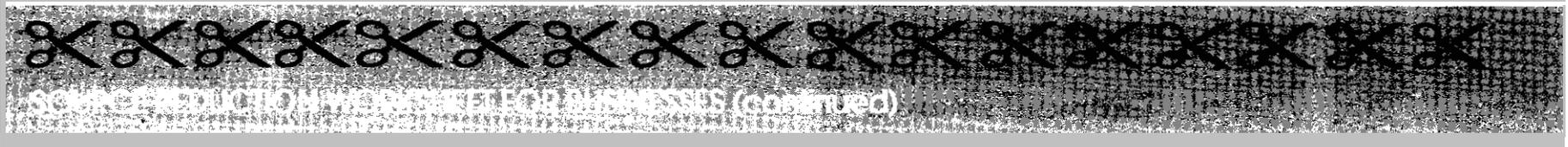
Any other obstacles to doing? _____

- Implement immediately.
- Study further.
- Not practical at this time.
- Not applicable.

PART 2: EVALUATION, SECTION D

PART 2: EVALUATION, SECTION E

USE WITH FACT SHEET "BUSINESSES DO STEP-BY-STEP ANALYSIS"



Can you...

Buy a multiple-use product? Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

Any other obstacles to doing? _____

Can you...

Purchase a more efficient product? Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

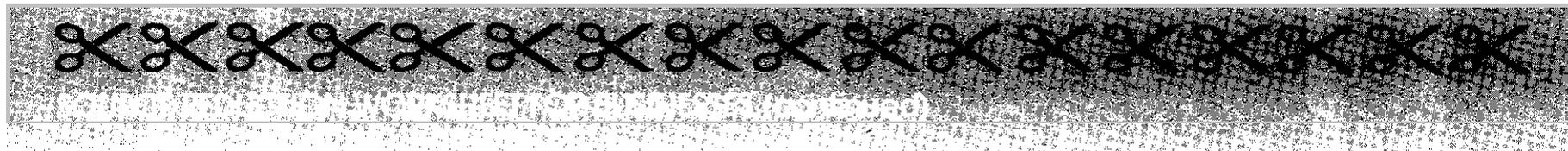
Any other obstacles to doing? _____

PART 2: EVALUATION, SECTION F

- Implement immediately.
- Study further.
- Not practical at this time
- Not applicable.

PART 2: EVALUATION, SECTION G

- Implement immediately.
- Study further.
- Not practical at this time.
- Not applicable.



Can you...

Use the product more efficiently? Yes No

If yes...How will it perform? _____

What will it cost? _____

What are the environmental trade-offs? _____

Any other obstacles to doing? _____

- Implement immediately.
- Study further.
- Not practical at this time.
- Not applicable.

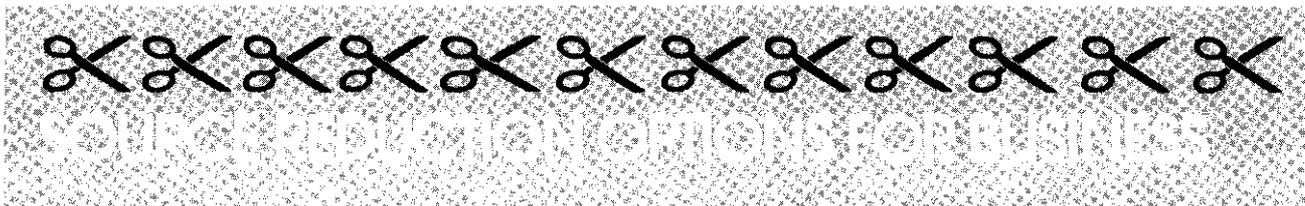
Summary...

Product evaluated: _____

	IMPLEMENT IMMEDIATELY	STUDY FURTHER	NOT PRACTICAL AT THIS TIME	NOT APPLICABLE
Reduce or eliminate product's use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase a less toxic substitute.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Substitute a reduced-volume product.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase a concentrated product.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy in bulk or larger sizes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Substitute a multiple-use product.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchase a more efficient product.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use the product more efficiently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SOURCE: *Getting at the Source: Strategies for Reducing Municipal Solid Waste*, World Wildlife Fund & The Conservation Foundation, Washington, D.C., 1991.

PRINTED ON RECYCLED PAPER.
PLEASE RECYCLE.



Use this checklist to help your business reduce waste disposal costs, improve efficiency in material management

and take part in Indiana's source reduction program. Our goal is to cut waste 35 percent by 1996 and 50 percent by 2001.

Don't purchase product.

Reduce use of product.

Purchase non-toxic or less-toxic substitute.

Purchase environmentally preferred products.

Purchased "light-weighted" or reduced products.

Purchased concentrated product.

Purchase in bulk or larger sizes.

Buy multiple-use products.

Purchase fewer models or don't upgrade/replace.

Purchase long-lived products.

Maintain properly/repair instead of replace.

Purchase reusable product, reuse product, donate to charity or sell second-hand.

Purchase more efficient product.

Use product more efficiently.

Purchase preferred complementary products.

Purchase remanufactured product.

Lease products

SOURCE: *Getting at the Source: Strategies for Reducing Municipal Solid Waste*, World Wildlife Fund & The Conservation Foundation, Washington, D.C., 1991



YOU CAN CUT IT!



Use supplier relationships to reduce

Your organization, as a customer, carries a lot of clout with its suppliers. Source reduction is a good way to exercise that clout.

Your material management or purchasing department can make a big dent in the amount of waste—especially from packaging—that your organization inherits from suppliers through special agreements.

Consider implementing a strategy in which suppliers are responsible for reducing packaging waste and/or retrieving it for reuse.

This could virtually eliminate pallets, wooden reels, strapping, plastic film, crates and corrugated cardboard from your waste stream and reduce the amounts of these products used overall.

Make such agreements a part of every bid proposal and every contract. When you can, specify a reduction option.

If suppliers are supposed to come up with reduction options on their own, have them submit the plans for your approval and show proof of compliance through receipts and bills of lading.

At PSI Energy, every bid proposal and contract includes this clause:

Our environment is an investment in the future. PSI Energy has made a strong commitment to environmental integrity by making proactive decisions to improve our operations, the community and country. PSI is not only thinking green, but also buying green. Therefore, we will consider and compare the environmental consequences of choosing certain suppliers and contractors when purchasing goods and services. We at PSI encourage our suppliers and contractors to consider their responsibility as an environmental citizen.

To bid proposals, PSI adds:

Information provided with your proposal which discusses your firm's environmental citizenship commitment will be favorably evaluated.

PSI says having these clauses has reduced waste and saved money otherwise spent on landfill disposal. Wood reel and pallet manufacturers are required to reclaim these items and make arrangements for refurbishment and reuse.

Sometimes PSI dictates particu-

Purchase Order				



lar plans for manufacturers to follow, but most often it's something they work with a supplier to devise through the contract-negotiation process. In all cases, manufacturers must show PSI documentation that they completed the agreement.

The utility says in most cases suppliers are eager to share what they're doing and to comply with PSI's wishes. The clauses haven't raised PSI's cost of doing business either. In some cases, it has lowered costs because they're paying for less packaging.

One item targeted for reduction is wood pallets. Through manufacturer refurbishment of wood pallets in 1992, the PSI Columbus office reduced its waste disposal costs 25 percent to 35 percent. In 1993, five to seven trips a month to the landfill dropped to one or two. This program has been expanded to all locations, and wooden reels have been added as a source reduction target. In just six months, 237 have been returned for manufacturer refurbishment and reuse.

Starting in 1993, PSI also began receiving meters packaged on cardboard pallets instead of wood. This substitution has reduced shipping costs because the cardboard pallet weighs less, and it can be reused more times than a wood pallet.

Another reduction effort PSI is currently working on involves retreading tires instead of buying new ones. They also want to be able to dictate disposal of any tire waste—whether it goes into paving materials or is burned to produce oil. One of PSI's generating stations near Terre Haute has experimented with using tire-derived oil instead of coal to fire its boilers, but the process has so far proven more costly.

For more information, contact:

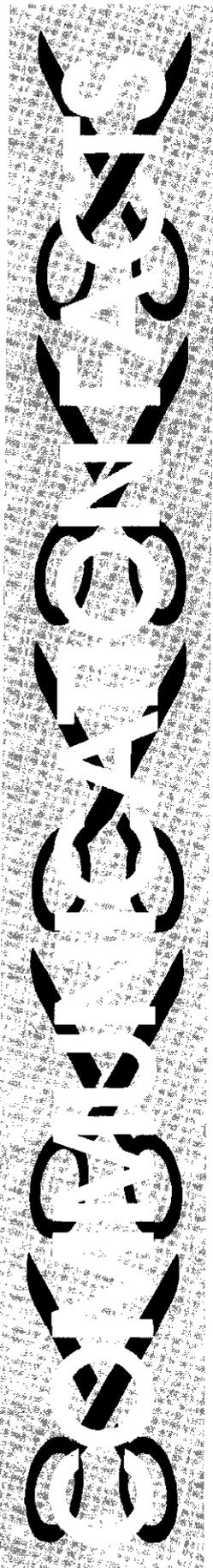
Dawn Harvey Horth, buyer, PSI Energy, 1000 E. Main St., Plainfield, Ind. 46168. Or call 317-838-1183.

Overall purchasing strategies:

- Make reduction and reuse an official part of your purchasing philosophy and strategy.
- Specify minimal packaging, or a low package-to-product ratio.
- Specify that suppliers ship products in returnable, reusable containers whenever possible.
- Buy durable products with longer lifetimes that can be easily repaired.
- Negotiate long warranty periods and follow regular maintenance schedules.
- Buy products that can be or are recharged, refilled, remanufactured or reused.
- Avoid single-use products.
- Buy in bulk, larger sizes or in concentrated form whenever possible.
- Take advantage of waste exchanges. These organizations provide "materials wanted" and "materials available" lists to help match waste generators with waste consumers.
- The Indiana Waste Exchange Catalog is available on a fax data base system. **For more information:** write Jim Britt, president, P.O. Box 454 Carmel 46032. Or, call 317-844-8764 or 800-968-8764.

SOURCE: *Priority #1: Waste Reduction*, Oregon Department of Environmental Quality, Portland, 1991.





Think green when you communicate

To stay in business, every organization needs to communicate with employees and customers regularly. These communications take the form of newsletters, booklets, catalogs, direct mailings and various forms of advertising.

Many of these communications improve the work environment for an employee or convey important information to a customer.

Still, it doesn't hurt to go over your company communications with a "green" pencil to see if you can correct some wasteful practices. Thinking green when you begin the next communication project can help prevent even more waste.

Getting directly to the point

Direct marketing, when it works correctly, can actually save resources by matching up buyers and sellers efficiently. At its worse, the industry is responsible for tons of junk mail consumers toss out unopened every day.

If your company uses direct marketing to talk to its existing customers or to attract new ones, you can do a lot to minimize paper waste, target mailings and reduce your undeliverable packages.

- **Merge/purge aggressively.**

Use some of the services provided by the Direct Marketing Association. The DMA's Mail Preference Service can provide direct marketers with names of people who want to be taken off lists.

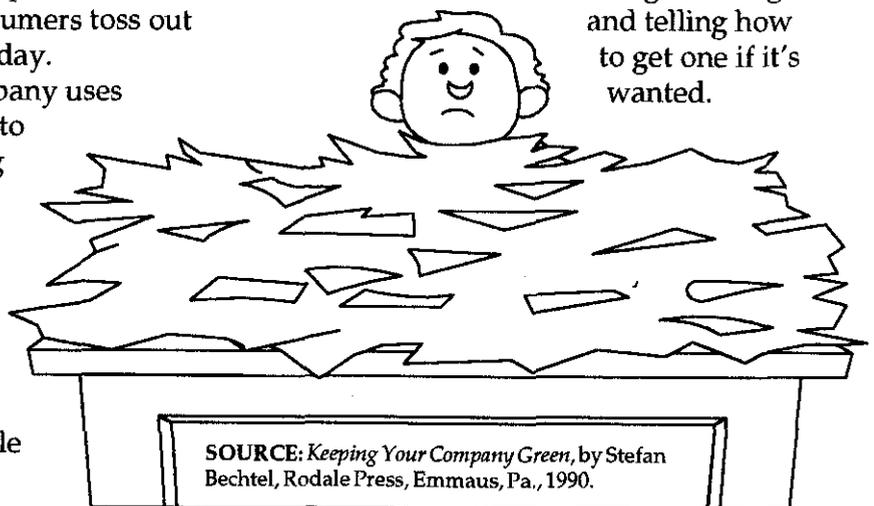
Its "Pander" file, when run against the lists you buy for your mailings, will eliminate names of people who are likely not to pay bills. The DMA also has a "Nixie" file that helps eliminate bad, undeliverable addresses—a problem the National Change of Address Data Bank can also help with.

- **Say it better, less often.**

Look for ways to make content and targeting of your direct-mail package more effective so you don't have to send as large a mailing. Also try to find ways you can reduce the amount of paper you mail by cutting down on your renewal or billing series.

Many direct marketers send out catalogs eight or 10 times a year. Some, however, are testing the idea of asking customers how many catalogs they prefer to get. They mail out order forms instead, explaining why the customer isn't

receiving a catalog and telling how to get one if it's wanted.



SOURCE: *Keeping Your Company Green*, by Stefan Bechtel, Rodale Press, Emmaus, Pa., 1990.



● **Use telemarketing.**

Making telephone calls certainly reduces waste. You'll have the added advantage of knowing whether or not the prospective customer actually got your message.

● **Shrink it.**

Try to trim the size of your catalog or direct-mail package. The U.S. Postal Service charges extra for handling oversized packages. You may also be able to cut down on the weight of your packages and save even more on postage.

● **Detox your mail.**

Try using paper that hasn't been chlorine-bleached, and eliminate plastic "polywrap" wherever possible.

Consider switching to soy- or water-based inks. These inks still use pigments from petrochemicals to ensure consistency of color from batch to batch, but they produce fewer and less toxic fumes than other inks. They also last longer, have better gloss and clean up more easily.

They aren't the right choice for every application yet. So if you must use a regular

ink, at least try to avoid extremely bright yellows and reds and metallics—all which take their brassy colors from heavy metals in the pigments.

Internally speaking

The written word will be an integral part of how we communicate at work for a long time, so always look for the most efficient way of using it. Distributing information through a system of bulletin boards is a time-honored communication method, and it produces less waste than sending memos to all employees.

Companies are also investing in video-conferencing facilities and video/slide programs transmitted through phone lines or computer networks and personalized at remote locations. Because the communication path is a sound wave, there's no paper trail.

High-tech/high-price solutions aren't the only ones that reduce waste, though, as you can see from reading the boxed feature on this fact sheet. Brainstorm with co-workers and ask employees for their opinions. The best solution may be simpler than you think.

It's a gift

Corporate gifts speak straight to your company's environmental ethic. Look for ones that communicate what you really want people to remember about your organization.

The proliferation of promotional buttons, plaques and paperweights affect our waste stream throughout their life cycles.

Consider instead certificates redeemable for trees at a local nursery. The tree helps the environment while perpetually reminding the recipient of your organization.

Another idea is to award Indiana State Park passes. Every time recipients enjoy Indiana's environment, they'll remember your environmental commitment.

For more information, contact the Indiana Department of Natural Resources, 402 W. Washington St., Room 255B, Indianapolis 46221, 317-232-4124, or toll-free 800-622-4931.



Voice-mail line informs, produces no waste

PSI Energy's Corporate Communications department was looking for ways to improve communication with supervisory staff taxed for time but interested in some professional development.

The staff tested a "news show" on audio cassette, featuring topics supervisors said they were interested in knowing more about. Focus groups that previewed the show liked getting information without getting more paper, but they suggested pushing source reduction one step further and eliminating the cassette.

The result was a voice-mail feature line called "Sound Bites" that debuted in March 1993. Callers have several options to choose from and a fifth feedback option so there's no need for any exchange of paper. Features are kept brief and updated every few weeks.

For more information:

- Write Susan Lawson, PSI Energy, 1000 E. Main St., Plainfield 46168. Or call her at 317-838-1481.
- Call Sound Bites yourself at 317-838-6000.

Cutting waste at the office

If you work in an office, there's a lot you can do to reduce waste—regardless of what your actual job is. Try some of these tips to green up your work environment:



Copy?

The average 100-person business uses about 378,000 sheets of copier paper in a year—enough to stack seven stories high. In fact, every minute of every day, Americans run off about 750,000 photocopies of everything from inter-office memos to recipes they want to share with a co-worker.

In a year, that's 400-billion copies—and many of them end up in the trash! Commercial and residential paper waste together account for almost 40 percent of waste now being landfilled. Eliminating paper from waste would nearly double the lives of current landfills.

Try these tips to reduce your paper use:

- **Ask yourself if you really need all those copies**, then make only what you'll use. If each copier in the United States used just five fewer copies every business day, we'd save as much as 17.5-million *reams* of paper—the equivalent of 1.4-million trees.
- **Photocopy documents front-to-back.** Many copy machines will do this automatically. If yours doesn't, check to see if the ma-

chine is leased. If it is, your employer may be interested in leasing a duplex copier the next time around. Position it as a cost-saver.

- **Route one copy** instead of making duplicates whenever you can.
- **Keep a box near the copier for bad copies.** Ask employees to use the box, then cut up the discards and use as note paper.



Just the fax

According to MCI, Americans sent 30-billion faxes in 1990. Faxing is not only quick and convenient, but it eliminates the need for envelopes, labels and stamps.

If the document needs to go to more than one person, faxing it also means you can avoid making extra photocopies.

