The Vinyl Institute

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VINYL. IT'S RECYCLABLE.

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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, banning their use in disposable products will not substantially alter the magnitude of the solid waste problem.

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Ultimately, the solid waste dilemma will be solved through a combination of management techniques that employs recycling and incineration of most MSW components and minimizes landfilling. To that end, the Vinyl Institute supports research in a number of areas of solid waste management.

The plastic two-liter soda bottle and gallon milk jug have proven that traditional recycling programs can be effectively used to handle plastic packaging products of distinctive shapes and primarily one-material composition. Similar programs have been established in Europe to reprocess table water bottles, which are typically composed of PVC. There are no technological barriers to including vinyl products in such types of programs and newer efforts in the United States are being encouraged by the vinyl industry.

A promising technology for reprocessing plastic packaging lies in the area of recycling commingled, or mixed, plastics. This new technology eliminates the need for consumers or waste handlers to separate different types of plastic packaging prior to processing and also facilitates the recycling of plastic packaging made of several different materials (composite packaging). Currently, the Vinyl Institute is one of several organizations underwriting research in this area.

While technological barriers to recycling continue to be overcome, the development of markets for recycled materials must become a priority if recycling is to play a significant role in solid waste management. In the interim, and for MSW components that cannot be recycled or recycled further, incineration provides a practical, environmentally sound alternative.

As a division of the Society of the Plastics Industry, the Institute participates in a number of industry-wide programs established to address the issue of plastics in solid wastes, including the issue of marine pollution. And, through its own committee structure, the Vinyl Institute maintains an ongoing technical program devoted to PVC and solid waste management, focusing the expertise of recognized industry leaders on the role that plastics, and particularly PVC, play in this 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 industry, the public interest and the environment.

PVC in the Solid Waste Stream – The Facts

PVC (polyvinyl chloride, or vinyl) is one of the world's most widely used and versatile plastics. In packaging, it is used in food wrap, rigid blister pack and in bottles for drugs, sundries, edible oils and other food products. Nevertheless, vinyl constitutes only 5% of all plastics used in packaging[14] and plastic packaging, in turn, represents only about 3-5% of all materials found in the solid waste stream.[4] Despite its minor role in the waste stream, some concerns about PVC have been raised. Here are the facts:

About PVC and Recycling:

Like other plastics, PVC can be recycled. In fact, because of the diversity of uses for vinyl outside of the packaging industry, it represents an excellent candidate for recycling into second generation products. One of the first such examples occurred in Europe, where vinyl containers used for bottled water were collected and reprocessed into electrical wire sheathing. In the United States, scrap PVC currently is being used to manufacture drain pipe as well as wood-substitute products. In addition, new research indicates that PVC also can be successfully included in commingled plastics recycling.[17] This emerging technology is widely regarded as one of the most promising waste management alternatives because it will eliminate the need to sort and separate different plastic materials.

About PVC and Dioxins:

Dioxins are a family of chlorinated organics and are formed from virtually all combustion processes. Tests conducted on behalf of the New York State Energy Research and Development Authority (NYSERDA) comparing waste with typical levels of PVC, waste with extra amounts of PVC and waste containing no PVC have revealed that even when MSW has no vinyl in it, dioxins are formed during incineration because dioxin levels are dependent on incinerator operating conditions and not on the makeup of the waste. By carefully controlling combustion temperatures, dioxin formation can be limited to extremely low levels.[11] Dioxins form even when all vinyl products are removed because 50-70% of the chlorine present in MSW comes from sources other than chlorine-containing plastics.[12] These include such items as paper, table salt, vegetable matter and wood.

About PVC and Acid Rain:

Hydrogen chloride generated by the incineration of PVC has not been shown to be a measurable contributor to acid rain formation.[16] Uncontrolled emissions from power plants burning fossil fuels are the principal contributors to acid rain, specifically producing sulfur dioxide and nitrogen oxide. Furthermore, a modern incinerator equipped with a scrubber will eliminate over 90% of the hydrogen chloride gas generated from combustion.[15]

About PVC and Groundwater:

PVC products found in landfills are chemically stable materials that do not decompose when subjected to the forces that cause paper, metal or certain organic materials to degrade. For this reason, PVC does not leach harmful chemicals into groundwater. In fact, it is PVC's outstanding resistance to corrosive soil and water conditions that has made it a preferred material for water distribution piping for many years. Because of its stability and resistance to attack, PVC also is used to make liners for landfill sites.

