thoughts

HANSON+DOREMUS
INVESTMENTS AND PLANNING

FROM HANSON+DOREMUS

MAY 2025

Wasting away…

The weekly pilgrimage down the driveway with garbage and recycling in tow is a common rhythm of domestic life. The conscientious among us take the additional time to rinse and sort. Many of us have two bins, and may have seen those "sorted" bins end up in the same truck! So what really happens next and where does the journey end for our trash?

You'll be happy to learn that collection trucks are equipped with compartments for mixed solid waste and recycling, so our sorting isn't in vain. But you will be less happy to learn what actually happens with our waste. That is the subject of the new book *Waste Wars* by Alexander Clapp. It is also the topic of this special "Garbage Issue" of the newsletter. We will be leaning heavily on Clapp's work to explore what's really going on and some of the dynamics involved as a plastic jar, for example, makes its way from the end of your driveway to be burnt in the Malaysian or Turkish countryside.

But first, a brief orientation. Most of the trash we don't attempt to recycle stays relatively close to home and ends up in a landfill. That accounts for around half of our overall waste, which is nearly five pounds per person, per day (yikes). The number of active landfills has decreased in the U.S., with larger regional facilities replacing local ones. Here in Vermont, there is only one open landfill, in Coventry, which handles most of the state's waste. Nationally, a smaller percentage of our trash is burned instead of buried, at times producing energy (and emissions) in the process.

Recycling has a more complicated path. Much that could be recycled still ends up in the landfill. The rest is sold on the recycled commodities market to the highest bidder. But only about 60%-65% of the items we intend to recycle are actually given a second life. That number is shockingly low for some materials, like plastics, at 9% (*see table below*).

While our domestic recycling capabilities have improved in recent years, spurred by China's 2018 ban on importing solid waste, still some 25%-30% of items intended for recycling are shipped abroad. A portion ends up in unregulated dumps, waterways, and "trash towns," where entire local economies depend on the processing, parsing, and selling of European and American garbage. The flow is typically from higher income countries with much larger consumption per capita to lower income countries with more lax environmental regulations. And don't let the percentages fool you, it all adds up to millions of tons of waste exported from the U.S. alone.

The remainder of this issue will explore these topics. We will dive into plastics and then the special case of electronic waste (E-waste), which cannot be recycled with typical items or sent to landfills. We will conclude with some perspective on how we got here and what we might do to improve the situation. This issue does not make for light fare. We hope it makes us all think a little more about what we do with our garbage, and what we consume in the first place.

- Sarah Cocina

U.S. WASTE AND ITS DESTINATION

Material	Waste Product	% of Waste	% Recycled	Destination	End Use (examples)
Trash	Mixed Solid Waste (MSW)	N/A	N/A	local landfill	N/A
Recycling	Cardboard / paper	23%	68%	sold on commodities market	cardboard, paperboard
Recycling	Plastics	12%	9%	sold on commodities market	containers, carpet, fleece, toys
Recycling	Metals	9%	34%	sold on commodities market	cans, car parts, rebar, appliances
Recycling	Glass	4%	25%	sold on commodities market	road base, concrete mix
Recycling	Electronics	2%	20%	specialty recycler	refurbished/resold, dismantled

Source: Chittenden Solid Waste District, EPA (data as of 2018 for % figures), Alliaruza Recycling

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By Alex Watson

A life of plastic...

The creation and commercialization of plastic may be one of the crowning achievements of the twentieth century. It may also end up being one of the most harmful to humanity and the earth.

For better, and certainly for worse, disposable plastic products are perhaps synonymous with a stereotype of America, like fast food and baseball. The story, as told by Alexander Clapp in his new book, *Waste Wars*, begins during World War II when the wartime economy sought a cheap, synthetic material. Plastic, the byproduct of fossil fuel production, was the answer, and it soon rolled off assembly lines and into our daily lives.

Crucially, one of the results was the advent of single-use products. The idea was simple: the product was cheap, and you were supposed to feel OK about using it once or twice and throwing it away. This phenomenon opened new doors for companies but also led to a massive increase in waste. Since then, billions upon billions of pounds of plastic have been produced – and will persist for thousands of years.

This trend did not go unnoticed. One early solution to the mounting piles of plastic waste was to burn them. Another solution was to recycle them. The marketing was smoother for the latter, and recycling became the feel-good solution for the masses. Use your plastic once and it will be used again in another life.

The reality is not so clean. First, there are many varieties of plastic and not all of them can be blended together. Additionally, the pieces that can be recycled can only be used once or twice more before permanent disposal is required—eventually it becomes trash. Another conundrum is that producing plastic is cheap while recycling it is not. Without economic incentive, even what is recyclable becomes less than desirable for industry. And, of course, the process can be toxic. There are many chemical additives to plastic which are released during the recycling process.

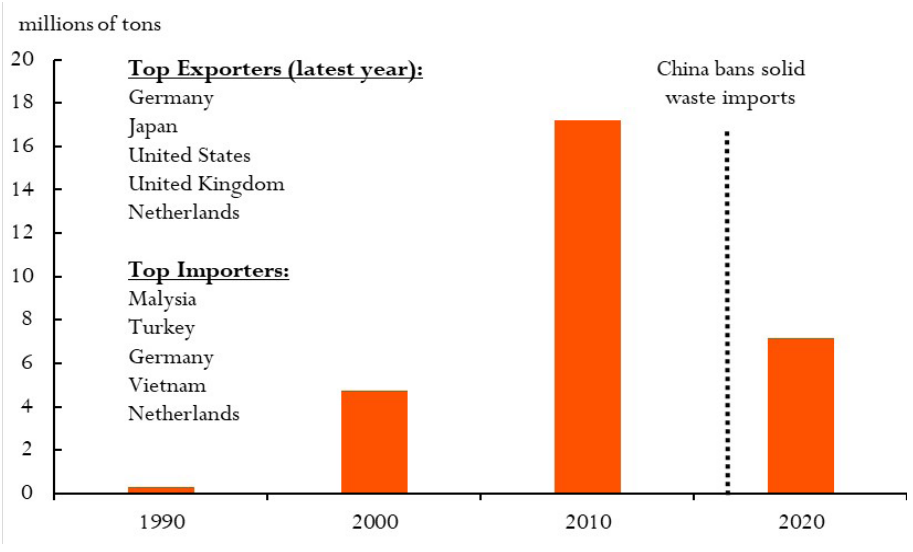
So what was to be done? Globalization offered one solution. Enterprising individuals—trash brokers—from lower income countries saw an opportunity to buy plastic waste from the U.S. for use in cheaply produced products back home. Recycling efforts were redoubled, and the developed world now had a garbage chute for its plastic. But this process has come at a cost. Those lower income countries who agreed to take the plastic were also among those with the least stringent environmental regulations. The imported plastics were used until they could not be, then often dumped and burned in the countryside.

This cycle has continued over time. The destination countries have changed, notably in 2018 when China banned imports of plastic waste, but the plastic trade remains the same. According to the Environmental Protection Agency, only 9% of plastic gets recycled in the U.S. The amount that is exported is hard to come by, but estimates range from 2%-5% of all U.S. plastic waste, or around one million tons of the stuff (*see chart below for global export figures*).

I wish our story ended here, sour note that it is, but it gets grimmer. Microscopic pieces of plastic, now referred to as micro- or nano-plastics, have been found all over the world, including inside humans. Studies linking microplastics to health issues such as heart disease, stroke, cancers, hormone imbalances, and birth defects have been popping up left and right. Microplastics float in the air and are inhaled, they enter our skin when we handle plastic materials or wear it next to our skin (polyester and nylon are derived from plastic), and enter our food through packaging.

Plastic has done wonders for the world. Technological innovation, medical intervention, improvement in food storage – the list goes on. However, we are seeing the consequences. How serious they end up being, we do not yet know. In the meantime, I continue to use many plastic items in my life, but for my children, it is metal water bottles and glass containers.

GLOBAL PLASTIC WASTE EXPORTS



Source: UN Comtrade

By Neil Macker

Our evolving E-waste problem...

Electronic waste, or "E-waste," is the byproduct of our ever-increasing appetite for electronics, including smartphones, tablets, laptops/desktop PCs, e-cigarettes, small and large household/kitchen appliances, and flat televisions. We not only own more of these devices than ever before, but have come to view many of them as disposable after a few years of use.

The problem is getting worse. Consumers around the world are generating more E-waste every year, with less than a quarter formally collected and recycled. According to the *The Global E-waste Monitor 2024 Report,* from 2010 to 2022 the amount of electronic and electrical equipment (EEE) on the market expanded 3.7% annually to 96 billion kilograms while the annual level of E-waste grew faster, at 5.1%. More concerning, recycling rates have not kept pace (*see chart below*).

The bulk of E-waste is not formally recycled. Around a quarter of it ends up in landfills, while 30% finds its way to the informal recycling industry in lower-income countries. Why does this matter? It's toxic.

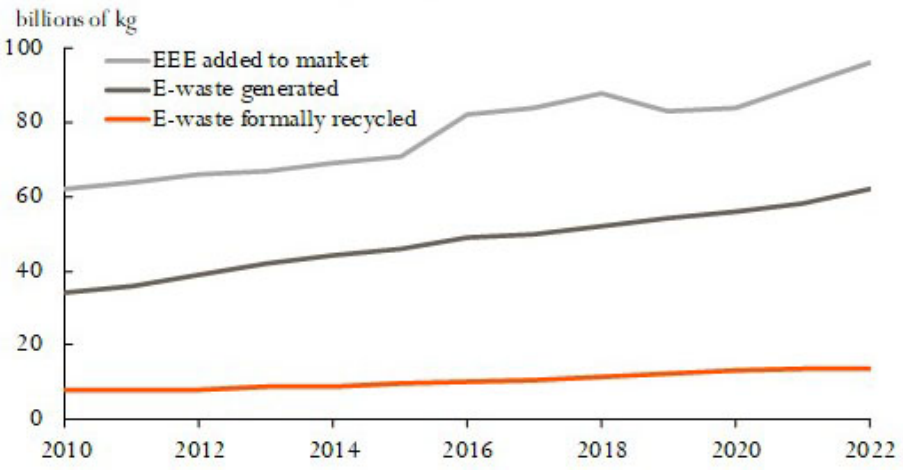
E-waste is composed largely of metals, plastics, and other materials like glass, minerals, and composite materials. *The Global E-waste Monitor 2024* report estimates that 58 thousand kilograms of mercury and 45 million kilograms of plastics containing brominated flame retardants are released into the environment annually due to improper disposal or recycling of E-waste. With temperature exchange equipment like refrigerators, freezers, and a/c units, comes the added hazard of releasing refrigerants into the atmosphere, negatively affecting the ozone layer and contributing to climate change. Even without burning or dismantling, the combination of time and warmer weather can result in these toxic materials leaching out of landfills, contaminating the soil and air with harmful chemicals such as lead, cadmium and beryllium. The World Health Organization has warned that exposure to toxic E-waste could lead to adverse health consequences such as negative birth effects, adverse mental impacts on children, and respiratory issues.

Similar to the theme with plastics and other high-income country garbage, E-waste exports often end up in lower income countries with limited environmental regulations. The amount of E-waste transported across borders is difficult to measure accurately as most of it is shipped illegally as used electronics for resale or reuse. Some estimates are that around two-thirds of the used electronics trade is actually E-waste.

While the informal recycling industry can provide jobs, the health and environmental cost can be tremendous. Alexander Clapp, in his latest book *Waste Wars*, takes us to Agbogbloshie, a slum in Ghana built on a landfill comprised largely of the Western World's E-waste. Agbogbloshie's industry is not only about dismantling electronics for parts but also about extracting metals in any way possible. Clapp describes how one of the groups at the bottom of the slum's economic hierarchy, known as "burner boys," use fire to extract copper from plastic encased cables. The fires are not fueled by wood or other paper products, but rather leftover plastic from TVs and other electronics, old tires, and even the Styrofoam liners from refrigerators. The resulting conflagration frees the copper from its encasement but also causes great harm. He reports that chicken eggs from the area are "probably the most poisonous on Earth" and that the surrounding slums are "full of hands missing fingers, feet shorn of toes, limbs pocked with burns, and the occasional one-eyed dismantler."

The cruel irony of the copper recycling process is that its most likely use will be as another piece of electronic equipment that could end up back in Agbogbloshie.

E-WASTE GENERATED VERSUS RECYCLED



Source: The Global E-waste Monitor 2024

THE GARBAGE ISSUE

By Anne Doremus

Where do we go from here?...

The world's current struggles with waste are not new. Many of us first became aware of the problem in the 1980s as recycling programs across the country gained steam. Since then, a steady stream of regulations at both the domestic and international levels have done little to stem the tidal wave of waste. Is there any hope for large scale solutions or are we destined to live in a world of ever-growing trash?