Unfortunately, thermal fax paper is coated with chemicals that contaminate the recycling process, and Americans use about 300-million rolls of this paper every year. That's enough to stretch from the earth to the moon 26 times. Faxes also fade after about six months, so about 25 percent get photocopied, too.

Here are some ways to "green up" the process:

- **Cut the size of your cover sheet**, or eliminate it all together if what you're faxing already contains an address and return address. Or buy a stamp with your return address and phone number, and stamp the document instead. If everyone who owns fax machines switched from full-page to half-page cover sheets, it would save about two-million miles of thermal fax paper.



- **Choose a plain-paper fax.** These work like photocopiers or laser printers. Reproduction is better, and they don't fade. Initial cost is somewhat higher, although they're cheaper to operate in the long run. Prices are gradually coming down as these machines are on the market longer.
- **Get a fax circuit board, software and modem for your personal computer.** This method takes files directly from your PC and sends them to other PCs with fax set-ups or to any other type of fax machine. You don't have to print out a document to send it, and you can view faxes you receive before deciding if you need to print them. Quality is high—the PC converts faxes sent and received into a bit-mapped image you print on the same printer connected to your PC—and cost can be about \$100 if you already have the PC and modem. However, you'll need a flatbed scanner or conventional fax machine to send documents not in a PC file.



Anything but paper!

- **Use the telephone whenever possible and voice mail if it's available.** Voice mail can even be used to "bulk mail" a recorded message to many other voice-mail users at once.
- **Use electronic mail if it's available.** Save even more paper by *not* printing out the e-mail messages you receive.
- **Use bulletin boards to post company information** instead of sending copies to all employees.



It's in the mail

- **Mail items in the smallest envelopes or boxes** they'll fit in.
- **Reuse envelopes and boxes** you receive by placing a label over the old address.
- **Buy reusable envelopes** for inter-office mail.
- **Avoid using labels on envelopes or internal mail.** Envelope trays for your laser printer allow you to key addresses into your computer and print them out the same way you do letters and reports.

- **For bulk inter-office mail, invest in a sheet-fed labeling system.** These systems reference a stored mailing list to print addressing information directly onto the sheet instead of onto a label.
- **Instead of envelopes,** fold paper, staple, address and mail.
- **Merge/purge your mailing lists** to check for duplicate names. If the list is a large one, check out services that'll do this for a fee, or invest in computer software to do it for you.



Other ideas

- **Use "refillable" products**—tape dispensers, laser-printer toner cartridges, ink jets.
- **Reuse file folders**—If an average file-cabinet drawer holds about 100 hanging folders and the cabinet has five drawers, that's 500 folders. At a cost of 50 cents each, that's \$250 worth of folders.
- **Buy large sizes to reduce packaging waste**—The amount of packaging per unit will be less.
- **Take a reusable mug or glass to work** and eliminate the need for disposable cups.
- **Choose rechargeable batteries** for beepers, dictaphones and calculators. Or buy a solar calculator.
- **Take your lunch.** Carry food in reusable containers. You'll avoid the waste of a fast-food restaurant and save yourself money.

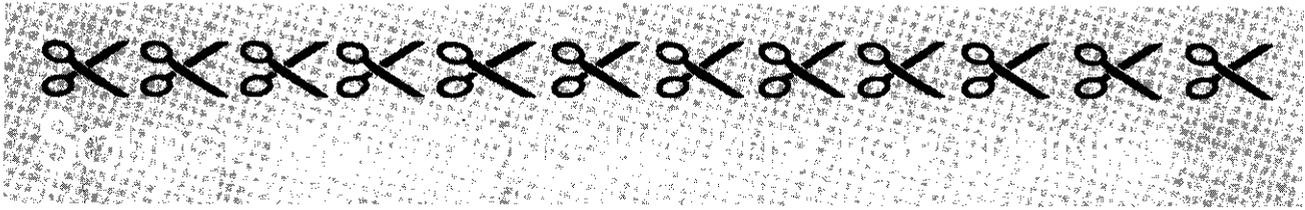
SOURCE: *50 Simple Things Your Business Can Do to Save the Earth*, The Earth Works Group, Berkeley, Calif., 1991.



Checklists available

To help you evaluate what you're already doing to reduce waste and what possibilities are still available, ask your solid waste management district official for source reduction checklists appropriate for your business.

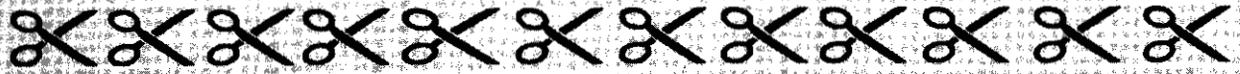




Use this checklist to help your business reduce waste disposal costs, improve efficiency in material management and take part in Indiana's source reduction program. Our goal is to cut waste 35 percent by 1996 and 50 percent by 2001.

Options for reducing office paper waste

	ALREADY DOING	WILL START	NOT POSSIBLE	NOT APPLICABLE
 Set computer printers so they don't feed extra sheets of paper between jobs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Use floppy diskettes instead of paper to maintain file copies of documents generated on personal computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Make electronic mail available.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Buy copiers with duplex printing options to photocopy on both sides of paper.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Route documents instead of making extra copies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide bulletin boards to post documents of interest to most employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Collect bad copies and other scrap to make into notepads.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Substitute carbonless forms for carbon paper.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Reuse file folders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invest in reusable envelopes for inter-office mail.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reuse other mailing materials—plastic or padded envelopes, poster tubes, etc.—whenever possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Mail items in the smallest envelopes or boxes they'll fit in.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invest in an envelope tray for your computer printer so you can avoid using labels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



	ALREADY DOING	WILL START	NOT POSSIBLE	NOT APPLICABLE
 For bulk inter-office mail, invest in a sheet-fed labeling system to avoid the need for envelopes or gummed labels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Design documents to be folded self-mailers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Merge/purge mailing lists to check for duplication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Remove organization name from mailing lists (Ask your solid waste district coordinator for consumer fact sheet outlining this process).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Devise simple mechanism for employees to have names and work addresses removed from mailing lists.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Make voice mail available through your telephone system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buy plain-paper fax machines or add a fax option to an existing PC.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 For thermal paper fax devices, cut the size of your cover sheet or eliminate it if appropriate addressing information already appears on the document.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Route and share newspapers and magazines in common areas rather than buying extra copies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Shred newspapers and reuse for packing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Donate old issues of trade journals to libraries.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Donate old issues of general interest magazines to hospitals, clinics or nursing homes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Use this checklist to help your business reduce waste disposal costs, improve efficiency in material management and take part in Indiana's source reduction program. Our goal is to cut waste 35 percent by 1996 and 50 percent by 2001.

Storage and maintenance options

To reduce *paper* waste...



Return cardboard boxes to distributor for credit on bill.

ALREADY DOING

WILL START

NOT POSSIBLE

NOT APPLICABLE

Reuse cardboard boxes for business mailings.

Pack old business records in used boxes.

Make cardboard boxes available to employees/customers for reuse.



In restrooms, substitute hot-air hand dryers for paper towels.

To reduce *wood* waste...

Require suppliers to collect crates, pallets, barrels and spools for reuse.



Reuse crates, pallets, barrels and spools internally.

Offer crates and pallets to employees/customers for use as kindling or to make backyard composting bins.

Offer spools to employees/customers for use as outdoor tables.

Use waste exchange to get rid of crates, barrels, pallets and reels.

To reduce *plastic* waste...

Buy tissue products wrapped in recyclable paper or packaged in bulk in cardboard containers rather than plastic.



Eliminate trash bag liners in waste cans where no wet trash is disposed of.



Reduce,
Indiana...
then
recycle!



Give discount to customers for bringing in their own bags for packaging groceries or other merchandise.

ALREADY DOING

WILL START

NOT POSSIBLE

NOT APPLICABLE

Purchase motor oil in bulk.



Reuse polystyrene packing peanuts or bubbles you receive.

Reuse rigid plastic items such as chairs and garbage cans.

To reduce glass waste...

Reuse and recycle glass containers where possible.

To reduce metal waste...



Substitute refillable bottles for aluminum cans.

Reuse containers at business or offer to employees/customers.



Purchase oils, chemicals and other liquids in reusable containers.

To reduce toxic waste...



Use halon-free fire extinguishers.

Use non-toxic cleaning products, paints and finishes.



Train employees to handle, store and dispose of chemicals properly.



Restaurants can affect waste line

Reducing waste makes good ecological sense and good business sense. In the long run, it stands to make the biggest impact on the bottom line and the environment.

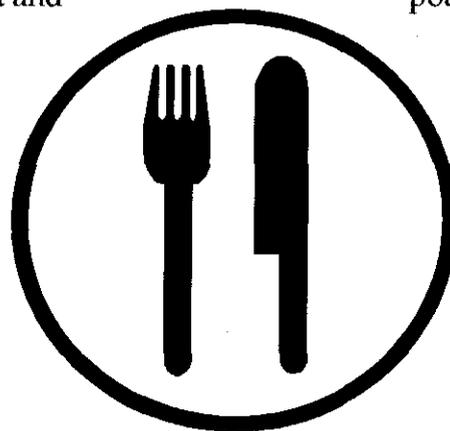
Food-service buyers and operators can be both environmentally aware and efficiency-minded by minimizing incoming waste, increasing the usability and/or longevity of product and reducing the amount and toxicity of waste.

Tackle packaging concerns

As a business owner or operator, your customer is your first concern. Remember that you're a customer to your suppliers, so they're bound to be interested in what you have to say.

Work with them to reduce unnecessary packaging for the goods you buy. Discuss such issues as:

- Reducing thickness and weight of packaging and shipping materials.
- Reducing the number and thickness of dividers.
- Reducing the volume of packaging without harming efficiency.
- Substituting rigid packages for flexible packaging.
- Switching to reusable packages and containers.



Cracker Barrel Old Country Stores is based out of Lebanon, Tenn., but has many restaurants in Indiana. In 1991, it hired its own environmental affairs coordinator and started asking suppliers to change the way products were shipped.

The result was a substantial reduction in waste. Here are some highlights:

- Restaurants used to get potatoes in "double" boxes, where the top of the box actually slid over the bottom. By switching to boxes with flap tops they reduced the cardboard content of each box a half-pound.
- Suppliers increased the size of bacon boxes from 20 to 30 pounds, which had several advantages.

Fewer boxes meant less handling, more freezer storage space and less overall packaging.

- The company asked suppliers to ship bread in reusable plastic boxes. The plastic boxes cost \$7.50 each, compared to \$1 for two cardboard boxes that hold the same amount. However, the plastic boxes can be used 500 times, while the cardboard can be used only once.

Take on trash next

Focus on reducing the amount of trash you send to landfills. Try taking just an hour a week to focus on ways you can reduce the amount of materials coming into your food service that ends up as trash going to the landfill.

You might even use that time



to take a walk through the kitchen and look for ways to reduce. Consider these purchasing options:

- Larger sizes, concentrated forms or reusable containers.
- Less packaging—fewer layers, thinner layers or no packaging at all means less waste that you and your customers pay to throw away.
- Paper supplies with less thickness or weight.
- Reusables instead of paper for wiping cloths, towels, towel machines in restrooms.
- Extend the life of equipment or a particular product.
- Evaluating service policies to discourage the number of units taken by customers—napkins, straws, condiments.
- Review recipes and consider ways to train employees to reduce the amount of leftover and discarded food. Offer smaller portions for those who request them. Utilize boneless, portion-ready and trimmed ready-to-use products.
- Stainless steel condiment dispensers in place of packets and plastic bottles.
- Avoid single-use products.
- Reduce the number of toxic products you use.
- Update your waste audit and estimate your recyclable waste and diversion rate.

Reuse what you purchase

Evaluate the effect of reusing some items and prolonging the life of items normally discarded. Your situation may differ from the next restaurant down the road, but it's worth looking into.

Many products can be reused on-site—dishes, flatware, glassware, plastic trays, compartmental plates to eliminate side dishes, reusable cocktail stirrers.

Instead of always choosing single-use items because they seem more convenient, find out the relative costs and customer and employee reactions to using table linens, cloth napkins, reusable placemats, wiping towels, reusable coffee filters and restroom hand blowers instead.

Many products can also be reused by suppliers and customers. Request permanent-delivery containers or reusable packaging that

can be returned to the supplier for items like bread, rolls, eggs, beverages and chicken.

Let customers and employees take home five-gallon containers for their own storage needs. Try making scoops and funnels from plastic food bottles. You can also redesign product boxes to be used as take-out plates and containers.

Although it's much better to reduce waste by improving forecasting and food-production controls, sometimes food can be frozen and reheated to proper serving temperatures instead of being thrown away. If you can meet sanitation regulations, consider donating food to charitable organizations, feed lots or zoos.

Reuse promotions

Reusable drink-cup promotions are more than just a way to market movies and cartoon characters. You can also use them to promote your restaurant and its interest in preserving the environment.

Purchase a supply of reusable coffee mugs or other beverage containers, imprinted with your restaurant name and an environmental message. Sell them filled with a drink for a special price, and then have customers bring them in for a discounted refill.

The Stonehenge Lodge in Bedford has a reusable coffee-mug program. This program, along with other source reduction efforts, has enabled the hotel and restaurant complex to reduce its solid waste stream by 65 percent. **For more information, call Max Creek, food and beverage manager, 800-274-2974.**

For more information, contact:

- **The Indiana Restaurant Association**, 2120 N. Meridian St., Indianapolis 46202.
- **The National Restaurant Association**, Technical Service Department, 311 First St. NW, Washington, D.C. 20036. Or call the association hotline, 800-424-5156.

SOURCE: Robert D. Buchanan; extension specialist in the Department of Restaurant, Hotel, Institutional and Tourism Management; 152 Stone Hall, Purdue University, West Lafayette 47907, 317-494-5995.





Use this checklist to help your business reduce waste disposal costs, improve efficiency in material management and take part in Indiana's source reduction program. Our goal is to cut waste 35 percent by 1996 and 50 percent by 2001.

Food-service/restaurant options

ALREADY DOING
WILL START
NOT POSSIBLE
NOT APPLICABLE

To reduce *paper* waste...

Substitute reusable dishes for single-use paper products.

Use cloth napkins in place of paper.

Use cloth hand towels instead of paper towels for food-service workers.

Provide condiments such as sugar, salt and pepper in reusable containers.

Dispense condiments like sugar, salt and pepper in paper packages only on request.

Use reusable metal or cloth coffee filters instead of paper.

To reduce *plastic* waste...

Provide reusable cutlery instead of plastic.

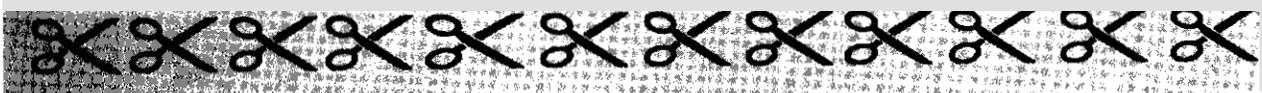
Provide reusable tableware and cups instead of single-use plastic.

Instead of single-use coffee stirrers, make reusable spoons available.

Encourage employees and customers to bring their own reusable mug or glass, and consider giving them a discount if they do.

Sponsor a special promotion to sell beverages in reusable containers, then give discounts on drinks whenever customers bring the cup in for a refill.

Return polystyrene egg cartons to distributor for reuse.



Reduce,
Indiana...
then
recycle!

Avoid microwavable trays and films.

Serve condiments—mustard, catsup, cream, mayonnaise, etc.—in reusable containers or dishes.



Provide plastic-packaged condiments only on request.

Provide straws only on request.

Provide drink lids only on request.



Purchase oils, chemicals and other liquids in reusable containers.

To reduce metal waste...



Buy beverages in returnable or reusable bottles instead of metal cans.

Buy beverages in dispensers/tanks instead of single-serving containers.



Reuse metal containers at business or offer to employees/customers.

Other ways to reduce wastes...

Send used grease to a renderer.

Donate leftover food to shelters for homeless.

ALREADY DOING
WILL START
NOT POSSIBLE
NOT APPLICABLE

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Chapter 7: How industries can reduce

Together with the commercial and institutional sectors, industry is responsible for up to 70 percent of the solid waste stream, according to the North Carolina Environment, Health and Natural Resources Department. So helping industry understand and practice source reduction can have a significant effect on reducing the waste stream.

A primary responsibility of economic-minded industry managers will be to research and develop new ways for improving operational procedures and managing inventory more effectively. These responsibilities are consistent with the objectives of source reduction.

In addition, the design and marketing of products provide opportunities for reducing the amount of waste associated with consumption of a product.

To restate, local manufacturers have two possible source reduction approaches:

- Reduce the amount and toxicity of waste created in the production of goods.
- Reduce the amount and toxicity of waste the consumer will discard from the product itself or its packaging.

Solid waste planners can work with industries to help them develop source reduction programs. This will involve:

● Waste audits

Often used to quantify sources, types and amounts of waste in a specific waste stream, data captured from a waste audit can be used to identify types of materials that may be reduced or recycled. Waste audits also aid processors in estimating amounts of market-

able wastes, transportation costs and potential market rates for materials.

● Technical assistance

Use the materials in this booklet to develop and/or participate in educational programs to assist generators in identifying source reduction opportunities.

● Training

Conduct source reduction workshops to teach or develop skills in local industries.

● Networking campaigns

Develop local waste-audit teams to assist area businesses.

● Team building between business and government

Solid waste planners can assist with developing economically and environmentally advantageous programs such as information sharing and waste-exchange programs.

● Recognition, awards and other incentives

Once industries implement source reduction programs, solid waste planners can provide window stickers or plaques to show customers the business is working to reduce waste.

Groups of businesses in similar industries or located close to each other can be encouraged to work together and with technical and professional associations on source reduction strategies. By gathering purchasing and environmental program managers into work groups, ideas can be exchanged and solutions to waste-reduction problems developed.



