

THE PLASTICS PROBLEM PART 2: CONSUMERS AND PLASTICS

by Stephen G. Puccini

Part 1 concluded by highlighting the burden the consumer must share in meeting local and state goals for waste reduction. But where exactly does the consumer "fit in"? The short answer is, "at the supermarket," where the consumer decides what products to buy, and therefore what marketing "signals" to send manufacturers. Is the consumer looking for convenience? Is the consumer demanding reusable products? Can the consumer have it both ways?

The message that manufacturers hear greatly influences what products they ultimately offer to the buyer and, most importantly, how they package them: As single-service or reusable packages? As packages made from recycled or virgin materials?

How manufacturers "package" their products, however, is not limited strictly to design, but also includes the claims they make to persuade the buyer's shopping decisions. How does a product that is "environment friendly" influence the average consumer's buying decision? Given the increasing awareness of the solid-waste crisis and other environmental problems among consumers, probably greatly.

"Is the consumer demanding reusable products? Can the consumer have it both ways?"

But what makes a product "environment friendly"? Should the consumer assume that if a product makes no claim it is "environment 'unfriendly'"? Who decides what is "environment friendly" and upon what criteria do they base this (and similar) claim(s)?

Part 2 addresses these and other related questions. We begin by focusing on how source reduction is being viewed as a crucial part of the strategy in diffusing the solid-waste crisis and a lead component of the waste management hierarchy. Green marketing claims are then examined to illustrate how clearly defined terms used in "green labeling" allow consumers to make more environmentally sound product choices, while assisting manufacturers in developing end markets for recycled plastic materials. Finally, we depart from the discussion of how consumers and manufacturers can interact to reduce the amount of plastic packaging entering the waste stream by shifting to the broader public health question of how desirable the widespread use of plastic packaging is in the first place: Should we be concerned about additive migration from plastics into food?

I. Sending the Message

A. Source Reduction and Trends in Packaging Designs

We have touched upon three different methods of disposing of our waste plastic in this country: landfilling, mass-burn incineration and recycling. While any one of these by itself would certainly be inadequate in managing the 660 pounds of packaging materials the average American consumer throws away each year, an integrated approach that combines these methods would seem most sensible.¹⁰² However, as many solid-waste planners, legislators, and others have been recognizing, the most effective way to dispose of packaging waste, including plastics, is simply to produce less of it in the first place.

As Bill Lawren writing for *National Wildlife* states, "There are those who would bury it, others who would burn it and some who would ban it altogether. Some experts, both within and outside the plastics industry, believe recycling is the most promising approach. For many environmentalists, however, recycling only attacks the symptoms and actually might perpetuate the disease. The only real hope, they argue, lies in shaking our dependence on plastics and drastically cutting back on the amount we produce."¹⁰³

Source reduction, grounded in a "less is more" philosophy "...means cutting back on the use of frivolous plastic items and those designed to be used once and thrown away."¹⁰⁴ This not only suggests that consumers should be more savvy in recognizing the connection between the choices they make at the supermarket and the well-being of the environment, an approach called "precycling," but it also requires active participation by the packaging industry in rethinking product design. As Lisa Collaton from Environmental Action states, "...it's up to the packaging industry to create a 'source-reduction' mentality, [to] design packaging that is less toxic and made of better but fewer materials."¹⁰⁵

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Packagers rely on package design to identify their products to the public or to gain a competitive edge over like products. These considerations often exclude aspects of disposability and recyclability in package design decisions. Although some companies are incorporating these criteria more and more in their final packaging designs, the trend toward modifying existing packaging or in approaching it with new designs which are more in-line with solid-waste priorities, namely disposability and/or reusability and recyclability may ultimately depend on the consumer. Information regarding emerging consumer attitudes toward the increasing use of plastics in packaging, however, is contradictory.¹⁰⁶

Surveys show that consumers increasingly regard a package's disposability as an important factor in influencing their buying decisions. This may help explain why some companies have been making claims that their products are in one way or another "environment friendly." (This is discussed in greater detail in "Green Marketing" below.) One Gallup survey, for example, found that "more than 90 percent of consumers are willing to make a special effort to buy products from companies trying to protect the environment. More than 90 percent say they would sacrifice some convenience, such as disposability, in return for environmentally safer products or packaging. And nearly 90 percent are willing to pay more for them."¹⁰⁷ Results from a 1989 survey conducted by *Packaging* magazine indicate that consumers are willing to spend between \$.05 and \$.15 more for a product that is "easily recyclable" over a "difficult-to-recycle" one.¹⁰⁸ Consumers, however, still rank "convenience, freshness and tamper-evidence [packaging] as highly as ever."¹⁰⁹ These considerations, along with technological developments, such as the advent of the microwave oven, have "spurred production of consumer products in single-service packages, many made of plastic for microwave use."¹¹⁰ New barrier technologies, which have given rise to composite containers, have been instrumental in allowing plastics to be used for an increasing variety of foods.

