



Rethinking Recycling

HOW CITIES CAN ADAPT TO EVOLVING MARKETS

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The National League of Cities (NLC) is the nation's oldest and largest organization devoted to strengthening and promoting cities as centers of opportunity, leadership, and governance. NLC is a resource and advocate for more than 1,600 member cities and the 49 state municipal leagues, representing 19,000 cities and towns and more than 218 million Americans.

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NLC NATIONAL
LEAGUE
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SUSTAINABLE CITIES INSTITUTE

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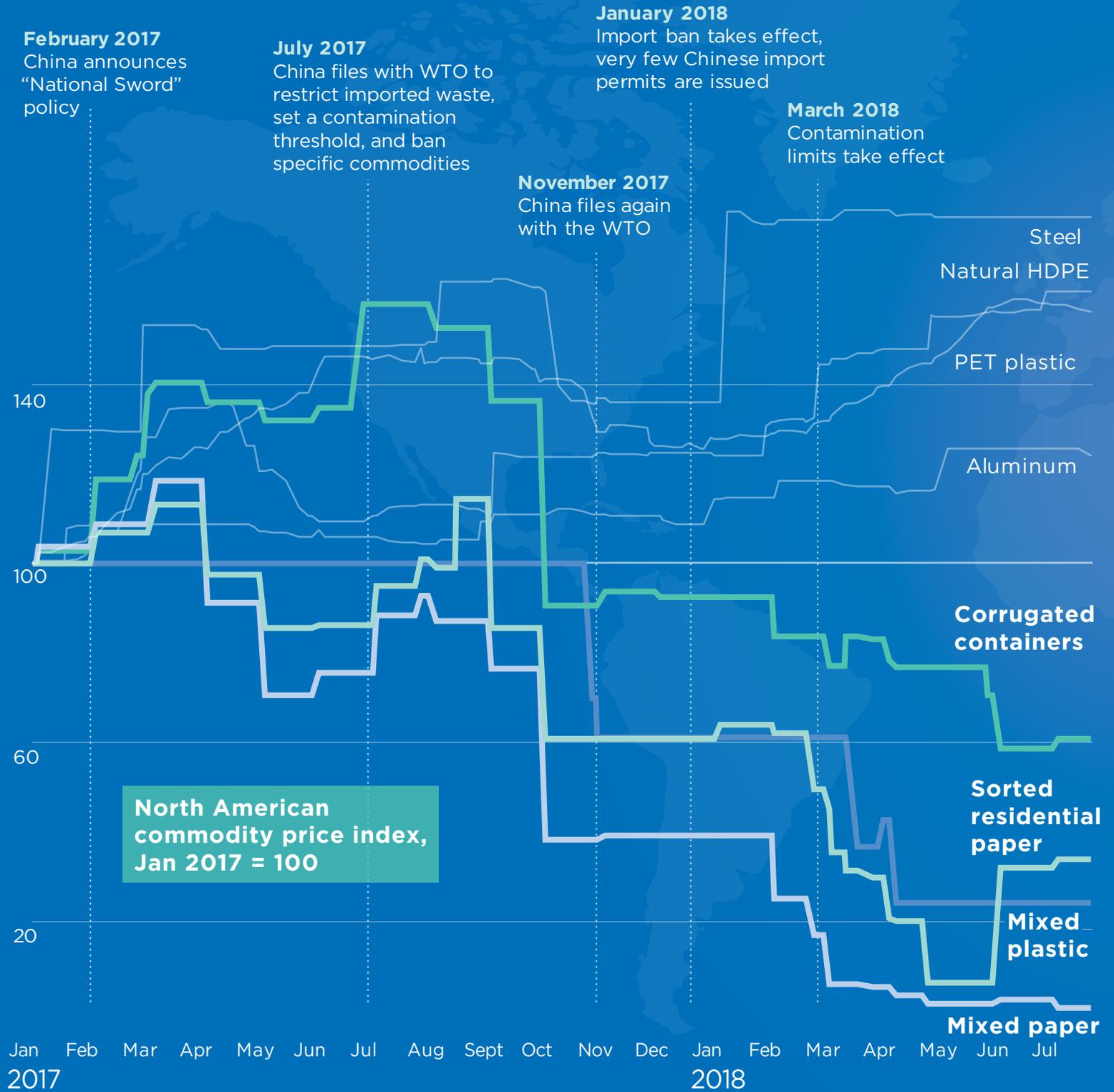
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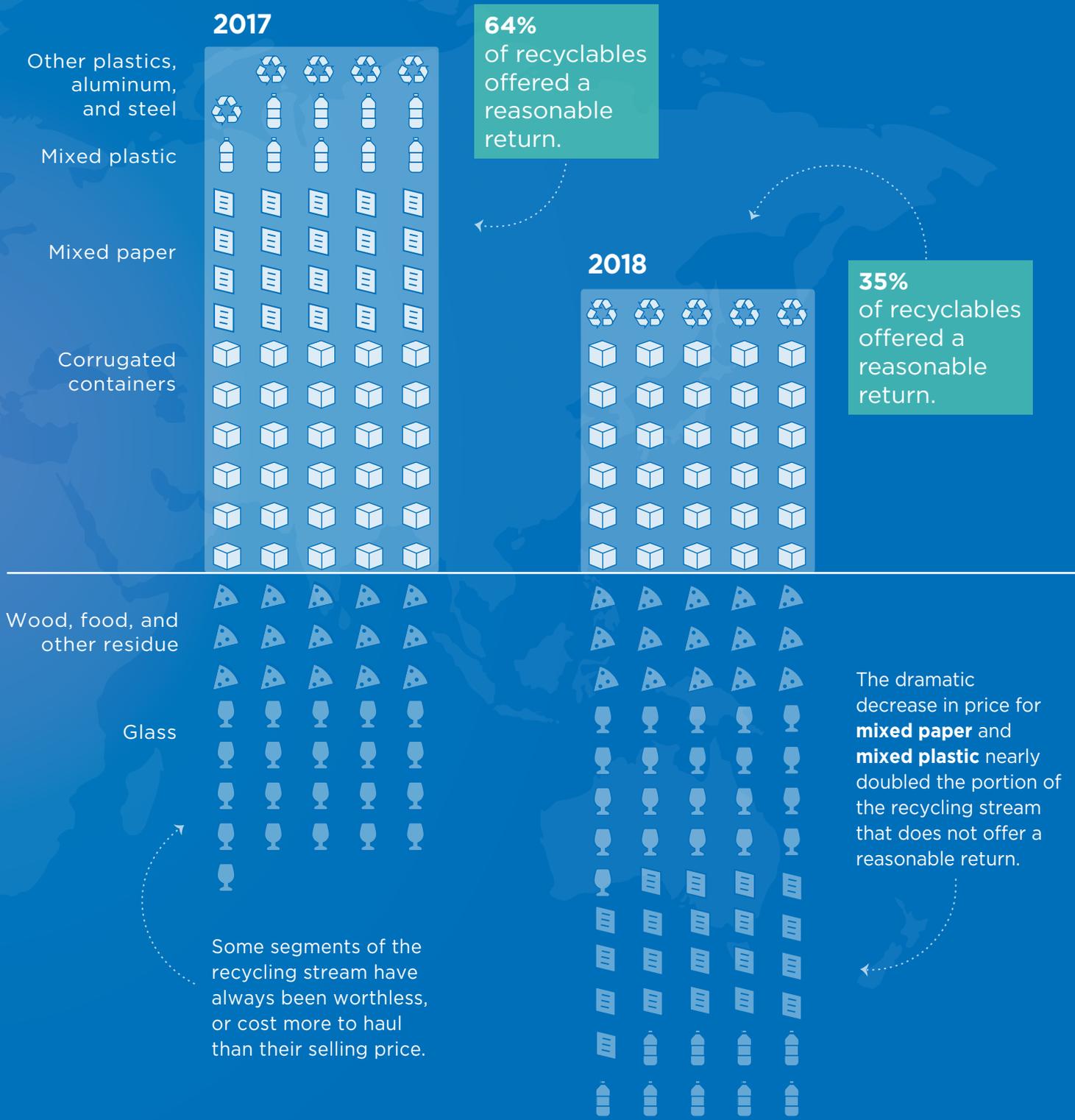
Recycling Markets Hit By China's New Policy