How one solid waste management district is helping industries reduce

An example of solid waste planners working with industries is the Northeast Indiana Solid Waste Management District's industry waste minimization program. The NISWMD provides ongoing assistance to industry through on-site waste audits, workshops for employee "green teams," identification of recyclables and end markets, and follow-up recommendations.

The goal of this program is to provide on-site assessment of an industry's waste stream, suggest possible waste-minimization practices and provide potential market outlets for

recyclable wastes. This program benefits industry through reduced disposal costs, and it benefits the NISWMD through waste reductions achieved.

Industries doing an exemplary job at source reduction and recycling are showcased in periodic feature articles in the business section of local newspapers. **For more information, call Barry Bender, education coordinator, NISWMD, 219-925-4857.**



How to use this section

This part of *You Can Cut It!* is geared specifically toward the industrial sector. Materials in it are appropriate for manufacturers of products rather than providers of services.

The three distinct types of materials in this section used together can help you reduce the waste streams of industries in your jurisdiction. Build on these suggestions for use:

● Fact sheets

These contain facts about a particular waste common in the manufacturing waste stream, a particular process that commonly causes waste or a specific source reduction effort. All fact sheets include information on how to reduce waste and solve the problem discussed.

Use the fact sheets to help educate manufacturers about the concept of source reduction and show them what other industries are doing. The fact sheets should also make them aware of potential problem items in their waste streams and show them how to set up reduction programs of their own.

Examples of efforts already under way throughout the state are included, along with names and/or telephone numbers so that businesses new to source reduction can benefit from the experiences of others.

● Checklists

These are included with some of the fact sheets to give companies a quick look at potential problem areas and help them audit what they may already be doing to prevent waste. Some of the checklists included in the business section will also be appropriate for

manufacturers to use. The checklists are a tool to determine what's possible, what might not be practical and what activities to tackle first.

● Worksheets

Use these to help manufacturers thoroughly analyze their process operations to find out what's causing their waste and strategize about how to reduce or prevent it. Companies will need one worksheet set (three pages) for each operational process they target. Instructions to accompany the worksheet are in two fact sheets:

- "Assessment answers questions," pages 115-116.

- "Do step-by-step options analysis," pages 121-122.

● Other aids

Other sections of this guide will also be of interest to industries. The business section, in particular, includes information also appropriate for industry. For example, reduction strategies for offices are located in the business chapter, even though both the commercial and industrial sectors generally have office needs.

Don't forget to check the business section thoroughly when putting together an educational resource plan for the manufacturers in your area.

Gaining an environmental outlook

Most organizations wouldn't think of existing without a vision statement, mission statement or set of strategic goals. Your approach to creating a manufacturing environmental ethic should be just as structured and reflected in the company's larger strategic plan.

Corporate environmental charters traditionally take in much more than source reduction, reuse or recycling. They reflect how the company sees itself in relation to its environment, its employees and the customers it serves.

Corporate environmental charters show investors, customers and employees your organization's commitment to the environment. You may want to consider including a commitment to the following items in your charter:

- Produce durable products.
- Minimize the amount of unnecessary packaging.
- Seek opportunities to maximize the use of purchased products and the reduction and reuse of generated waste.

DowBrands, whose world headquarters is in Indianapolis, has a long-standing tradition of trying to accommodate the environment in its manufacturing processes.

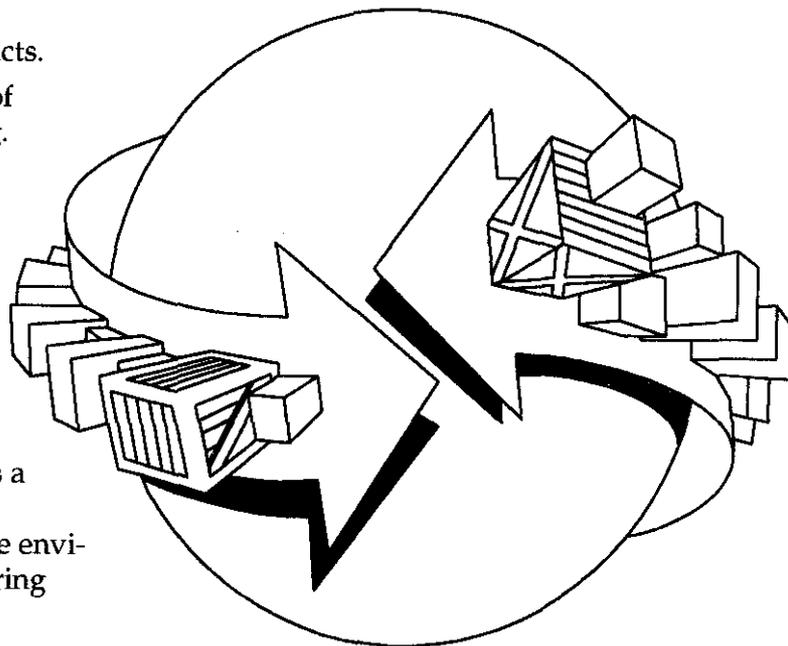
The company subscribes to the integrated waste-management hierarchy in which source reduction is the preferred option.

This concept is at the heart of its Waste Reduction Always Pays program, initiated in 1986. WRAP seeks to reduce the impact of waste by cost-effectively encouraging creativity among employees and recognizing innovative waste-reduction projects.

In 1991, DowBrands added an Environmental Advisory Panel (EAP). This external group of experts in the fields of packaging, environment, education, standards and consumer advocacy provides advice and assists DowBrands in understanding its business in the context of environmental issues.

One mission of the EAP is to forecast, given current environmental trends and behavior, the possible evolution of DowBrands products in the coming decade.

In 1991, DowBrands also pulled together more than 25 spe-





cific environmental initiatives that had been in use at the company for years. The result is an environmental charter of sorts that DowBrands calls its "Green Goals."

The Green Goals serve to improve the environmental performance of DowBrands products and services and are designed to evolve in response to technological breakthroughs and market demand.

The Green Goals provide guidance on environmental improvements in six categories:

- Product formulations
- Innovations in packaging
- Source reduction and recycling
- Recycled content in packaging
- Overall manufacturing waste reduction
- Marketing and education efforts

DowBrands put its Green Goals to work and realized a 50-percent reduction in packaging for selected "two-in-one" hair-care products, which clean and condition hair in one step and reduce the need for two separate packages. Two hair-care products are available in jumbo sizes, which account for a 30-percent reduction in the weight and volume of plastic packaging per ounce of product.

Another Green Goal that's been integrated into DowBrands packaging is the replacement of inks, dyes and pigments containing heavy metals with metal-free pigments.

For more information, contact DowBrands public affairs department, 317-873-7000.



The packaging hierarchy at left was established by the Indiana Packaging Waste Reduction Task Force. For a complete copy of the task force report, call the Indiana Department of Environmental Management at 800-451-6027, extension 8172.

Consider its recommendations when packaging your products and adopt the hierarchy as part of your corporate environmental ethic.





Reductions for industry in 5 easy steps

Reducing the waste your manufacturing operation generates can produce significant benefits:

- Savings from reduced raw material purchases.
- Reduced storage, transportation and disposal costs.
- Reduced exposure to environmental and worker-safety liabilities.
- Improved public image.
- Reduced regulatory-compliance costs.
- Improved production efficiency.

What is waste?

Waste can be solid, liquid, gas or a combination released into air, land, surface water or groundwater. In concrete terms, your waste is likely to be:

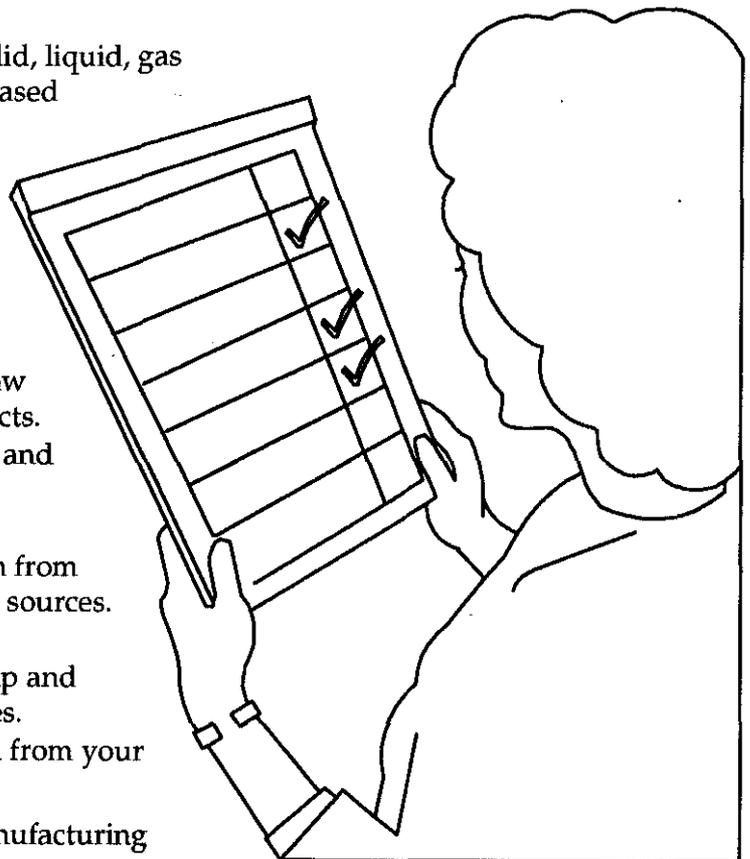
- Surplus "virgin" raw materials.
- Off-specification raw materials or products.
- Obsolete materials and products.
- Spills and leaks.
- Air emissions, both from stacks and fugitive sources.
- Waste water.
- Equipment clean-up and maintenance wastes.
- Packaging taken in from your supplier.
- Scrap from the manufacturing process.

Once materials are recycled, however, they become resources rather than wastes.

What is source reduction?

Source reduction involves any in-plant activity that decreases the volume and/or toxicity of waste at the point of generation. Source reduction is the environmentally preferred approach to waste management that usually provides the greatest economic benefits. The presence of waste in an industrial process indicates some inefficiency or incomplete use of resources. So reducing waste is the same as increasing industrial efficiency.

Source reduction for industry attempts to minimize the environmental and financial impact of wastes a company generates by





increasing efficiency, substituting material or changing processes so that fewer waste materials are produced.

Materials in your waste stream should be targeted for reduction if they appear in significant quantities, have a low product-to-package ratio, or are likely to have a negative impact on the environment.

You can start a source reduction effort at your company by following the steps in the diagram at right.

Start small, aim high

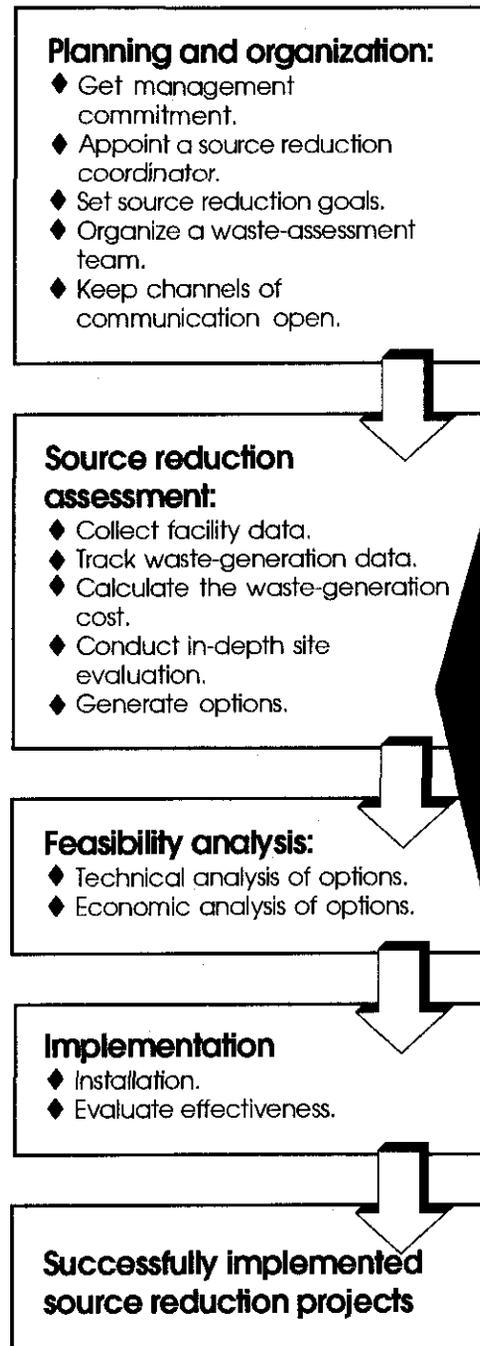
While "zero waste" should be your ultimate goal, in the beginning, follow these goal-setting suggestions:

- Set goals both for the company as a whole and for individual operating units.
- Make sure goals are in line with overall corporate strategic goals.
- Make goals measurable, whether they are qualitative or quantitative.
- Make goals achievable with available or budgeted resources.
- Phase in goals over time.
- Make goals that are ambitious and will help "stretch" your organization's efforts.

Remember that before you can generate a solution to your waste problem, you have to identify and understand the cause of the problem. Conducting a waste assessment will give you answers to the *What? When? Where? How? and Why?* of your waste.

Ask for another fact sheet on waste assessments—"Assessment answers questions"—and the "Industry waste-analysis worksheet."

Flow diagram of a source reduction program



Source: Adapted from *Developing a Waste-Reduction Program*, Office of Waste Reduction Services, Lansing, Mich., authors David M. Fiedler and William M. Kesling.



Assessment answers questions

Step 1: Collect facility data

In this portion of your assessment, identify the origin, quantity and characteristics of the waste streams of your company's operations.

Existing record-keeping systems, the number and complexity of the manufacturing operations and associated waste streams are some of the factors that affect how long it will take to perform a complete assessment.

Prioritize operations and complete assessment of one before moving on to the next targeted operation on the list. This should help make the job more manageable.

An effective way to identify all waste streams from a targeted operation is to perform a mass balance. According to the mass balance principle, the weight of all material going into a process must equal the weight of all material leaving the process. Follow these steps to collect waste-generation data through mass balance:

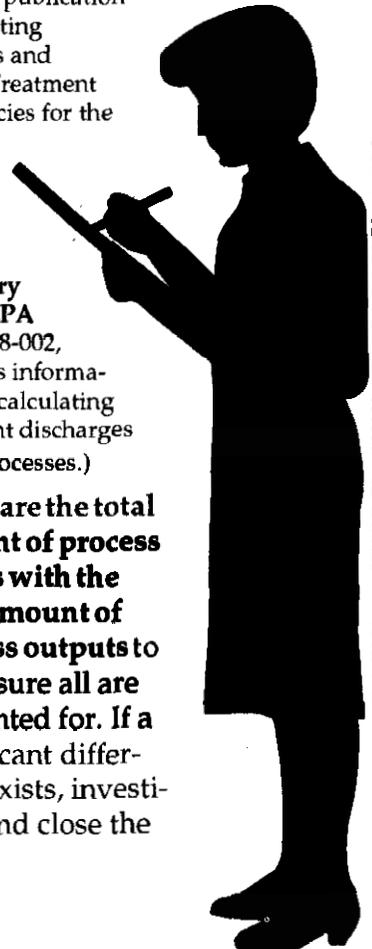
- **Identify unit processes** that make up your targeted operation and prepare a process flow diagram using lines and labels to describe interconnections. See the sample on the back of this sheet.
- **Identify all inputs** to each unit process—raw materials and the containers they come in, waste that is reused and process water. Examine purchase orders to determine what raw materials

have been delivered. Record these inputs in Section A of the "Industry waste-analysis worksheet." For simplicity, use the same measurement unit for all data—for example, pounds per year.

- **Identify all outputs** of the unit processes—products, by-products, wastes to be recycled and wastes to be disposed of. Consult shipping records, billings for solid waste disposal and municipal water treatment, hazardous waste manifests, Material Safety Data Sheets, annual pollution reporting forms and environmental permits. Record process outputs in Section B of the "Industry Waste-Analysis Worksheet."

(Note: The Environmental Protection Agency publication "Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form, EPA 560/4-88-002, contains information on calculating pollutant discharges from processes.)

- **Compare the total amount of process inputs with the total amount of process outputs** to make sure all are accounted for. If a significant difference exists, investigate and close the gap.





Step 2: Track waste-generation data

If a record-keeping system doesn't already exist, the waste-assessment team should set one up. This will help collect waste-generation data over time and analyze any trends.

For most companies, waste is an ever-changing commodity. Examining trends can provide valuable insight into conditions responsible for generating waste peaks and valleys. Such data can also help measure effectiveness of your source reduction program.

When analyzing trends, remember that most waste generation is a function of production. Comparing waste generation at different production levels without taking production volume into account won't give you meaningful results. Use the waste-generation index below in trend analysis because it expresses waste generation as a function of production:

$$\text{Waste-generation index} = \frac{\text{Waste quantity}}{\text{Unit of production}}$$

Some wastes are generated from maintenance and cleanup activities. For non-production wastes, the lower half of the index should be a function of the maintenance activity—for example, square footage of floors cleaned.

Step 3: Calculate cost of waste generation

Calculating waste-generation costs will help your company make the proper economic analyses of source reduction options, as well

as prioritize the waste streams most likely to yield significant cost reductions.

The waste-generation cost includes the disposal cost and the costs of waste transportation, labor, value of the wasted raw materials, future waste disposal liability costs and other costs. Record those in Section C of the "Industry waste-analysis worksheet."