Composite containers, made of several different materials, include "structural layers bound to a barrier layer by adhesives."¹¹¹ PP or PET are the resins often found in the structural layers. Because barrier layers prevent the absorption of gases, primarily oxygen and carbon dioxide, odors, fragrances, and solvents by other packaging materials, products previously packaged in glass are increasingly being found in composite containers. As mentioned above, however, barrier packaging is difficult to recycle due to its heterogeneous composition. Nonetheless, the use of

composite containers is experiencing rapid growth. In 1985, roughly 300 million high-barrier composite containers were produced. By 1995, production is anticipated to increase to 29 billion units per year.¹¹²

At the same time, however, nine of sixteen leading food companies responding to a 1988 survey conducted by Harborside Research voiced some concern over the current and future use of composite packaging materials which, in part, is a reflection of the pressure some "anxious retailers" have exerted regarding the use of multi-layer plastics.¹¹³ Heinz U.S.A., for example, adopted the "squeezable", PP-based Gamma bottle after it was introduced in 1983 for its ketchup. Because the Gamma bottle weighs less than glass and is much more resistant to breakage, Heinz was able to reduce its handling and shipping costs. The greatest drawback to the Gamma bottle, however, is that it is both a multi-layered and mixed-resin container, again making it more difficult to recycle. As a result, Heinz recently dropped the Gamma bottle and switched to the EnviroPet bottle, a "PET mono-resin squeezable bottle," which does not require the use of adhesives.¹¹⁴ In explaining the shift, Heinz noted that "recycling programs for PET far exceed those in place for PP."¹¹⁵

Similar reasoning supported Beatrice/Hunt-Wesson's decision to switch over much of its oil bottle production from PVC to PET. However, the main impetus was provided by growing health concerns regarding additive migration into food of vinyl chloride monomers. Harborside's study showed substantial concern in the food packaging industry over PVC, both in regard to the issue of additive migration and the release of hazardous materials from mass-burn incineration (see above). Of the sixteen food packagers studied, "four indicated that they were restricting use of all PVC, while four more would not specify it for any new packages."¹¹⁶

Another development in package design was the introduction of the all-PET beverage container in 1989. The all-PET container is replacing PET beverage containers with HDPE base cups with ones that now use cups made from recycled PET bottles. PET base cups cost 25 percent less to produce than HDPE base cups, and because it is a mono-resin container, it is easier to recycle.¹¹⁷

In Germany, Proctor & Gamble sells their Downy fabric softener as a concentrate which consumers mix with water in a refillable bottle. The reason this product is successful is due to the high demand for refillable packages by German consumers who are acutely aware of space limitations for landfill sites.¹¹⁸ If this product is to enjoy similar success in the United States, it must be

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accepted by American consumers who are accustomed to nonrefillable products.

Thus, although a cursory look at new packaging may suggest that little is changing in the way of packaging design, industry observers see definite changes behind the scenes, and suggest that if packaging companies wish to maintain, or even expand, their market share, disposability and recyclability must be integrated into new package designs in which plastics has become the material of choice.¹¹⁹ In addition, some package designers are gradually understanding their role in helping to alleviate the solid-waste problems facing this country and are spreading that awareness to their design students in schools throughout the United States.¹²⁰

At the same time, consumers must continue to send a strong signal to retailers and packaging manufacturers that they are willing to pass on some convenience in favor of greater source reduction. Buying products which use less packaging, contain a higher content of recycled postconsumer materials, and can ultimately be reused is an effective means of exhibiting this preference.

II. A Different Response: Green Marketing

In 1986, SPI directed Opinion Research Corporation to conduct a survey of solid-waste officials, fire chiefs, environmental news editors, and community leaders. The survey revealed that this group considered plastics as the material most harmful to the environment and contributed a "great deal" to disposal problems.¹²¹ This image of plastics seems to be shared by the general public. In 1988, 56 percent of Americans polled thought that plastics were harmful to the environment; in 1989, that number jumped to 72 percent.¹²²

This may help explain why the packaging industry has been fighting very hard to change public perceptions regarding plastics by making claims that their products are "degradable," "recyclable," "recycled," "environment friendly," and/or "ozone friendly," all of which "imply that they are based on objective scientific investigation."¹²³

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A 1991 poll conducted by J. Walter Thompson revealed that "85 percent of respondents would prefer a product labeled 'biodegradable' over one that wasn't—even though two-thirds of the group weren't sure what the term meant." That same year, the Marketing Intelligence Service reported that

"the percentage of new packaged products making some kind of green claim more than doubled between 1989 to 1990, rising from 4.5 percent to 11.4 percent of the total." A similar trend was evident in advertisements appearing on television and in "major print outlets."¹²⁴