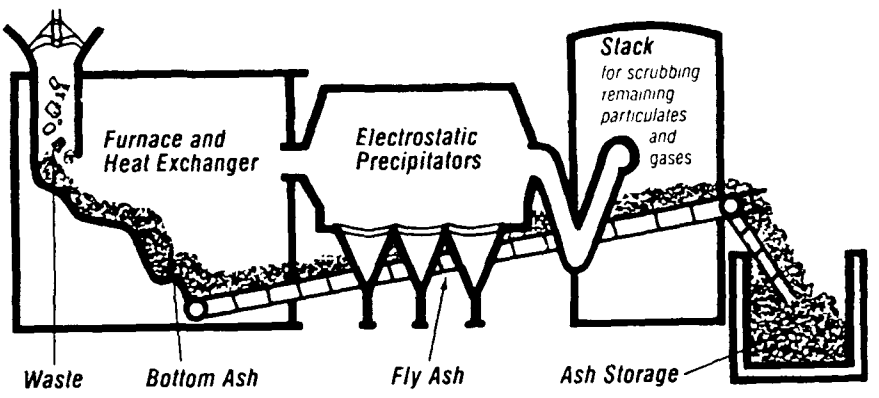
Incineration: Expanding Options for MSW Management

While many plastic products represent outstanding recycling candidates, much of the waste stream does not, either because it is unsortable or because recycle uses do not exist. For this portion of the waste stream, incineration represents an efficient, cost-effective alternative to landfilling. In fact, many plastics contribute the most to resource conservation when they are burned for their energy content. A pound of mixed plastics, for instance, will produce 12,000 BTU's when properly incinerated – roughly the equivalent of a pound of coal.[9] 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 cannot be reprocessed again. 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.

Recently, it has been suggested that the incineration of plastics results in the generation of hazardous air emissions. New research has revealed that it is incinerator operating conditions – primarily temperature – and not the contents of the trash being burned, that affect the generation of such toxic materials as dioxins and furans in combustion gases.[11]

Improvements in scrubber technology have further reduced the potential environmental risks that have, in the past, been associated with this form of waste management.

As land, transportation and operating costs increase, incineration becomes even more economically attractive. While the expense of landfilling likely will continue to rise, the investment in incineration facilities can stabilize or even decrease MSW management costs for those items in the waste stream that remain after recycling.[10]



Modern incinerators operate cleanly and efficiently, producing about 9 million BTU's for every ton of MSW produced[2] – the equivalent of ½ cord of wood or almost 2 barrels of crude oil.

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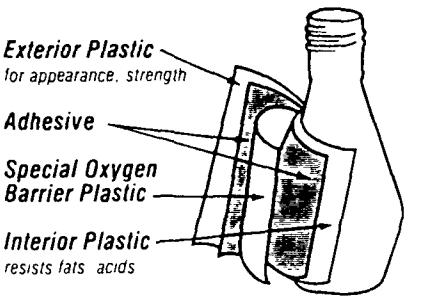
Recycling: Some Considerations for Success

Of the many different types of plastic packaging used today, two materials constitute the majority of products in the waste stream: polyethylene terephthalate (PET) and high density polyethylene (HDPE). Already, a large amount of these materials is being recycled, primarily through the collection of PET soda bottles and HDPE milk jugs. In fact, currently, 20% of PET bottles are recycled,[8] compared to a rate of 5% for glass packaging.[1]

Creating Market Demand

Recycling of such easily recognized packaging is likely to grow as long as demand for recycled material grows as well. However, a drawback to recycling any material is that supply of recycled material frequently outstrips demand, creating the need to store those items collected for recycling until use levels rise or new applications are developed. Also, the cost to produce recycled material cannot exceed that of virgin material if recycling is to be economically viable.

These limitations explain why only about 50% of all aluminum cans are recycled,[7] despite the fact that the feasibility of recycling aluminum has long been established.



High technology laminated barrier packages combine different plastic materials to improve shelf life of food products and handling convenience.

Establishing Practical Approaches

Communities that hope to expand plastics recycling beyond easily recognized containers made from one type of plastic face a large task because of the many types of plastic materials that can be used for packaging. Some recycling proponents are calling for labeling or coding of plastic packaging as to material of composition in order to address this issue and the Vinyl Institute supports the voluntary system recently developed by The Society of the Plastics Industry.

However, labeling and "source separation," the process of sorting MSW components by type of material, do not address the new trend in packaging towards "composites" – containers made up of several different materials. 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 label of another, with the container itself being a third. For this reason, support is growing for the recycling of "commingled," or mixed, plastics. Commingled plastics eliminate the need for source separation and labeling, and also broaden the number of plastic materials that can be effectively recycled. Commingled technology is being studied throughout the country, most notably at the Center for Plastics Recycling Research at Rutgers University in New Jersey.

Are Plastics the Solid Waste Culprits?

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, plastic packaging represents only 3-5% of the discards found in today's MSW.[4] And, even if plastics were to replace *all* existing glass, metal and paper packaging, they would increase to only a third of the current MSW total.[6] By far, the largest proportion of disposed items consists of "traditional" materials: leaves, grass, textiles and paper.

The Municipal Solid Waste Stream
Percent of Total Discards

Durable goods (appliances, furniture, etc.)	14.0
Nondurable goods (clothing, newspapers, etc.)	25.6
Containers and Packaging*	32.6
Food Wastes	8.1
Yard Wastes	17.9
Misc. Wastes	1.8
	100.0%

*Glass	8.9
Steel	2.1
Aluminum	0.7
Paper	15.6
Plastics	3.7
Wood	1.5
Misc.	0.1
	32.6%

Four Reasons Why Plastics Are the Preferred Packaging Product

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

From clear to opaque, rigid to flexible, from simple "plastic wrap" to sophisticated pump dispensers, plastics are the package designer's – and the package user's – choice.

Two Alternatives: Recycling and Resource Recovery

Recycling is simply a way of salvaging the reusable content of garbage and reprocessing it for further use. Essentially, there are three types of recycling: reuse of an existing article, refabrication into articles with short to moderate life spans and refabrication of articles with many years of useful life. Converting discarded plastic packaging into pallet strapping represents a short-term recycling process; converting plastic packaging into drainage pipe represents long-term recycling.

Depending on the application into which a material has been refabricated, recycling can remove a discarded product from the waste stream for several weeks or many years. When underground piping is fabricated from waste plastic packaging, for instance, the material can remain out of the waste stream for over 40 years.

When recycling is not feasible, or when a product has reached the end of its recyclable life, incineration provides yet another method for obtaining further value from it.

The practice of incinerating or burning solid waste to recover energy is really another form of recycling, with heat or energy being the final product rather than reprocessed material.

Incineration has been used in the United States since 1885 to process MSW.[4] 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 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 – combustibles like paper and yard wastes, noncombustibles like metal and glass – can be processed alike.

Incineration also substantially reduces the volume of waste destined for landfilling. Incineration typically reduces MSW volume by as much as 90% and weight by up to 75%, with only the ash from combustion and non-burnables remaining.[5]

Today, incinerators operate under regulations of the U.S. Environmental Protection Agency, which sets strict standards for many types of incinerator emissions. Additional regulations are under consideration that would broaden the list of incinerator emissions controlled by the EPA and tighten guidelines for disposal of incinerator ash.[14]

At the same time, improved scrubber technology has reduced incinerator emissions and new hazardous waste processing technology is addressing the problem of residues which result from the incineration of items such as batteries and other heavy-metal containing products.[15]

Incineration with Energy Recovery: Additional Benefits

- eliminates source separation
- eliminates deposit systems
- significantly reduces MSW weight and volume

The Solid Waste Dilemma

Every year, Americans generate over 140 million tons of garbage or "municipal solid waste."[1] 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.[2] Many cities, however, are facing a landfill crisis as the number of suitable sites decreases and opposition to new sites increases. New York City, for example, estimates that its current landfill space will be totally depleted by the year 2000.[3]

MSW managers now realize that landfilling also squanders a valuable resource: the potential material and energy recoverable from products disposed of in landfills 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. In the future, landfill disposal most likely will be used only where recycling or incineration are not appropriate or effective.

Revised and Updated

Plastics in the Waste Stream:

Options for Practical Solid Waste Management

Including a Special Section on PVC Products in Municipal Solid Waste