Step 4: Conduct an in-depth site evaluation

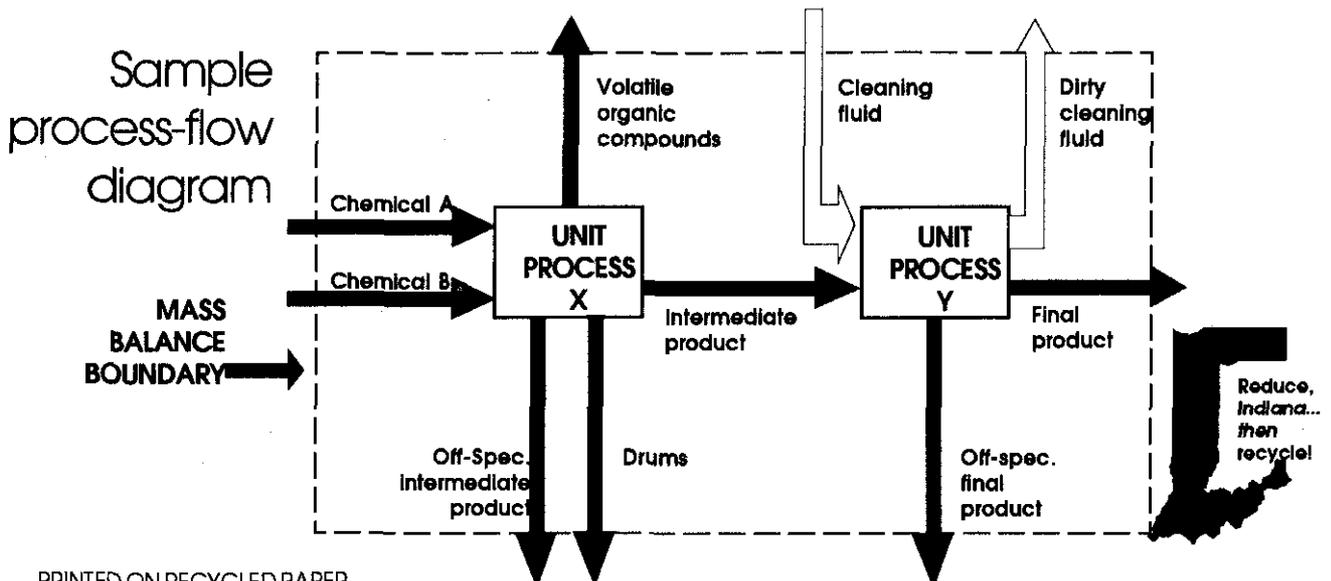
After the facility data has been collected and organized, the waste-assessment team should conduct an in-depth site evaluation of the targeted operation.

A visit will help the group better understand each process and resolve any questions or conflicting data uncovered during the facility data-collection step.

Step 5: Generate options

Once you've taken this "fingerprint" of your waste stream, the waste-reduction committee can collectively brainstorm to generate a list of source reduction options.

Source: Adapted from *Developing a Waste-Reduction Program*, Office of Waste Reduction Services, Lansing, Mich., authors David M. Fiedler and William M. Kesling.



PRINTED ON RECYCLED PAPER.
PLEASE RECYCLE.



TARGETED OPERATION: _____

COST ITEM	COST
Purchased process equipment	
Materials	
Utility Connections	
Additional equipment	
Site preparation	
Installation	
Engineering and procurement	
Start-up	
Training	
Permitting	
Initial charge of catalysts and chemicals	
Fixed capital investment	
Working capital	
TOTAL CAPITAL INVESTMENT	

OPERATING COST/REVENUE ITEM	\$ PER YEAR
Decrease in disposal cost	
Decrease in raw materials cost	
Decrease (increase) in utilities cost	
Decrease (increase) in catalysts and chemicals	
Decrease (increase) in O&M labor costs	
Decrease (increase) in O&M supplies costs	
Decrease (increase) in insurance/liabilities costs	
Decrease (increase) in other operating costs	
Incremental revenues from increased production	
Incremental revenues from marketable by-products	
NET OPERATING COST SAVINGS	

*Decreases in operating cost or increases in revenue are positive.
Increases in operating cost or decreases in revenue are negative.

SOURCE: "Developing a Waste Reduction Program," Office of Waste Reduction Services, Lansing, Mich., authors David M. Fiedler and William M. Kesling.



Inspection: Seeing is believing

Seeing the process in operation is vital to your evaluation. Use these guidelines to help you prepare for and conduct the site inspection:

- Prepare an agenda in advance that covers all points needing clarification. Share the agenda with supervisors in the area being assessed several days before the actual inspection.
- Schedule the inspection to coincide with the operation of interest—start-up, equipment cleaning, bath dumping, shutdown, etc.
- Monitor the operation at different times during the shift, and during all shifts if needed, since waste generation is highly dependent on human activity.
- Talk with operators, shift supervisors and foremen. Assess their awareness of the waste-generation aspects of the operation.
- Photograph or videotape the area of interest. Many details can be captured that would otherwise be forgotten or recalled incorrectly.
- Observe housekeeping details, such as visible spills or leaks. Also look at the overall cleanliness of the area. Note any odors or fumes.

- Assess the organization structure and level of coordination of environmental activities between various departments.
- Assess administrative controls—quality controls, cost accounting, material-purchasing procedures and waste-generation records.
- In performing the site inspection, the waste-assessment team should follow the process from the point where raw materials enter the process to the point where the products and wastes leave. Make sure the team identifies the sources of waste.

The inspection may result in preliminary conclusions about the causes of waste generation that can be confirmed with additional data, analysis or site visits.

SOURCE: *Source Reduction Strategy Manual*, Pennsylvania Bureau of Waste Management, Harrisburg, 1993.





Do step-by-step options analysis

Step 1: Define problem

Select a target to analyze for source reduction potential. The target could be any component of your organization's waste stream—a specific kind of paper, glass, wood, plastic or chemical. Consider:

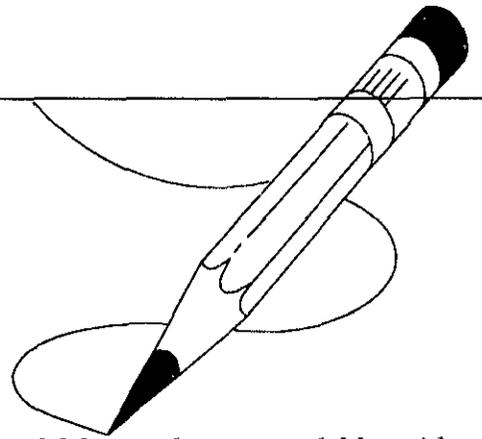
- How much of it do you produce?
- What handling problems does it cause?
- How toxic is it—either in its present form, in its manufacture or in its disposal?
- How much additional waste is generated throughout its life cycle?
- Are alternatives available if you decide to stop using the product?

To achieve the greatest source reduction results, you may want to target wastes that appear in significant quantities, have a low product-to-package ratio or are likely to impact the environment negatively.

Step 2: Come up with options

You have options for reducing the waste you find. Consider these:

- Reduce or eliminate production of the product.
- Eliminate toxic ingredients.
- Substitute environmentally preferred materials or processes.
- "Light-weight" or reduce product volume.
- Produce concentrated product.
- Produce in bulk or larger sizes.
- Combine functions of several products.
- Produce fewer models or styles of product.



- Make product upgradable, with interchangeable parts.
- Increase product life-span.
- Improve repairability of product.
- Produce for consumer reuse.
- Produce a more efficient product.
- Use product ingredients more efficiently.
- Change characteristics of complementary products.

Step 3:

Evaluate options for effectiveness

Consider all the options that apply to the product you're evaluating. You may be surprised which one will be most effective to reduce waste.

As you evaluate substitutes, be sure to test their performance and consider their comparative toxicity, cost and any other environmental trade-offs. This is critical to ensure the "cure" won't be worse than the disease.

Step 4:

Take obstacles into account

While you're brainstorming about alternatives that can cut your solid or toxic waste, be sure to evaluate possible obstacles to using the alternatives and possible solutions to the obstacles. Obstacles you may encounter include:

- **Technical obstacles**—Maybe more research and development is needed, or physical constraints limit the adoption of alternatives.



Necessary raw materials and production capacity may not be available.

- **Information obstacles**—Your in-hand information may be incomplete or faulty. Possibly the information you need to make an informed decision is proprietary or expensive to obtain.
- **Economic obstacles**—Your firm may lack the funds for initial capital investment. Perhaps the alternative would increase costs, and your product would no longer be competitive in the marketplace. Or, alternatives could increase your liability.
- **Public-policy obstacles**—Government standards may dictate that some alternatives are unacceptable, or policy may encourage contradictory incentives.
- **Consumer-preference obstacles**—The alternative may be less convenient or require a change in life-style, and customers or employees may choose not to adopt it. Additionally, consumers sometimes value the look or feel of a product, and a change in either may make the product undesirable. Third, if the product becomes hard to find, consumers might not search it out.
- **Institutional obstacles**—No infrastructure may exist to support source reduction.

Step 5: Perform formal feasibility analysis

Once you've narrowed the list of source reduction options, perform a technical and economic analysis on each technique selected.

- **Technical analysis**—The technical evaluation will help you determine if the option will work in a specific application. If the option requires installing equipment, you may need to visit a similar installation, review vendor literature and/or a pilot-scale demonstration.

Answer these questions to complete your technical evaluation:

- Is space available?
- How long will it take to deliver and install?
- What sort of testing is required before installation?
- Are utilities already available?
- Will it change work flow and/or production procedures?
- Will product quality be affected?
- How will production be affected?
- What training is required to operate and maintain the new system?

- Will the new equipment require additional storage or material handling?
- What's the warranty?
- Can it be easily serviced?
- Will it meet environmental and worker health-and-safety requirements?

- **Economic analysis**—An economic evaluation is simply a comparison of the operating costs of an existing operation with the capital and operating costs of the proposed source reduction option.

Capital costs include costs for process equipment, construction materials, site preparation, installation, utility hook-ups, engineering, permitting, training, start-up and cost of capital itself (interest costs). Operating costs include costs for raw materials, maintenance, supplies, labor, utilities, waste transportation, disposal, storage and waste-handling.

Your goal is to determine *incremental* operating costs—or actual operating costs of the existing operation minus estimated operating costs projected with the source reduction option. When that difference is a positive number it means there is a decrease in operating costs as a result of the source reduction measure. This difference is referred to as an *incremental operating cost savings*.

Record capital costs, incremental operating costs and incremental revenues of the source reduction option in Section D of the "Industry waste-analysis worksheet."

Generally, you'll implement lower cost options first. Some source reduction options require no economic evaluation because there are no capital costs and the option will result in a net operating cost savings. If the option requires significant capital costs, perform the economic evaluation using a standard measure of profitability—most often, pay-back period. The formula for calculating pay-back period is:

$$\text{PBP} = \frac{\text{Total capital cost of project}}{\text{Annual net operating cost savings}}$$

SOURCES: *Developing a Waste-Reduction Program*, Office of Waste Reduction Services, Lansing, Mich., authors David M. Fiedler and William M. Kesling. *Getting at the Source: Strategies for Reducing Municipal Solid Waste*, World Wildlife Fund & The Conservation Foundation, Washington, D.C., 1991



Use method that gives correct results

Several methods can be used to quantify your source reductions, depending on the specific waste stream—actual quantity change, adjusted quantity change, throughput and changes of any hazard (flammable, poisonous) or toxicity level.

The key to selecting the best method for measuring your source reduction is to design a system that accurately reflects results. The mechanism by which waste is generated is a key factor in selecting the optimum measurement method.

Actual quantity change

This is the change in weight or volume of waste generated in a given time. Although simple to calculate, this method may not accurately describe the amount of source reduction that has occurred. This is because other factors, such as changes in production levels or product quality, aren't considered.

Adjusted quantity change

This method uses an activity index to adjust the actual quantity change so that it takes into account changes in production activity.

Select the measure of production activity most closely related to the waste generation—number of employees, weight of product, number of units of product, surface area of product,

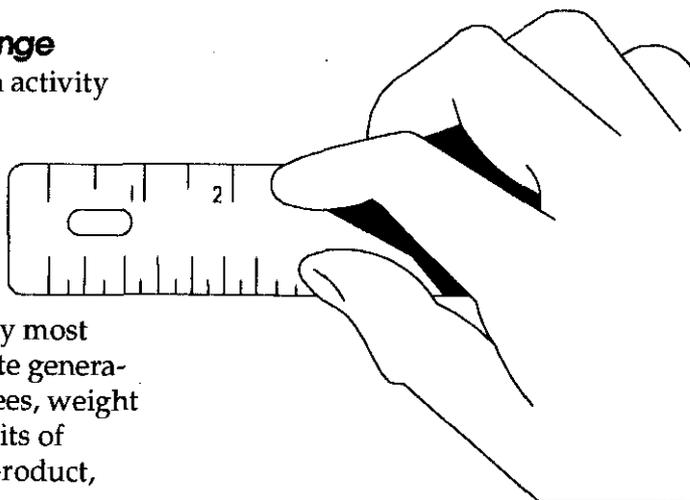
dollar value of product, etc. The best measure is based on the mechanism by which the waste is generated.

The activity/production index is a measure of changes in economic and other factors that affect the quantity of waste generated. The index is used to distinguish year-to-year quantity changes resulting from source reduction activity from those changes attributable to economic or other factors.

The activity/production index can be calculated by first determining the most appropriate measure of production or activity, using the product manufactured, raw materials used, number of hours the plant was in operation, total number of employee hours worked, sales, budget or any other factor that's appropriate for the waste stream.

Divide the value of that measure for the current year by the comparable value for the previous year. To calculate the source reduction that has occurred, multiply the previous year's waste generation by the activity/production index.

To calculate the amount of source reduction, subtract the quantity of waste actually generated





in the current year from the expected amount.

Throughput

This measure of source reduction relies on changes in the throughput ratio over time.

The throughput ratio is the ratio of the quantity of a material produced as waste before treatment to the total throughput.

The total throughput is the sum of the amount of product generated as waste plus the amount consumed in the process plus the amount incorporated in the product.

Using this calculation is also good for evaluating efficiency of a manufacturing process.

Reduction in chemical toxicity or product hazard

One indication of reduced hazard is if a hazardous waste is converted to residue by changing raw materials or inputs to the manufacturing process.

It's important to avoid transferring pollutants from one media to another or diluting a waste. These activities are not source reduction.

The important factor in documenting toxicity or hazard reductions is to select proper criteria for each waste. For example, toxicity may be of little concern for a highly ignitable hazardous waste. Decreased ignitability so that the waste is no longer classified as hazardous might be a more relevant improvement.

Evaluations of toxicity can be based on

various properties of the waste and its potential effects on human health and the environment. Essentially, the generator must use personal knowledge of the waste and its potential effects on the environment to select a proper measure of toxicity and document a reduction in toxicity.

Tangibles and intangibles

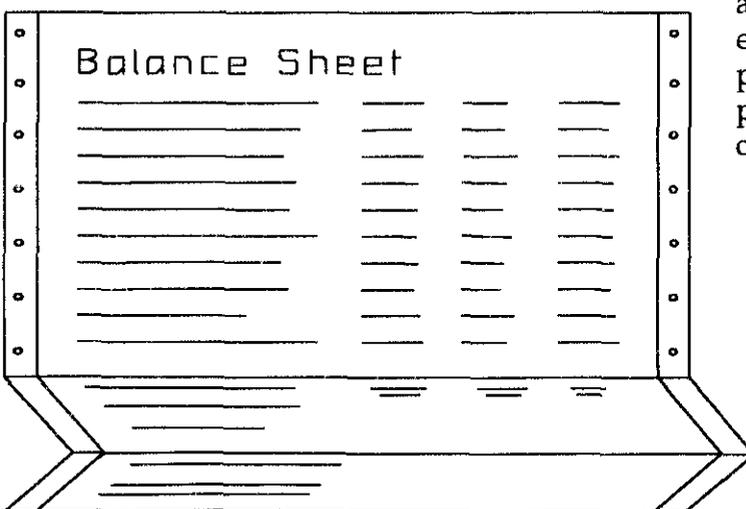
Other quantifiable costs of your source reduction program include materials developed and the value of the time put in by the coordinator and waste-assessment team. Savings can also include avoided disposal fees, which can be calculated by tracking before and after costs.

Not all benefits show up on a ledger sheet, though. Over time, employees who've been trained to reduce and avoid waste will also save your company the cost of buying excess materials and disposing of waste, since less will be created.

Decreasing landfill space and resistance to siting new disposal facilities are likely to drive up future disposal costs. Source reduction helps your company reduce present costs and manage cost increases for future planning.

Source reduction also instills in employees a sense of pride in knowing their efforts will benefit the company, the community and the environment. You might consider trying to measure this through ongoing employee attitude surveys.

In any event, make sure your customers and the general public know about your efforts to reduce waste. Publicize employee contributions through awards programs, in annual reports and in other company communications.



SOURCE: *Source Reduction Strategy Manual*, Pennsylvania Bureau of Waste Management, Harrisburg, 1992.



Preventing hazardous waste pays

Best Lock Corp., an Indianapolis manufacturer of master-keyed locking systems, can offer proof that reducing and minimizing industrial waste throughout the manufacturing process can increase productivity and save money.

Degreasing

Best Lock uses perchloroethylene, a chlorinated solvent, for degreasing. However, detailed vapor degreaser clean-out procedures help get the most use out of the solvent. Laboratory tests conducted on a daily basis determine life expectancy of the solvent and avoid unnecessary clean-outs.

Best Lock replaced porous material baskets with metal dipping baskets to reduce vapor drag-out. The company also purchased five parts washing machines that use an alkaline soap and water solution, rather than a toxic cleaner.