IMPORT RESTRICTIONS MEAN PLUNGING PRICES FOR KEY COMMODITIES



Biggest Losers Are Also Largest Volume

Steep drop in price for mixed paper and plastic cut the price for a typical ton of mixed residential recycling in half.





INTRODUCTION

The United States produces more municipal solid waste than any other country in the world.¹



In 2015, Americans generated more than 262 million tons of waste, or nearly 4.5 pounds per person, per day. To handle this load, nearly every U.S. city has developed a solid waste management program that includes recycling. These initiatives have overall proved successful. The recycling rate has tripled in the last 30 years to approximately 25.8 percent in 2015, or nearly 68 million tons.² The industry is both environmentally beneficial and economically significant. In 2007, the U.S. recycling and reuse industry accounted for 757,000 stable jobs, \$36.6 billion in wages, and \$6.7 billion in state, local and federal tax revenues.³

But today, the recycling industry is in the midst of a global crisis precipitated by China's latest waste import policy, National Sword. In

January 2018, China implemented an import ban on certain commodity mixes, and in March the country began enforcing stricter limits on how much contamination can be present in recyclable materials. The ban specifically targets mixed paper and mixed plastics, the two most common types of materials processed by municipal recycling systems. Since China previously received more than half the world's recyclable commodity exports, the move has unsettled global recycling.

While China's new policy is not an outright ban on all recycling imports, the contamination limits of 0.5 percent are so low that no American processor can realistically meet them. Officially, the Chinese contamination rates have varied between

What is Contamination?

Contamination of recycling can mean a variety of things. For example, food waste, stray plastics and plastic bags, and glass shards stuck in paper fibers can all contaminate paper and cardboard streams.

Perhaps the most significant contamination source, however, is simply trash and "wishful recycling": trying to recycle items that are either not accepted by the local recycling system or are just not recyclable at all. A common example is Styrofoam containers.



Image Credit: Spencer Platt/Getty Images.

Rethinking Recycling: How Cities Can Adapt to Evolving Markets

1.5-10 percent over the last several years.⁴ In actuality, these standards were only enforced for a brief period of time, and importers still accepted highly contaminated loads, sometimes up to 40-50 percent trash.⁵

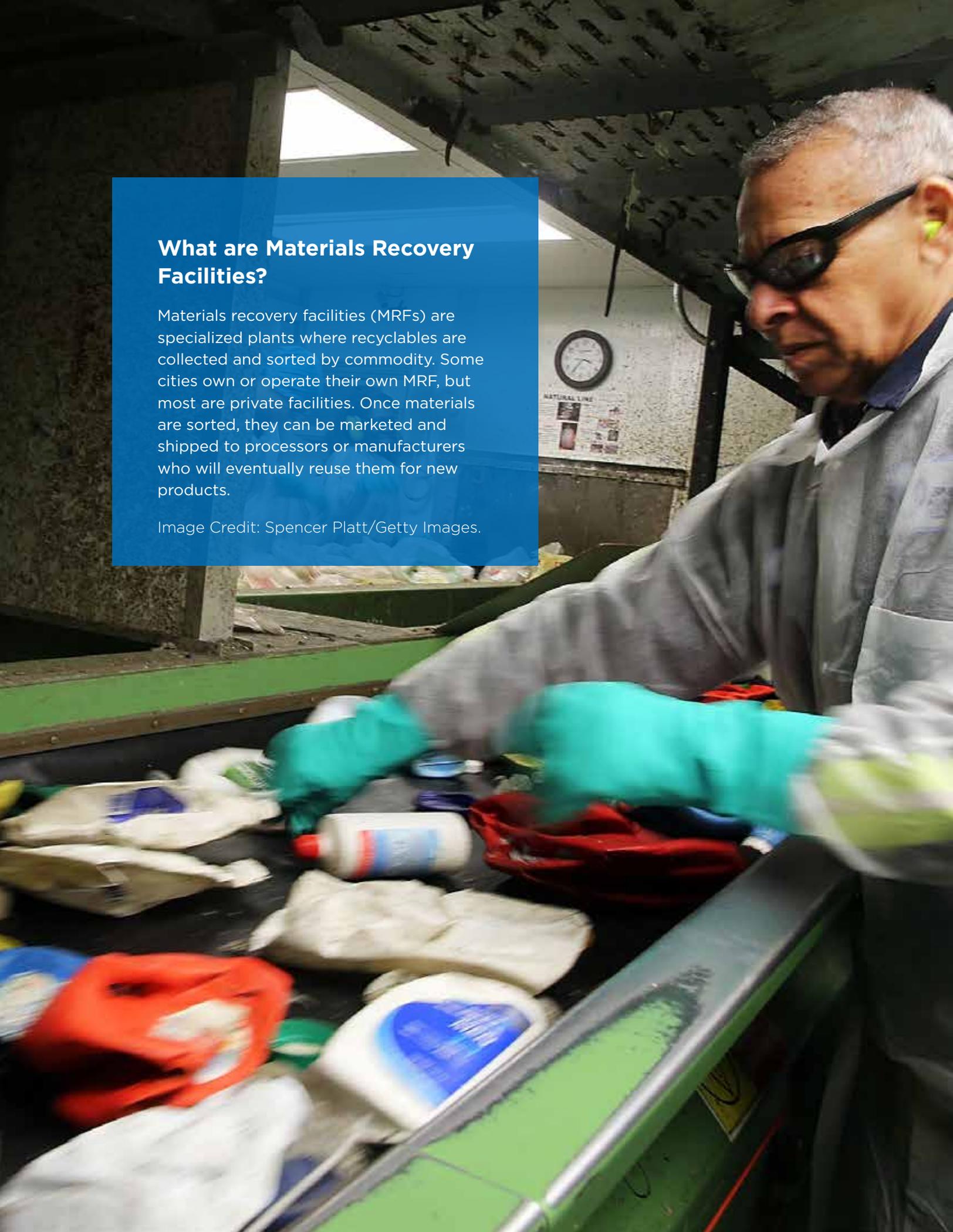
Now though, China is making a serious effort to tackle its own environmental issues. Additional restrictions are scheduled to take effect later in 2018 and in 2019, and China aims to halt all solid waste imports by 2020. As a result, prices have plummeted for many types of recyclable commodities and revenues are dropping for cities, haulers and processors who rely on these sales.

Cities throughout the U.S., as well as private haulers and operators of materials recovery facilities (MRFs), must reevaluate their operations and policies in order to adapt and maintain viable municipal materials management systems.

What are Materials Recovery Facilities?

Materials recovery facilities (MRFs) are specialized plants where recyclables are collected and sorted by commodity. Some cities own or operate their own MRF, but most are private facilities. Once materials are sorted, they can be marketed and shipped to processors or manufacturers who will eventually reuse them for new products.

Image Credit: Spencer Platt/Getty Images.



A woman in a dark jacket and patterned top is seen from a high angle, sorting through a massive pile of discarded plastic bottles. The scene is set in a recycling facility, with the ground covered in a sea of clear and colored plastic bottles. The entire image has a blue color overlay. A green rectangular frame surrounds the central text.

HOW CHINA'S REGULATIONS AFFECT CITIES

The new policy has upended recycling markets globally, even for programs that were not previously reliant on export sales.



