

### The Solid Waste Dilemma

If all the garbage brought to U.S. landfills every year were collected in one location, it would cover an area of one square mile and reach almost as high as the Statue of Liberty.

Every year, Americans generate over 141 million tons of garbage or "municipal solid waste." That's more than 1,240 pounds for every man, woman and child. Currently, over 90% of this municipal solid waste — or MSW — is disposed of in landfills. Many cities, however, are facing a landfill crisis as the number of suitable sites decreases and opposition from nearby residents increases. New York City, for instance, estimates that its current landfill space will be totally depleted by the year 2000.

### Recycle symbol

Additionally, MSW managers now realize that landfilling also squanders a valuable resource: the potential material and energy recoverable from landfill products such as paper, yard wastes and plastics. As an alternative, many municipalities now are turning to recycling and incineration as better ways to manage the solid waste dilemma.

## Two Alternatives: Recycling and Resource Recovery

Recycling is simply a way of salvaging the reusable content from potential garbage and reprocessing it for further use. Recycling has been used for years to extend the useful life of certain paper products like newspapers, and also helped the aluminum cans gain the lion's share of the beverage container market. Success in these areas has led to recycling programs for newer products — most notably PET (polyethylene terephthalate) two-liter soda bottles. Nevertheless, recycling cannot be considered a permanent solid waste solution, as it merely prolongs the time until an item is disposed of. At that point, recycled products also become MSW components.

## Incineration symbol

The practice of incinerating or burning solid waste to recover energy is really another form of recycling, with heat or light being the final product rather than reprocessed material. Incineration has been used in the United States since 1885 to process MSW. While early incinerators often were blamed for generating dust and foul odors, state-of-the-art installations now

operate cleanly and efficiently — so much so, that they are the preferred method of MSW management in much of Europe and in Japan. This growing popularity also is due to the other benefits that incineration provides. For example, there is no need to separate waste components for special handling; all items in the solid waste stream — combustible and noncombustible — can be processed alike.

Incineration also eliminates the need to impose deposit systems on components of the waste stream for which recycling programs do not — and most practically cannot — exist. Finally, incineration substantially reduces the volume of waste destined for landfilling. Incineration typically reduces MSW volume by 75%, with only the ash from combustion and non-burnables remaining. Moreover, incineration is a solid waste solution that can keep pace with the growing practicality and popularity of disposable consumer items.

## Are Plastics the Solid Waste Culprits?

### The Municipal Solid Waste Stream

Durable goods	12.7%
Nondurable goods	24.9
Food wastes	14.0
Yard wastes	12.8
Packaging*	34.0
Other	<u>1.6</u>
	100.0%

* Paper	17.9
Glass	8.2
Metal	3.3
Plastics	3.4
Other	<u>1.2</u>
	34.0%

Plastics represent only 3.4% of the total MSW stream.  
(Source: Franklin Associates)

The makeup of today's MSW is somewhat different than it was five years ago. It contains a slightly larger percentage of plastic packaging — a direct reflection of the increasing demand for the convenience and superior performance that plastics provide. Despite this, plastics represent only 3.4% of the entire MSW content. And, even if plastics replaced all existing glass, metal and paper packaging, they would increase to only a third of the MSW total. By far, the largest proportion of disposed items consists of yard wastes, nondurable goods like magazines and clothing, and durable goods like appliances and tires.

### Side Bar: Four Reasons Why Plastics Are the Preferred Packaging Product

1. Plastics are lightweight. They reduce shipping costs; are easier to handle.
2. Plastics are nonbreakable. They provide an extra measure of safety for users; eliminate breakage costs for bottlers, shippers and handlers.
3. Plastics make innovative, convenient packaging possible.
4. Plastics help food and medicine last longer, stay fresher.

From clear to opaque, rigid to flexible, from simple "plastic wrap" to sophisticated plastic "cans," plastics are the package designers — and the package user's — choice.

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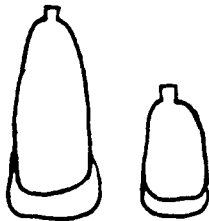
Recycling: Why It Works, Why It Doesn't

Recycle Markets Must Exist

A key to the success of recycling programs is the existence of markets and uses for recycled materials. Although many products— and virtually all plastics — can be recycled, purity and quality demands set for many applications preclude the use of recycled material. The Food and Drug Administration, for instance, prohibits the use of recycled material in food-contact applications.