The water that remains can be discharged directly to a sanitary sewer. Substitute procedures have reduced hazardous air emissions, cut hazardous waste and established a safer work environment for employees.

Chlorinated hazardous waste has been cut 74 percent—from 19 tons in 1985 to five tons in 1992. The reduction paid for itself in five years.

Coating/painting operations

Best Lock also reduced by

50 percent the amount of waste contaminated with nickel from the electroplating process.

Waste-water treatment sludge dropped from 55 tons in 1985 to 26.5 tons in 1990 through:

- Use of triple counter-flow rinses to ensure better rinsing.
- Incorporation of atmospheric evaporation into the rinsing process.
- Reuse of concentrated solution in the electroplating process.
- Replacement of cartridge filters with permanent filters that have back-flushing capabilities.

This reduction paid for itself in two years, while another reduction in the lacquer/paint-stripping operation had a two-month pay-back.

Methylene chloride, an air toxic, was reduced by 93 percent. Better procedures for mixture ratios, re-evaluating material flow and handling procedures of parts, and constructing a clean area to store parts prior to





being lacquered or painted reduced stripper-solution waste from 8,000 pounds in 1985 to 500 pounds in 1991.

Oil recovery and reuse

Oil reclamation and reducing oily absorbent waste are additional areas where Best Lock has achieved source reductions.

All 5,000 gallons of cutting oil used yearly to maintain the tight tolerances of machining parts is now reclaimed and reused on-site with a two-stage filtration system and an ultra-filtration process. The project had a three-month pay-back and provides additional savings of \$12,000 per year from reduced oil purchases.

Oil spills used to be cleaned up with a clay absorbent, which was landfilled at a rate of 18 tons per year. Now operational changes have been implemented to prevent spills:

- Improved equipment maintenance helped prevent machine-oil leaks.
- Splash shields directed cutting oil to the containment reservoir.
- Drip pans were placed under stored oily parts.

For more information on Best Lock's reduction and pollution prevention practices, contact David Benshoof, 317-849-2250.

Source reduction checklists

For cleaning and degreasing...

- Use cleaning devices rather than chemicals to clean transfer lines.
- Use dry and non-solvent cleaning procedures when feasible.
- Schedule production of lightest-color product batch first.
- Use counter-current cleaning methods where possible—dirty solvent for initial cleaning and clean solvent for final cleaning.
- Dedicate process equipment to a single product where feasible to reduce the number of cleanups.
- Recover spent solvents for reuse.
- Cover cleaning tanks with impervious material to prevent vapor loss.
- Centralize and consolidate cold cleaning operations to minimize vapor loss.
- Avoid cross-contamination of cleaners.

- Extend life of cleaners through filtration and replenishment.
- Increase drain times for parts before and after washing to reduce drag-out.
- Remove sludge from cleaning tanks regularly.
- Designate responsibility for coolant maintenance and replacement.
- Use coolants that have a long life.

For painting and coating operations...

- Train paint operators to minimize unacceptable quality and paint waste.
- Size paint batches to specific jobs.
- Use equipment with high transfer efficiency (such as electrostatic applicators).
- Automate spray and dip operations.
- Design filters properly to prolong filter life and minimize waste.
- Optimize spray speed, distance, angle, pressure and other conditions to reduce over-spray.
- Evaluate the use of different paint arrestors, such as water curtains and filters.
- Regularly inspect production equipment, such as racks, for cleanliness.
- Use water-based or high-solids coatings whenever possible.
- Clean hooks to prevent paint buildup.

For leaks and spills...

- Inspect and maintain valves, pipe joints, pumps and tanks to prevent leaks and spills.
- Install spill basins or dikes in storage areas.
- Install splash guards and drip boards on tanks and faucets.
- Install overflow control devices on process and storage tanks.
- Use welded pipe joints.
- Use pumps without seals.
- Capture and reuse spilled or leaked materials, if possible.

SOURCE: "Fact Sheet: Waste Reduction Checklist," Michigan Office of Waste Reduction Services, Lansing, December 1989.



Industries: Cut waste, add profit

Industries can practice source reduction to minimize waste and its environmental and financial impacts by revamping production procedures and processes to eliminate it.

Increased efficiency of machinery, substitution of materials, process changes, improved housekeeping and management practices, and reclamation within a process are all examples of source reduction at work in manufacturing.

However, activities that merely transfer wastes from one media to another—such as from air to water—don't qualify as source reduction.

The general tips described in this fact sheet can be applied to a variety of industries and waste streams to help prevent waste. However, development and implementation of a source reduction program doesn't need to drain business resources.

Source reduction can be incorporated into existing programs for employee safety, quality control and employee involvement. Thereby, any expenses associated with establishment of a new program can be avoided, while, at the same time, the source reduction activities help the existing programs meet their goals.

You'll likely find other side benefits to cutting waste. Most fundamentally, the generation of waste may indicate some inefficiency or incomplete use of resources. So, to reduce waste is to increase industrial efficiency.

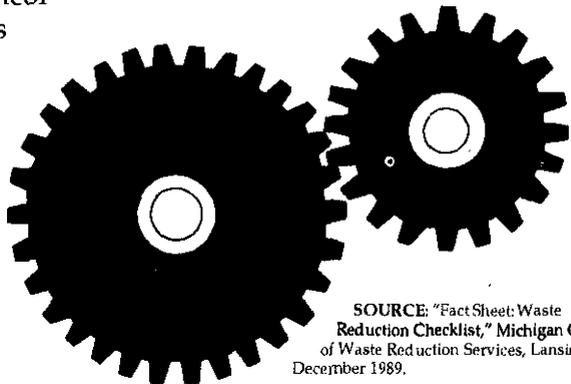
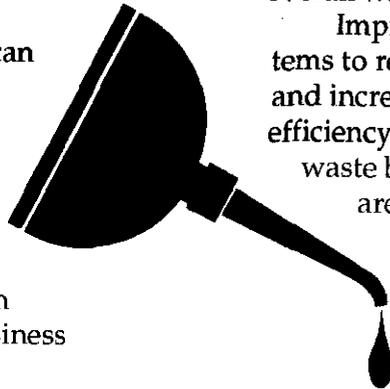
A comprehensive source reduction program can also cut disposal costs, limit environmental liability, encourage higher product yields, enhance corporate image and reduce environmental compliance burden.

Ways industries can reduce

- **Renewed commitment to quality control.**

Upgrade equipment, improve quality monitoring systems for higher production efficiency, and **beef up worker training**. This will result in fewer rejected products, fewer inferior products and less overall waste.

Improve inventory systems to reduce inventory needs and increase material-handling efficiency. This can mean less waste because raw materials are kept from spoiling, warping or becoming obsolete. You



SOURCE: "Fact Sheet: Waste Reduction Checklist," Michigan Office of Waste Reduction Services, Lansing, December 1989.



can also return faulty inputs to suppliers to send a strong signal that quality counts.

- **Durability and repairability.**

Choose equipment and machines that are long-lasting and can be repaired. This extends the life of the equipment and keeps it out of the landfill. Negotiate service contracts and practice regular maintenance to keep equipment running most efficiently.

- **Input substitution.**

Examine your raw materials for ways to reduce the toxicity or volume of waste. This might mean substituting an input that's easier to recycle than another.

- **Product changes.**

Alter the final product to generate less waste. This alteration could be a change in composition or substitution of a different product.

- **Technology changes.**

These changes could include process and equipment changes, process automation and changes in operational settings.

- **Input packaging.**

Work with suppliers to reduce the amount of packaging that's sent to you. Buy in bulk and ask vendors to eliminate unnecessary wrapping or padding. Insist that suppliers back-haul their containers and packing materials.

- **Recover and reuse.**

On-site recovery and reuse of used solvents, plastic scrap, trimmings and other production materials save money and the environment. Each time a material is reused, a new one need not be manufactured or refined, and eventually disposed of.

When designing or procuring products and packaging, consider the potential reuse of scrap, containers and other materials.

Here's how one company put it to work

Best Lock Corp., a manufacturer of master-keyed locking systems in Indianapolis, has a long-standing tradition of reducing waste in its processes. Here are some examples:

- Eliminated a cyanide heat-treating process by changing engineering specifications to a

pre-hardened material.

- Eliminated the use of chlorofluorocarbons in the metallurgical lab by purchasing a filter system for use on the compressed air system.
- Reduced the use of paint thinners by purchasing a spray-gun cleaning system. This allows for continuous reuse of solvents and has decreased solvent consumption by 108 gallons a year.
- Collects and sells brass finishing dust for metal content. Disposal of this dust was cut from 33,000 pounds in 1986 to 1,734 pounds in 1992 through resale. The more than 22 tons sold for metal content in 1992 generated \$18,000 in additional income for the company.

For more information, contact David Benshoof, 317-849-2250.

Source reduction checklist

On the production line...

- Substitute non-hazardous ingredients for hazardous materials where possible.
- Mix only the volume of material required to fill an order.
- Recover oils, solvents and other cleaning materials.
- Perform regular maintenance to prevent leaks and prolong equipment life.
- Evaluate process performance to help determine efficiency. Adjust as necessary to be certain waste and off-specification products are kept to a minimum.
- Purchase more efficient equipment. Train and motivate employees and install quality monitoring systems to reduce production-line rejects.
- Implement a collection system for recoverable materials.
- Modify production equipment to reduce production scrap.
- Evaluate pay-back of reduction programs in terms of reduced input costs and reduced disposal costs.
- Organize the flow of the production line to minimize handling of materials.



Look for a 'package' deal

A lot of suppliers and industries are working together to refurbish and reuse storage and packaging materials.

Pallets are a good example of an item that can often be reused or refurbished. There are also cardboard or recycled plastic pallets that cost more, but are stronger and last much longer.

A more 'pallet-able' choice

A tree must grow about 10 years to produce enough lumber to manufacture one wood pallet. Each year, American businesses buy 500-million wood pallets. Stacked on top of each other, they'd form a pile 3,617 miles high.

All of those pallets used to end up in landfills, but that's changing. PSI Energy, headquartered in Plainfield, negotiates with suppliers to collect their wood pallets to reuse and refurbish them.

This reuse helped PSI's Columbus office cut its waste disposal costs 25 percent to 35 percent the first year. **For more information, call Tom Furnish, customer services supervisor, at 317-379-3210.**

The program has been expanded to other PSI locations and suppliers, and wood reels have been added as a source reduction target.

Starting in 1993, PSI also began receiving meters packaged on cardboard pallets instead of wood. Although the cardboard version is slightly more expensive, it costs PSI less to use overall. The cardboard pallet weighs 77 percent less, so shipping costs are lower. It also can be reused more times than a wood pallet because it's stronger.

What to do with corrugated packaging

Corrugated is a term used interchangeably with cardboard. Here, both terms are used together to prevent confusion. Cardboard,

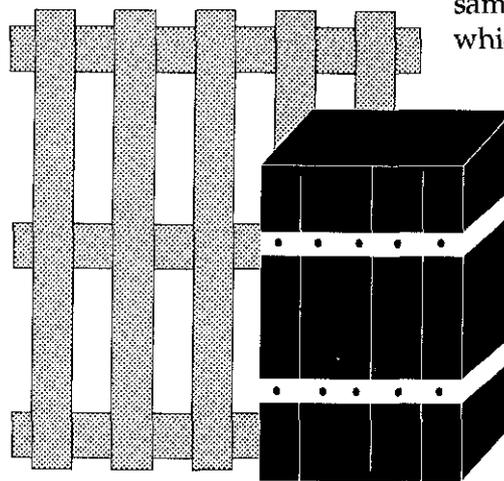
however, is not the same as paperboard, which is commonly used in shoe boxes and as backing for pads of paper.

Corrugated is one of the easiest materials to reduce or reuse. Because it's bulky, removing it from your waste stream can dramatically

reduce waste collection, hauling and disposal costs. If you pay for waste disposal by volume, reducing or eliminating corrugated waste will enable you to reduce the number and size of your waste dumpsters and the number of pickups.

Here are some tips on how to reduce:

- **Haul back cardboard contain-**





ers—Many businesses haul back cardboard from their customers. Back-hauled cardboard and packaging can then be reused.

- **Use reusable containers**—Cardboard waste can be reduced by using plastic or metal containers where appropriate. Reusable containers can reduce a firm's waste-handling costs and cardboard-packaging expense. While more expensive than cardboard on the front-end, reusable containers are more durable and thus have a much longer useful life. To save storage space, some reusable containers are even designed for stackability and nesting.

- **Purchase supplies and parts in bulk**—Significant cardboard savings can sometimes be realized by purchasing in bulk instead of in small, individual packages.

Other options

- Look for reusable substitutes to address packaging-disposal concerns. DowBrands, which is headquartered in Indianapolis, has converted from 55-gallon drums to returnable totes for raw-materials supplies at plants where specialty cleaners are manufactured. The change eliminates drum disposal and keeps more than 300 metal drums per manufacturing site from going to landfills every year. **For more information, call DowBrands public affairs department at 317-873-7000.**

- Substitute plastic pallets. They cost five to 10 times as much as wood, but they can be reused for years and are often made from recycled plastic.

- Advertise excess pallets or pick up pallets with a listing in the Indiana Waste Exchange catalog. To list your pallets or receive a catalog, call 800-968-8764. For more information on this free service, request the fact sheet "Turn your trash into treasure."

Source reduction checklists

In shipping, receiving, storage areas...

- Reduce the generation of wood and cardboard waste by working with suppliers to provide returnable and reusable containers.
- Distribute your own products in returnable containers to reduce your company's consumption of raw materials.
- Keep recoverable items such as corrugated cardboard containers separate from waste.
- Buy items in bulk if it will reduce waste.
- Reuse pallets and wood reels, or have suppliers collect and refurbish them.
- Ask suppliers to provide packing materials that are reusable or returnable.
- Use reusable, "nestable" storage containers that fit inside each other or stack for efficient storage and shipping.

For material handling...

- Don't mix unlike materials, except as required for production.
- Return empty containers to suppliers.
- Stack containers in accordance with manufacturers' instructions to prevent collapsing from excessive weight or improper weight distribution.
- Receive materials in reusable containers.
- Label all containers and process tanks to properly minimize contamination, especially for hazardous materials.
- Regularly look for ways to reduce or eliminate losses due to spoiled batches, out-of-date stock, spills and unused formulations.

SOURCE: "Fact Sheet: Waste Reduction Checklist," Michigan Office of Waste Reduction Services, Lansing, December 1989.



YOU CAN CUT IT!



Turn your trash into treasure

subscription. The exchange is a vehicle for companies to find uses for materials that otherwise might be landfilled. The hope is that one company's waste will be another company's raw materials.

Listings in the catalog don't include contact information. To

Management's Office of Pollution Prevention and Technical Assistance. It's operated under contract by Recycler's Trade Network, based in Carmel.
RTN



listings are also carried on a fax data base system. This allows interested parties immediate access to information about the listings by calling either



Britt, RTN president, P.O. Box 454, Carmel 46032. Or, call 317-844-8764 or toll-free in Indiana 800-968-8764.

Informal waste exchanges

Some companies or communities also have informal waste exchanges. Best Lock Corp., an Indianapolis manufacturer of master-keyed locking systems, has been selling material through a waste exchange since 1988. Take a look at the highlights:

- **1992**—Sold 3,580 pounds of cleaners, 76 gallons of tri-chrome solution and a used waste-water treatment system.
- **1991**—Sold 2,660 pounds of cleaners, 330 gallons of nickel solution, used propane tanks and used plating equipment.
- **1990**—Sold 508 pounds of cleaners.
- **1989**—Sold 550 pounds of cleaners and used plating equipment.
- **1988**—Sold 8,800 pounds of obsolete materials, such as cleaners, acid salts and caustics, along with 2,000 gallons of nickel solution.

For more information, call David Benshoof at 317-849-2250.

Jefferson County has an environmental roundtable, made up of various community leaders. The group meets monthly to talk about source reduction programs and activities. However, its meetings have led to waste exchanges on more than one occasion:

- A local industry received a shipment of 9,000 small mirrors that were slightly defective. The local developmental services shelter used the mirrors to make Christmas ornaments they could sell as fund-raisers.
- Local recyclers were able to get some sturdy Gaylord boxes to use as drop-off containers so that a plastics manufacturer wouldn't have to landfill them.
- Madison Consolidated Schools shreds some of its confidential papers and gives the material to a local industry, which uses it as packing.

For more information, call Dave Adams at 812-273-1622, extension 580.

More formalized efforts

PSI Energy's waste exchange started out informally but has grown into a specialized subsidiary that operates separately from the electric utility.

In 1985, when construction ended on PSI's Marble Hill nuclear station, the utility began an aggressive brokering effort to recoup some of its investment through resale of materials purchased for use at the plant construction site. They were so successful that other companies asked them to serve as brokers for their scrap and overstock.

Now, a full-fledged subsidiary operates out of the Madison Marble Hill site—Power Equipment Supply Co. PESCO has since acquired Ohio-based North American Machinery, which sells, refurbishes and services electrical-power equipment used in substations, power plants and other industrial operations.

For more information, call Vince Griffin, PSI environmental stewardship manager, at 317-838-1955.





Reuse can reduce industry waste

To distinguish reuse from recycling, reuse is defined as the return of a material or product to the economy for use, without any change in its identity, by using a product again for its original purpose or finding different uses for the commodity.

If the application is truly "reuse," no energy beyond what's used to clean the material or product is required to remanufacture or recycle it.