This market shift has a major impact on cities, since their service revenues are intertwined with their processors' and haulers' ability to sell high-value recycling commodities. Across the country, cities are experiencing multiple related effects:

Diminished Markets: China has effectively taken itself out of the global market for recycling exports. The effect is crippling, since China previously took in more than half of the world's recycling commodity exports for use as feedstock for its manufacturing industry. The United States previously exported one-third of its recyclables, about half of which went to China alone. Sixteen million tons of recyclables need a new market, and other nations can hardly make a dent in absorbing this excess supply.⁶

Market Fluctuations and Reversals: In some places, the economics of recycling have been turned "upside-down." Commodities that once brought in revenue are now a cost liability, with haulers and MRFs paying to offload the materials instead of being paid for them. Some haulers have resorted to paying \$18-20 per ton to take their mixed paper, a commodity that used to bring in \$80-100 per ton in revenue. All of these costs will eventually be passed to cities and their residents. Additionally, virtually all processors have begun to receive drastically lower prices for commodities. This is most problematic for cities whose operations are based on revenue

or enterprise operations. Cities that receive funding through tax revenue or a general fund are more insulated from market fluctuations, as are those who contract out the majority of their operations.

Lower Revenues: With China largely out of the picture, the available supply is overwhelming, but the demand for the supply is relatively low, resulting in depressed markets and lower revenues across the United States, with some areas impacted more severely than others. Although clean commodities are still in high demand, these are not what the markets are currently flooded with. Without China's demand for lower quality feedstock, the remaining buyers have their pick of abundant, albeit not particularly clean, supply at rock-bottom prices. This means lower revenues for all MRF operators, not just the ones previously dependent on China.



A history of waste export to China

Historically, importing waste has been a boon to China's economy, specifically for its manufacturing industry. Beginning with the rise of global consumerism in the 1980s, large cargo ships of manufactured goods would arrive daily to the United States from China. The cargo ships would then head right back to China, practically empty. This arrangement presented an opportunity to sell our waste to China, to be used as feedstock in the manufacture of new consumer goods. It was a low-cost means of disposing of our waste, more cost-effective than processing it domestically. China began to build a large recycling processing industry, as facilities in the United States began to shutter. In the face of increasing environmental and labor standards in the United States, domestic

facilities could not compete with the low-cost Chinese alternative. In 2016, the United States alone exported 16 million tons of material to China, or \$5.2 billion worth of commodities. Prior to the contamination restrictions, the United States was exporting about one-third of its recyclables, about half of which were going to China.⁶ Every day, China accepted 4,000 shipping containers of recyclables.⁷

Although China has cited environmental and human health concerns as the main motivation for the revised material contamination policies, the country's economy will also benefit from building a domestically-based recycling industry. Additionally, China has historically struggled to manage its own waste and is the biggest contributor of ocean pollution in the world. The new policies will allow China to turn its focus inward.

1980s

Cargo ships arriving in the USA containing goods from China were returning to China virtually empty. This evolved into a low-cost opportunity for the USA to send overstock solid waste and recyclable goods back to China.



Consumer Goods →

← Solid Waste

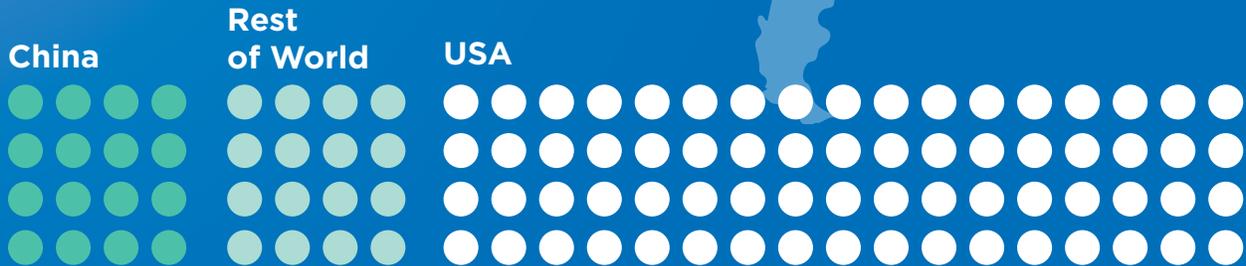
5.2 Billion

In 2016, the United States alone exported 16 million tons of material to China, or \$5.2 billion worth of commodities.

4,000

Every day, China accepted 4,000 shipping containers of recyclables.

The United States exports about **one-third** of its recyclables, about **half** of which go to China.



Total US Recycling Stock: Most stays, but much goes abroad.



SHORT-TERM RESPONSES AND STRATEGIES

The impact of the new policies is beginning to trickle down to municipalities across the country.



The changes are affecting different cities in different ways, depending on the structure of the existing local or regional waste management and recycling systems; which features of the system are private versus public; the type of contracts cities have with their haulers and processors; and the local or regional opportunities for the processing and sale of commodities. Across the United States, bales of recyclable commodities are piling up because they are too contaminated to meet the new requirements.