PET Bottles:

Available recycled material  
Available recycled material markets



In many cases, supply far outstrips demand for recycled product.

For those applications where recycled materials can be used, supply frequently outstrips demand, creating the need to store indefinitely those items collected for recycling.

Source Separation Required

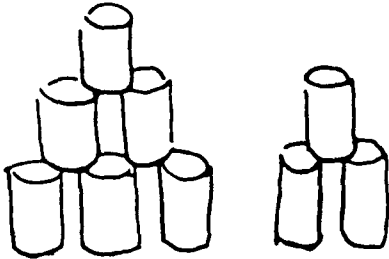
Recycling also requires "source separation," the process of sorting MSW components by type of material. Although this can be done relatively easily for one-material products like aluminum cans and one-gallon polyethylene milk jugs, the new trend in packaging is toward "composites" —



The plastic package of the future will be a composite of several different materials.

containers made up of several different materials. Composite packaging is becoming more and more popular because it allows container designers to create lightweight, easy-to-handle packaging while maintaining or improving product shelf life. So-called "barrier" packages like the plastic ketchup bottle — with one or more materials forming the wall of a container and another the wall liner — are good examples of advanced composite packaging, but even the simplest package may include a cap of one material, a carrying handle of another, with the container itself being a third. Thus, efforts to simplify source separation by labeling containers as to their material makeup — a solution growing in popularity with regulators — are of limited practicality.

No. of Al cans produced  
No. of Al cans recycled



Even the most successful recycling programs fall short of processing all available product.

Finally, source separation faces consumer resistance and increases handling costs for municipalities that institute "post-consumer" sorting of MSW components. Consequently, despite markets for the recycled material, only 55% of all aluminum cans are recycled, only 20% of PET bottles.

### Incineration: MSW Management That Makes Sense for Plastics

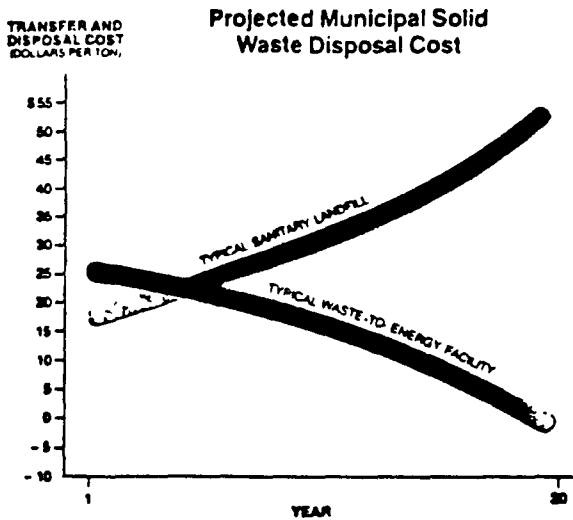
Flow diagram:  
incineration process



One ton of MSW will produce 9 million BTU's — enough to ...

Unlike other components of the waste stream whose useful lives are best extended by recycling, many plastics contribute the most to resource conservation when they are burned for their energy content. A pound of plastic, for instance, will produce 12,000 BTU's when properly incinerated — roughly the equivalent of a pound of coal. Plastics, however, are not the only products that can be burned to produce energy. Almost anything that burns produces BTU's, even grass clippings. Moreover, even the most successful recycling program eventually produces items that can be reprocessed no further. If these items are burnable, they too become candidates for incineration and energy recovery. In a sense, incineration

is really a form of recycling, with energy instead of material being the recycled product. Thus, incineration presents a practical way to handle all combustible MSW components, not just plastics.



Source: American Ref-Fuel

And, as land, transportation and operating costs increase, incineration becomes even more attractive. While the expense of landfilling likely will continue to rise, the investment in incineration facilities can stabilize or even decrease MSW management costs.

### PVC in the Solid Waste Stream - The Facts

PVC (polyvinyl chloride, or vinyl) is one of the world's most widely used plastics. It also is one of the most versatile because it can be either rigid or flexible, opaque or transparent. Because of its versatility, PVC is finding growing use in the packaging industry in food wrap, rigid blister pack and in bottles for drugs, sundries, edible oils and other food products. Like all



plastics, PVC can be recycled. Typical uses for recycled PVC include fence posts, stadium seating and \_\_\_\_\_. However, as with other plastics, experts in MSW management are beginning to see that the best way to recover the value of PVC is through incineration with energy recovery.