As Wynne notes, however, many companies making "green" claims "exaggerate or even fabricate the environmental qualities of their goods" as a way of distinguishing them from their competitors'. According to Wynne, companies have been able to make these claims, whether or not they provide consumers with "genuine information," because the claims themselves have "no fixed meaning."¹²⁵

In response to these concerns, a coalition of attorneys general from ten states (Attorney General Task Force) conducted a series of public hearings on environmental marketing in March 1990.¹²⁶ They issued their findings in the "Green Report" which recommended national definitions and standards.¹²⁷ On July 17 and 18, 1991, the Federal Trade Commission (FTC) arranged hearings which included both industry groups and environmentalists on the proposed national guidelines.¹²⁸ There was agreement on all sides that "the Federal government needs to bring order to the marketplace, whether by defining disputed terms or by making hard-and-fast regulations."¹²⁹

In the absence of standards and uniformity, it will remain difficult to "prosecute potential transgressors" for making "legally deceptive" claims.¹³⁰ Industry may also be burdened since "products are not manufactured or packaged separately for each state and manufacturers are vehemently opposed to having to do so."¹³¹

In 1989, for example, sixteen states had laws requiring the use of degradable plastics in six-pack ring holders, but there is no uniform definition of degradable.¹³² Is marketing an item as degradable basically misleading given that "degradable plastics provide tangible benefits in many applications," such as six-pack beverage ring holders, sutures, and mulch film? How should consumers interpret claims of degradability by product manufacturers given that some states "require or authorize state agencies to use degradable plastic products, while others have enacted legislation banning the sale of non-degradable plastic products throughout the state?"¹³³

Minnesota apparently did both. After having passed legislation mandating that all state agencies use degradable trash bags, it repealed that statute before it took effect after a state committee's report raised concerns about the environmental safety of degradable plastics' end-products, its alleged benefits in "standard waste-disposal systems," and the effect promotion of degradable products would have on consumers' attitudes toward recycling and littering.¹³⁴

Manufacturers can be similarly misled. Regarding Mobil's decision to market its Hefty Degradable® trash bags, contrary to its own finding that their "environmental benefits" were largely myth, Wynne explains "Mobil pointed to a recently enacted Minnesota law that would have forbidden any public agency--including the Attorney General's office--from buying or using nondegradable plastic bags" as its "most compelling portion of its answer...to the complaint against its degradable Hefty bag line."¹³⁵

The terms "recyclable" and "recycled" raise similar questions. Without an official definition, "manufacturers can claim anything is recyclable, even when, as a practical matter, there is no place to recycle it." "Recycled" can also mean different things to different people. The Green Report found that "when consumers think about recycling, they are thinking about postconsumer waste--the trash they leave at the curb." Some manufacturers, however, label their products "recycled" if it includes "preconsumer waste," such as industrial scrap from production processes.¹³⁶

Are consumers misled by such claims, or, as Wynne asks, "may they be properly led to demand products that help reduce the overall waste stream, which certainly is better for the environment than products that contain no waste materials at all?"¹³⁷ Should products containing only postconsumer waste be allowed to use "recycled" labels, or should the source of the recycled material even matter?¹³⁸

"Environment friendly" poses a slightly different problem. Should the term be "avoided altogether" as the Green Report recommends, or does this term represent "mere puffery" in which case "manufacturers may not need to substantiate factually" this "vague or broad green marketing term?" Further, will "truly reasonable consumers" actually be deceived by such a vague claim knowing that "stretching the truth is commonplace in advertising?"¹³⁹

In regard to plastic packaging, specifically PS foam products, the term "ozone friendly" has been closely scrutinized. Only until recently, PS was manufactured with chlorofluorocarbons (CFCs), which are widely responsible for destruction of the planet's protective ozone layer. Although PS manufacturers began phasing CFCs out about four years ago, products which claim to be CFC-free, and therefore "ozone friendly,"

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have been met with skepticism. The Green Report and the FTC point out that some "CFC-free" products use other ozone-depleting compounds, such as trichloroethane or hydrochlorofluorocarbons (HCFCs). Other products use "volatile, flammable hydrocarbons," such as butane, which "contribute to the formation of ground-level ozone, a component of smog."¹⁴⁰ Recently, however, the United States and other signatories to the Montreal Protocol agreed to freeze HCFCs after 1996 at the 1991 level, and to ban them altogether by 2030. Other ozone-depleting chemicals are to be eliminated four to nine years sooner than previously agreed.¹⁴¹

For this and from questions regarding its "disposability," PS continues to receive "bad press." In 1989, for example, "a total of 66 state and 108 local laws were proposed restricting

the use of PS. Of that number, most were tabled pending full environmental impact studies and/or recycling demonstrations. The rest were enacted."¹⁴² Some of these, however, have been vigorously challenged in court by SPI and other coalitions within the plastics industry.