Both private processors and publicly-run facilities have been using a variety of new strategies to cope with the depressed markets, ranging from manual cleanup efforts, to landfilling or burning excess recyclables. And while some private processors have been temporarily absorbing costs in the hopes that the market will bounce back, others have begun pushing city staff to address the financial implications of the new Chinese regulations. This pressure from private contractors has had a direct impact on municipalities and has spurred cities to take action. Tactics range from educational outreach campaigns to modification of cities' contracts with their haulers and processors:

Slower processing to clean up

contamination: In an effort to retain as much value for their commodities as possible, processors are trying to comply with China's new quality standards. Processors are

cleaning up their facilities and slowing down sorting lines so personnel can manually remove waste contamination, as well as adding additional personnel to the sorting lines. The unwelcome side effect is added labor costs and less throughput of clean, recyclable commodities.

Some processors, particularly those at the start of new municipal contracts, have elected to invest in capital improvements, amortizing costs over the course of the contract. Common upgrades include new screens that help to sort commodities by type and size, and the latest generation of optical sorters that separate commodities by color and material type or grade. Robotic sorters, the newest technology, effectively replace people on the sorting line, and can sort at least twice as fast. However, the technology is still in its infancy. Only six locations nationwide have made the switch, and there are high cost barriers.

New and unconventional markets:

In the short-term, many local governments and private sector recycling partners are looking to new or unconventional markets to pick up the slack. Several Asian and Southeast Asian countries, such as India, Indonesia, Malaysia, South Korea, Taiwan, Thailand and Vietnam, have absorbed some of the excess supply. According to David Biderman, executive director and CEO of the Solid Waste Association of North America

(SWANA), cities on the West Coast and in the Northeast region are the most focused on these new markets. Critics of this market shift are concerned, however, about the social and environmental implications of exporting to these less well-developed and less well-regulated countries. The pollution and human health impact of this shift could be more detrimental than what currently exists in China. Increased exports to these countries are also likely to be short-lived, as Indonesia, Malaysia, Thailand and Vietnam have all recently adopted similar recycling import restrictions to China's after being inundated with materials earlier this year.

MRFs in the Portland area have started exploring sending more of their plastics to Merlin Plastics just across the border in British Columbia, Canada. Meanwhile, San Antonio's processor has been exploring new markets in Mexico in order to maximize volume and price incentives both domestically and south of the border. Despite this growth in new and unconventional markets, the combined capacity hardly makes a dent in the 45 million ton global recycling import footprint that China has left behind.¹

Stockpiling: In many areas of the country, processors that are unable to offload materials have been stockpiling bales of mixed paper and plastics in the hopes that markets will rebound or new markets will open up. Because recyclable materials are commodities, many processors consider disposal of the stockpiled bales akin to throwing away money. Long-term stockpiling is not always feasible, however, and is nearly always cost-prohibitive. For safety reasons, there are also restrictions on whether waste can be stored outside or inside, requirements for sprinkler and fire suppression systems, and height limits for stacked stockpiled

bales. Tom Padia at StopWaste, the joint powers authority for waste management and recycling in Alameda County, Calif., notes that outside storage can be problematic, particularly for paper commodities which can get "sun burn," begin to degrade or show water damage. Once this kind of damage occurs, the commodities are no longer valuable for sale on the market. Additionally, while California law does not specifically prohibit the landfilling of recyclable materials, it is nonetheless a common element of franchise agreements in the state that operators cannot landfill the recyclables, so stockpiling often becomes the only option. Processors in California are worried because solid waste regulators have the authority to inspect facilities, issue notices and violations, and ultimately shut down facilities for noncompliance.

Landfilling: Landfilling tends to be a last resort, but some facilities have already reached this breaking point. The most public cases of landfilling have occurred in states where landfilling recyclables is prohibited, such as in Massachusetts and Oregon. As of late May 2018, the Massachusetts Department of Environmental Protection had issued 36 waivers for facilities to dispose of recyclable materials because the cost of recycling and processing commodities exceeded the cost to landfill them. In Oregon, the Department of Environmental Quality had issued 26 waivers as of mid-July 2018 for disposal, granted to those facilities that have proved they have exhausted all other options to market the commodities.

In some areas of the country, such as Austin, Texas, and Phoenix, Ariz., fees charged by landfills may be as low as \$15 to \$20 per ton. In other areas, such as Portland, Ore., disposing of materials at the landfill costs \$95



A worker is seen manually separating waste at the Wongpanit Suvarnabhumi recycle collection center on September 1, 2017 in Bangkok, Thailand. Several Asian and Southeast Asian countries, such as India, Indonesia, Malaysia, South Korea, Taiwan, Thailand and Vietnam, have absorbed some of the excess supply that American cities struggle to deal with.

Image Credit: Paula Bronstein/Getty Images.

San Antonio's Diaper Dilemma

In San Antonio, the local processor instituted a surcharge that is, strangely, associated with diaper contamination. Last year, San Antonio's recycling contamination rate was as high as 28 percent, and the recycling facility, which processes around 300 tons of material per day, sometimes found over 100 pounds of dirty diapers every hour. In order to sort contaminated materials and encourage cleaner incoming loads, the processor began to assess a contamination surcharge of \$12.50 per ton. With San Antonio's total amount of annual recycling just over 90,000 tons, that surcharge could add up to about \$1.2 million in annual fees. If the city can get the pounds of diapers down to less than 50 per hour for three consecutive audits, the contamination surcharge will be waived. The city of San Antonio initially charged residents a \$25 penalty for depositing diapers in their recycling cart, and in March 2018 raised the penalty to \$50. As of August 2018, the city's recycling contamination rate has decreased to around 22 percent.



per ton. But when the MRFs around Portland started charging in excess of \$100 per ton to drop off recyclable materials, a \$95 per ton landfill tipping fee suddenly became an attractive alternative, prompting some haulers to seek disposal waivers from the state.

Landfilling is not ideal for a variety of reasons. The loss of valuable reusable materials, as well as the energy embedded in those materials, is viewed as monetarily undesirable. The risk of exhausting landfill capacity, the potential for public backlash and cost are all concerns.

Waste-to-Energy: Other areas of the country have turned to incineration as a last-ditch resort. Much like throwing recyclables in the landfill is akin to throwing away money, burning them is like burning money. But at least with incineration, the heat can be captured to generate electricity or steam heat for buildings. Waste-to-energy also ultimately reduces the volume of materials disposed of in landfills.⁸ The energy can be sold through a utility, ultimately recapturing some of the lost financial value of the commodities.

In instances in which the material is not marketable, can no longer be stored on site at a processing facility and cannot be legally landfilled, incineration can be an attractive and comparatively profitable solution. Willie Puz, director of public affairs and recycling at the Solid Waste Authority of Palm Beach County, Fla., notes that the Authority incinerated and recovered the energy of just over 150 bales of mixed paper and plastics earlier this year at a time when the paper was no longer viable for processing and the plastic could not even be given away for free.

Although the technology today is significantly safer, waste incineration is not publicly popular in the United States due to a history

of environmentally harmful incineration practices. Incineration also produces significant greenhouse gas emissions, so the solution contradicts other local environmental goals.

Education: Cities have doubled down on efforts to educate residents on what is and is not recyclable in their systems. Many have launched education and public outreach campaigns that include monthly bill inserts, social media and website widgets to curb “wishful recycling.” The city of Elgin, Ill., recently rolled out an educational campaign using Waste Management’s [Recycle Often, Recycle Right](#) toolkit to curb contamination and plastic bag usage. And with support from the Recycling Partnership, similar educational maneuvers that encourage residents to recycle and “recycle right” have been implemented in Atlanta, Chicago and Denver. These educational initiatives commonly include strategies such as having trash collectors tag recycling bins and carts to note when items are improperly disposed and refusing pickup if behaviors do not change over the course of several weeks.

Several states have also initiated wider-reaching education campaigns. For instance, Florida’s [Rethink. Reset. Recycle.](#) initiative offers educational resources directly to residents as well as to local recycling coordinators and public information officers. Additionally, Oregon offers a variety of marketing and educational resources to local governments in order to encourage correct recycling and contamination reduction, and the state Department of Environmental Quality formed a Recycling Market Stakeholder Work Group in response to the issues arising from the Chinese policies.

Contamination fees and fines: Many haulers and processors have begun assessing penalties as a way to recuperate lost revenue and help subsidize additional processing and sorting costs. For example, in Fort Collins, MRF operators have begun to inspect incoming loads for contamination. If loads contain more than 10 percent contamination by volume, they will assess the hauler a penalty fee of \$75 per ton for the load. The fee effectively pays for the contaminated load to be hauled to the nearby landfill and disposed as garbage.

At the curbside level, some haulers have begun levying fines or written citations directly to households and property owners for contaminated bins and carts. The severity of the penalties range from a simple tag on the contaminated carts, to fee-based tickets with a three strikes and you're out (of the recycling program) rule.

Rate increases and hauling surcharges:

Whether due to local policies or ordinances, or contracts with private haulers, some municipalities do not have the option to assess customer or subscriber fines. The additional costs must be paid, however, and many private haulers and processors are now turning to their municipal partners to help share the burden. These private entities have asked cities for increased hauling fees or temporary surcharges. Even in cases in which contracts do not expire for some time, municipalities have generally been amenable to these requests.

Bruce Walker, solid waste and recycling program manager in Portland's Bureau of Planning and Sustainability, sympathized with the haulers, saying they, "were hung out to dry for months" as they sought a rate increase. The city's hauling rates had not been

raised since 2012 thanks to realized hauling efficiencies, but the sudden spike in the cost of processing and marketing the recyclables threatened the viability of the entire service. To address the problem, Portland recently pushed an expedited "emergency" rate increase through its city council to help balance system revenues and costs.

Contract modifications to share risk:

Many municipal contracts with haulers and processors are between five and 10 years in length, extending to around 15-20 years if the agreement involves facility construction. Some contracts have been known to run as long as 30 years. In this market, however, some cities have signed contracts as short as one year in order to avoid a long-term commitment to astronomically high rates.

For instance, the Solid Waste Authority of Palm Beach County, Fla., secured a short-term agreement through a broker with a domestic paper mill to purchase their mixed paper commodity. The agreement ensures both a minimum and maximum price for the paper, and "provides the guaranteed movement of this paper product for twelve months, which stabilizes our movement and minimizes our pricing risk," said Director of Public Affairs and Recycling Willie Puz.