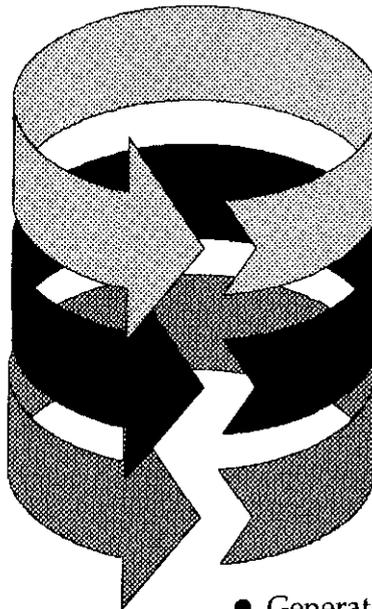
Tons of manufacturing by-products, clean construction scrap and other commercial and industrial discards can be reused. Collection, warehousing and distribution systems change what could have been waste into an opportunity for industries to demonstrate new behaviors and methods for using resources.

Programs established in some communities retrieve and redistribute a wide variety of reusable discards, including:

- Factory seconds.
- Unfinished garments.

- Scrap remaining after a product is made.
- Overrun stock a distributor can't sell.
- Discarded office furniture and equipment.
- Outdated business forms and other business inventory.
- Depreciated business equipment.
- Manufacturer trimmings and overruns.
- Building contractor trimmings and damaged surplus.
- Decorator fabrics ends and swatch books.

These programs differ from thrift stores like those operated by the Salvation Army or Goodwill Industries in that they don't accept or collect used furniture, clothing or household supplies.



Common goals

Although programs vary in form, all were established with similar goals in mind:

- Collect excess materials from business and industry.
- Provide the community access to these materials.
- Provide publicity and education on resource reuse.
- Generate funds to support program services.

An Indiana reuse program

Rehab Resource Inc. is a non-profit organization, operating out of Indianapolis, that's designed to facilitate repair and rehabilitation of substandard housing. In the process, it also diverts materials that



would otherwise be considered waste from entering the waste stream.

RRI accepts donations of excess, discontinued or cosmetically damaged building materials from private businesses, manufacturers, suppliers and contractors. Donations may be new or used, as long as all materials are in reasonably good condition.

Products are then made available for a handling fee to member agencies, which include community development corporations, multi-service centers and other non-profit organizations working on behalf of low-to-moderate income families.

RRI supports rehabilitation of existing housing and development of affordable housing for needy families. It also aids individual efforts to repair and maintain property by making affordable, quality building products available.

Any not-for-profit organization can become part of the Rehab Resource user network by completing a membership application. There is no membership fee.

Members can then use RRI materials for projects they're doing on behalf of needy families or repair they're making to their own facility. They can also refer individuals who meet income guidelines to use the RRI warehouse.

Rehab Resource has four objectives:

- **Enhancement of the low-cost housing effort.** Warehouse users can expect to pay 50 percent to 70 percent less than the cost of comparable items retail.
- **Enhancement of community redevelopment and economic development efforts.** Building products typically make up about one-third of total project cost. As a central procurer and distributor of low-cost con-

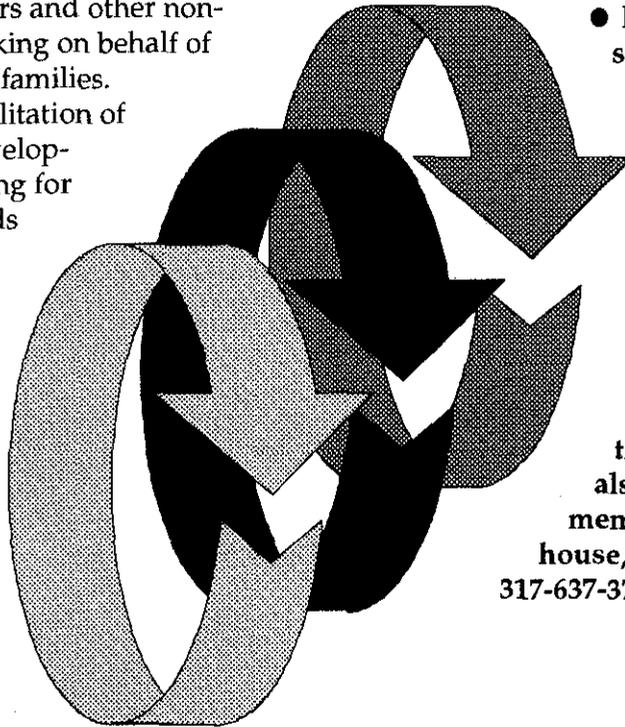
struction material, RRI helps other organizations that produce and repair substandard housing stock make their money go further.

- **Conservation of resources.** Every truckload of materials donated to RRI represents one less truckload going to a landfill or incinerator, which helps Indiana's solid waste management system save money, too. The program directly impacts the state goal of reducing solid waste 35 percent by 1996 and 50 percent by 2001.

- **Rehab Resource represents a unique, hybrid organization** by its combination of being a small business and a not-for-profit organization.

RRI serves all of Indiana from its warehouse at 243 W. Merrill St. in Indianapolis.

For more information on donating materials to RRI, becoming a member or touring its warehouse, call Kamau Jywanza, 317-637-3701.



SOURCE: "Reuse as a Key Element in Waste Reduction," written by Sheila Cogan and published in *Resource Recycling*, June 1991.



Chapter 8: Resources



Organizations/Tools

Indiana Department of Commerce
Office of Energy Policy
1 N. Capital, Suite 700
Indianapolis 46204-2288
317-232-8940

Program available:

Recycling Market Development

Recycling means more than just separating recyclable materials from the waste stream. Recycling is a process that is completed only after recyclable materials are manufactured into new products and purchased by consumers.

Recycled materials can be comparable in quality and price to virgin materials. However, recycled materials and goods must overcome perceptual biases by manufacturers interested in using them as feedstocks and consumers unaware of the availability and quality of recycled products.

This program was established to help develop and promote markets for recyclable materials by removing these barriers.

Program objectives:

- To develop the state's industrial capacity for making use of its recyclable materials.
- To assist local governments, non-profit organizations and businesses in identifying and securing markets for their recyclable materials.
- To assist Indiana manufacturers and distributors of recycled products in marketing these products.
- To promote demand for recycled products.

Program Services:

- *Financial assistance*—The Recycling Promotion and Assistance Fund provides low-interest loans to business for purchasing equipment and machinery. Eligible projects include those resulting in the final processing or conversion of secondary (recyclable)

materials into industrial feedstocks or the manufacture of products from these feedstocks.

- *Technical assistance*—The program helps local units of government, the private sector and non-profit organizations find markets for their recyclables through market information, marketing advice, recycled product promotion and market research.

Indiana Department of Environmental Management

P.O. Box 6015

105 S. Meridian St.

Indianapolis 46206-6015

IDEM switchboard—317-232-8603

Office of Pollution Prevention and Technical Assistance (OPPTA)—317-232-8172

Office of Solid and Hazardous Waste Management (OSHW) —317-232-8941.

Environmental concerns or information help line (within Indiana)—800-451-6027

IDEM was established April 1, 1986, to protect the environment and public health. Its responsibilities include enforcement of state and federal environmental laws, enforcing the rules of Indiana's environmental boards, writing and issuing environmental permits and providing technical assistance.

To date, the IDEM includes as its major accomplishments:

- A 20-year solid waste plan for Indiana.
- An Office of Pollution Prevention and Technical Assistance.
- A recycling grants program to help local communities.
- A toll-free help line to provide immediate response to environmental concerns.

The Office of Pollution Prevention and Technical Assistance represents Gov. Evan Bayh's pro-active initiative to prevent environmental damage through household and industrial toxic reduction, to thwart the solid waste crisis by statewide reduction and recycling, and to create long-term environmental solutions through education and community outreach programs.

OPPTA offers guidance and assistance necessary to bring about a new environmental ethic for Indiana—to preserve and protect our Hoosier heritage for future generations.

Pollution prevention, recycling and education specialists in the OPPTA provide guidance to government officials, industries, schools and the public to develop programs and habits that help preserve our environment.

The Office of Solid and Hazardous Waste Management implements the Indiana Solid Waste Management Plan, reviews 20-year plans for the 61

solid waste management districts and assists districts as they develop and implement their plans. This office also monitors the state's progress toward reaching Gov. Evan Bayh's 35-percent and 50-percent waste reduction goals and assesses the need for legislative and state plan revisions to better address Indiana's solid waste management and recycling needs.

Publications available from the Office of Pollution Prevention:

- *The Indiana Recycling Handbook*—A guide to establishing a local community reduction and recycling program (co-published by IDEM and the Indiana Recycling Coalition)
 - *Citizens Participation Manual*, a citizen's guide to getting involved in local solid waste management planning (co-published by IDEM and the Indiana Recycling Coalition)
 - *Indiana Yard Waste Solutions*—A guide to source reduction, chipping, composting and land application.
 - *Recycling: How to Do It at the Office*—A complete guide for Indiana businesses.
 - *Recycle, Indiana!*—A guide to curbside, drop-off and buy-back recycling in Indiana.
 - *The Indiana Recycled Paper Task Force Final Report*
 - *The Indiana Packaging Waste Reduction Task Force Final Report*
 - *The Indiana Recycling K-12 Curriculum Guide*
- Brochures available:**
- *Cool Things Kids Can Do to Save the Earth*
 - *Simple Substitutions for Hazardous Household Products*
 - *Simple Things You Can Do to Save the Earth*
 - *Composting is Nature's Recycling System*
 - *Recycle Indiana*

Indiana Institute on Recycling

Room 921, School of Education
Indiana State University
Terre Haute 47809
812-237-3000

The Indiana Institute on Recycling is a state agency with offices at Indiana State University in Terre Haute. Formed in 1990, the institute:

- Provides a central source of information on recycling in Indiana and the nation.
- Conducts research on recycling topics.
- Designs and leads educational workshops.
- Provides expert counsel to the Indiana General Assembly.
- Assists local units of government, citizens' groups and businesses in the development of recycling programs.

The institute's monthly newsletter, "The Indiana Recycler," reports how communities around the

state are developing and improving methods to collect, process and market recyclables. The newsletter also reports current market prices for cans, glass, paper and plastics.

Indiana Recycling Coalition

P.O. Box 20444
Indianapolis 46220-0444
317-283-6226 (phone or fax)

The Indiana Recycling Coalition is a not-for-profit 501(c)(3) corporation representing concerned citizens, state and local government officials, business, industry and environmental groups. Incorporated in December 1989, the coalition works to expand waste reduction, reuse and recycling efforts throughout Indiana.

The coalition serves as an information clearinghouse and networking source and coordinates efforts of those involved in the recycling cycle. The coalition promotes the use of recyclable and recycled materials, with a special emphasis on education.

Membership of the coalition is divided into categories—individual members, citizen groups, government and corporate. The coalition provides a broad range of activities for members. As a growing organization, coalition efforts will expand as recycling changes in Indiana.

Currently, members can:

- Attend the annual conference at a discount.
- Participate in board meetings.
- Submit articles for publication in quarterly newsletters.
- Join committees such as...
 - Annual Conference Planning
 - Market Development
 - Membership and Development
 - Publications
 - Recycling Health and Safety Advisory
 - Southwestern Indiana Recycling Initiative
 - Training and Education
- Receive discounts to training sessions.
- Attend periodic general and regional meetings.

The coalition encourages members to suggest and participate in development of other projects that could benefit Indiana recyclers of all levels.



Directory

Association of Indiana Counties, 101 W. Ohio St., No. 710,
Indianapolis 46205

Indiana Association of Cities and Towns, 150 W. Market St., No.
728, Indianapolis 46204

Indiana Department of Commerce, Office of Energy Policy, 1 N.
Capitol Ave., Suite 700, Indianapolis 46204, 317-232-8951

Indiana Department of Environmental Management, P.O. Box

6015, 105 S. Meridian St., Indianapolis, 46206, 317-232-8172

Indiana Department of Natural Resources, 402 W. Washington St., Room 255B, Indianapolis 46221, 317-232-4200

Indiana Institute on Recycling, Room 921, Indiana State University School of Education, Terre Haute 47809, 800-242-4467

Indiana Recycling Coalition Inc., P.O. Box 20444, Indianapolis, 46220, 317-283-6226

Indiana Waste Exchange Catalog, see **Recycler's Trade Network**

Institute for Local Self-Reliance, 2425 18th St. N.W., Washington, DC 20009

Recycler's Trade Network, publishes Indiana Waste Exchange Catalog; Jim Britt, president. P.O. Box 454, Carmel 46032, 317-844-8764, 800-968-8764

U.S. Conference of Mayors, 1620 I St. N.W., Fourth floor, Washington, DC 20006, 202-293-7330

U.S. Environmental Protection Agency, Region V, 77 W. Jackson Blvd., Chicago, Ill. 60604, 312-886-6530, 800-621-8431

Indiana Solid Waste Management Districts

Adams County

Bob Tyler, director

William F. Baker, board chair

1570 W. 450 North, Decatur 46733, 219-724-9971, 219-724-8281 (fax)

Allen County

Anthony G. Burrus, administrator

1 Main St., Room B-86, Fort Wayne 46802, 219-428-7265

Ed Rousseau, board chair

1 Main St., Room 200, Fort Wayne 46802
219-428-7555

City of Columbus—Bartholomew County

James Murray, administrator

720 S. Mapleton St., Columbus 46201-7353, 812-376-2614

Micheal Totten, board chair,

2227 Gilmore Ave., Columbus 47201, 812-372-0179

Benton County, see *Northwest Indiana*

Blackford County, see *Mideast Indiana*

Boone County

Phill Carroll, acting director

832 Langsdale Ave., Indianapolis 46202, 317-926-5492 (work)

Thelma Theobald, board chair

201 Courthouse Square, Lebanon 46052, 317-436-2242

Brown County

Mark W. Davis, district administrator

P.O. Box 529, 121 Locust Lane, Nashville 47448, 812-988-0140

Jerry Floyd, board chair

Rural Route 1, Box 241, Nashville 47448, 812-988-7473

Carroll County, see *Northwest Indiana*

Cass County

Bill Champion, board chair

2533 E. Broadway, Logansport 46947

219-722-1776, 219-753-7722 (government building), 219-722-7216

(fax)

Clark County

Jerry Fuller, executive director

405 E. Court Ave., Suite 6, Jeffersonville 47130, 812-285-7963, 812-

285-9773 (fax)

Ralph Guthrie, board chair

Highway 160 East, Henryville 47126, 812-246-4381 (work), 812-

294-1149 (home)

Clay-Owen-Vigo

Donna Klewer, director

36 E. National Ave., Brazil 47834

Jack Johnson, board chair

Coleen Wolford, secretary

c/o Auditor's Office, Courthouse, Brazil 47835, 812-448-3410

Clinton County, see *Wildcat Creek*

Crawford County

L. Eugene Wright, board chair

Rural Route 1, English 47118, 812-739-2625

Daviess County

Joseph B. Wuertz, director

P.O. Box 312, Montgomery 47558, 812-486-3774

Jack Graber, board chair

Rural Route 2, Box 52, Montgomery 47558, 812-486-3834, 812-486-3649 (home)

Dearborn County

Louis G. Meyer, interim director

215B W. High St., Lawrenceburg 47025

812-537-8824, 812-537-3225 (home)

Rodney Dennerline, board chair

9777 U.S. 50, Aurora 47001, 812-926-0589

Decatur County

Norma Bainbridge, administrative director

208 W. Main St., Greensburg 47240

812-663-0960 (district office)

Cleo Duncan, board chair

1205 E. Tara Road, Greensburg 47240, 812-663-5595

Dekalb County, see *Northwest Indiana*

Dubois County

Emily Nichols, director

After 8/14/93, 180 E. Sixth St., Jasper 45756, 812-481-7040

Mary Lou Schnell, board chair

One Courthouse Square, Dubois County Courthouse, Jasper

47546, 812-482-5505, 812-678-5161 (courthouse)

East Central Indiana (serves Delaware, Grant and Madison counties)

Dean Smith, director

County Government Center, 16 E. Ninth St., Anderson 46016,

317-641-9513, 317-747-7730 (courthouse)

Phil Rybolt, board chair

308 N. Washington St., Swayzee 46986, 317-668-8871 (work)

Elkhart County

Tim Neese, administrator

315 S. Second St., Elkhart 46516, 219-523-2389, 219-523-2390

David Hess, board chair

Commissioners Office, 117 N. Second St., Goshen 46526, 219-534-3541

Fayette County, see *Three Rivers*

Floyd County

Stephen Sharp, board chair

City County Building, Room 214, New Albany 47150, 812-945-

4790 (home), 812-945-4063 (work), 812-948-4733 (courthouse)

Fountain County

Dave Ziegler, director and board chair

Courthouse, Covington 47932, 317-798-4985, 317-793-2243

(courthouse)

Franklin County, see *Southeast Indiana*

Fulton County

Nancy Krom, administrator

1342 Lucas St., Rochester 46975, 219-223-4939

Randy Sutton, board chair

313 W. 11th St., Rochester 46975, 219-223-4489

Gibson County

Gary Phillips, administrator

c/o Gibson County Commissioners Courthouse, 101 N. Main St.,

Princeton 47670, 812-385-3136

Warner Clem, board chair

812-385-8260

Grant County, see *East Central Indiana*

Greene County

Jeff Myers, director

Courthouse, Room 108, Bloomfield 47424, 812-384-9231
Bob Crowe, board chair
Route 1, Box 368, Solsberry 47459

Hamilton County

Barry Nulty, director
317-776-8500 (Hamilton County Health Department)
Jane Wygant, assistant director
1 Hamilton County Square, Suite 30, Noblesville 46060-2229
Steven Holt, board chair
1 Hamilton County Square, Suite 157, Noblesville 46060, 317-773-5997 (work)
Fred Swift, commissioners assistant
317-776-9719