The most well-known ban on items such as PS foam "clamshells," plastic meat trays, and plastic grocery bags enacted by Suffolk County, New York, in March 1988, was overturned by the New York Supreme Court in 1989. The court "essentially ruled that the ban could not be implemented until the county could conclusively determine that plastics do indeed pose an environmental threat."¹⁴³ The industry also argued that the ban "conflicts with [New York's] goals of 10 percent waste reduction and 40 percent recycling by 1997, in part because the banned plastic packaging is potentially recyclable, particularly the PS."¹⁴⁴

Newark, New Jersey, passed legislation banning non-degradable PS packaging materials in February 1989. The measure, patterned after Suffolk County's order, however, has been weakened by Newark lawmakers who have placed various loopholes in the ordinance. For example, PS can still be used as lids on beverage containers, PS foam trays for meat, fish, poultry and dairy are exempted, and retail outlets can continue to use PS food packaging if they can prove that at least 60 percent of its being recycled.¹⁴⁵

The above discussion illustrates Wynne's contention that the costs of not regulating are simply too high. Without regulation "manufacturers will continue to make questionable environmental claims, consumers will become more disillusioned, and the consumer market will fail to serve as a mechanism of genuine environmental innovation and improvement."¹⁴⁶ Some states and the FTC, after the 1991 hearings mentioned above, have apparently heeded this warning.

On July 28, 1992, the FTC issued the first national guidelines for green marketing. Although the guidelines are not enforceable regulations, they will "enable companies to determine what marketing claims will be safe from FTC enforcement action" and if they "meet with the regulated community's confidence...they may become the standard for future regulatory efforts by other entities."¹⁴⁷

Congress has proposed legislation in this area. Senators Joseph Lieberman (D-Connecticut) and Frank Lautenberg (D-New Jersey) are co-sponsoring The Environmental Marketing Claims Act of 1991 (Environment Act) which was introduced in October 1990, and reintroduced in the 1991-92 session of Congress (S. 615). As of this writing, it was with the Senate Committee on Environment and Public Works. The bill calls upon the EPA "to develop binding definitions for green marketing terms"¹⁴⁸ and "to create a certification program through which manufacturers must seek permission to use them."¹⁴⁹

One month before the Environment Act was first introduced, the California legislature approved The Environmental Advertising Claims Act (Green Labeling Law) sponsored by Byron Sher (D-Santa Clara). The measure "defines certain specific terms used to make environmental claims and requires that manufacturers substantiate vague ones."¹⁵⁰ The Green Labeling Law defines the terms "biodegradable," "photodegradable," "recyclable," "recycled," and "ozone friendly." Products which use these labels must meet these definitions, or those "established in trade rules by the Federal Trade Commission."¹⁵¹

Products using the terms "biodegradable" and "photodegradable" mean that they have "the proven capability to decompose" within one year into non-toxic soil, water or carbon dioxide "in the most common environment where the material is disposed" through natural biological or physical properties, such as heat and light. The term "recyclable" may be used only where the item can be "conveniently recycled" in every county in California with a population of over 300,000. "Recycled" means that the product's contents contain at least 10 percent postconsumer material by weight. "Ozone friendly" or any similar term may be used only if in producing or

using a product the chemicals or materials released will not "cause unnatural and accelerated deterioration of ozone."¹⁵²

Rhode Island, New York and Indiana have adopted measures similar to California's in defining their own environmental marketing standards. Business and advertising interests are concerned that this activity will spill over into other states resulting in a "national patchwork of differing state standards impeding any legitimate environmental marketing nationwide."¹⁵³ As a result, challenges to such legislation are expected.

On February 5, 1992, for example, an industry coalition, which included SPI, brought a suit in Federal District Court in San Francisco to enjoin the enforcement of the California Green Labeling Law. The California Attorney General was named defendant. The coalition contends that the law violates their First Amendment right to free speech "by unduly restricting environmental labeling."¹⁵⁴

In September, the court suggested that some portions of the law may be unconstitutionally vague, but made no ruling on the coalition's motion for summary judgment. The court particularly questioned the definition of "recyclable" on product labels asking whether "conveniently recyclable" meant "technologically convenient" or "convenient relative to access."