San Antonio entered into contract negotiations with its MRF operator in spring 2016. The city now pays a higher fee to drop its materials at the MRF, but in return it receives a higher share of the revenue - when the MRF has it. Brian Halverson, environmental services manager in San Antonio's Solid Waste Management Department, notes that this arrangement, sharing in the highs while being insulated from the lows, has become an industry trend in the past couple of years.



Image Credit: Spencer Platt/Getty Images.

Ultimately, public-private partnerships play an integral role in local government, and as such the success of private entities is critical to government operations, says Kim Hynes, executive director of the Central VA Waste Management Authority. If the business models are not financially sustainable due to the market conditions, then the government cannot provide waste and recycling services to its residents.



Oregon's commodities market crash

In Portland, local area MRFs paid haulers between \$30 and \$40 per ton of commingled recycling back in 2011 and 2012. Today, haulers pay the MRFs in excess of \$100 per ton. Until recently, however, the city and its residents remained relatively insulated from the costs, as minor increases were incorporated in the annual rate review process. Meanwhile, in Eugene, over 100 miles south of Portland, private haulers collect and ship recyclables to Portland area MRFs, and then pay fees in excess of \$100 per ton to drop the loads at the MRFs. These costs have resulted in limitations on the types of plastics collected in Eugene and other parts of Oregon.

Credit: Natalie Behring/Getty Images.

Rethinking streams: So far, very few cities have elected to eliminate materials from recycling programs or transition from single stream to multiple stream recycling systems. However, cities with multiple stream systems have fewer contamination issues. Concord, Mass., has had dual stream recycling for years, meaning plastic, glass and metal containers are deposited in one bin, while paper is deposited in another. "This separation helps keep the paper stream clean so it can maintain its value," notes Rod Robison, the environmental services program administrator for the town of Concord. While Concord's dual stream recycling program has not incurred contamination fees or surcharges to date, some Massachusetts communities with single stream systems are in vastly different situations because it's harder to keep materials from becoming contaminated.

Despite the benefit of multiple stream systems alleviating contamination, infrastructure expense is a key barrier to making the switch. Different types or numbers of trucks and bins are required to revert to multiple streams from single stream, and many cities have only recently made the switch to single stream. While more streams would reduce contamination and associated sorting costs, it is unclear whether the capital expense would outweigh the savings and higher waste diversion rates brought on by single stream.

Cities should also be cautious because it took years of education and outreach to get residents to recycle as much as they currently do. Eliminating materials now would undo years of work and further confuse residents about what can and cannot be recycled.



The image features a teal gradient background with a faint aerial view of a city and mountains. A white rectangular box with a teal border is centered in the middle of the image, containing the text "CITY PROFILES" in white, bold, uppercase letters.

CITY PROFILES

Several cities are not only taking a proactive approach to the large-scale changes that are rocking international recycling markets, but are also pursuing ambitious goals like zero waste.



The following cities offer examples of what municipal governments can do to safeguard against the negative impacts of the rapidly changing recycling markets as well as build towards sustainable, equitable systems. These cities represent small, medium and large populations.

Durango, Colo.

Until late 2017, Durango, Colo., was making money from its recycling service. The city of roughly 19,000 hauls its own single stream recycling and bales the commingled recycling locally. Friedman Recycling then collects and transports 30 bales per truckload more than 200 miles to its facility in Albuquerque, N.M., for sorting and sale. The city's agreement with Friedman also includes a rebate for commodity sales. However, when the contamination policies went into effect, that rebate disappeared almost immediately. As of April 2, the company began assessing a \$25 per ton surcharge to sort and remove contaminants in the hopes of making the commodities more marketable.

Factoring in the cost of transportation to the Albuquerque, N.M., facility, the \$25 per ton contamination surcharges and the absence of a commodity sale rebate, the city is now paying around \$1,150 per load of recycling. If this continues, the shortfall over the course of a year is estimated to reach \$172,000. The city funds its service from customer fees and receives no tax revenue for the operation, so

the shortfall could essentially put the service out of business.

In response, Durango's city council recently approved a temporary surcharge for all Durango recycling customers. The city's sustainability coordinator, Imogen Ainsworth, notes that the surcharge of \$2.69 "will appear as a separate line on residential and commercial utility bills starting in June and is designed to offset increased fees charged to the city by Friedman [Recycling] for the processing of recyclable material."

Fort Collins, Colo.

On the other side of the state, Fort Collins, Colo., is in a much more fortuitous situation. The local Larimer County Landfill is the only publicly-owned landfill in Northern Colorado and handles a large portion of the region's waste, but it is projected to close in 2025 due to lack of capacity. Without a new approach and strategic plan for materials management and resource recovery throughout the region, the shortfall in regional waste handling capacity could be nearly half a million tons annually by 2040. Fort Collins, along with other regional governments, saw this predicament as an opportunity to rethink how the region could handle waste in a more sustainable way that can advance the city's waste reduction and recycling goals.

Since 2015, Fort Collins has been working with the Larimer County government, as well as

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several neighboring towns and cities to study the region's wasteshed.

The study efforts included an initial waste diversion analysis; an examination of the material makeup of waste in the region as well as additional diversion opportunities; an analysis of existing flows of waste throughout the wasteshed; and an assessment of anticipated future waste flows and infrastructure opportunities. The five recommended infrastructure options include a new county landfill, a new central transfer station, a yard waste organics processing facility, a food waste organics compost facility and a construction and demolition waste processing facility.