Hancock County, see *Three Rivers*

Harrison County

Edward B. Sieg, interim administrator
P.O. Box 355, Corydon 47112, 812-738-8241 (courthouse), 812-738-2925 (highway department)
Terry Miller, board president
Route 3, Elizabeth 47117, 812-969-2398

Hendricks County, see *West Central Indiana*

Henry County, see *Three Rivers*

Howard County

Keith Fallon, director
120 E. Mulberry, Room 104, Kokomo 46901, 317-456-2274
Rob Whitacre, assistant director
Dave Griffey, board president
317-452-9324

Huntington County

Robert Brown Jr., interim director and board chair
1214 Charles St., Huntington 46750, 219-356-6256

Jackson County

LeRoy Crees, executive director
P.O. Box 286, Brownstown 47220-0286, 812-358-4277 (district office), 812-358-3188 (home)
James T. Eglen, board chair
7743 W. County Road 300 North, Brownstown 47220, 812-995-2961

Jasper County, see *Northwest Indiana*

Jay County, see *Mideast Indiana*

Jefferson County, see *Southeast Indiana*

Jennings County, see *Southeast Indiana*

Johnson County

Alvin Givens, director
Steve Boggs, board chair
120 E. Jefferson St., Franklin 46131, 317-738-2546 (district office), 317-738-2291 (fax)

Knox County

Kaye Driskill Cannon, director
3340 Hillcrest Road, Vincennes 47591, 812-886-0066 (district office), 812-882-8926
Jerry Brocksmith, board chair
Rural Route 1, Bicknell 47512, 812-735-4211

Kosciusko County

Fiona Norris, director
P.O. Box 1192, Warsaw 46581, 219-372-3087 (district office)
Jeffrey Plank, board chair
P.O. Box 953, Warsaw 46580, 219-372-9595

LaGrange County, see *Northeast Indiana*

Lake County

Mayor James Metros, board chair
3145 45th St., Highland 46322, 219-662-3240
Jeanette Romano, secretary, 219-922-1266
Gilbert King, vice chair, 219-881-1400

LaPorte County

Lynn Waters, director
809 State St., County Complex, Level 3, LaPorte 46350, 219-326-6808, extension 408, 219-326-5310 (fax)

Elmo Gonzalez, board president
801 Michigan Ave., LaPorte 46350, 219-362-8220

Lawrence County

James Parker, district administrator
Courthouse, Bedford 47421, 812-275-3111 (district office)
Jack Cummings, board chair
812-279-7347 (work), 812-275-7100 (home)

Madison County, see *East Central Indiana*

Marshall County

Jamie Medley, district administrator
County Building, 112 W. Jefferson St., Plymouth 46563, 219-935-8618, 219-935-8612 (fax)
Jan Garrison, board chair
833 Oakhill Ave., Plymouth 46563, 219-936-9279

Martin County

Laura Albertson, administrator
P.O. Box 343, Loogootee 47553, 812-295-4291, 812-295-3647 (attorneys' office)
Cary Albright, board president
P.O. Box 1078, Shoals 47581, 812-274-2110

Miami County

Ray Hopkins, board chair
County Auditor's Office, Miami County Courthouse
Peru 46970, 317-472-3901 (work)

Mideast Indiana (serves Blackford, Jay and Wells counties)

Carter Leonard, administrator
100 N. Jefferson St., Hartford City 47348, 317-348-7220 (district office)
Rex K. Chaney, board chair
317-348-1077 (auditor's fax), 317-348-3136 (work)

Monroe County

Mike Frey, manager
1040 W. 17th St., Bloomington 47404, 812-333-3869
Joyce Poling, board chair
Monroe County Courthouse, Bloomington 47401, 812-332-6311
Montgomery County, see *West Central Indiana*

Morgan County, see *West Central Indiana*

Newton County, see *Northwest Indiana*

Noble County, see *Northeast Indiana*

Northeast Indiana (serves Dekalb, LaGrange, Noble and Steuben counties)

Brian R. Miller, executive director
Barry Bender, education coordinator
213 E. Seventh St., Auburn 46706, 219-925-4857 (district office)
Harold Gingerich, board chair
P.O. Box 725, Topeka 46571, 219-593-2689

Northwest Indiana (serves Benton, Carroll, Jasper, Newton, Pulaski and White counties)

Linda G. Horn, district administrator
P.O. Box 731, Monticello 47960, 219-583-1551
Charles Altman, board chair
Rural Route 1, Chalmers 47929, 219-984-5306
Ohio County, see *Southeast Indiana*

Orange County

Bob Gilliatt, board chair and plan administrator
County Complex Building, 205 E. Main St., Paoli 47454, 812-723-2811 (work), 812-723-5754 (home)
Owen County, see *Clay-Owen-Vigo*

Parke County, see *West Central Indiana*

Perry County

Mary Ann Wheatley, board chair
907 16th St., Tell City 47586, 812-547-5145

Pike County

Susan Halslip, administrator
Pike County Courthouse, Petersburg 47567, 812-354-2924
Randy Harris, board chair
409 N. 11th St., Petersburg 46567, 812-354-8511
Kelly Russell, secretary, 812-789-2230

Porter County

Jim Mandon, district manager
Mayor David Butterfield, board chair
Valparaiso City Hall, 166 Lincoln Way, Portage 46383, 219-462-1161, 219-464-4273 (fax)

Posey County

Patricia Brunner, executive director
City Hall Annex, 520 Main St., Mount Vernon 47620, 812-838-1613

Martin Redman, board chair
Courthouse, Mount Vernon 47620, 812-682-4213, 812-838-1311 (courthouse)

Pulaski County, see *Northwest Indiana*

Putnam County, see *West Central Indiana*

Randolph County, see *W.U.R.*

Ripley County, see *Southeast Indiana*

Rush County, see *Three Rivers*

St. Joseph County

Paul E. Trost, executive director
207 W. Colfax Ave., South Bend 46601, 219-235-9971 (district office), 219-235-9972 (district office), 219-235-9973 (fax)
Richard L. Larrison, board chair
Seventh floor, City-County Building, South Bend 46601, 219-235-9534

Scott County, see *Southeast Indiana*

Shelby County

Marcia Perdue, director
Waste Flow Services Inc., P.O. Box 107, Morristown 47161, 317-763-7415

David Mohr, board chair
Court House, Room 101, Shelbyville 46176, 317-392-6310 (courthouse), 317-835-7755 (home)

Southeastern Indiana (serves Franklin, Jefferson, Jennings, Ohio, Ripley, Scott and Switzerland counties)

Thomas J. Perotti, executive director
P.O. Box 166, Versailles 47042, 812-689-3525 (district office), 812-689-3563 (fax)

Bill Comer, board chair
Rural Route 2, Box 545A, Scottsburg 47170, 812-794-8748

Spencer County

Deborah Steinkamp, director
Rural Route 1, Box 515B, Chrisney 47611, 812-362-7401
Roy Ranger, board president
Rural Route 2, Box 322, Dale 47523, 812-937-4798 (home)

Starke County

Michael Haugh, administrator
Starke County Government Building, 53 E. Mound St., Knox 46534, 219-773-9118

Pam Fletcher, board president
219-772-9106 (courthouse), 219-772-4416

Steuben county, see *Northeast Indiana*

Sullivan County

Mike Myers, district administrator
P.O. Box 26, Shelburn 47849
Ed Cox, board president
Attention: Judy K. Harris
Court House, Sullivan 47882, 812-268-4491, 812-268-6814

Switzerland County, see *Southeast Indiana*

Three Rivers (serves Fayette, Hancock, Henry and Rush counties)

Steve Lempke, director
P.O. Box 426, Rushville 46173-0426, 317-938-1055, 317-932-4355 (fax)

Dr. Warren Buhler, board chair
Rural Route 8, Box 10, Rushville 46173, 812-932-3022

Tippecanoe County, see *Wildcat Creek*

Tipton County

Brook Edwards, director
Rural Route 4, Box 161A, Tipton 46092, 317-675-4535

David Berkemier, board president
Court House, Tipton 46072, 317-675-2794

Union County, see *W.U.R.*

Vanderburgh County

Joe Ballard, director
Civic Center Complex, Room 207, 1 NW Martin Luther King Jr. Blvd., Evansville 47708
812-426-5601

Betty Lou Jerrel, board chair
305 Administration Building, Civic Center Complex, 1 NW Martin Luther King Jr. Blvd., Evansville 47708, 812-426-5241

Vermillion County

John Cheesewright, board president
Rural Route 1, Box 14, Dana 47847, 317-665-3831

Vigo County, see *Clay-Owen-Vigo*

W.U.R. (serves Randolph, Union and Wayne counties)

Jim Lasley, solid waste coordinator
2380 Liberty Ave., Richmond 47374, 317-962-2828, extension 270 (district office), 317-962-4709 (home), 317-962-2669 (fax)

Max Smith, board chair
Wayne County Administrative Office, 401 E. Main St., Richmond 47374, 317-489-4036 (home)

Wabash County

Dean Eppley, board chair
711 West SR 124, Wabash 46992, 219-563-4928

Warren County

Jack Sargent, administrator
Mary Lou Easter, education coordinator
Randall Brenner, board chair
408 W. Washington St., Williamsport 47993, 317-762-6182, 317-762-6181

Warrick County

William F. Kavanaugh, director
Paul Houston Annex, 109 W. Main St., Boonville 47601, 812-897-6210 (district office)
Chris Horn, board chair
Courthouse, Boonville 47601, 812-897-6155, 812-897-6120 (courthouse)

Washington County

Mike Goering, administrator
Courthouse, Salem 47167, 812-883-4805, 812-883-2431 (district office)
Jerry Roberts, board president
Route 1, Campbellsburg 47108
812-755-4140

Wayne County, see *W.U.R.*

Wells County, see *Mideast Indiana*

West Central Indiana (serves Hendricks, Montgomery, Morgan, Parke and Putnam counties)

Cassie Stockamp, coordinator
P.O. Box 68, Danville 46122, 317-745-2491 (district office)
Jim Hauck, education coordinator
George Nicholas, board chair
Parke County Courthouse, Rockville 47872, 317-569-3422

White County, see *Northwest Indiana*

Whitley County

Gordon West, administrator
701 S. Line Road, Columbia City 46725, 219-244-5303
Pat Zickgraf, board chair
Whitley County Courthouse, Columbia City 46725

Wildcat Creek (serves Clinton and Tippecanoe counties)

Dawn Boston, director
2436 Glick, Lafayette 47905, 317-474-5607, 317-474-6714 (fax)
Nola Gentry, board chair
2436 Glick, Lafayette 47905, 317-432-9215

Purdue University Cooperative Extension Offices

Adams County, P.O. Box 466, 804 Mercer Ave., Decatur 46733-0466, 219-724-3000, 219-724-8172 (fax)

Allen County, 4001 Crescent, Fort Wayne 46815-1489, 219-481-6826, 219-481-6439 (fax)

Bartholomew County, 1971 State St., P.O. Box 507, Columbus 47202-0507, 812-379-1665, 812-376-3200 (fax)

Benton County, 604 E. Second St., Suite A, Fowler 47944-1302, 317-884-0140, 317-884-0574 (fax)

Blackford County, Courthouse, Hartford City 47348-2299, 317-348-3213, 317-348-1077 (fax)

Boone County, 1300 E. 100 South, Lebanon 46052-9697, 317-482-0750, 317-482-8926 (fax)

Brown County, Fairgrounds, P.O. Box 7, Nashville 47448-0007, 812-988-5495, 812-988-4310

Carroll County, Box 317, Indiana 39 South, Delphi 46923-0317, 317-564-3169, 317-564-4743 (fax)

Cass County, County Government Building, Room 302, Logansport 46947-3149, 219-753-7750, 219-753-7759 (fax)

Clark County, Agriculture Building, 9608 Highway 62, Suite 1, Charlestown, 47111-9640, 812-256-4591, 812-256-4270 (fax)

Clay County, Courthouse, Brazil 47834-2659, 812-442-1442, 812-448-8309 (fax)

Clinton County, 1701 S. Jackson, Frankfort 46041-3391, 317-659-6380, 317-659-6382 (fax)

Crawford County, 110 N. Main St., English 47118-0189, 812-338-2352, 812-338-3294 (fax)

Daviess County, Courthouse, Box 247, Washington 47501-0247, 812-254-1090, 812-254-7472 (fax)

Dearborn County, 233 Main St., City Hall, Aurora 47001-1385, 812-926-1189, 812-926-3006 (fax)

Decatur County, 766 W. Main St., P.O. Box 105, Greensburg 47240-0105, 812-663-8388, 812-663-6478 (fax)

Dekalb County, 215 E. Ninth St., Suite 300, Auburn 47606-2336, 219-925-2562, 219-925-3130 (fax)

Delaware County, Delaware County Building, Room 202, Muncie 47305-2879, 317-747-7732, 317-747-9157

Dubois County, 1482 Executive Blvd., Suite A, P.O. Box 30, Jasper 47547-0030, 812-482-1782, 812-482-3301 (fax)

Elkhart County, 4-H Fairgrounds, 17746 County Road 34, Goshen 46526-6497, 219-533-0554, 219-533-0254

Fayette County, 111 W. Fourth St., Connersville 47331-1901, 317-825-8502, 317-825-8140 (fax)

Floyd County, 209 City County Building, New Albany 47150-3588, 812-948-5470, 812-945-1168 (fax)

Fountain County, Courthouse, P.O. Box 181, Covington 47932-0181, 317-793-2271, 317-793-2573 (fax)

Franklin County, Courthouse, Brookville 47102-4590, 317-647-3511, 317-647-3340 (fax)

Fulton County, 802 Jefferson St., County Office Building, Rochester 47975-1536, 219-223-3397, 219-223-2386 (fax)

Gibson County, 800 S. Prince St., Courthouse Annex, Room 33, Princeton 47670-2664, 812-385-3491, 812-385-3662 (fax)

Grant County, 401 S. Adams, County Complex, Suite A516, Marion 46953-2035, 317-668-8871, 317-664-8165 (fax)

Greene County, Rural Route 2, Box 38A, Bloomfield 47424-9769, 812-659-2122, 812-659-9155 (fax)

Hamilton County, 2003 E. Pleasant St., Noblesville 46060-0854, 317-776-0854, 317-776-9892

Hancock County, 620 N. Apple St., Greenfield 46140-1533, 317-462-1113, 317-462-2424 (fax)

Harrison County, 124 S. Mulberry St., County Office Building, Corydon 47112-1218, 812-738-4236, 812-738-8535 (fax)

Hendricks County, 955 E. Main St., P.O. Box 7, Danville 46122-0007, 317-745-9260, 317-745-9267 (fax)

Henry County, 1635 Indiana Ave., New Castle 47362-3244, 317-529-5002, 317-529-8966 (fax)

Howard County, 120 E. Mulberry, Howard County Government Building, Suite 105, Kokomo 46901-4660, 317-456-2313, 317-456-2319 (fax)

Huntington County, Courthouse, Huntington 46750-2897, 219-356-1728, 219-356-7650 (fax)

Jackson County, Courthouse, Brownstown 47220-2055, 812-358-6101, 812-358-5030 (fax)

Jasper County, 122 N. Cullen, Box A, Rensselaer 47978-2644, 219-866-5741, 219-866-4961 (fax)

Jay County, Courthouse, Portland 47371-2116, 219-726-4707, 219-726-9021 (fax)

Jefferson County, Courthouse, Madison 47250-3599, 812-265-8919, 812-265-4500 (fax)

Jennings County, Courthouse Annex, P.O. Box 300, Vernon 47282-0300, 812-346-5209, 812-346-8022 (fax)

Johnson County, 80 S. Jackson St., Wright Building, Franklin 46131-2309, 317-736-3724, 317-736-3727 (fax)

Knox County, 102 N. Seventh St., Vincennes 47591-2072, 812-885-2548, 812-882-5789 (fax)

Kosciusko County, 100 W. Center St., Courthouse, Warsaw 46580-2865, 219-372-2340, 219-372-2342 (fax)

LaGrange County, 114 W. Michigan St., County Office Building, LaGrange 46761-1889, 219-463-7808, 219-463-2244 (fax)

Lake County, 2293 N. Main St., Lake County Government Center, Crown Point 46307-1896, 219-755-3240, 219-755-3251 (fax)

LaPorte County, Courthouse Square, LaPorte 46350-3482, 219-326-6808, 219-326-7362 (fax)

Lawrence County, 1410 I St., Courthouse Annex, Bedford 47421-3337, 812-275-4623, 812-275-4131 (fax)

Madison County, 16 E. Ninth St., Madison County Government Center, Anderson 46016-1538, 317-641-9514, 317-641-9517

Marion County, 9245 N. Meridian St., Suite 118, Indianapolis 46260-1812, 317-253-0871, 317-848-7229 (fax)

Marshall County, 112 W. Jefferson, 304 Marshall County Building, Plymouth 46563-1764, 219-935-8545, 219-935-8612

Martin County, 205 Main St., Agricultural Service Building, P.O. 158, Shoals 47581-0158, 812-247-3041, 812-247-3616

Miami County, 21 Court St., Peru 46970-2266, 317-472-1921, 317-473-9436 (fax)

Monroe County, 119 W. Seventh St., Bloomington 47404-3926, 812-333-3575, 812-332-0491 (fax)

Montgomery County, 400 Parke Ave., 4-H Fairgrounds, Crawfordsville 47933-1525, 317-364-6362, 317-362-7315 (fax)

Morgan County, 159 W. Morgan St., P.O. Box 1151, Martinsville 46151-1151, 317-342-1010, 317-342-5173 (fax)

Newton County, Courthouse, 201 N. Third St., Kentland 47951-1239, 219-474-6081, 219-474-6347 (fax)

Noble County, Weber Road, Courthouse Annex, P.O. Box 26, Albion 46701-0026, 219-636-2111, 219-636-7704 (fax)