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Ironically, California legislators had considered amendments to the original 1990 law aimed at providing more precise definitions of some terms, but they were blocked by heavy lobbying from industry. According to Lynda Williams, counsel for Californians Against Waste, one of the environmental groups defending the law, the lobbying was part of a deliberate attempt to challenge the law in court in the hope of overturning it completely.¹⁵⁵

In addition to federal guidelines and state laws, private initiatives are also attempting to "clarify standards for environmental claims in advertising." Green Seal and Green Cross, two private non-profit organizations, have developed environmental seal of approval programs which charge manufacturers fees to have their products tested on the basis of their environmental merits.¹⁵⁶

Although the criteria Green Seal and Green Cross employ in their analyses are very different and have resulted in some rivalry between the two groups, they will not be examined here. Rather it is important to recognize that although seals of approval will not substitute for effective regulation, they are also not incompatible. As Wynne explains, "...the seal could alert [consumers] to a product that is somehow environmentally 'good,' while terms could help to explain why."¹⁵⁷

However, while the actions of California and other states and private groups like Green Seal and Green Cross may provide models for the rest of the nation in defining green marketing terms and helping consumers make environmentally sound choices, uniform, national standards that preempt state laws and are not overly restrictive are clearly needed and will be most effective promoting recycling and source reduction of all materials in the solid-waste stream, including plastics.

III. Cause for Concern? Additive Migration From Plastics Into Food

Although plastic food wraps and plastic food containers are commonplace in kitchens and food stores, the question of additive migration from plastics into food is sometimes overlooked in discussions concerning plastic packaging. How concerned should consumers be about additive migration? While it is likely that some transfer of polymer additives and monomers will occur where there is direct contact between the plastic and the packaged good(s), there is less consensus on whether such migration poses a threat to public health.

In 1976, the Natural Resources Defense Council (NRDC) published a report which included a study of additive migration in plastic beverage bottles. The study found, "There is enough toxicological data on the substances that migrate from plastic beverage bottles to raise serious doubts about their safety, but not enough to resolve those doubts." The report roundly criticized the Food and Drugs Administration (FDA) for approving plastic beverage bottles "on the basis of scant and questionable data on the health effects of migrating substances," concluding

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that the FDA had not "satisfied its statutory duties under either the National Environmental Policy Act or the Food, Drug, and Cosmetics Act." PET bottles, for example, were approved by the FDA with "virtually no data on the chronic effects of substances that migrate" and without consistent "long-term extraction testing even though beverages are likely to be stored for relatively long periods of time." At the time

this NRDC report was written, SPI and Monsanto maintained that no additive migration occurs from plastic beverage containers.¹⁵⁸

Another resin, PVC, has also been a focus of attention regarding the question of additive migration from plastics into food. A commonly used plasticizer in PVC, diethyl hexyladipate (DEHA), is a recognized carcinogen. There is also some evidence that it may be mutagenic (able to cause genetic damage) and teratogenic (able to damage fetuses), although "animal experiments to determine the effects of DEHA...have been inconclusive."¹⁵⁹

Consumers' Research reported that "In a 1987 study of home use of PVC film wrap, the migration level of DEHA was found to increase in proportion to the time that the food was in contact with the PVC wrap, and with the rise in cooking temperature. The highest migration levels were found when the plastic film was in direct contact with food that had a high surface fat content [such as meats and bakery products]."¹⁶⁰ Nonetheless, because PVC film wrap is useful for covering food that is to be stored or cooked in a microwave, it has become quite commonplace in kitchens and food stores.

At the same time, microwave technology and use by consumers continue to change: power levels are going up and consumers are more at ease with microwave cooking.¹⁶¹ With a microwave oven in nearly 70 percent of homes in the United States, a \$450 million market for plastic microwave cookware and accessories continues to expand.¹⁶² "Active packaging" is one example of the industry's response to this expanding market niche.

Active packaging incorporates "metallic heat 'susceptors' into plastic food packaging intended for microwave cooking. The susceptors focus microwave radiation to produce extremely hot surfaces (400° to 500° F) within the package" in order to brown or crisp the food contained therein.¹⁶³ But whether achieved from increasing power levels or the presence of heat "susceptors" in food packaging, high heat may result in an increase in additive migration where

plastic packaging is used in conjunction with microwave ovens. In the case of PVC film wrap, the dangers may be even greater.

At the time of the 1987 study mentioned above, the temperature range approved by the FDA for the use of plastic packaging in microwave cooking was between 212° to 275° F. As a result, the FDA began working with members of the packaging industry to study new testing procedures and to investigate what modifications could be made in packaging materials to assure their safety at high heat. However, manufacturers were not barred from printing "microwaveable" on some plastic wrap products, even though a product bearing that term does not mean the FDA has granted approval for that use. In this way the plastics industry is largely self-regulated.¹⁶⁴

First Brands Corporation, manufacturer of polyethylene-based GLAD® Cling Wrap, makes a similar claim, but also recommends that their film wrap not come in contact with food being cooked in a microwave oven. The following information is found printed on the box: "Useful for microwave cooking...major microwave oven manufacturers recommend the use of plastic wrap as a cover for 'Microwave-Proof' ovenware. Certain foods with high fat or sugar content can become quite hot in a microwave oven and should not come into contact with GLAD® Cling Wrap. When covering foods with GLAD® Cling Wrap in a microwave oven, it is recommended that a large enough container be used to allow an inch or more between the plastic wrap and the food."

IV. Conclusions

Many issues regarding the proliferation of plastic packaging have been raised in Parts 1 and 2. Because plastics are synthetic and inert, they persist in the environment long after their useful life. Of course, paper, glass and metals are also slow to breakdown in their common environments, namely landfills. These materials, however, enjoy much higher recycling rates than those for plastics. Plastics, however, are replacing these as the packaging materials of choice. As a result, the recyclability of the waste stream may be at risk at a time we can least afford the danger.

As we have seen, government and industry must play a vital role in encouraging greater plastics recycling throughout the nation. This can partly be achieved by uniform recycling policies and other legislative mechanisms, as well as improvements in reclamation technologies. As Part 2 emphasizes, however, the consumer must share some of the responsibility in reducing plastic packaging in the waste stream.

Source reduction is one way the buyer can help meet this burden. By focusing on the disposability of a product, the consumer can send a signal to the manufacturer to design packaging that uses fewer (plastic) materials and can be conveniently reused. Source reduction, however, while voluntarily being pursued by some manufacturers, has been frustrated by consumers who value both a clean environment and convenience and manufacturers who make deceptive claims about the environmental merits of their products.

This desire for convenience has also hastened the advent of the microwave oven, around which a profitable market in plastic accessories and single-service packaging has emerged. This has raised some unanswered questions regarding the impact of plastic food packaging on consumers' health, in addition to the solid-waste stream.

Again, government can play a lead role in filling the gap and in recommending packaging guidelines which reflect waste reduction goals. Industry can cooperate with governmental agencies like the FTC in clearly defining "green labeling" terms, encouraging national standards, and adhering to them. Lastly, consumers can become part of the solution by being more discriminating in their buying decisions, thereby sending a strong message to

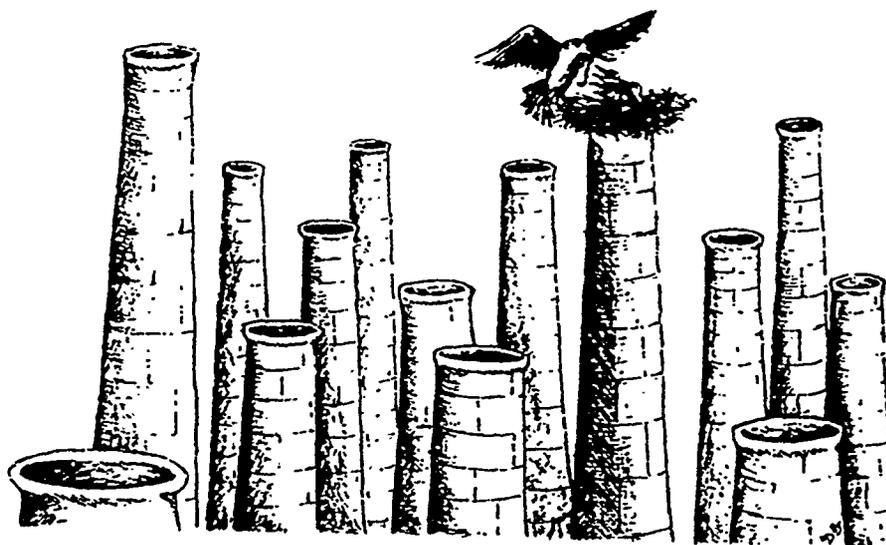
manufacturers that source reduced, reusable packaging is favored. Ultimately, it is consumers who must decide, particularly through their buying decisions and lifestyle choices, whether they wish to discard the throwaway society.

NOTES

1. Nancy Wolf and Ellen Feldman, Environmental Action Coalition, *Plastics: America's Packaging Dilemma* 13 (1991)
2. Bill Lawren, *Plastic Rapt*, National Wildlife, Oct.-Nov. 1990, at 10, 12
3. Wolf and Feldman, *supra* note 1, 13
4. *Id.* at 27
5. *Id.* at 15-16
6. Mark Crawford, *There's (Plastic) Gold in Them Thar Landfills*, Science, July 22, 1988, at 411, 411
7. Wolf and Feldman, *supra* note 1, 15
8. *Id.* at 28
9. Alan Newman, *Recycling and Reducing*, Environmental Science and Technology, Nov. 1991, at 1819, 1820
10. Wolf and Feldman, *supra* note 1, 28
11. *Id.* at 27
12. *Id.* at 105
13. *Id.* at 110
14. T. R. Crompton, *Additive Migration from Plastics into Food*, 11 (1979)
15. Wolf and Feldman, *supra* note 1, 106
16. John Bell, *Plastics: Waste Not, Want Not*, New Scientist, Dec. 1, 1990, at 44, 45
17. Wolf and Feldman, *supra* note 1, 106
18. S. Gary Howell, *A Ten Year Review of Plastics Recycling*, Journal of Hazardous Materials, Jan. 1992, at 143, 144
19. Wolf and Feldman, *supra* note 1, 43
20. *Id.* at 92
21. *Id.*
22. Cal. Pub. Res. Code §§ 18012 and 18015 (West Supp. 1992)
23. James J. Callari, *How Did Plastics Become the Target?* Plastics World, Sep. 1989, at 12, 13
24. Wolf and Feldman, *supra* note 1, 53
25. *Id.* at 13
26. Howell, *supra* note 18, 149
27. Callari, *supra* note 23, 13
28. Wolf and Feldman, *supra* note 1, 53
29. *Id.*
30. David Erickson, *Can Plastics be Burned Safely?* Plastics World, Sep. 1989, at 39, 43
31. *Id.* at 39
32. *Id.* at 41
33. JoAnn Gutin, *Plastics-A-Go-Go*, Mother Jones, Mar.-Apr. 1992, at 56, 59
34. Bell, *supra* note 16, 44
35. Wolf and Feldman, *supra* note 1, 63
36. *Id.* at 56
37. *Id.*
38. Erickson, *supra* note 30, 41
39. Callari, *supra* note 23, 15
40. Wolf and Feldman, *supra* note 1, 56
41. Erickson, *supra* note 30, 41-43
42. Wolf and Feldman, *supra* note 1, 56-64
43. John E. Young, Worldwatch Institute, *Reducing Waste, Saving Materials*, State of the World 1991, 46 (1991)
44. *Id.*
45. *Id.*
46. Malcolm Gladwell, *Plastics Manufacturers Speed the Search for New Ways to Recycle Disposable Plastics*, Wash. Post, May 2, 1989, at E1
47. *Plastics Industry Group Asks 25% Recycle by '95*, Wall St. J., Mar. 29, 1991, at A5(E)
48. Newman, *supra* note 9, 1820
49. Gladwell, *supra* note 46, E6
50. *Recycling Firms Attacking Solid Waste Problem*, Plastics World, July 1989, at 10, 10
51. Randolph B. Smith, *Plastics Makers Plan Packaging Recycling Plant*, Wall St. J., Aug. 20, 1990, at B4D, B4D
52. *Producers Plan to Recycle 25% of Food Service Plastics*, Plastics World, Apr. 22, 1990, at 45, 46
53. Gutin, *supra* note 33, 58
54. Gladwell, *supra* note 46, E1, E6
55. *Id.*
56. Wolf and Feldman, *supra* note 1, 66
57. *Id.*
58. *Id.* at 9

59. *Id.* at 71
60. Crawford, *supra* note 6, 411
61. Wolf and Feldman, *supra* note 1, 66
W Business Watch, *Plastics World*, Oct. 1992, at 81, 81
63. Wolf and Feldman, *supra* note 1, 69
64. *Id.* at 68
65. Jim Glenn, *An Industry Shapes Up for Recycled Plastics*, *BioCycle*, Jan. 1991, at 38, 38
66. Wolf and Feldman, *supra* note 1, 69
67. Crawford, *supra* note 6, 412
68. Wolf and Feldman, *supra* note 1, 70
69. Gutin, *supra* note 33, 58
70. Wolf and Feldman, *supra* note 1, 68
71. Gutin, *supra* note 33, 58
72. Tom Waters, *The Plastics Problem*, *Discover*, Feb. 1989, at 22, 22
73. Ann Leonard, *The Myth of Recycled Plastics*, *Greenpeace: Toxic Trade Update 5.2, Second Quarter 1992*, at 3
74. Wolf and Feldman, *supra* note 1, 98
75. Pub. Res. §§ 42310, 42330 and 42372 (West Supp. 1992)
76. Crawford, *supra* note 6, 412
77. Young, *supra* note 43, 50
78. PW Newsgram, *Plastics World*, Jan. 1990, at 3, 3
79. *Selling Green*, *Consumer Reports*, October 1991, at 687, 689
80. Roger D. Wynne, *Defining "Green": Toward Regulation of Environmental Marketing Claims*, 24 *U. Mich. J. L.*, at 785, 790
81. *Selling Green*, *supra* note 79, 690
82. Wynne, *supra* note 80, 792-793
83. *Id.* at 9
84. *Selling Green*, *supra* note 79, 689
85. Jack Anderson and Dale Van Atta, *Plastics Industry Fights Recycling Bill*, *The Wash. Post*, Mar. 2, 1989, at D.C. 15, D.C. 15
86. Wolf and Feldman, *supra* note 1, 86
87. Laurie McCarthy, *Degradable Plastics Fit Best in Specialty Areas*, *Plastics World*, Sep. 1989, at 29, 31
88. *Id.* at 29
89. Lawren, *supra* note 2, 16
90. *Id.*
91. *Id.*
92. McCarthy, *supra* note 87, 35
93. Crawford, *supra* note 6, 412
94. McCarthy, *supra* note 87, 35
95. Mark K. Solheim, et. al. *Environment: What to Buy*, *Changing Times*, Feb. 1990, at 29, 31
96. McCarthy, *supra* note 87, 33
97. Wolf and Feldman, *supra* note 1, 89
98. McCarthy, *supra* note 87, 35
99. *Plastics in the Spotlight*, *BioCycle*, July 1990, at 40, 43
100. *Id.*
101. Wolf and Feldman, *supra* note 1, 86
102. Waters, *supra* note 72, 22
103. Lawren, *supra* note 2, 12
104. *Id.* at 13
105. *Id.*
106. Wolf and Feldman, *supra* note 1, 33
107. Solheim, *supra* note 95, 29
108. Mark Schlack, *Package Design Will be Shaped by Solid Waste*, *Plastics World*, Sep. 1989, at 20, 20
109. *Id.*
110. Wolf and Feldman, *supra* note 1, 32
111. *Id.* at 29
112. *Id.* at 30
113. Schlack, *supra* note 108, 23
114. Wolf and Feldman, *supra* note 1, 36
115. James Callari, *Heinz Could Trigger Big Coex Changes*, *Plastics World*, May 1990, at 15, 15
116. Schlack, *supra* note 108, 24
117. Charles Lodge, *PET Regrind Base Cups Save Bottlers Money*, *Plastics World*, May 1989, at 14, 14
118. Schlack, *supra* note 108, 23
119. *Id.* at 27
120. Wolf and Feldman, *supra* note 1, 31
121. *Importance of Plastics Shadowed by Bad Image*, *Plastics World*, Jan. 1987, at 16, 16
122. Jack Anderson and Dale Van Atta, *Plastics Deteriorate in Image Only*, *The Wash. Post*, Jan. 30, 1990, at B26, B26
123. Wynne, *supra* note 80, 787
124. *Selling Green*, *supra* note 79, 687
125. Wynne, *supra* note 80, 786

126. *Id.* at 792
127. *Selling Green*, *supra* note 79, 688
128. Betty-Jane Kirwan and Leslie A. Tucker, *Green Labeling Standards*, *Los Angeles Lawyer*, Sep. 1992, at 30, 30
129. *Selling Green*, *supra* note 79, 688
130. Wynne, *supra* note 80, 790
131. Kirwan and Tucker, *supra* note 128, 32
132. Anderson and Van Atta, *supra* note 85, D.C. 15
133. Wynne, *supra* note 80, 791-792
134. *Id.* at 792
135. *Id.*
136. *Selling Green*, *supra* note 79, 688
137. Wynne, *supra* note 80, 791
138. *Selling Green*, *supra* note 79, 688-689
139. Wynne, *supra* note 80, 791
140. *Selling Green*, *supra* note 79, 690
141. *Nations OK Timetable to Phase Out Ozone-Depleting Chemicals*, *The Davis Enterprise*, Nov. 26, 1992, at A-8
142. *Producers Plan to Recycle 25% of Food Service Plastics*, *supra* note 79, 45
143. *Recycling Firms Attacking Solid Waste Problem*, *supra* note 77, 10
144. Wolf and Feldman, *supra* note 1, 97
145. *PW Business Watch*, *Plastics World*, Mar. 1990, at 99, 99
146. Wynne, *supra* note 80, 792
147. Kirwan and Tucker, *supra* note 128, 30
148. *Id.* at 32
149. Wynne, *supra* note 80, 794
150. *Id.* 793
151. *Bus. & Prof. § 17508.5* (West Supp. 1992)
152. *Id.*
153. Kirwan and Tucker, *supra* note 128, 57
154. *Id.*
155. Miranda Ewell, *Environmental Ad Law Goes to Court*, *S.J. Mercury News*, Sep. 19, 1992, at 3B
156. Kirwan and Tucker, *supra* note 128, 30
157. Wynne, *supra* note 80, 799
158. *Natural Resources Defense Council, Pop Bottles: The Plastic Generation (A Study of the Environmental and Health Problems of Plastic Beverage Containers)*, 5-23 (1976)
159. Wolf and Feldman, *supra* note 1, 110
160. Beatrice T. Hunter, *Plastics in Contact with Food*, *Consumers' Research*, Nov. 1988, at 8, 8
161. Wendy Mutch, *Plastics Sizzle in Microwave Applications*, *Plastics World*, Jan. 1987, at 14, 14
162. *Id.*
163. Hunter, *supra* note 160, 8
164. *Id.* at 9



< Michael De Sena