Further efforts to reduce waste must be based on a deep understanding of the problem and how we got here. In the wake of WWII, rising income levels, falling manufacturing costs and the development of plastics all contributed to growing waste volumes. The statistics in this issue, based largely on data from Alexander Clapp's recent book *Waste Wars*, highlight the explosion of waste fueled in large part by the growth of plastic, single-use products.

In addition, growing environmental regulations have had some perverse negative consequences. With tougher regulations came higher costs and the move to ship ever-growing quantities of waste from the developed world to countries with the lowest costs and least environmental controls. Recycling mandates too have helped relieve our guilt by convincing us of the limited environmental impact of our consumption patterns. Throwing your plastic Starbucks cup in the blue recycling bin, for example, may make you feel better about buying the next one. But as we've outlined in this issue, this move is hardly "costless" from an environmental standpoint.

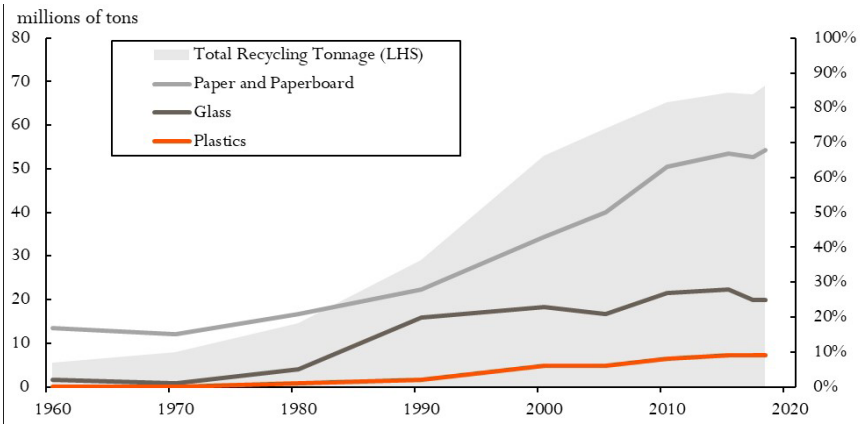
Unfortunately, there is no "magic bullet" waiting to solve the globe's growing waste dilemma. The waste market - for plastic, steel, paper, and E-waste - is not one market, but many. Because each has its own distinct supply/demand characteristics, technical recycling challenges, and varying global regulations, no one solution is likely to work for all. Ultimately, future waste mitigation efforts will need to take several forms. Since the problem is largely related to consumption, it is tempting to think that, with the right information, consumers will alter their own behavior. History shows, however, that relying on individual action alone is unlikely to solve the problem.

Further regulatory reforms offer more promise but are complicated by the fact that there is no one, global regulatory enforcement authority. Still, further coordinated efforts should not be discounted. The United Nation's Environmental Assembly is currently negotiating a new Global Plastics Treaty. When signed, this Agreement, which includes over two hundred countries, aims to address the full lifecycle of plastics from production and design, to waste management.

More generally, policies aimed at shifting the responsibility to manufacturers, so called "Extended Producer Responsibility," could help incorporate the cost of recycling and disposal into the price of consumer goods. They could also provide companies with an incentive to innovate on sustainable product design and packaging. On the consumer side, "Pay As You Throw" policies that charge by the pound for waste (with recycling sometimes free, as an added incentive) can help keep our consumption of disposable products top of mind. Finally, a range of emerging technologies will help. Examples under development today include the use of robotics and AI to make waste sorting efforts more efficient and on the material science side, more biodegradable packaging solutions.

What can each of us do to help solve this global problem? First, reducing consumption of single-use products will have the biggest impact. In addition, we can avoid electronic products with short life spans (i.e., planned obsolescence) while favoring companies making real progress toward sustainable packaging goals. Second, get educated. Keep in mind that while recycling volumes in the markets for steel and paper have grown meaningfully, these efforts are rarely "clean." And recycling rates for many materials like plastic remain low (*see chart left*). As the chart on page 1 of this issue illustrates, local solid waste districts and state/federal environmental agencies can be helpful sources when trying to determine where our waste goes. The title of Alexander Clapp's book, *Waste Wars*, is apt. This work will indeed be a war, and a long one at that.

U.S RECYCLING RATES BY MATERIAL AND TOTAL TONNAGE



Source: Environmental Protection Agency