Ohio County, 412 Main St., Rising Sun 47040-1030, 812-438-3656, 812-438-3657 (fax)

Orange County, 205 E. Main St., Box 4, County Office Building, Paoli 47454-1596, 812-723-3600, 723-4196 (fax)

Owen County, Courthouse, Spencer 47460-1749, 812-829-5020, 812-829-4289 (fax)

Parke County, Fairgrounds, P.O. Box 146, Rockville 47872-0146, 317-569-3176, 317-569-2279 (fax)

Perry County, Courthouse Annex, P.O. Box 97, Cannelton 47520-0097, 812-547-7084, 812-547-7085 (fax)

Pike County, Courthouse, Petersburg 47567-1298, 812-354-6838, 812-354-8028 (fax)

Porter County, 1401 Calumet Ave., Courthouse Annex, Valparaiso 46383-3198, 219-465-3555, 219-464-8976 (fax)

Posey County, Ag Service Center, P.O. Box 546, Mount Vernon 47620-1200, 812-838-1331, 812-838-6176 (fax)

Pulaski County, 125 S. Riverside, County Building, Winamac 46996-1528, 219-946-3412, 219-946-3680 (fax)

Putnam County, 1 Courthouse Square, Room 10, Box 523, Greencastle 46135-1503, 317-653-8411, 317-653-5279

Randolph County, Rural Route 3, Box 32, Winchester 47394-9508, 317-584-2271 (phone and fax)

Ripley County, Courthouse, Third Floor, Box 248, Versailles 47042-0248, 812-689-6511, 812-689-6298

Rush County, Courthouse, Rushville 46173-1891, 317-932-5971, 317-932-2787 (fax)

St. Joseph County, 227 W. Jefferson Blvd., 646 County City Building, South Bend 46601-1870, 219-284-9604, 219-233-5437 (fax)

Scott County, 1100 S. Main St., P.O. Box A, County Office Building, Scottsburg 47170-0136, 812-752-2841, 812-752-3245 (fax)

Shelby County, 408 S. Tompkins St., Shelbyville 46176-2096, 317-392-6460, 317-835-2816 (fax)

Spencer County, Courthouse, P.O. Box 309, Rockport 47635-0309, 812-649-6022, 812-649-6040 (fax)

Starke County, 1 E. Washington St., Courthouse, Knox 46534-1148, 219-772-9141, 219-772-6900 (fax)

Steuben County, 1455 S. Old U.S. 27, Angola 46703-8901, 219-665-2189, 219-665-9037 (fax)

Sullivan County, Courthouse, Sullivan 47882-1511, 812-268-4332, 812-268-4229 (fax)

Switzerland County, East Main St., P.O. Box 175, Vevay 47043-0175, 812-427-3152, 812-427-2818 (fax)

Tippecanoe County, 2111 Teal Road, Lafayette 47905-2290, 317-474-0793, 317-474-5330 (fax)

Tipton County, Courthouse, P.O. Box 70, Tipton 46072-0070, 317-675-2694, 317-675-3594 (fax)

Union County, 26 W. Union, Box 12, Courthouse, Liberty 47353-1350, 317-458-5055, 317-458-6887 (fax)

Vanderburgh County, 1 NW Martin Luther King Jr. Blvd., 202 Administration Building, Evansville 47708-1878, 812-426-5287, 812-426-0848 (fax)

Vermillion County, Courthouse, P.O. Box 248, Newport 47966-0248, 317-492-3394, 317-492-3050 (fax)

Vigo County, 275 Ohio St., Terre Haute 47807-3495, 812-238-8371, 812-238-9980 (fax)

Wabash County, Courthouse, Wabash 46992-3167, 219-563-0661, 219-563-3451 (fax)

Warren County, 7 Railroad St., Williamsport 47993-1196, 317-762-3231, 317-762-6813 (fax)

Warrick County, 215 S. First St., Courthouse Annex, P.O. Box 284, Booneville 47601-0284, 812-897-6100, 812-897-6102 (fax)

Washington County, 35 Public Square, Courthouse Annex, Salem 47167-2054, 812-883-4601, 812-883-3988 (fax)

Wayne County, County Administration Building, Richmond 47374-4280, 317-973-9281, 317-935-2512 (fax)

Wells County, Courthouse, Bluffton, 46714-2050, 219-824-0116, 219-824-4891 (fax)

White County, Main and Broadway, County Building, P.O. Box 368, Monticello 47960-0368, 219-583-7442, 219-583-1505 (fax)

Whitley County, 115 S. Line St., Courthouse Annex, Columbia City 46725-2393, 219-625-3313, 219-248-3156 (fax)



Diapers

Available from your library or the Indiana Institute on Recycling, 800-242-4467.

"Changing the Cloth Diaper Scene." *BioCycle*. February 1992.

Chertow, Marian, and Reid Lifset. "The Diaper Wars." *BioCycle*, March 1990.

Disposable Versus Reusable (Cloth) Diapers, available through Arthur D. Little Inc., Cambridge, Mass., 617-854-5770.

"Diaper Debate Continues." *Indianapolis Star*. Aug. 16, 1990.

Feder, Barney J. "Cloth Diaper Closings Set by Gerber." *New York Times*. Jan. 14, 1992.

Joseph, Lawrence E. "The Bottom Line on Disposables." *The New York Times Magazine*. Sept. 23, 1990.

Lyman, Francesca. "Diaper Hype." *Garbage*. January/February 1990.

Murphy, Karen. "South Bend Hospital Disposes of Disposable Diapers." *Indianapolis Star*. Jan. 28, 1991.

Poore, Patricia. "Disposable Diapers are OK." *Garbage*. October/November 1992.

The Diaper Debate, New York, NY, 1989. Call Diaper Manufacturers Group, 212-340-0618.

Westerman, Marty. "Disposable Diaper Recycling: The Straight Poop." *Resource Recycling*. July 1991.

Household batteries

Available from your library or the Indiana Institute on Recycling, 800-242-4467.

Baechle, Mary. "Dry Cell Battery Recycling Feasibility Study." *Solid Waste Management Newsletter*. July 1992.

DuBois, Annette, and Jessie Lang. "Household Batteries: Drop-off and Curbside Collection." *Resource Recycling*. February 1992.

Gitlin, Lisa. "Batteries Not Included." *Recycling Today*. March 1991.

Price, John L. "Managing Mercury Battery Wastes Through Source Substitution." *MSW Management*. January/February 1992.

Reutlinger, Nancy and Dan de Grassi. "Household Battery Recycling: Numerous Obstacles, Few Solutions." *Resource Recycling*. April 1991.

Household hazardous waste

Available from your library or the Indiana Institute on Recycling, 800-242-4467.

Arrandale, Tom. "Toxics in the Waste Stream." *Governing*. July 1992.

Caldwell-Johnson, Tere, and Caroline Cummings. "Toxic Cleanup for Households." *BioCycle*. March 1991.

DePeyster, Deborah. "How to Clean Green." *Garbage*. October/November 1992.

Dorand, Theodore D. "Planning for Effective Collection of Bleach, Paint...and Mystery Materials." *Solid Waste & Power*. April 1991.

Kinney, George, and Ray Erickson. "Mechanized Processing for Household Paints." *BioCycle*. February 1990.

Flynn, Alicia, and Ron E. Kessler. "Take Me Shopping: A Consumer Guide to Safer Alternatives to Household Hazardous Products." Hazardous Waste Management Program, Santa Clara, Calif.

Gelbmann, Liz. "Full-time Hazwaste Disposal." *Waste Age*. March 1991.

Gooch, Hunter. "How to Keep Hazardous Waste Out of Landfills." *MSW Management*. March/April 1992.

Lie, Gregory B. "Reuse Option for Household Hazardous Waste." *BioCycle*. October 1991.

Musick, Mike. "Old Paint Learns New Tricks." May 1991.

National Solid Waste Management Association, "Meet the Browns," *Institute of Chemical Waste Management*, Washington, D.C.

Purin, Gina. "Financing Household Hazwaste Collection." *Waste Age*. March 1991.

Ruggeri, Mike. "County Spurs Hazwaste Collection with Private Hauler." *World Wastes*. 1992.

U.S. Environmental Protection Agency. "A Survey of Household Hazardous Wastes and Related Collection Programs." Washington, D.C., October 1986.

Walters, David. "Illinois Collection Days Target Household Hazwaste." *World Wastes*. November 1991.

Woods, Randy. "Curbing Household Hazardous Waste." *Waste Age*. September 1991.

Zavestoski, Stephen. "Nebraska Pestors Farmers to Recycle Pesticide Containers." *Recycling Times*. July 28, 1992.

Packaging

Available from your library or the Indiana Institute on Recycling, 800-242-4467.

Chagnon, Robert M. "Granulation for Post-Consumer Plastics Recycling." *Resource Recycling*. August 1990.

Council on Plastics and Packaging in the Environment. "Plastic Packaging & Degradability." Fact Sheet, Washington, D.C., February 1989.

Council on Plastics and Packaging in the Environment. "Plastic Packaging Recycling." Fact Sheet, Washington, D.C., February 1989.

Erwin, Lewis, and L. Hall Healy Jr. *Packaging and Solid Waste Management Strategies*, AMA Membership Publications, New York, 1990.

Gitlin, Lisa. "How Much is Enough? Is Right?" *Recycling Today*. December 1990.

Indiana Packaging Waste Reduction Task Force. "Guidelines and Recommendations for Packaging Waste Reduction in Indiana," Final Report, Jan. 1, 1992.

Kleiner, Art. "Compact Packaging for the Compact Disk." *Garbage*. November/December 1991.

Ligon, Paul J. "Isolating the Cost of Excessive Packaging." *BioCycle*. November 1991.

Marinelli, Janet. "Packaging." *Garbage*. May/June 1990.

McCarthy, James E. "Recycling and Reducing Packaging Waste: How the United States Compares to Other Countries." CRS Report of Congress. Washington, D.C., Nov. 8, 1991.

Meade, Kathleen. "The Challenges Facing Packaging." *Waste Age*. March 1990.

Raymond, Michele. "Aseptic Recycling on Trial." *BioCycle*. January 1992.

Shea, Cynthia Pollock. "Package Recycling Laws." *BioCycle*. June 1992.

Short, Herb, and Jonathan Gardner. "Global Firms Must Struggle with German Recycling Law." *Plastics News*. March 30, 1992.

"Study Rates Pollution Costs for Packaging." *BioCycle*. September 1992.

The Polystyrene Packaging Council. "Questions and Answers," Washington, D.C., June 1991.

Source reduction

Available from your library or the Indiana Institute on Recycling, 800-242-4467.

Allaway, David. "Does Source Reduction Work?" Resource Recycling. July 1992.

Coppock, Jane. "Prospects for Waste Reduction." *BioCycle*. August 1991.

Grogan, Pete, and Brad Schwartz. "Strategic Shift to Source Reduction." *BioCycle*. January 1991.

Marinelli, Janet. "Garbage at the Grocery." *Garbage*. September/October 1989.

Rattray, Tom. "Source Reduction: An Endangered Species?" *Resource Recycling*. November 1990.

Schwartz, Joe. "Shopping for a Model Community." *Garbage*. May/June 1990.

Sherman, Steve. "Local Government Approaches to Source Reduction." Resource Recycling. September 1991.

U.S. Environmental Protection Agency. "The Consumer's Handbook for Reducing Solid Waste," Office of Solid Waste, 401 M St. SW, Washington, D.C. 20460, August 1992.

Unit pricing

Kaldjian, Paul. "Charging Households for Waste Collection and Disposal: The Effects of Weight or Volume-Based Pricing on Solid Waste Management," EPA Report, 1990. Call National Technical Information Service, 703-487-4650.

"Unit Pricing: Providing an Incentive to Reduce Waste," RCRA Hotline, 800-424-9346.

"Variable Rates in Solid Waste: Handbook for Solid Waste Officials," call National Technical Information Service, 703-487-4650. Free brochure with executive summary available from RCRA Hotline, 800-424-9346.

Yard waste: backyard composting

Available from your library or the Indiana Institute on Recycling, 800-242-4467.

About Managing Yard Waste. South Deerfield, Mass., 1991. Call C. L. Bete Co. Inc., 800-628-7733.

Amiran, Doron and Steven E. Sherman. "Source Reduction Through Home Composting." *BioCycle*. April 1991.

"At-Home Waste Management." *BioCycle*. May 1991.

Benton, Graig H. "Home Composting Program Options." *BioCycle*. April 1991.

Gale, Robert J. P. "Home Composting: It's Popular and Effective." *Resource Recycling*. December 1991.

Indiana Department of Environmental Management/Indiana Recycling Coalition. *Indiana Yard Waste Solutions*. January 1993.

Nash, Cheryl. "Backyard Composting: The First Step in Organic Waste Management." *Resource Recycling*. May 1992.

Roulac, John W. *Backyard Composting: Your Complete Guide to Recycling Yard Clippings*. Ojai, Harmonious Press, 1992.

Taylor, Paul. "Backyard Composting as MSW Strategy." *BioCycle*. September 1990.

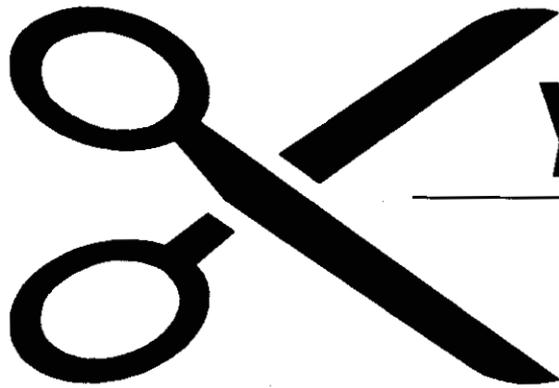
YOU CAN CUT IT!





Logo sheet





YOU CAN CUT IT!

The _____

Solid Waste Management District

recognizes

for success in reducing
Indiana's solid waste
at the source.

Signed

Date

Glossary

Commercial waste—A subset of municipal solid waste. Commercial waste materials originate in wholesale, retail, institutional or service establishments, such as office buildings, stores, markets, theaters, hotels, airports, train stations, hospitals, schools and warehouses. No industrial process wastes are included, but normal municipal solid waste such as packaging, cafeteria, washroom and office wastes from industrial sources are included.

Composting—A natural process consisting of the biologic reduction of organic wastes, carbon dioxide, water and heat into a stabilized organic matter called humus.

Final disposal facility—A landfill, an incinerator or a waste-to-energy facility.

Generation—Generation refers to the weight, volume or percentage of materials as they enter the waste stream and before materials recovery, composting or combustion take place.

Hazardous waste—Wastes that could cause injury or death, or damage or pollute land, air or water. A waste is considered hazardous if it is ignitable, corrosive, reactive or toxic.

IDEM—Indiana Department of Environmental Management.

Incineration—Burning solid waste under conditions where combustion factors such as temperature, retention time and air are controlled.

Industrial waste—Materials discarded from industrial operations or derived from the manufacturing process.

Institutional waste—Waste materials originating in schools, hospitals, prisons, research institutions and other public buildings.

Integrated pest management (IPM)—The carefully managed use of three different pest control tactics: biological, cultural and chemical. Biological control means using natural enemies of the pest, like lady bugs to control aphids. Cultural or horticultural control involves the use of gardening methods like mowing high to shade out weeds. Chemical control involves the judicious use of pesticides.

Intercropping—May involve planting “repellant” plants with the chosen crop to ward off pests, or planting “trap” plants, which are appealing plants that divert would-be pests from the chosen crop.

IRC—Indiana Recycling Coalition, Inc.

Materials recycling—Collecting, processing, marketing and remanufacturing many materials currently found in our waste stream. Recycling diverts resources from landfills and incinerators back to manufacturers.

Mulch—Ground or mixed yard trimmings placed around plants to prevent evaporation of moisture, to avoid freezing of roots and to nourish soil.

Municipal solid waste—Any garbage, refuse, industrial lunchroom or office waste, and other material resulting from the operation of residential, municipal, commercial or institutional establishments and from community activities. The term does not include special waste, hazardous waste, industrial process waste, infectious waste, wastes that result from the combustion of coal or materials being transported to a facility for reprocessing or reuse. “Reprocessing or reuse” does not include incineration or placement in a landfill.

Residential waste—Waste generated in single- and multi-family housing.

Reuse—Buying durable materials with reusable value instead of single-use, disposable items. Reuse is at the same level in the solid waste management hierarchy as recycling.

Sanitary landfill—A system of land disposal in which waste is compacted and covered with a layer of soil each day to minimize pest,

esthetic, disease, and air- and water-pollution problems.

Solid waste—All putrescible and non-putrescible solid and semi-solid wastes, except human excreta, but including garbage, rubbish, ashes, street cleanings, dead animals, animal remains, and solid commercial, industrial and institutional wastes.

Source reduction—Evaluating and reducing consumption of products, especially single-use items, over-packaged products with elements unnecessary to their purpose, to minimize the volume and toxicity of waste entering the waste stream.

Subtitle D—The section that covers solid, non-hazardous waste in the Resource Conservation and Recovery Act (RCRA).

Toxicity—The property of being poisonous, of causing death or of causing severe debility of an organism, whether temporary or permanent.

Toxic waste—Waste that can produce injury upon contact, or by accumulation in a susceptible site in or on the body of a living organism.

Waste exchange—A computer and/or catalog network that redirects waste materials back into the manufacturing or reuse process by matching companies generating specific wastes with companies that use those wastes as manufacturing inputs.

Waste-to-energy—Reducing the volume of solid waste by incineration and recovering the heat as steam that may be used as is or to produce electricity.

Yard trimmings—Leaves, grass clippings, weeds, brush and other organic garden debris.