Recently, some concerns have been raised as to how PVC packaging products react in the incineration process. Here are the facts:

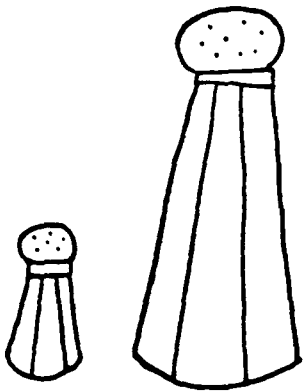


The presence of PVC in the incinerator does not increase dioxin production.

*italics / bold*

Recent testing to determine the sources of chlorodioxin generation in MSW indicates that the amount of water and oxygen present during the incineration process, plus the operating conditions of the incinerator, are the crucial factors in dioxin formation.

Other tests, specifically conducted with PVC-free MSW, reveal that dioxin forms even when all vinyl products are removed. This is because PVC represents only 5% of the chlorine present in solid waste. Fully 50% of the chlorine present in MSW comes from other sources, including table salt,



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*other sources.*



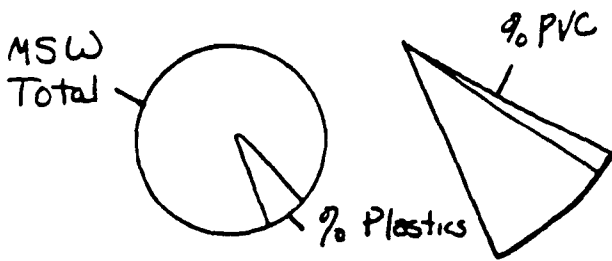
"Acid rain" linked to incinerators is caused primarily by emissions of sulfur dioxide and nitrogen oxides, not hydrogen chloride.

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Uncontrolled emissions from power plants burning fossil fuels are the principal contributors to acid rain. Additionally, emissions of all incinerator off-gases can be minimized by the installation of scrubbing equipment and by following proper operating conditions.

(need reference to testing here)

Summary for section — use as caption:



PVC constitutes only 6% of all plastics used in packaging. Plastics, in turn, represent only 3% of all packaging materials found in the solid waste stream. (need statement here on overall plastics/PVC effects on incineration process.)

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## The Vinyl Institute Position

Plastics are fast becoming the preferred packaging material because of the superior performance properties they provide.

However, their impact on the MSW stream is minor and banning their use in disposable products will not substantially alter the magnitude of the solid waste problem. It will, on the other hand, deny consumers of the many advantages that plastic packaging provides.

A few plastic products in the market, most notably the two-liter soda bottle and the gallon milk jug, are excellent recycling candidates because of their distinctive shape and their one-material composition. However, because of the limited market for recycled plastic materials, this is a long-term solution at best and one that cannot be used at all with multi-material packages.

Although plastics have changed the overall composition of MSW, they do not require extraordinary disposal techniques. In fact, the best way to process the majority of plastic waste - via incineration - is also the best way to handle other waste stream components.

To that end, the Vinyl Institute has taken a very active role in supporting research to advance the state of incineration technology. The Institute is the sole industry sponsor of tests being conducted by the New York State Energy Research and Development Authority (NYSERDA) which currently is studying operating variables in commercial incinerators.

In addition, the Institute is a founding member of the Council on Plastics and Packaging in the Environment. A coalition of plastics producers, the packaging industry and several food and beverage manufacturers, the council was established to address the issue of plastics in solid wastes.

Finally, through its own committee structure, the Vinyl Institute maintains an ongoing technical program devoted to PVC and solid waste management, which includes independent research projects in areas related to the issue.

The Vinyl Institute recognizes solid waste management as one of the most critical issues facing this country today. Practical approaches exist, however, that can be adapted without unnecessarily restricting the use of materials which provide numerous consumer benefits. By working with the scientific community, legislators, regulators and other government officials throughout the country, the Vinyl Institute is helping to develop solutions to the solid waste dilemma that serve not only industry but the public interest and the environment as well.

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The Vinyl Institute is a division of the Society of the Plastics Industry representing the leading manufacturers of PVC and its feedstock, VCM.  
Members include: