

A Consumer's Guide To Environmental Myths and Realities

by

**Lynn Scarlett
Reason Foundation**

NCPA Policy Report No. 165

September 1991

ISBN 0-943802-68-7

**National Center for Policy Analysis
12655 North Central Expressway, Suite 720
Dallas, Texas 75243
(214) 386-6272**

Executive Summary

Americans are being besieged with advice on how to be “good environmentalists.” Advice on what products to buy and what actions to take is routinely given to consumers, legislators and even school children. The problem is the advice is often wrong and, if followed, could cause environmental harm. What follows are some common myths.

MYTH NO. 1: We are running out of landfill space. All of the garbage America produces in the next 1,000 years would fit in a landfill that occupies less than one-tenth of 1 percent of the continental United States.

MYTH NO. 2: Americans are especially wasteful. When a common definition of garbage is used, American households produce only 7 percent more solid waste than the Japanese. Moreover, careful studies show that the amount of waste we generate per person may have been virtually constant over the past two decades and the amount of waste per dollar of GNP has been falling.

MYTH NO. 3: Packaging is bad. Because of state-of-the-art packaging, the United States wastes less food than any part of the world except Africa, where the threat of starvation means that even rotten food is consumed. Because of packaging, we can meet our consumption needs while producing less food — which means fewer pesticides, less pollution and less energy use. The same principle also applies to non-food packaging.

MYTH NO. 4: Plastics are bad. Without the use of plastics, our total use of packaging materials (measured by weight) would increase four-fold, our energy consumption would double and the garbage we dispose of would more than double.

MYTH NO. 5: Disposables are bad. Careful studies show that disposables are not necessarily worse than reusable or recyclable products. For example, aseptic juice boxes (which are usually disposed of, rather than recycled) have a clear edge over their alternatives by most measures. Consumers who care mainly about landfills may choose cloth diapers. But consumers who care more about air and water pollution and conserving water and energy might choose disposables, which may also be preferable on the grounds of health and convenience.

MYTH NO. 6: Recycling is always good. Recycling itself can cause environmental harm, e.g., more fuel consumption and more air pollution. As a result, the environmental costs of recycling may exceed any possible environmental benefits.

MYTH NO. 7: Nonbiodegradable products are bad. For two-thirds of the nation’s landfills, (those without liners), it’s the products which degrade that pose a potential environmental threat. Degradation can lead to leaching, as chemicals reach the water supply and cause a health threat to fish, wildlife and humans. The other one-third of landfills are completely sealed and allow very little degradation. For those landfills, consumer choices regarding degradability do not matter.

MYTH NO. 8: Recycling paper saves trees. Since most of the trees used to make paper are grown explicitly for that purpose, if we use less paper, fewer trees will be planted and grown by commercial harvesters. Recycling paper doesn't save trees, it reduces incentives to plant them.

MYTH NO. 9: We cannot safely dispose of solid waste. This was a valid concern in the past. In fact, 22 percent of Superfund sites (hazardous waste disposal areas) are former municipal landfills. But things are different today. Government regulations and new technology permit the safe disposal of solid waste — in landfills or by waste-to-energy incineration — without threat to human health or the environment. Even without new improvements, the Environmental Protection Agency estimates that the aggregate risk from all operating municipal solid waste landfills in the United States is one cancer death every 23 years.

MYTH NO. 10: We are running out of resources. Although all resources are finite, technology and markets make it possible to use resources without exhausting them. That's why the international price of virtually every raw material went down (reflecting abundance), not up (reflecting scarcity) over the past decade.

Within the last several years, numerous states and cities have passed laws banning or restricting the use of consumer products. In most cases the laws focus on trivial problems and threaten to do more harm than good.

- Although children's aseptic juice boxes constitute two-hundredths of one percent of the nation's landfills, they have been banned in Maine.
- Although polystyrene food containers constitute two-thousandths of one percent of the nation's landfills, they have been effectively banned in Portland, Oregon and Newark, New Jersey and face a 1993 ban in North Carolina.
- Although disposable diapers constitute less than 2 percent of the nation's landfills, a proposed law in Oregon would make possession of one a criminal offense.
- Although newspapers constitute only 7 percent of the nation's landfills and newspaper recycling has adverse environmental consequences (including potential toxic waste from deinking), publishers are required to recycle in California, Connecticut, Maryland, Missouri and Wisconsin and similar laws have been proposed in Illinois, New Jersey and New York.

Rather than adopt the command and control approach to solid waste, a better approach is to rely on markets. Even though the cost of solid waste disposal is soaring in many cities and states, consumers are largely insulated from the costs of their own behavior. In two-thirds of U.S. cities, households face no charge for garbage disposal or a charge correlated to the amount of waste they generate.

If people faced real prices for the garbage they disposed of, they would then bear the full cost of their own behavior. In light of these incentives, markets, rather than politicians, could be relied upon to find innovative, efficient solutions to solid waste problems.

Introduction

In recent years, numerous groups, including federal agencies, have offered advice on how Americans can be “good environmentalists.” Through broadcast and print media, consumers, legislators and even children are told what products and what actions are environmentally “good” and “bad.”

When Bad Advice is Worse than No Advice. Although frequently well-intentioned, the advice is all too often based on little more than the simple-minded application of such core beliefs as “recycling is good,” “disposables are bad,” “packaging is bad,” “plastics are bad,” etc. In many cases the advice-givers focus on only one environmental concern (such as the volume of solid waste) while ignoring all others (such as air pollution, water pollution, energy use and the use of other scarce resources).

From the perspective of the total environment, the advice is often *wrong*. Consumers who try to follow simple rules when they shop may end up harming the environment more than if they simply ignored the environmental consequences of their behavior.

Legislation Based on Bad Advice. Ordinarily, one would expect legislators to think through the consequences of the laws they pass. But with respect to the “green” approach to consumer products, too often they have not done so. Based on uncritical acceptance of a number of myths, cities and states are passing simplistic and counter-productive laws.

- In 1989, Maine banned (with some exceptions) aseptic packaging—the small, rectangular boxes used as beverage containers—from its store shelves.
- Florida banned nonbiodegradable polystyrene foam and plastic-coated paper products used for food packaging.¹
- Portland, Oregon, and Newark, New Jersey, have effectively banned polystyrene food packaging, and North Carolina will ban polystyrene food packaging after October 1, 1993 if it is not being recycled at a 25 percent rate.
- Other cities and states have proposed bans on disposable diapers, including an Oregon proposal to make possession of disposable diapers a criminal offense.

"Advice on what products are environmentally 'good' or 'bad' is often wrong."

"Environmentalists who follow simple-minded rules may do more harm than good."

- At least 38 states have implemented product and packaging mandates designed to reduce waste or promote recycling.
- Twenty-eight states have enacted recycling or waste reduction mandates, with another five states setting nonmandatory recycling goals.
- Seven states have embarked on “green” labeling programs.
- More than 3,000 cities have instituted recycling programs and, in many, recycling is mandatory.

Separating Fact from Fiction. As a public service to consumers and politicians, this report examines some of the most common environmental myths, especially those relating to solid waste. It also proposes a different approach to public policy issues — one which is environmentally sound and economically sensible.

MYTH NO. 1: We Are Running Out of Landfill Space.

We are reminded almost daily that American households dispose of a great deal of trash.

- A 1987 *Newsday* article reprovably reported that each American household discards an average of 13,000 paper items, 500 aluminum cans and 500 glass bottles annually.
- A 1988 Franklin Associates study prepared for the Environmental Protection Agency (EPA) estimated that Americans throw away 157.7 million tons of solid waste annually, or about 3.5 pounds of trash per day per person, compared with 2.7 pounds in 1960.²
- Another report says, “The total annual U.S. collection of 150 million tons would fill a convoy (of ten-ton garbage trucks) 140,000 miles long, over five times the distance around the Earth’s equator and over half way from here to the moon.”³

But are we running out of places to put the garbage we generate? The answer is “no.” In many parts of the country, potential landfill space is abundant and we are in no danger of running out.⁴

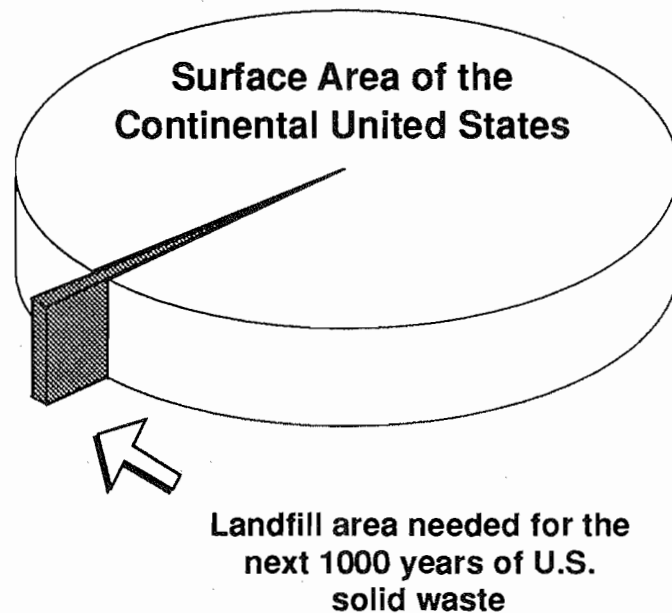
“There is no danger of running out of landfill space.”

- All of the garbage Americans will produce for the next 1,000 years would fill an area 44 miles on each side and about 120 feet deep.
- A super landfill this size would occupy less than one-tenth of 1 percent of the surface area of the continental United States. [See Figure I.]

Anyone who has looked from an airplane at the western part of the United States knows there is plenty of land where we might store the next 1,000 years' worth of garbage with little inconvenience or health hazard to nearby residents.⁵ But we do not have to ship all of our garbage to Arizona or Nevada in order to bury it. For example, New York, a state some think has an especially serious landfill capacity shortage, has identified about 200 square miles of land suitable for landfills.⁶ In the Pacific Northwest, five landfills in the process of being sited in the dry, eastern part of the region could handle 80 to 100 years of the area's entire solid waste stream. Nor do we have to force communities to develop landfills. In many parts of the country, people are willing in principle to provide landfill space for the right price.

FIGURE I

Are We Running Out of Landfill Space?



"A landfill containing the next 1000 years' worth of U.S. garbage would occupy less than 1/10th of 1 percent of our land."

Moreover, once lined and covered, a landfill is not permanently unusable. Parks, golf courses and buildings cover the surface areas of some covered landfills — although many people using these facilities are unaware of the landfill beneath them. Properly sited and operated, landfills pose little threat either to human health or to the environment.

Landfill Capacity. About 73 percent of all municipal solid waste in the United States ends up in landfills.⁷ And despite the abundance of potential landfill space, the number of landfills actually receiving trash is shrinking.

- Over the past 10 years, more than half of the 18,500 municipal solid waste landfills that existed in 1979 have closed.⁸
- A decade ago, at least 300 to 400 new municipal landfills came on-line each year. By the 1980s, the number of new landfills coming on-line had dropped to between 50 and 200 per year.
- As a result the EPA estimates that only 4,000 landfills will remain open by 1993.⁹

The fact that more than half the landfills now in use will be closed within five years is not unusual. Most are designed for about 10 to 20 years' use.¹⁰ And the fact that more landfills are closing than the number of new landfills opening is also not a major problem. Since the new landfills are about four times as large as the old landfills, there has been only a small net loss of landfill space available nationally.

Nonetheless, some areas of the country face a serious shortfall in landfill capacity. For example:¹¹

- New Jersey, with a severe shortage of landfill space, exports more than one-half of its refuse.
- Pennsylvania and New York have sufficient capacity to receive trash for only the next five years.

The Politics of Garbage. The primary reason for the landfill crisis is politics. One political factor is the much-publicized NIMBY (not-in-my-backyard) syndrome that has delayed or prevented the opening of new landfills to replace those reaching capacity. Even

"Since new landfills are four times as large as the old landfills that are closing, there has been only a small net loss of landfill space available."

expanding *existing* landfills to increase capacity has run up against NIMBY opposition. As a result, we are experiencing an “artificial shortage” caused by opposition by both the public and some legislators who have created a de facto moratorium on expanding landfill capacity.¹²

Partly because of the NIMBY syndrome, permits for landfills have been increasingly hard to obtain. In 1988, Pennsylvania had under consideration some 35 permit applications that could have added 118.2 million tons of new capacity, enough to meet the state’s needs for the next 35 years. Yet some of these applications had been pending for seven years, even though they proposed designs that met strict environmental standards.¹³

Within the past year, regulators have begun to approve more permit requests, but demand still outstrips capacity in many areas and the cost of obtaining a permit has soared, making it difficult for smaller landfill operators to obtain new permits. This difficulty is clearly reflected in land values:¹⁴

- In Princeton, New Jersey, one site with a landfill permit was offered for sale at \$500,000 per acre.
- The same site, *without* a permit, would have sold for \$20,000, according to local realtors.

New Jersey’s scarcity of landfill capacity also can be traced to ill-conceived legislation — the 1976 Solid Waste Utility Control Act. This law in effect treats solid waste collection and disposal as a public utility, subject to rate regulation similar to that applied to electric utilities. Moreover, New Jersey rate regulations allow landfill operators to recover only *past* costs, not *replacement* costs¹⁵ — thus deterring private operators from investing in new landfills. Perversely, New Jersey’s attempt to cap costs has instead resulted in soaring disposal costs for the state’s municipalities, which now must haul garbage out of state at costs reaching over \$130 per ton, compared to a nationwide average of just over \$30 per ton. [See Figure II.]

New Jersey, which has the highest disposal costs in the nation, is not alone in experiencing soaring “tipping fees” — those fees charged by landfill or incinerator operators to receive trash:¹⁶

“The landfill crisis is a political crisis, not an environmental one.”

"Two-thirds of U.S. households have no financial incentive to reduce the amount of garbage they produce."

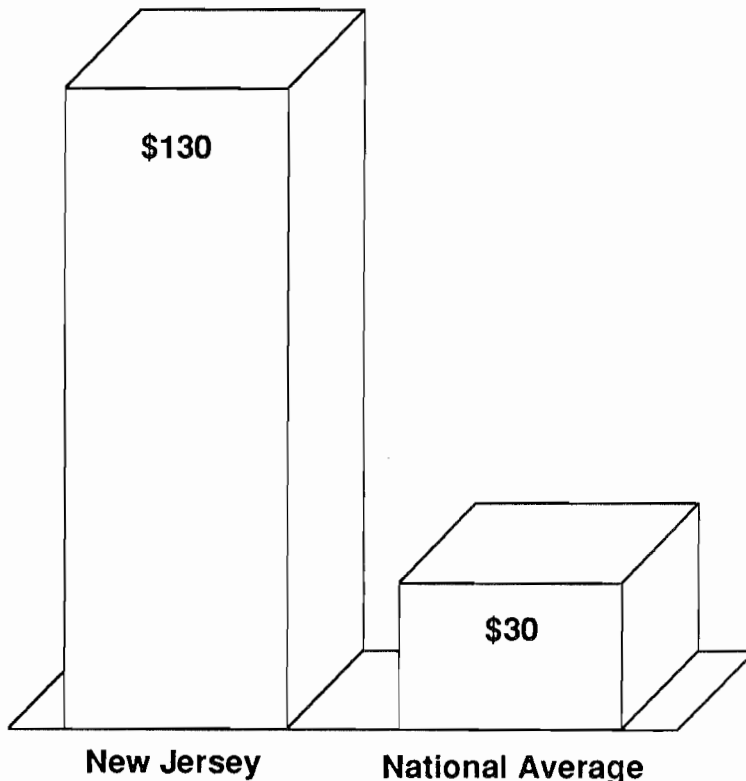
"Because of its public policies New Jersey's garbage disposal costs are more than four times the national average."

- In the 1970s, many communities paid as little as \$2 per ton in tipping fees at landfill sites.
- By 1982 the average fee had increased fivefold to \$10.80 per ton; and by 1988 the average cost had doubled again to \$20.36 per ton.
- Today the National Solid Waste Management Association (NSWMA) estimates that, as a result of tighter environmental standards, many landfills must charge more than \$30 per ton.
- Expanding existing sites, which requires upgrading to meet the tighter new standards, could cost \$12 to \$25 per ton of added capacity, representing a fivefold increase in disposal costs in some instances.

The Lack of a Market for Garbage. Despite the fact that disposal costs are rising, most consumers in most cities are not charged prices that reflect the social cost of disposing of the garbage.¹⁷

FIGURE II

1988 Landfill Fees¹



¹Tipping fees.

Source: National Solid Waste Management Association.

- A survey of 246 cities with populations ranging from 5,000 to 1.75 million showed that 39 percent did not charge any user fee for garbage collection.
- Of those that did, about half charged a flat fee, regardless of the amount or weight of the garbage collected.
- Thus, in more than two-thirds of the cities surveyed, households had no financial incentive to reduce the amount of garbage they produce.

In general, we get what we subsidize; and since we subsidize solid waste disposal, we are getting more solid waste.

MYTH NO. 2: Americans Are Especially Wasteful.

In the preface to a book on the garbage crisis, former Texas Commissioner of Agriculture Jim Hightower complains, "We have been taught to be wasteful. Today, our durable goods are anything but durable, designed as they are for planned obsolescence, and nearly all our nondurable goods are sold in throwaway packaging. We produce enormous quantities of waste, then try to bury it or burn it and forget it."¹⁸

No doubt about it, Americans throw away a lot of stuff. Annually, we produce some 180 million tons of municipal solid waste, which includes household, commercial and light industrial waste. But are we overly wasteful? How do we rank compared with other nations, rich and poor?

Several reports comparing U.S. per capita waste production with that of other affluent nations show the U.S. leading the pack. For example, *Waste Age* magazine reported that Japan produces only 76 percent of the amount of garbage generated per person in the United States. Households in France are reported to produce only 60 percent and Germany only 40 percent. But these figures are deceptive, and often amount to "comparing apples and oranges."¹⁹

One problem with international statistics is that Japan and some European countries define municipal solid waste as including only those materials sent to waste treatment or disposal facilities. In the United States, we include recycled materials in our definition.

"Japanese households produce almost the same amount of waste as American households."

- Using the Japanese definition of waste, U.S. households produce about 3.2 pounds of waste per day compared to Japan's 3 pounds per day.²⁰
- Thus, the Japanese produce 94 percent as much waste as Americans do, not the reported 76 percent.

International comparisons also have other problems. In some countries, like Japan, lack of timber resources for paper production makes paper relatively expensive. This gives people a much stronger incentive to reuse and conserve paper. Moreover, in high-density urban settings, the Japanese produce little or no yard waste, a major component of suburban U.S. waste. All told, it appears that people in other countries respond to economic incentives when making decisions about waste — just like Americans do.

Comparing current figures with past estimates can also be deceptive. Most reports on the amount of garbage Americans produce over time fail to alert the reader that the numbers are not based on actual physical measurements. Instead, they are based on models which *estimate* the amount of garbage produced. Harvey Alter of the U.S. Chamber of Commerce identified those few cities which actually measured the amount of solid waste disposed of over selected periods of time and found no general increase:²¹

- For example, the number of pounds of municipal solid waste per person in Los Angeles remained virtually unchanged from 1967 to 1976.
- Alter concluded that for the nation as a whole, per capita solid waste generation was virtually constant between 1970 and 1984.

Alter also discovered that the amount of solid waste we generate is falling in relation to our gross national product (GNP).²² As the nation becomes wealthier, we consume more goods and services. But the amount of trash we produce *per dollar of GNP* is falling, not rising. Failure to recognize this fact produced some notoriously incorrect predictions about the future. For example, in the 1970s the EPA estimated that per person generation of solid waste by the mid-1980s would be nearly 60 percent greater than it turned out to be.

As garbologist William Rathje has observed: "Americans are wasteful, but to some degree we have been conditioned to think of ourselves as more wasteful than we truly are."²³

"The amount of garbage each person generates has changed little in the past two decades."

MYTH NO. 3: Packaging Is Bad.

In its 1990 report on solid waste, the Council of Northeast Governors concluded that “no packaging is the best packaging.” In order of descending preference, the council proposed (1) no packaging, (2) minimal packaging, (3) returnable, reusable and refillable packaging and (4) recyclable packaging.²⁴ Similar ideas are widely accepted by consumers who are concerned about the environment.

Yet to argue that no packaging is the best option neglects the role of packaging in actually preventing waste. Nowhere is this more evident than with food packaging. For example,²⁵

- Packaging represents from 30 to 40 percent of the solid waste disposal in the United States, but only 20 percent in Mexico.
- Yet despite the fact that Americans throw away more packages, the average Mexican household throws away three times more food debris.²⁶
- As a result, the average Mexican household throws away 40 percent more total refuse than the average U.S. household — an amount equal to 1.6 pounds per household each day.
- To put this number into perspective, if Phoenix, Arizona, disposed of as much trash per household as Mexico City does, city sanitation crews would have to collect, haul and bury 80 more tons of household garbage each workday.

Mexico’s greater amount of solid waste is directly related to its lack of packaging. In the United States, when food is processed and packaged, the unused parts (rinds, peels, etc.) are often used as fuel, animal feed or some other economically useful by-product. In Mexico, by contrast, unused food by-products become garbage. In general,

- The extra 1.6 pounds per household per day disposed of in Mexico City is food debris — the skins, rinds, peels, tops and other inedible parts discarded in food preparation and portions of edible food discarded.²⁷
- The average Mexican household throws away daily more than half the amount of food required to provide an adult with a nutritionally sound diet for one day.²⁸

"The average Mexican household throws away 40 percent more garbage than the average U.S. household."

Another reason why food packaging reduces waste is that it reduces spoilage. In general, as the use of packaging materials increases the fraction of food waste decreases.²⁹

- Overall, for every 1 percent increase in packaging, there is a 1.6 percent decrease in food waste.
- This relationship “holds for data from many countries, over a considerable range of waste composition and perhaps a broad period of time.”

For example, the exotic layering of metals and plastics that keeps Keebler cookies fresh for as long as nine months after they leave the oven lets the company distribute them throughout the United States without having a plant in every city. Packaging meets consumer needs and economizes on the use of resources at the same time.

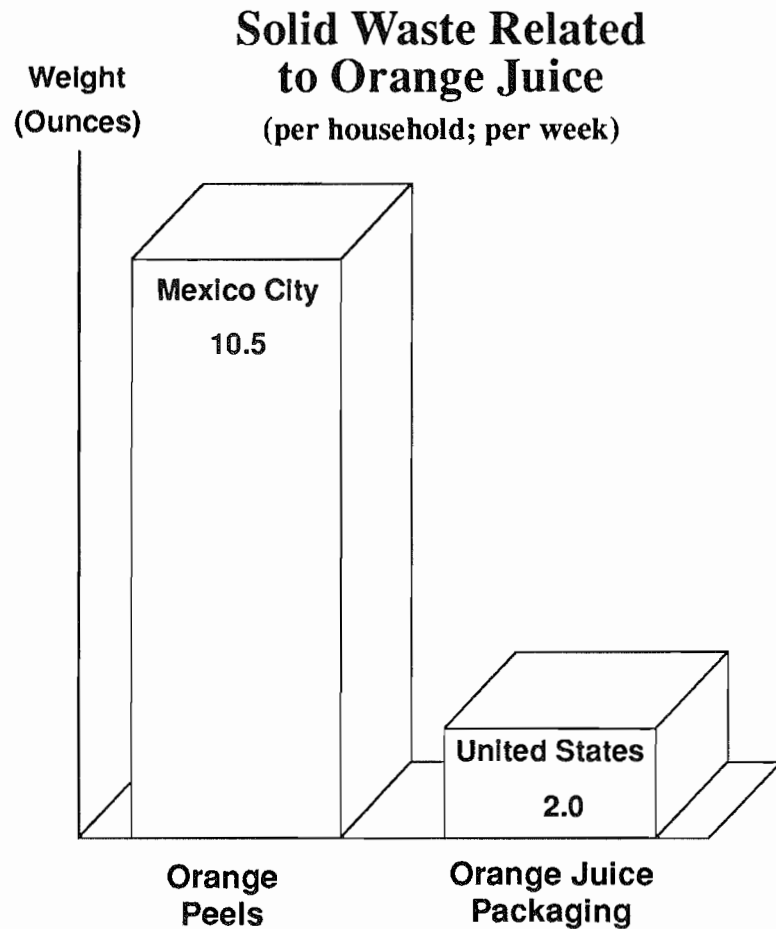
Precisely because of state-of-the-art packaging, the United States wastes less food than any other part of the world except Africa, where the threat of starvation means that even rotten food is consumed.³⁰ Because of packaging, we can meet our domestic consumption needs with fewer resources — less pesticides, less pollution and less energy use.

Case Study: Orange Juice Consumption. In Mexico City, most consumers squeeze fresh oranges to make orange juice and throw away the peels. Many U.S. households, by contrast, buy frozen juice concentrate. The result? The typical Mexican household tosses out 10.5 ounces of orange peels each week while the typical American household throws out only 2 ounces of cardboard or aluminum from a frozen concentrate container. [See Figure III.] In the United States, the peels discarded from the oranges are used by the orange juice industry for animal feed and other products.³¹

But even that does not provide the full picture. To yield the same quantity of orange juice, a consumer uses 25 percent more oranges than does an industrial processor. This means that fresh oranges require about 25 percent more fertilizer, water, fuel and other resources to produce a given quantity of juice.³² The case for food packaging becomes even more dramatic if one includes transportation requirements for fresh oranges in contrast to frozen orange juice:

“Because of packaging, the United States wastes less food than any other part of the world except Africa.”

FIGURE III



"With less packaging, Mexico City residents generate five times more garbage to get orange juice."

Source: William Rathje and Michael Reilly, *Household Garbage and the Role of Packaging* (Tucson, Arizona: University of Arizona, July 1985).

- In the United States, fresh oranges are transported in containers requiring nearly nine times more corrugated cardboard waste at the retail level than the 12-ounce frozen concentrate alternative.
- And it takes 6.5 times more truckloads of fresh oranges to produce equal quantities of orange juice — resulting in 6.5 times more energy consumption and 6.5 times greater production of pollution and greenhouse gases.

This does not mean that we should restrict the consumption of fresh foods. Fresh oranges offer some distinct benefits — including better taste and a reduced need for refrigeration (and hence reduced energy consumption). It does mean that we should reject the notion that “no packaging is the best packaging.”

MYTH NO. 4: Plastics Are Bad.

State legislators are increasingly disposed to pass laws which limit the choices of consumers over the products they buy and the packages that contain those products. Yet picking “winners” through the political process is fraught with peril. To most advocates of “green consumerism,” aluminum containers are best, glass containers are second best and plastic containers are the least preferred. Yet as Figure IV shows:³³

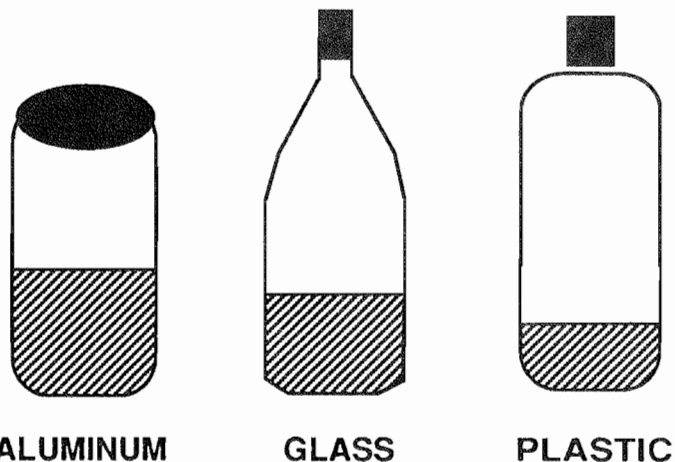
- In order to make containers holding an equal volume of liquid, glass requires one-third more energy than plastic and aluminum requires twice as much.
- So if the goal is to reduce energy consumption, plastic containers are best, glass is in second place and aluminum is a distant third (without recycling) — exactly the reverse of the normal ranking.

If all three containers are used once and thrown away, plastic containers conserve the most energy. If recycling is possible, the rankings change — depending on what can be recycled. For example:³⁴

- A recycled aluminum can requires less energy than either a glass or plastic container produced for one-time use.

FIGURE IV

Amount of Energy Needed to Produce a Container



Source: William Shireman, California Futures.

"Because of plastics, the amount of packaging we throw away has gone down."

"A plastic bottle requires less energy to produce than either non-recycled aluminum or glass containers."

- On the other hand, if the glass container can also be recycled, it requires less energy than a recycled aluminum can.
- If the plastic container can be refilled, in principle it can be reused dozens of times — it becomes again the most energy-conserving container.

Of course, energy use is not the only thing environmentalists care about. The “green” profile of the containers also depends on other factors affected by the container’s production — air pollution, water pollution, solid waste generation, toxicity, raw materials consumption, etc. Cradle-to-grave studies (which look at all of the environmental aspects of a product’s production and consumption, including energy use, air and water emissions, waste generation, etc.) can yield a far different conclusion about a product’s environmental costs and benefits than the examination of a single dimension such as biodegradability, recycling potential or solid waste volume.³⁵

Much product-banning legislation is directed at plastics, particularly polystyrene foam packaging (such as Styrofoam). Such legislation assumes that plastics contribute significantly to our waste problem, that they are nonrecyclable and therefore wasteful relative to available alternatives. In fact, all plastic materials combined comprise only 8 percent of municipal solid waste³⁶ and the introduction of plastic packaging appears to be a beneficial development. Even though we consume more products over time, the percent of packaging materials in our solid waste stream by weight has been declining (from 33.5 percent in 1970 to 30.3 percent in 1980)³⁷ and plastics may be the principal reason. Plastics are lighter in weight and more efficient than other packaging, and have increased as a portion of the waste stream, while metals and glass have declined.³⁸

To illustrate this point, a German research organization examined the effects of eliminating all plastic packaging in the Federal Republic of Germany. The results were stunning:³⁹

- If alternatives replaced plastic packaging whenever available, materials usage by weight in Germany would increase fourfold and packaging costs would more than double.
- Energy consumption would almost double from the current levels, and solid wastes would increase by 256 percent.

“Without plastics, our use of packaging materials would increase fourfold, our energy consumption would almost double and the amount of garbage would more than double.”

The report concludes that “all of the cost-intensive endeavors, over many years, to reduce the use of material through more suitable packaging and ‘slimming down’ individual packaging materials would be [reversed] with one stroke.”⁴⁰

Much criticism of plastics has focused on grocery bags and fast-food packaging. In both instances, the debates have over-simplified reality.

Case Study: Plastic Grocery Bags. Typically composed of polyethylene, plastic grocery bags actually stack up quite well against the leading paper bag alternative in terms of energy use, air and water emissions in the production process, and even in terms of solid waste impact.

- Using a 2:1 ratio of plastic to paper bags (since a typical consumer will use more plastic bags than paper ones for a given volume of groceries), Franklin Associates found that plastic sacks require 20 to 40 percent less energy to produce than their paper counterparts.⁴¹
- Plastic sacks produce 74 to 80 percent less solid waste by volume than the paper sacks, with the difference decreasing as recycling increases.⁴²
- The production of plastic sacks also results in less air and water pollution than paper sacks.⁴³

Case Study: Fast-Food Packaging Several cities, including Portland, Oregon, and Newark, New Jersey, have essentially banned polystyrene food packages — used until last year, for example, to hold McDonald’s hamburgers. Yet studies indicate that fast-food plastic packaging is not the “villain” some of its critics have claimed. Indeed, such packaging may actually conserve resources relative to the standard alternatives.

Franklin Associates performed a life-cycle study of a set of paper and plastic fast-food products, looking at energy use, air and water emissions and solid waste. Comparing the foam polystyrene “clamshell” hamburger container with a coated, bleached paperboard alternative, the study found that:⁴⁴

- Although the paperboard contributes 29 percent less solid waste by volume than polystyrene clamshells, the clamshells require 30 percent less energy to produce.

"Polystyrene requires less energy and leads to less air and water pollution than many paper alternatives."

- The production of the clamshell results in 46 percent less air pollution and 42 percent less water pollution.

Many of the same comparisons apply to the debate over polystyrene cups versus paper cups. For example, a study published in *Science* argued that:⁴⁵

- The average 10-gram paper cup consumes 33 grams of wood and uses 28 percent more petroleum in its manufacture than the entire input in a polystyrene cup.
- The paper cup requires 36 times as much chemical input as the polystyrene cup, partly because it weighs seven times as much.
- It takes about 12 times as much steam, 36 times as much electricity and twice as much cooling water to make the paper cup.
- About 580 times as much waste water, 10 to 100 times the residual effluents of pollutants and three times the air emission pollutants are produced in making the paper cup.

In addition to all that, paper cups cost the consumer about two-and-one-half times as much as polystyrene cups. And polystyrene is completely recyclable, which isn't always true of the paper used in cups.

MYTH NO. 5: Disposables Are Bad.

"Disposable products are not generally worse than other products."

To some environmentalists, anything "disposable" is bad and "recycling" or "reusing" is always good. In recent years, this idea has dominated public policy debates and produced numerous laws and regulations designed to discourage disposable products. Maine has banned aseptic juice boxes (except those containing Maine apple juice). Portland, Oregon, and Newark, New Jersey, have already effectively banned polystyrene food packaging, and if polystyrene is not being recycled at a 25 percent rate, a North Carolina ban will begin October 1, 1993. An Oregon proposal would make possession of disposable diapers a crime.⁴⁶

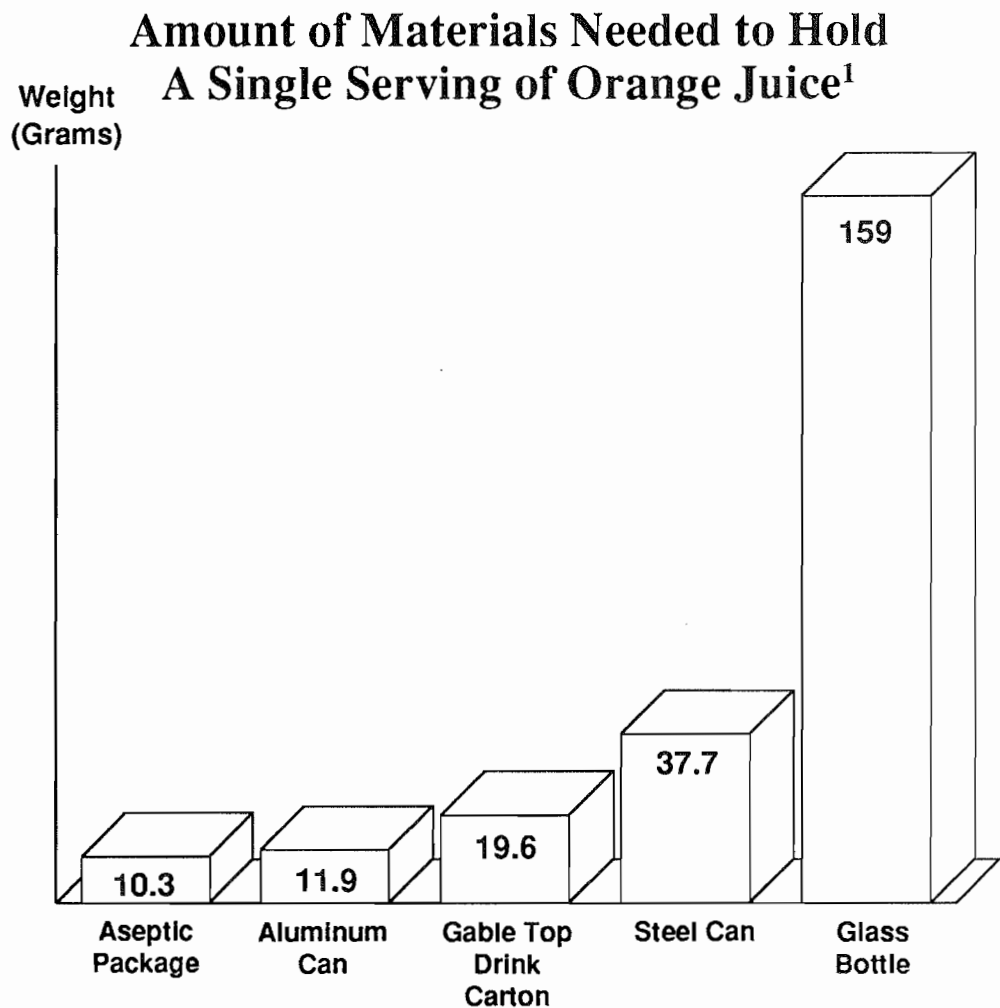
Greenpeace is now attacking facial tissues.⁴⁷ An article in a recent issue of *Garbage* magazine went so far as to suggest that "throw-away" feminine hygiene products are wasteful and listed a number of

reusable alternatives. The discussion implied that use of disposable tampons is frivolous, particularly since less wasteful substitutes exist.

But is it really true that disposables are always more environmentally harmful than other products? The evidence suggests otherwise.

Case Study: Aseptic Juice Boxes. One consequence of the bias against disposables is that aseptic packages — little juice boxes — are a frequent target of some environmentalists.⁴⁸ Yet the evidence shows that the aseptic package uses the least amount of packing material and is the most energy efficient single-serve package on the market.⁴⁹ [See Figure V.] For example, the traditional gable-top drink carton requires refrigeration, takes more room in transit, weighs 90 percent more and holds less juice. Aseptic packages also have other advantages over their alternatives:⁵⁰

FIGURE V



"Aseptic juice boxes use the least amount of packaging and are the most energy efficient containers on the market."

¹Grams of materials needed to contain an 8.45 ounce single serving.

Source: Harry Teasley, "Presentation on Aseptic Packages to the Maine Waste Management Agency," October 9, 1990.

- Filling aseptic boxes requires about half as much energy as filling glass bottles.
- For a given beverage volume, transporting empty glass bottles requires 15 times as many trucks as transporting empty aseptic boxes — thus using more fuel and causing more air pollution.
- Because the end product is lightweight, small and rectangular, filled aseptic packages can be transported more efficiently than full glass bottles — using 35 percent less energy.
- And since aseptic boxes are the only containers currently in use which can hold liquid dairy products without refrigeration, they do not contribute to CFC production (said to pose a threat to the ozone layer) by conventional refrigerants.

Case Study: Disposable Diapers: The argument for banning or taxing disposable diapers and promoting cloth diapers has been advanced on the grounds that disposable diapers are “wasteful” — they are used once and then discarded. However, some cradle-to-grave studies show that, when all environmental effects are considered, cloth diapers have no clear advantage over disposable diapers.⁵¹ Even though disposable diapers generate 90 times the amount of solid waste, there are alternatives to throwing them in landfills. They can be converted into compost or incinerated to produce energy. Moreover, disposable diapers have other advantages over cloth diapers.⁵² [See Figure VI.]

- Cloth diapers consume — over their cradle-to-grave lifespan — six times more water than disposables.
- Although the nonrenewable resource content of the two products is almost the same,⁵³ cloth diapers require more than three times as much energy as disposables in their full life-cycle.
- The production and use of disposables generates about a tenth of the amount of air and water pollution.

Moreover, in certain areas of the country, the case for disposables is stronger. In California and other western states, landfill space is relatively abundant (but for the normal political obstacles) and water is scarce. California residents who avoid disposables and wash cloth diapers with scarce water may be actually causing the greater environmental harm.

"Californians who avoid disposable diapers and wash cloth diapers with scarce water may be causing environmental harm."

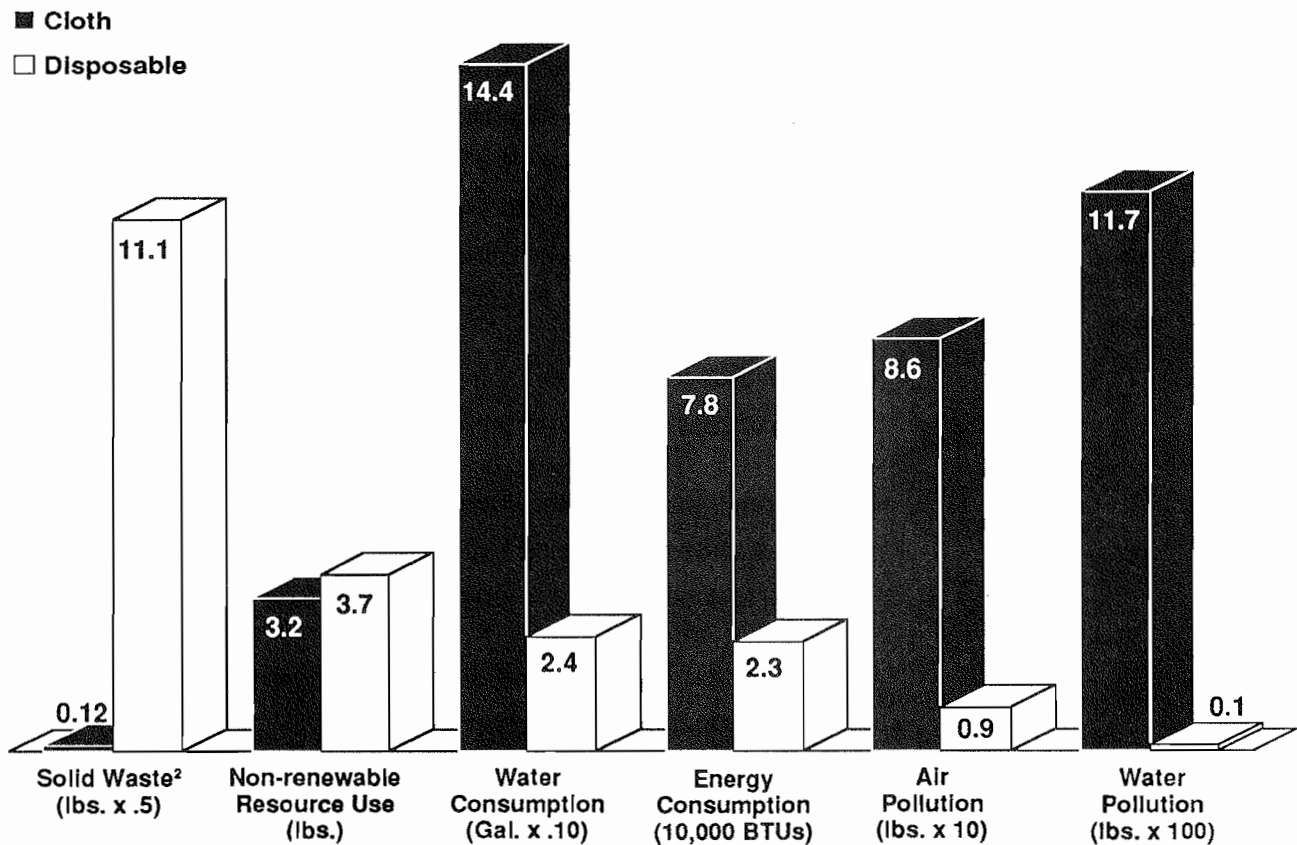
"Disposable diapers require less water and energy, and cause less air and water pollution."

Should Consumer Preferences Matter? Both disposable and cloth diapers serve as undergarments for babies. But a distinct bundle of other qualities differentiates the two. For example, at least three recent studies have found that disposable diapers perform better than cloth in guarding against diaper rash.⁵⁴ The American Academy of Pediatrics and the American Public Health Association maintain that to protect the public's health, cloth diapers should not be used in day-care centers. The reason is that disposable diapers leak less and result in less contamination of their surroundings.⁵⁵

Disposables may also offer convenience and improve the quality of life. A single parent living in an apartment without washing facilities and with no laundry nearby, for example, may strongly prefer disposables. Cloth diapers, on the other hand, are often less expensive and some parents may believe they are more comfortable for their children.

FIGURE VI

The Diaper Debate¹



¹Figures based on average weekly diapering requirements per child.

²Post-consumer waste.

Source: Arthur D. Little, "Disposable Versus Reusable Diapers: Health, Environmental and Economic Comparison," Cambridge, Massachusetts, March 16, 1990, Table I-I, p. 1-5.

Consumer preferences play a role in making trade-off decisions about resource use. Disposable feminine hygiene products or disposable diapers may result in more solid waste than reusable alternatives, but other values — convenience, sanitation, health and comfort — are also important to users of these products. Proposals to ban or regulate such products override the preferences of individuals and replace them with politically determined choices, and with little evidence that the political prescription produced real environmental benefits.

MYTH NO. 6: Recycling Is Always Good.

In principle, most waste products — iron and steel, aluminum, glass, oil, paper and even tires and plastic — can be recycled into some other product. And far more recycling takes place than most people are aware of — largely in response to marketplace incentives rather than government regulations. For example:

- Over half of all the aluminum cans in the United States are currently recycled.
- About 80 million tons of iron and steel are recycled each year — more than three times the amount by weight of all other materials recycled.
- Most glass containers currently produced contain at least 25 percent recycled glass.
- Despite popular perceptions, plastic can also be recycled and about 23 percent of all the plastic used in soft drink containers is recycled into other products.
- More than ten million tires are recycled each year, making possible the retreading of 20 million truck tires and 17 million passenger car tires and a 30 percent reduction in energy use relative to the amount of energy needed to produce a new tire.
- About 10 percent of post-consumer oil is recycled, of which 57 percent is reused for fuel, 26 percent is used to produce lubrication oil and 17 percent is placed on roads for dust control or is used as a wood preservative.
- Almost 30 percent of all post-consumer paper used in the United States is now recycled.

"More than 50 percent of aluminum cans and 23 percent of plastic soft drink containers are being recycled."

But are we doing enough? Would universal recycling be better for the environment? Many environmentalists apparently think so. And in response to this attitude, cities and states are turning to mandatory recycling programs:⁵⁶

- Currently, 33 states have enacted recycling or waste reduction quotas.
- Ohio will require 25 percent recycling by 1995 and Florida will require 30 percent recycling by 1994.
- California has decreed that its cities must achieve 25 percent recycling by 1995 and 50 percent by the year 2000.
- The EPA recommends 25 percent recycling by 1992 and 50 percent by 1997.

Recycling May Cause Environmental Harm. Studies show that recycling itself has environmental side effects. Curbside garbage recycling programs often require more collection trucks — one set for recyclables, the other for the remaining waste — which means more fuel consumption and more air pollution. Some recycling programs produce high volumes of water waste and use large amounts of energy. Recycling requires production facilities — which may be located hundreds of miles from cities where garbage is collected. Simply getting the product to the facility may require considerable use of fuel and other scarce resources.

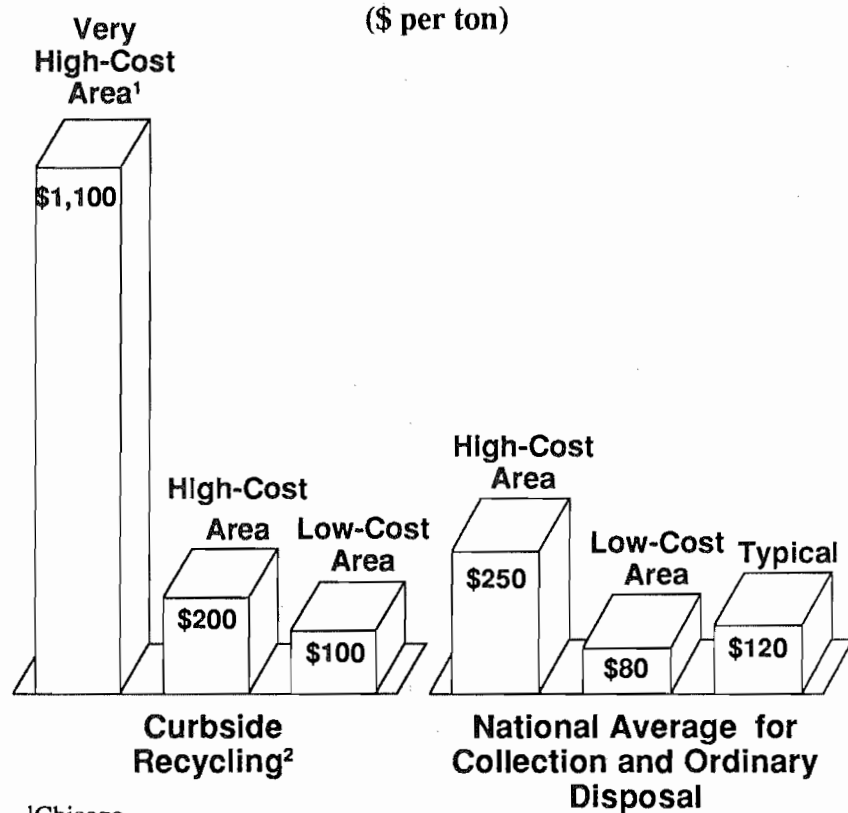
One indicator of the environmental cost of recycling is its economic cost. In general, the higher the economic cost of recycling, the more labor, energy, capital and other scarce resources that are being used. Thus, cities where recycling costs far exceed the full costs (including environmental protection costs) of ordinary disposal may be doing more environmental harm than good by recycling. For example:⁵⁷

- In Rhode Island, the net cost of recycling often exceeds \$180 per ton, compared to \$120 to \$160 a ton for ordinary waste collection and disposal.
- In Chicago, net recycling costs of a curbside program ranged from \$515 to \$990 a ton, compared to about \$110 per ton in revenues and just over \$40 per ton for tipping fees. [See Figure VII.]

"Recycling may cause more air and water pollution and more energy consumption."

FIGURE VII

Is Recycling Worth the Cost?



¹Chicago

²Net of resales and savings on landfill tipping fees.

Laws that Backfire. Cradle-to-grave studies show that sometimes recycling makes sense and sometimes it does not. One area where recycling seems to make both economic and environmental sense is in the disposal of aluminum cans. Since recycling requires only 5 percent of the energy needed to transform bauxite ore into aluminum, it pays for producers to use recycled cans and a market for these cans encourages entrepreneurs to collect them efficiently.⁵⁸ Energy savings are achieved, even taking into account transportation of the cans to the reprocessing facility. But in other areas, recycling doesn't make sense. And mandatory recycling and other government regulations are often worse than the disease they seek to cure. For example:

- Recycling newsprint requires de-inking — involving the use of toxics which create other disposal problems.
- Some states, including California, insist that used oil be treated as a hazardous waste — thus raising the cost and inhibiting the use of recycled oil. In the absence of such regulation, motor oil can be recycled efficiently and safely.

"Sometimes recycling pays; sometimes it doesn't."

- A number of communities (including Suffolk County, New York, and Twin Cities, Minnesota) have effectively banned some plastic products — thus encouraging the use of products that may have greater environmental impact.
- California's regulation of toxic substances (much more stringent than federal law) has significantly increased the cost of recycling scrap metal from automobiles.⁵⁹
- Mandatory recycling of some products may simply replace the existing recycling of other products (e.g., steel cans may replace auto scrap and newspapers may replace factory scrap) — causing costs to rise with no net increase in recycling.⁶⁰

MYTH NO. 7: Non-biodegradable Products Are Bad.

To some consumers, anything that degrades (nature's recycling) is "good," anything that does not is "bad." The facts say otherwise. Most modern landfills (about one-third of all landfills) are sealed, thus inhibiting biodegradation of anything. In the landfills that are not sealed, the items that don't degrade (such as plastic) do not break down and release chemicals into the soil. By contrast, products that do degrade can threaten the environment if they are disposed of improperly. Degradation can leach chemicals into our water supplies and endanger fish, wildlife and humans.

"Virtually nothing degrades in a modern landfill."

MYTH NO. 8: Recycling Paper Saves Trees.

Proponents of paper recycling argue that recycling a ton of newsprint saves 17 trees. Yet most of the trees used to make paper are not virgin forests, but trees planted explicitly for manufacturing paper. Thus, if we use less paper from virgin pulp, fewer trees will be planted and grown by commercial harvesters. An analogy is Christmas trees. Most Christmas trees are grown explicitly for the Yuletide and would not otherwise exist. The net effect of widespread paper recycling, according to Clark Wiseman, would actually be a decline in tree planting and tree coverage as lands were converted into other uses.⁶¹

"Recycling paper prevents trees from being planted."

Moreover, harvesting and planting trees may have other environmental benefits. A study by the Goddard Space Institute and Columbia University shows that trees consume large amounts of carbon dioxide. In fact, U.S. forests could be consuming as much carbon dioxide as the U.S. emits. But that is true only of growing forests. Mature forest ecosystems — made up of a combination of growing trees and dead material — give off as much carbon dioxide as they consume.⁶²

MYTH NO. 9: We Cannot Safely Dispose of Solid Waste.

Much of the public opposition to landfills stems from concerns that they represent a threat to health and safety. With respect to older landfills, some of these concerns are justified. According to the Office of Technology Assessment (OTA):⁶³

- About 70 percent of existing landfills are older landfills that lack pollution control features or are improperly sited.
- In fact, old municipal landfills make up 22 percent of the sites on the Superfund National Priorities List — a list of the most dangerous hazardous waste disposal sites.

The biggest risk is water pollution. If a landfill is in an area with a high water table, or if it is improperly lined, leachate can reach groundwater or surface water and create a health risk. Another risk is the emission of volatile gases into the atmosphere.

Most new landfills, however, must comply with state government regulations, which prohibit their siting in areas with permeable soils or shallow water tables or near wetlands and require leachate collection system liners and landfill cover. Provided the laws are complied with — and technological and operational tools now available are properly used — *all new landfills can be operated safely without threat to humans or the environment.*

Ironically, efforts to prevent the siting of new landfills may actually result in attempts to expand and prolong the use of older, less environmentally sound facilities, with the perverse result that environmental safety and health goals are undermined. Even so, the EPA

"The aggregate risk from all operating landfills is one cancer death every 23 years."

estimates that *the aggregate risk from all operating municipal solid waste landfills in the United States is at most one cancer death every 23 years.*⁶⁴

Incineration of solid waste creates safety concerns for two reasons: (1) the emission of pollutants from the incinerator and (2) the disposal of ash residues. As in the case of landfills, modern technology offers solutions to these problems.

Depending on the location, incinerators potentially release carbon monoxide, carbon dioxide, nitrogen oxides, and dioxins and furans — both of which are considered carcinogens — and some heavy metals. Yet modern waste-to-energy incineration plants use dry scrubbers, electrostatic precipitators and fabric filters that can remove 95 percent of gases from air emissions. Other control techniques significantly reduce heavy metals emissions. Even carcinogenic pollutants can be controlled:⁶⁵

- One study found that a Pittsfield, Massachusetts, plant lowered by 99 percent its total dioxin emissions.
- In fact, a World Health Organization report found that the natural “background” presence of dioxins and furans in the atmosphere was greater than the concentrations in the emissions from incinerators.

Even without further advances in technology, waste-to-energy incineration is unlikely to harm human health.

- For example, even if 100 percent of U.S. solid waste were incinerated, the air emissions would compose less than one-half of 1 percent of all combined emissions in the United States and carbon dioxide emissions would amount to only 2 percent of the CO₂ generated from the combustion of all other fossil fuels.⁶⁶
- Before the Environmental Hearing Board of Pennsylvania experts testified that “the risk of a child getting cancer from [eating] one peanut butter sandwich per month for 15 years is 500 times greater than the risk of cancer from emissions” of a waste-to-energy facility.⁶⁷

“With modern technology, disposing of garbage by burning poses little risk to health or safety.”

MYTH NO. 10: We Are Running Out of Resources.

Aside from concerns about limited landfill space, the argument for mandatory recycling is motivated by another assumption: that we are running out of scarce resources. Just as Thomas Malthus predicted in the 19th century that the growth of the human population would outstrip the world's food supply, so some modern environmentalists have for decades predicted that we will run out of food and all other natural resources. Malthus and the modern Malthusians are wrong for the same reason — they ignore the role of technology and markets.

"The price of almost every raw material is down (reflecting abundance), not up (reflecting scarcity)."

In almost every field of human endeavor, technology is making it possible to use resources without exhausting them. For example, despite 20 years of predictions that the world was running out of oil, international oil prices fell during the 1980s, and the U.S. domestic price of gasoline (in real terms) hit an all-time low.⁶⁸ One reason is technological innovation, which has allowed us to economize on the use of oil. For example, oil consumption over the past decade fell 9.3 percent in the United States and Canada and 15.8 percent in Western Europe and Japan — despite economic growth.⁶⁹ Similarly, despite the finite amount of copper in the world, copper prices are down, not up. One reason is the development of fiber optics cable, made of silica (sand), which can carry one thousand times more messages than copper wire. In telecommunications, wire requiring one ton of copper can now be replaced by a fiberglass cable requiring only 25 kilograms of silica, which can be produced with only 5 percent of the energy needed to produce the copper wire it replaces.⁷⁰

Case Study: Betting the Planet.⁷¹ Ecologist Paul R. Ehrlich says population growth is outstripping the earth's resources. Economist Julian L. Simon says that human ingenuity keeps the planet's resources from being depleted in the context of property rights and market prices. In 1980, they put their money where their mouths were and made a bet. Simon offered to let anyone pick any natural resource and any future date, and he bet that the price would decline by that date. If the resource really became scarcer as the world's population grew, he reasoned, then its price should rise over time.

Ehrlich and two associates picked quantities of five metals — chrome, copper, nickel, tin and tungsten — then worth a total of \$1,000, and chose a ten-year period. If combined prices of the metals were

higher in 1990 than in 1980, Simon agreed to pay the Ehrlich group the difference in cash; if the combined prices were lower, they would pay him the difference. Without ceremony last fall, Ehrlich sent Simon a sheet of calculations and a check for \$576.07.

- Over the ten-year period, each of the five metals had declined in price when adjusted for inflation.
- The drop was so sharp that Simon would have come out slightly ahead even without the adjustment for inflation.

Prices of food and most natural resources have been falling for decades because of entrepreneurship, changing consumption patterns and continuing technological improvements. Despite that fact, Ehrlich, who had predicted that “before 1985 mankind will enter a genuine age of scarcity” including food shortages, now says it will happen sometime in the next century.

Misleading Consumers Through “Green” Labeling

“Green” labeling is the fad of the moment. Anxious to appeal to the environmental concerns of consumers, many producers label their products “ozone friendly,” “biodegradable,” “photodegradable,” “reusable,” “recyclable” and “recycled content.” The use of these terms is often misleading. But, as we shall see, even accurate labels can mislead. Governments have also gotten into the labeling business, in this country and abroad.

- Under Germany’s “Blue Angel” program, started in 1978, the government has awarded “environmental soundness” labels to about 3,300 products in 58 categories.
- Canada’s green labeling program recently awarded an environmental emblem to cloth diapers.
- In the United States, both New York and Rhode Island have introduced “Recycling Emblems.”
- And the Bush Administration is attempting to standardize a methodology which could serve as a precursor to a federal labeling program.

"In Germany, green labels are awarded to 3,300 products."

Surveys show that green labeling programs have considerable appeal for consumers:

- A 1990 survey by *Advertising Age* and the Gallup Organization found that 34 percent of respondents “indicated that a product certification program like Green Seal would have a ‘great impact’ on their purchasing decisions, and 40 percent said it would have ‘some impact.’”⁷²
- A *Good Housekeeping* survey reported that some two-thirds of respondents claimed a product certification program would be “very useful,” and another 27 percent thought such a program would be “somewhat useful.”⁷³

One problem with green labels is that they can mislead consumers about product quality. For example, in Germany products with a Blue Angel emblem are supposed to meet consumer needs as well as products without labels. But with 3,300 labeled products, how can government labelers be sure? They cannot. One study found, for example, that acrylic paints with the Blue Angel emblem perform less satisfactorily than traditional paints.⁷⁴

A second problem is that labels like “recyclable” do not tell consumers what they really need to know. As we saw in the comparison between aluminum, glass and plastic containers, whether a product actually *is recycled* makes all the difference.

A third problem is the focus of the labelers. New York and Rhode Island focus on only one narrow environmental concern — recycling potential. Yet as we have seen, choices based on only one environmental concern can harm the environment as a whole. Even when labelers claim to have considered the full life-cycle effects of a product, they usually lack the time or resources for the necessary studies. As a result, they often fall back on the “dumpster green” mentality — focusing mainly on the question of whether a product is destined for a landfill.

Case Study: Green Labeling by HBO. A 1990 television special produced by Home Box Office (a cable channel) was designed to teach children to be good “environmentalists.” Among its messages:

- Reusables are always preferable to disposables.
- Recycling is always better than throwing things away.
- No packaging is always better than packaging.

“Consumers who base choices on green labels may cause more harm than good.”

Although the program encouraged children's concern for the environment, there was no hint that following these simple-minded rules could actually increase air and water pollution, increase the nation's consumption of energy and other scarce resources, increase the output of toxic waste and generally cause a waste of resources.

Case Study: Green Labeling by the EPA. The federal government's most recent entry into green labeling was an EPA publication, *The Environmental Consumers' Handbook*, which was withdrawn from the market after justified complaints. Even the EPA's own staff complained that "the booklet contains oversimplifications, lack of life-cycle analysis and inaccuracies."⁷⁵ Among other messages, the handbook encouraged consumers to believe that:

- Cloth diapers are preferable to disposable diapers.
- Reusable products are preferable to disposable products.
- Homemade household cleansers (the EPA gave directions on how to make them) are preferable to commercial cleansers.

For an agency that some regard as overly cautious on health issues, the EPA showed remarkably little interest in the health and safety consequences of its own recommendations. Where is the evidence that replacing disposable products with reusables would not increase the cases of food poisoning?, asked the paper companies. Where is the evidence that homemade cleansers are safer or better for the environment than commercial cleansers?, asked the cleanser producers. One might also ask: Where is the evidence that the production of cloth diapers produces fewer pollutants than the production of disposables?

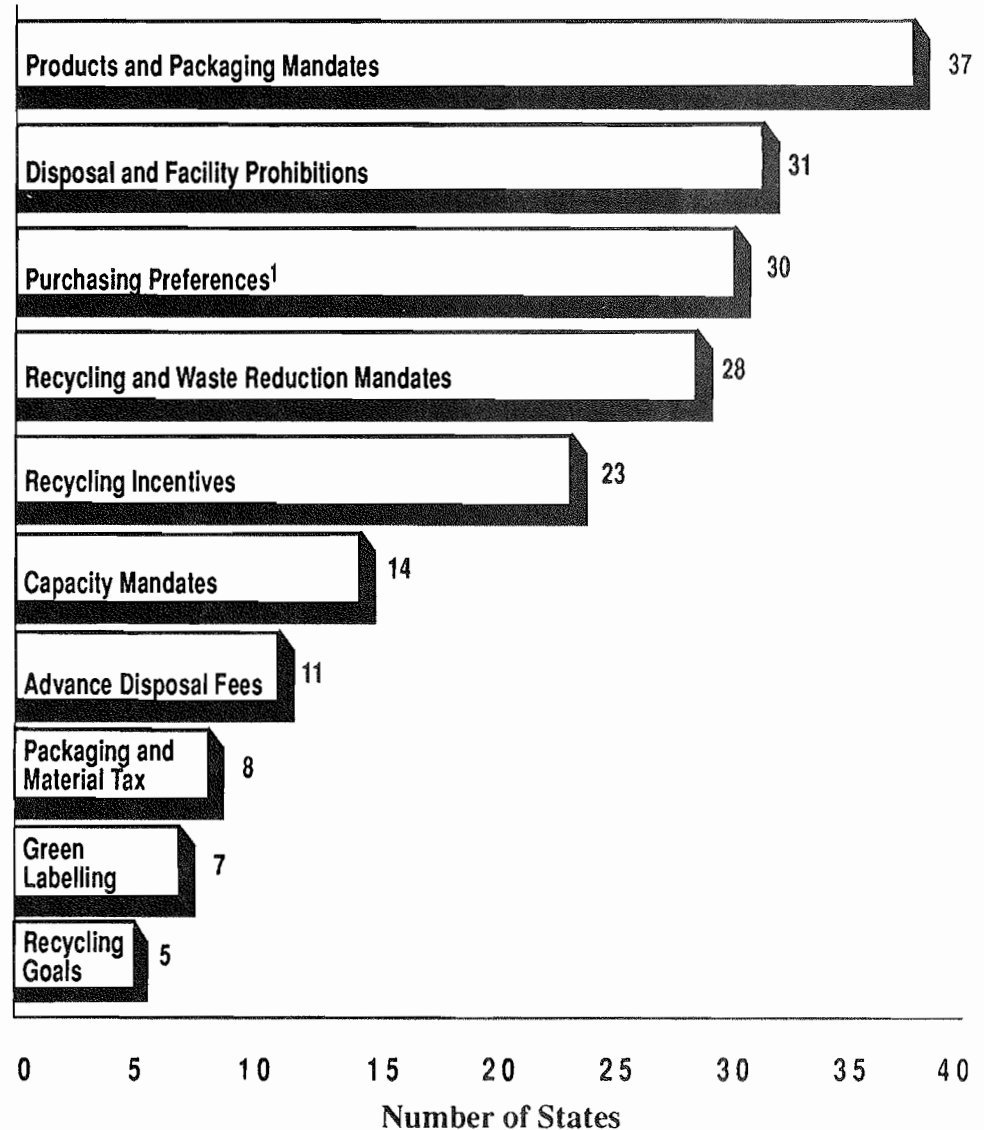
From Exhortation to Command and Control

When people fail to respond to appeals to change their behavior, advice-givers invariably turn to regulation. [See Figure VIII.] Unfortunately, efforts to ban products and force recycling usually have four adverse consequences: (1) decisions are based on momentary fads, rather than on real costs and benefits; (2) actual legislation tends to be shaped by special interests; (3) regulations have unintended consequences, which may be worse than the original problem; and (4) regulations fail to achieve their objectives, leading to pressure for even more regulation.

"The EPA now admits its consumer advice was simplistic and inaccurate."

FIGURE VIII

State Legislation Relating To Solid Waste



"When people fail to change their behavior, the advice-givers invariably turn to regulation."

¹Purchasing preferences are government procurement preferences for recycled contents in products.

Source: American Legislative Exchange Council, "State Solid Waste Policy," *Legislative Update*, January 1991. Reprinted in Kenneth Chilton, *Who Should Take Out the Trash?* (Washington University, St. Louis: Center for the Study of American Business, June 1991), Table A-1, pp. 34-35.

Legislative Fads. Because legislators do not personally bear the costs of their decisions, all too often they react to the fad of the moment rather than legislate on the basis of real economic and environmental costs and benefits. That may explain why so much environmental legislation focuses on the trivial and ignores the important.

As Table I shows, the targets of the most popular legislative actions comprise only a tiny fraction of most landfills.

TABLE I

Frequent Targets of Environmental Legislation

"The most spirited debates are often over trivial issues."

| <u>Product</u> | <u>Percent of Municipal Waste¹</u> |
|---|---|
| Polystyrene Food Containers | 2/1000 of 1% |
| Aseptic Juice Boxes | 2/100 of 1% |
| All Non-durable Plastic Plates and Cups | 2/10 of 1% |
| Disposable Diapers | 1.5% |
| All Plastic Containers and Packaging | 3% |
| Newspapers | 7% |

¹By weight.

Source: Source: Franklin Associates and miscellaneous industry-supplied information.

Special Interests. Because almost every regulation ban is good for some companies and bad for others, legislative proposals relating to solid waste automatically create special interest lobbies and lead to some unholy alliances between people who claim to be environmentalists and the producers of particular products. For example:⁷⁶

- Diaper services have lobbied heavily for bans on disposable diapers.
- Paper interests sometimes support the war on plastics, including a Maine law requiring retailers to use paper bags unless a customer requests plastic.
- Recycling companies lobby for laws that would mandate that products contain a minimum percent of recycled content and would forbid the term "re-cycled" to describe products made with factory scrap.
- De-inking plants have a vested interest in mandating the recycling of newsprint.

"Bad consumer advice is often promoted by special interests."

Unintended Consequences. As we saw in the case of recycling, most laws have unintended consequences — and the results may be worse than the original problem the law sought to correct. This is

especially true where government tries to micromanage the solid waste process. For example, beginning in 1994 a District of Columbia law will dictate how much recycled material must be in each type of paper product: 50 percent for high-grade printing and writing paper; 40 percent for newsprint; 5 percent for facial tissues; 20 percent for toilet paper; 30 percent for paper napkins; 40 percent for paper towels; and 40 percent for doilies. Apparently, the law has already stifled the expansion of recycling plants that cannot meet the high standards the law dictates.⁷⁷

Government attempts to micromanage solid waste disposal can reduce recycling in other ways. For example, mandated curbside, household separation recycling programs might prevent more cost-effective recycling that could have taken place through co-collection of recyclables and other waste, or through centralized sorting of waste and other innovations. Pittsburgh, for example, has introduced a "Blue Bag" program in which all recyclables are collected in a single bag and compacted in traditional garbage trucks. This has resulted in much lower recycling costs than the more common programs that have separate collection bins for different materials.

Regulating the Entire Economy. The most grandiose plans to regulate the solid waste stream would charge manufacturers "advance disposal fees" (ADFs) for each product, based on the disposal or recycling costs of each product:⁷⁸

"In theory, the government could charge manufacturers ADFs that would take into account such factors as: the actual collection and disposal costs of each product type or material; the actual collection and disposal costs in each different jurisdiction where a product is thrown away; current recycling rates; the actual length of product use per household; the actual consumption and disposal path of each product by household; recycling and other behavior in response to new charges, which would change the cost picture over time. One ADF scheme envisions using bar-coded information on each product to create a national database that would be used to regulate charges."

"A system of ADFs would require central planning on a scale not seen since World War II. Although no bill to establish the system has been proposed at the federal level, more limited ADFs have been enacted by the states." For example:

"Some misguided environmentalists would have government regulate the entire economy."

*"Lesson from other countries:
central planning doesn't
work."*

- In 1992, Florida will begin imposing fees on packaging materials that are not recycled at a 50 percent rate.
- Rhode Island has introduced ADFs for items such as tires and motor oil.
- In New Jersey, the governor's Solid Waste Task Force has recommended that manufacturers be taxed when they use virgin (as opposed to recycled) materials.
- And in California, one proposal would establish an elaborate system to subsidize recycling by taxing each product based on its recycling cost.

Using The Market to Solve Problems

The lesson coming from the Soviet Union and Eastern Europe is that central planners cannot manage complex economies. Bureaucrats and computers are no substitute for market prices in economizing on information and giving people incentives to change behavior. So far, that lesson has been largely ignored in the market for solid waste. Where the market has been allowed to work, the response has been considerable.

How Producers Respond to Market Incentives

One area where prices have been allowed to influence solid waste is in the market for raw materials for consumer products. In competitive market economies, producers are under constant pressure to produce more with less. For example:⁷⁹

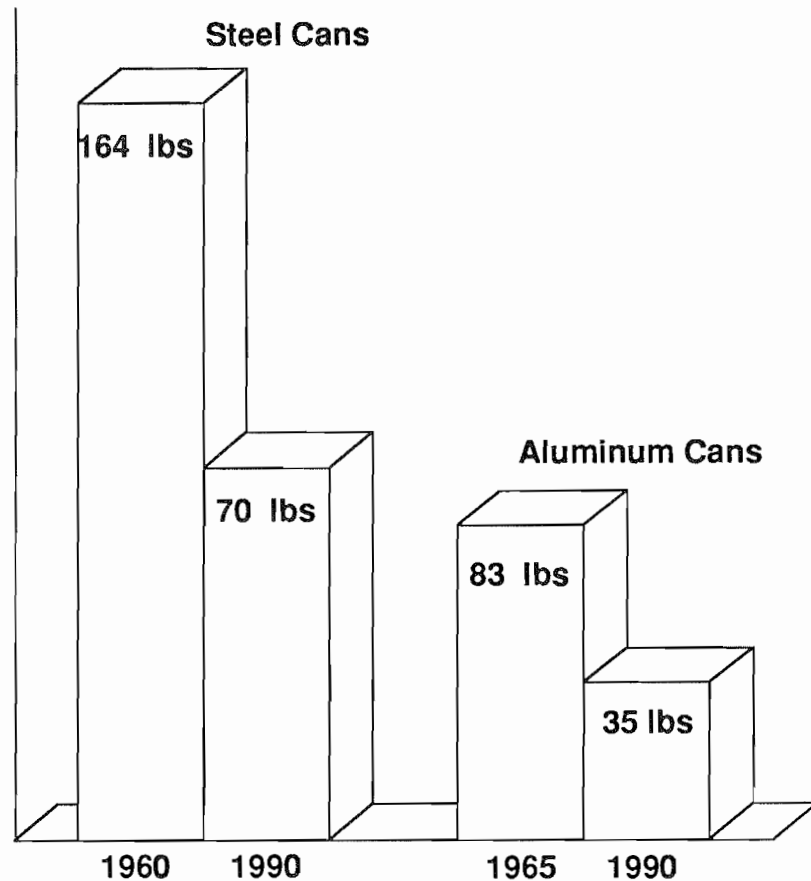
- A plastic milk jug weighed 95 grams in the early 1970s; the same jug today weighs 60 grams.
- Plastic grocery bags were 2.3 mils thick in 1976; by 1989 they were only .7 mils thick.

Similar trends hold for beverage containers. Between 1960 and 1986, beverage consumption increased significantly in the United States. Yet over the same period, beverage containers as a portion of the waste stream (by weight) fell from 6.1 percent to 4.6 percent.⁸⁰ For example:

FIGURE IX

Source Reduction Without Mandates

Pounds per
1,000 cans



"Over the past 30 years, the weight of steel soda cans fell by 65 percent and aluminum cans by 36 percent."

Source: Presentation by Harry Teasley at a Foundation for Research on Economics and the Environment Conference, Seattle, WA, 1990.

- Between 1960 and 1990, the weight of steel 12-ounce soda cans has fallen by 65 percent and aluminum cans by 36 percent.⁸¹ [See Figure IX.]
- Between 1960 and 1975, the weight of a glass bottle fell by 20 percent; and since the 1970s, the weight of a two-liter PET container fell by more than 25 percent.⁸²

Case Study: Energy Use. Mikhail Bernstam has shown that these are not isolated cases, but an inherent feature of market economics. Socialist economies, by contrast, necessarily use more resources and emit more pollutants than market economies to produce a given amount of goods and services, because they are so inefficient. Take energy, for example:⁸³

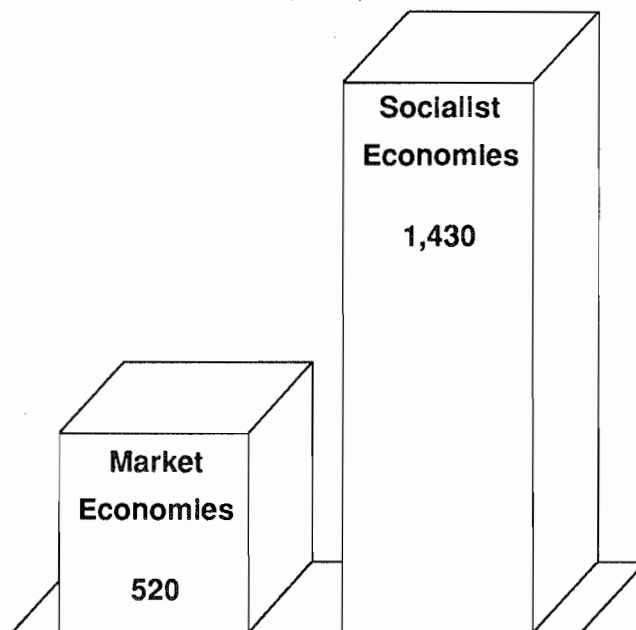
- The per capita use of energy in socialist economies is at least as high as, if not higher than, in market economies, even though their per capita GNP (the amount of goods and services produced) is only 40 percent as high.
- Per dollar of GNP, socialist economies use almost three times as much energy as market economies. [See Figure X.]

This comparison holds not only for socialist and capitalist economies in general, but also for countries that are very similar except for their political systems. For example:⁸⁴

- North Korea consumes 70 percent more energy per person and three times as much energy per dollar of GNP as South Korea.

FIGURE X

Energy Use Per \$1,000 of GNP¹ (1986)



"Per dollar of GNP, socialist economies use almost three times as much energy as market economies."

¹Kilograms of coal equivalent.

Note: Energy consumption is measured in kilograms of coal equivalent. Market economies are: the United States, Canada, Japan, the United Kingdom, West Germany, France, Belgium, Switzerland, Austria, Denmark, Sweden and South Korea. Socialist economies are: the USSR, Czechoslovakia, former East Germany, Hungary, Poland, Romania and North Korea.

Source: Mikhail S. Bernstam, *The Wealth of Nations and the Environment* (London, Institute of Economic Affairs, 1991), Table 5, p. 24.

- What was formerly East Germany consumes 40 percent more energy per person and 3.5 times as much energy per dollar of GNP as West Germany.

In market economies, a steady decline in the resources needed to produce a given level of goods and services has led to a decline in resource use per person (even though the economy has grown) and finally to a decline in total resource use (even though the population has grown.) For example:⁸⁵

- In the United States, the amount of energy needed to produce a dollar of GNP (in real terms) has been declining steadily at a rate of 1 percent per year since 1929.
- By 1989, the amount of energy needed to produce a dollar of GNP was almost half of what it was 60 years earlier.
- Moreover, since the 1970s there has been a steady decline in the amount of energy used per person.

The *total* amount of coal and electricity used in the United States continues to rise. But the use of many other resources in the production process has been declining for some time — even though the economy has been expanding at a brisk rate. The lower absolute use of resources is apparent for oil and gas, iron ore, iron-originated materials and outputs, and the stock of farm animals.⁸⁶

Quite the opposite has occurred in socialist countries, where per capita energy consumption has continued to rise. While the use of steel and many other production inputs has declined in absolute terms in the West, in socialist economies resource use has been constrained only by economic collapse.⁸⁷

How Consumers Respond to Market Incentives

As we have already noted, more than two-thirds of U.S. households face no economic cost for disposing of greater volumes of solid waste. If they paid the full cost of disposing of their garbage, people would have an incentive to alter their buying habits, recycle, compost and buy items in less bulky packaging. For example, an EPA study found that a 10 percent increase in the cost of garbage disposal resulted in a 1 to 2 percent reduction in household waste.⁸⁸ While the 10 percent increase leads to only small reductions in waste, current

"The amount of energy needed to produce a dollar of GNP has been declining at the rate of 1 percent per year since 1929."

underpricing of garbage service by at least 20 to 30 percent, coupled with escalating landfill costs, suggest that full-cost pricing to consumers would lead to more substantial decreases in waste generation.

The idea of charging households based on the amount and type of waste they dispose of is not new. Earlier in this century, when waste-handling was usually done by private scrap dealers and haulers, companies typically charged households different fees, based on categories of hard-to-handle materials. Today, a number of cities are rediscovering the virtues of the price system.

Case Study: Seattle. Since 1981, Seattle has charged residents based on the volume of garbage they generate. One consequence is that more than 85 percent of Seattle's residents participate in a recycling program and the city recycles between 18 percent and 35 percent of its municipal solid waste. As one study reported:⁸⁹

- In response to economic incentives, Seattle residents have reduced the average number of garbage cans from 3.5 down to just over 1 can per week, with households recycling, composting and compacting and actually generating less waste through revised purchasing habits.⁹⁰
- More than 24 percent of the city's garbage was being recycled before the introduction of any city-sponsored recycling program.

Case Study: Freeport, Illinois. Residents of Freeport pay \$5.75 a month for a weekly pickup of one 30-gallon bag of garbage and the average household pays 60 cents more for the pickup of another bag of trash. Recyclables are picked up for free under the system offered by one private hauler. Under the pricing scheme, customers have a financial incentive to reduce, reuse and recycle. They also have a choice. As a result of voluntary choices in response to market incentives, Freeport is recycling almost one-fourth of its trash.⁹¹ It is important to note the difference between a political imposition of a high fee for garbage collection, which is used to subsidize recycling, and market pricing of waste collection in which haulers require unit-based fees determined by actual collection and disposal costs.

"In Seattle, where people are billed for the amount of garbage they generate, over 22% of solid waste has been diverted from the landfill."

"Charles City County, Virginia accepted a landfill in return for \$1.1 million a year."

How Landowners and Cities Respond to Market Incentives

A key challenge is to overcome the NIMBY syndrome and find places that will accept landfills. Entrepreneurs have discovered that one approach that works is to pay a benefit fee to any community agreeing to host a facility. The fee is compensation for perceived or actual negative impacts of that facility. In return for host fees, NIMBY is converted into YIMBY — FAP: Yes, In My Back Yard, For A Price.

Case Study: Charles County, Virginia. In exchange for a host benefit fee of at least \$1.1 million per year, Charles City County, Virginia, accepted a regional landfill. Thanks to the landfill, the county cut property taxes by 20 percent, even though spending on schools went up. As a local administrator remarked, "We're good capitalists; we realized there was money in garbage."

Privatization and Innovation

In many places in the United States, garbage disposal is a function of city governments. Traditionally, a city-owned and city-operated sanitation service picked up the garbage and delivered it to a city-owned solid waste facility. Even today, with the rapid spread of privatization, private contractors often have little flexibility under contracts written by city governments. As a result solid waste disposal is (1) more costly than it needs to be, (2) less safe than it could be (3) and less amenable to innovation.

Lowering Costs. Several studies of privatization of collection, disposal and recycling services have shown that competitive contracting can achieve significant savings — as high as 30 percent. In large part, these savings have been achieved through innovation and increases in productivity as private service providers reduce costs to remain competitive.

Increasing Safety. In addition, private landfill operators have better environmental records than do public operators:

- Experience shows that private operators have been far more willing than their public counterparts to install liners, leachate collection systems and groundwater monitoring equipment.⁹²
- Studies dating from the mid-1980s show that privately owned landfills more frequently have been designed with leachate collection systems than have publicly owned facilities.⁹³

"Private operators have a better environmental record than public operators do."

- Privately owned landfills also are more likely to conduct groundwater monitoring (30 percent versus about 15 percent for county- and city-owned), and surface water monitoring (31 percent versus 24 percent for county and 13 percent for city).⁹⁴

Encouraging Innovation. Typically, public sector programs also are less responsive to opportunities to innovate and change. And, city-mandated recycling programs may prevent the development of more effective private sector programs. One reason may be that public officials rarely know the real costs of the services they provide.⁹⁵ For example, in a 1971 study of refuse collection in New York City, E.S. Savas found “that the full cost [of service] was 48 percent greater than the cost indicated in the city’s budget.”⁹⁶

Case Study: Recycling. Cities and states that mandate specific kinds of curbside recycling may be inhibiting development of more cost-effective recycling technology, for example recycling through centralized, automated separation or recycling using co-collection, or “Blue Bag” systems, where recyclables are all collected in one bag.⁹⁷ Typically, household separation is very incomplete, with individual recyclers excluding large portions of waste that are in principle recyclable. For example:⁹⁸

- A curbside program for a small town of around 23,000 people may collect 15 to 20 tons of recyclables in a year.
- Centralized separation by a waste hauler may extract from the solid waste stream twice that amount from the same small city in only a week.

City-run solid waste programs may interfere in other ways with state-of-the-art, integrated solid waste management by specifying one technology through political fiat rather than allowing marketplace technology evolution.

Case Study: Composting As people in agriculture have known for centuries, composting is nature’s way of recycling. The process takes organic materials and turns them into a product that can be used in agriculture and plant nurseries, on parks and golf courses, by landscapers and gardeners, even on Christmas tree farms. Can composting also help solve the solid waste disposal problem? Some think so. Since about 60 percent of solid waste is organic (yard waste, paper and food waste), as much as 60 percent of America’s solid waste could in theory be composted *if the economics are right.*

“Mandating curbside recycling may inhibit more cost-effective recycling through centralized separation or other innovative programs.”

"Environmentalists who follow simple-minded rules may do more harm than good."

Using composting to dispose of solid waste is not a new idea. In Europe, it has been done for almost two decades. But in recent years, some U.S. facilities have developed cutting-edge technology that is drawing the attention of the rest of the world. For example, a steady stream of foreign visitors makes its way each year to the Delaware Reclamation Plant in Pigeon Point, Delaware. The plant's integrated solid waste system composts, recycles, incinerates and landfills trash — all at the same site.⁹⁹

If composting is allowed to compete in the marketplace with other disposal alternatives, it may prove profitable in some circumstances.

Conclusion: Avoiding Future Myths

Millions of schoolchildren and unwary adults have been told that there are simple rules by which they can judge the environmental correctness of products. In fact, there are no simple, reliable rules. Since every simple rule is based on only one environmental concern, following the rules may cause more harm than good overall.

The most comprehensive studies of consumer products are life-cycle, or cradle-to-grave, studies. These studies attempt to look at all of the environmental aspects of a product's production, use and disposal. Because they are expensive, only a handful of products have been analyzed. Once completed, most life-cycle studies are still incomplete. For example, the typical method counts the total volume of air or water pollutants without consideration for whether some pollutants are worse than others.

"In selecting environmentally 'good' products, there are no simple, reliable rules."

Fortunately, environmentally conscious consumers have a much more reliable guide — market prices. For most products, market prices already reflect the cost of valuable resources used in their production, as well as the cost of controlling air and water pollution and making efficient use of energy. Market prices allow us to compare the cost of resources used to produce a product with other values we hold.

The biggest problems in the solid waste stream occur in areas where there are no market prices, either as a result of government actions or where costs of environmental impacts have not been included in solid waste collection and disposal pricing.

Extending the power of the marketplace to solid waste disposal would go a long way toward solving environmental problems. If households were charged market prices for garbage collection and disposal, they would have strong incentives to curtail the total amount of waste and the kinds of waste they generate. If a market for solid waste management were allowed to function, specialists would have strong incentives to innovate and discover the least costly ways of disposing of trash — recycling, composting, incinerating, landfilling or other techniques, as yet undiscovered.

NOTE: Nothing written here should be construed as necessarily reflecting the views of the National Center for Policy Analysis or as an attempt to aid or hinder the passage of any bill before Congress.

Footnotes

- ¹ The prohibition is to commence one year after the FDA approves degradable plastic packaging and upon commercial availability.
- ² Franklin Associates, *Characterization of Municipal Solid Waste in the United States, 1960 to 2000—Update 1988*. Report prepared for the U.S. Environmental Protection Agency (Prairie Village, KS.: March 1988).
- ³ Paul Relis and Anthony Dominski, "Beyond the Crisis: Integrated Waste Management" (Santa Barbara, CA: Community Environmental Council, January 1990), p. 4.
- ⁴ See, for example, A. Clark Wiseman, "U.S. Wastepaper Recycling Policies: Issues and Effects" (Washington, DC: Resources for the Future, August 1990), p. 2. There are parts of the country— particularly parts of the congested Northeast and places such as Florida, with a high water table, in which landfill sites are not abundant, however.
- ⁵ The fact that land appears suitable for use as a landfill from an airplane does not guarantee that it *is* suitable, however.
- ⁶ William Rathje, "Rubbish!," *Atlantic Monthly*, December 1989, p. 101.
- ⁷ Another 14 percent went to incinerators and was burned, while the remaining 13 percent was recycled by the end of 1988.
- ⁸ See Donald A. Norman and Jody M. Perkins, "Nonhazardous Solid Waste Landfill Policy." Unpublished draft working paper, December 1990, prepared for the American Petroleum Institute.
- ⁹ Franklin Associates, *Characterization of Municipal Solid Waste in the United States: 1960-2000* (Washington, DC: U.S. Environmental Protection Agency, 1986).
- ¹⁰ William Rathje, "Rubbish!," *Atlantic Monthly*, December 1989.
- ¹¹ See *City & State*, June 18, 1990, p. GM4.
- ¹² Neil Hamilton and Robert Wasserstrom, "Solid Waste Disposal in the United States: Rate Regulation Is Not the Answer" (Washington, DC: National Solid Waste Management Association, 1989), p. 2.
- ¹³ *Ibid.*, p. 5.
- ¹⁴ *Ibid.*
- ¹⁵ Neil Hamilton and Robert Wasserstrom, "Solid Waste Disposal in the United States: Rate Regulation is Not the Answer," (Washington, DC: National Solid Waste Management Association, 1989)
- ¹⁶ National Solid Waste Management Association and other sources.
- ¹⁷ "Survey of Solid Waste Charges," City of Worcester, MA, February 1990.
- ¹⁸ Louis Blumber and Robert Gottlieb, *War on Waste: Can America Win Its Battle with Garbage?* (Washington, DC: Island Press, 1989), preface by Jim Hightower, p. xv.
- ¹⁹ Jerry Taylor, "Municipal Solid Waste Management: An Integrated Approach," in *A Natural Resources Policy Agenda for the '90s* (Washington, DC: American Legislative Exchange Council, 1991), p. 128.
- ²⁰ Office of Technology Assessment, *Facing America's Trash: What's Next for Municipal Solid Waste?* (Washington, DC: U.S. Government Printing Office, October 1989), p. 102.
- ²¹ Harvey Alter, "The Future of Solid Waste Management in the United States," U.S. Chamber of Commerce, January 1990.
- ²² *Ibid.*
- ²³ William Rathje, "Rubbish!," p. 100.
- ²⁴ Council of Northeast Governors, "Source Reduction Council of CONEG: First Annual Report" (Washington, DC: Policy Research Center, September 10, 1990), p. iii.
- ²⁵ William Rathje and Michael Reilly, *Household Garbage and the Role of Packaging* (Tucson, AZ: University of Arizona, July 1985).
- ²⁶ Even taking into account different household sizes, the inverse relationship between food packaging and food waste still is relevant.
- ²⁷ William Rathje and Michael Reilly, *Household Garbage and the Role of Packaging*.
- ²⁸ These figures are crude since they do not take into account the mix of foods discarded, which "may not provide a nutritionally balanced diet. Nevertheless, such extrapolations," suggests Rathje, "do put food waste into more understandable terms." Rathje and Reilly, *Household Garbage and the Role of Packaging*, p. 45.
- ²⁹ The rate of food waste found in packages is below 5 percent in most cases, averaging 1.7 percent in Mexico refuse and 2.4 percent in U.S. refuse. *Ibid.*, p. 39.

³⁰ Alter, "The Origins of Municipal Solid Waste."

³¹ Rathje and Reilly, *Household Garbage and the Role of Packaging*.

³² Ibid.

³³ Source: William Shireman, California Futures.

³⁴ Ibid.

³⁵ Life-cycle (or cradle-to-grave) analysis develops quantitative measures for energy consumption and environmental effects throughout a product's life cycle, "beginning at the point of raw materials extraction from the earth and proceeding through processing, manufacturing, use, and final disposal, recycle, and reuse." See Franklin Associates, *Resource and Environmental Profile Analysis of Foam Polystyrene and Bleached Paperboard Containers* (Prairie Village, KS, June 1990), p. 1-2. See Chapter 2 for a detailed methodology description as applied to one set of products. For a critical look at life-cycle analysis, see Jere Sellers, et al., "The Life Cycle Analysis Methodology," presented at a Franklin Associates conference, "Life—Cycle Analysis: A Tool for the '90s," Kansas City, MO, April 10, 1991.

³⁶ Franklin Associates, *Characterization of Municipal Solid Waste in the United States*.

³⁷ Ibid.

³⁸ Gesellschaft fur Verpackungsmarktforschung (GVM), "Packing Without Plastic" (Weisbaden, Germany, December 1987), p. 5.

³⁹ Ibid.

⁴⁰ Ibid., p. 4.

⁴¹ As recycling of both sacks increases, the difference in energy use decreases because "the recycling energy savings occur at a greater rate for paper than for polyethylene," (pp. 1-4). Using the 2:1 ratio, at 60 percent recycling, both bags have equivalent energy requirements. See Franklin Associates, *Resource and Environmental Profile Analysis of Polyethylene and Unbleached Paper Grocery Sacks*, pp. 1-4.

⁴² Nonetheless, "polyethylene sacks continue to contribute less solid waste than paper sacks at all recycling rates." Ibid., p. 1-7.

⁴³ Regarding water emissions, at higher recycling rates for both grocery sacks, Franklin Associates reports that "the difference in waterborne waste becomes greater because recycled paper contributes more waterborne wastes than paper made from virgin material." Ibid. pp. 1-8.

⁴⁴ See Franklin Associates, *Resource and Environmental Profile Analysis of Foam Polystyrene and Bleached Paperboard Containers*. In the much-publicized move by McDonald's away from polystyrene, the company did not opt for the more energy-intensive coated paperboard most frequently described in the media. Rather, McDonald's switched from polystyrene foam to paper wrappings for its hamburgers. This wrapping, unlike coated paperboard, actually has fewer air and water emissions, requires less energy, and generates less solid waste than polystyrene foam. See McDonald's Corporation and the Environmental Defense Fund, Waste Reduction Task Force, *Final Report*, April 1991. The waste volume figures may be problematic, however, since Franklin Associates uses averages for large groups of containers rather than just actual clamshell information.

⁴⁵ Martin B. Hocking, "Paper Versus Polystyrene: A Complex Choice," *Science*, Vol. 251, February 1, 1991, pp. 504-505. Dialogue in the subsequent issues of *Science* magazine between Hocking and industry and other critics suggested that Hocking may have been using old or incomplete data to reach his conclusions. Nonetheless, Hocking's general point remains valid: Some plastics products do require less energy and produce fewer air and water emissions than their alternatives.

⁴⁶ Virginia Postrel and Lynn Scarlett, "Talking Trash," *Reason*, August/September 1991, p. 25.

⁴⁷ Postrel and Scarlett, "Talking Trash," p. 26.

⁴⁸ Aseptic boxes can be recycled but usually are not.

⁴⁹ Harry Teasley, Jr., "Presentation on Aseptic Packages to the Maine Waste Management Agency," October 9, 1990.

⁵⁰ Ibid.

⁵¹ Franklin Associates, *Disposable Diapers: Summary and Interpretation of Literature Sources on the Environmental and Health Effects of Diapers*, July 1990.

⁵² Arthur D. Little, "Disposable Versus Reusable Diapers: Health, Environmental and Economic Comparison," Cambridge, MA, March 16, 1990. (Prepared for Procter and Gamble.)

⁵³ Reusables require one-eighth of the amount of raw materials as disposables, but both cloth and disposable diapers are composed primarily of renewable resource content.

⁵⁴ See, for example, Robert L. Campbell, et al., "Clinical Studies With Disposable Diapers Containing Absorbent Gelling Materials: Evaluation of Effects on Infant Skin Condition," *Journal of the American Academy of Dermatology*, Vol. 17, No. 6, December 1987, pp. 978-987.

⁵⁵ Franklin Associates, *Disposable Diapers: Summary and Interpretation of Literature Sources on the Environmental and Health Effects of Diapers*. See also, Franklin Associates, *Energy and Environmental Profile Analysis of Children's Disposable and Cloth Diapers* (Prairie

Village, KS: July 1990).

⁵⁶ Postrel and Scarlett, "Talking Trash," pp. 22-31.

⁵⁷ Virginia Postrel and Lynn Scarlett, "Talking Trash," *Reason*, August/September, 1991, p. 27. Net costs are the gross costs minus sales revenue from recycled materials.

⁵⁸ Lynn Scarlett, "Make Your Environment Dirtier — Recycle," *Wall Street Journal*, January 14, 1991.

⁵⁹ Ibid.

⁶⁰ Gitlitz and Relis, *Recycling Markets: California and the Pacific Rim*, Conference Synopsis (Santa Barbara, CA: Community Environmental Council, 1988), pp. 26-27. For example, the domestic steel industry is already near capacity.

⁶¹ A. Clark Wiseman, "U.S. Wastepaper Recycling Policies: Issues and Effects" (Washington, DC: Resources for the Future, August 1990), p. 2.

⁶² Pieter Tans, Inez Fung and Taro Takahashi, "Observational Constraints on the Global Atmospheric CO₂ Budget," 1990, Goddard Space Institute and Columbia University.

⁶³ Office of Technology Assessment, *Facing America's Trash*, (Washington, DC, U.S. Government Printing Office, October 1989).

⁶⁴ Reported by the Office of Information and Regulatory Affairs, Office of Management and Budget.

⁶⁵ U.S. Conference of Mayors, *Incineration of Municipal Solid Waste: Scientific and Technical Evaluation of the State-of-the-Art*, February 1, 1990.

⁶⁶ Ibid.

⁶⁷ See *Waste Age*, November 1989, reporting on the April 28, 1989 meeting of the Environmental Hearing Board of Pennsylvania. Note that risk assessment is at best an imperfect science, with numerous assumptions made, drawing conclusions from data from animals given high doses of chemicals and applying that information to make assumptions about human health risks.

⁶⁸ Robert J. Beck, *Oil Industry Outlook* (Tulsa, OK: Penn Well Publishing Co., 1990), pp. 74 and 84.

⁶⁹ Ibid., p. 11.

⁷⁰ J. H. Muromaya and H. G. Stever, eds., U. Colombo, "The Technology Revolution and the Restructuring of the Global Economy," *Globalization of Technology*, (Washington, DC: National Academy Press, 1988), pp. 23-39.

⁷¹ John Tierney, "Betting the Planet," *New York Times Magazine*, December 2, 1990.

⁷² *Green Market Alert*, March 1991 (Bethlehem, CT: Market Alert Publications), p. 5.

⁷³ Ibid.

⁷⁴ Franklin Associates, *Background Document on Clean Products Research and Implementation* (Prairie Village, KS, June 1990).

⁷⁵ See Barry Meier, "U.S. Advice on Trash Causes Uproar," *New York Times*, June 29, 1991.

⁷⁶ Postrel and Scarlett, "Talking Trash," pp. 28-29.

⁷⁷ Ibid., p. 28.

⁷⁸ Ibid., pp. 28-29.

⁷⁹ Council for Solid Waste Solutions.

⁸⁰ Franklin Associates, *The Role of Beverage Containers in Recycling and Solid Waste Management* (Prairie Village, Kansas: April 1989), pp. xxv-xxvii, pp. 31-34.

⁸¹ Postrel and Scarlett, "Talking Trash," p. 27.

⁸² Alter, "The Future of Solid Waste Management."

⁸³ Bernstam, *The Wealth of Nations and the Environment*, Table 5, p. 24.

⁸⁴ Ibid. Note, however, that the two Koreas and two Germanys also had different levels of affluence. Thus, a poor nonsocialist country may have low energy efficiency.

⁸⁵ Ibid., pp. 28-29.

⁸⁶ Ibid., p. 28.

⁸⁷ Ibid., pp. 24-25.

⁸⁸ Environmental Protection Agency, "Unit Pricing: Providing an Incentive to Reduce Waste," 1991.

⁸⁹ Lisa Skumatz, *Variable Rates in Solid Waste*, Vol. I — Executive Summary, prepared for U.S. Environmental Protection Agency, Region 10, and City of Seattle Solid Waste Utility, June 1990, pp. 3-4.

⁹⁰ Although the total tons of waste did not decrease significantly there was a 22 percent decrease in the amount going to landfills.

⁹¹ Postrel and Scarlett, "Talking Trash," p. 31.

⁹² Neil Hamilton and Robert Wasserstrom, "Solid Waste Disposal in the United States: Rate Regulation Is Not the Answer," (Washington, DC: National Solid Waste Management Association, 1989), pp. 5-6.

⁹³ Office of Technology Assessment, *Facing America's Trash*, p. 316.

⁹⁴ Ibid.

⁹⁵ E. S. Savas, "How Much Do Government Services Really Cost?" *Urban Affairs Quarterly*, September 1979, p. 24.

⁹⁶ E. S. Savas, "Municipal Monopolies versus Competition in Delivering Urban Services," in W.D. Hawley and D. Rogers (eds.), *Improving the Quality of Urban Management* (Beverly Hills, CA: Sage, 1974).

⁹⁷ Pittsburgh, with its "Blue Bag" collection system, has contamination rates of around 7 percent, low enough to make the program more cost-effective than alternative curbside collection of separated materials.

⁹⁸ "XL Disposal's Automated Recycling," *Waste Age*, July 1990, pp. 49-56.

⁹⁹ Patricia Gallagher, "Composters Find Garbage is Golden," *Cincinnati Enquirer*, October 21, 1990.

About The Author

Lynn Scarlett is Vice President of Research of the Reason Foundation, a nonprofit public policy think tank based in Santa Monica, California. She has written extensively on a variety of subjects, including recycling and solid waste management, air pollution policy and land use policy. She is currently focusing her research on solid waste management issues.

The White House Office of Policy Development has used Ms. Scarlett's policy work on recycling and solid waste management. She has spoken frequently on solid waste management issues, urban growth/no growth policy and environmental policy. She served as a member of an expert panel to review the solid waste management master plan for Lee County, Florida.

Ms. Scarlett is a frequent contributor to the editorial pages of *USA Today*, and has written on environmental matters for the *Wall Street Journal*, the *Los Angeles Times*, the *San Diego Union*, the *Orange County Register*, and the *Los Angeles Daily News*.

Ms. Scarlett has a B.A. and M.A. in Political Science from the University of California, Santa Barbara. She completed her Ph.D. exams in economics and political science at the University of California, Santa Barbara, and is now completing her dissertation.

THE NATIONAL CENTER FOR POLICY ANALYSIS

The National Center for Policy Analysis is a nonprofit, nonpartisan research institute, funded exclusively by private contributions. The NCPA originated the concept of the Medical IRA (which has bipartisan support in Congress) and merit pay for school districts (adopted in South Carolina and Texas). Many credit NCPA studies of the Medicare surtax as the main factor leading to the 1989 repeal of the Medicare Catastrophic Coverage Act.

NCPA forecasts show that repeal of the Social Security earnings test would cause no loss of federal revenue, that a capital gains tax cut would increase federal revenue and that the federal government gets virtually all the money back from the current child care tax credit. These forecasts are an alternative to the forecasts of the Congressional Budget Office and the Joint Committee on Taxation and are frequently used by Republicans and Democrats in Congress. The NCPA also has produced a first-of-its-kind, pro-free-enterprise health care task force report, written by 40 representatives of think tanks and research institutes, and a first-of-its-kind, pro-free enterprise environmental task force report, written by 76 representatives of think tanks and research institutes.

The NCPA is the source of numerous discoveries that have been reported in the national news. According to NCPA reports:

- Blacks and other minorities are severely disadvantaged under Social Security, Medicare and other age-based entitlement programs;
- Special taxes on the elderly have destroyed the value of tax-deferred savings (IRAs, employee pensions, etc.) for a large portion of young workers; and
- Man-made food additives, pesticides and airborne pollutants are much less of a health risk than carcinogens that exist naturally in our environment.

What Others Say About the NCPA

"... influencing the national debate with studies, reports and seminars."

TIME

"... steadily thrusting such ideas as 'privatization' of social services into the intellectual marketplace."

CHRISTIAN SCIENCE MONITOR

"Increasingly influential."

EVANS AND NOVAK