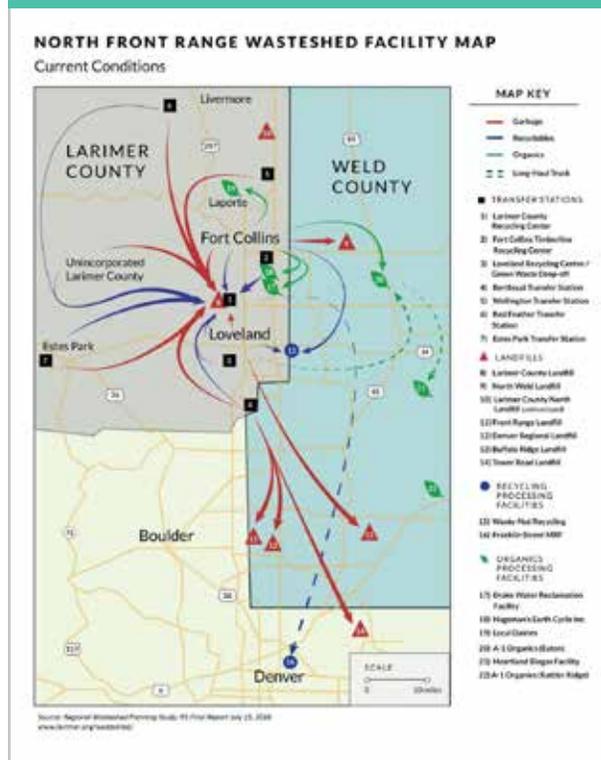
If instituted, the [Regional Wasteshed Plan](#) and proposed infrastructure developments will help the region move from a strategy of waste management to one of resource recovery for a circular economy. Better and more comprehensive waste diversion keeps resources within the cycle of production and utility, enhancing overall sustainability and enabling local industry to use local materials as manufacturing inputs, instead of resorting to virgin or imported materials. As Honore Depew, senior sustainability specialist with the Fort Collins Environmental Services Department, says: "You are not in control of your destiny when you are giving materials over to the landfill - it is a containment facility that is hermetically sealed for all time. Those resources are then lost to businesses that could use them."

The success of the coalition's studies, and the future implementation of the plan, hinge on successful coordination and relationships. The resulting master plan for regional infrastructure recommends that the county commit to financing and building

the five facilities, and that the municipalities commit to supporting process controls that would provide the county facilities with the necessary materials to operate: a yard waste ban and flow control for construction waste and single-stream recycling through hauling licensing requirements. The region will also depend on private industry to operate

What is A Wasteshed?

A wasteshed is analogous to a watershed or foodshed in that the flow of materials transcends the political boundaries of cities, counties and even states. Within the framework of local policies, regulations, and waste and materials processing capabilities, waste and recovered materials will flow according to the most economic path possible, regardless of jurisdictional boundaries.



the facilities and respond to new market opportunities.

Washington, DC

Washington, DC, is relatively unique in that it is entirely dependent on neighboring jurisdictions for waste and recycling processing. However, the District is aiming for a total waste diversion rate of 80 percent by 2032, and has instituted a series of plans to eventually achieve its ultimate goal of zero waste.

In 2014, the city created the Interagency Waste Reduction Working Group to help achieve this goal. This working group is a coalition of the four city departments involved in the various aspects of materials management and waste diversion: the Department of Public Works, the Department of Energy and Environment, the Department of General Services and the Department of Parks and Recreation.

One of the key accomplishments of this coalition was the creation of the [Zero Waste DC](#) website. The website serves as a “one-stop shop” for residents to use as a resource in reducing waste and learning how to handle recycling, composting and special waste streams. The website includes the usual list of acceptable and unacceptable items in each stream, as well as sector-specific information

for residents, businesses, government staff and public schools.

Perhaps the most unique features of the website, however, are the search tool and Waste Sorting Game. The website’s homepage includes a simple and intuitive search function for residents to query where and how a specific item can be safely disposed of or recycled. Searchable items include the basics, such as metal cans and glass bottles, as well as more obscure items, like electric toothbrushes, pumpkins and helium tanks. Meanwhile, the Waste Sorting Game is an interactive game that tests knowledge of proper material handling in the District.

But most strikingly, as China continues to limit the materials it will accept, Washington, DC, has expanded its list of recyclable materials and waste diversion programs. In late 2017, the District announced the expansion of its recyclables list to include food service packaging materials such as pizza boxes, deli and bakery cups and trays, plastic produce containers, and paper and plastic plates, cups, lids and to-go containers. The city partnered with the Foodservice Packaging Institute to help them work with their processors and end markets to gain acceptance of the materials. Such pilot programs are helping cities across the United States address the contamination issues of our current recycling system.



RECOMMENDATIONS

The solid waste and recycling industry is extremely fragmented, and municipal policies vary based on geography, local economic forces and history.



Costs are shifting dramatically within the industry so there are no silver bullets to deal with crashing commodity prices, but some of the approaches described above are proving to be more effective than others. The following recommendations can help city leaders to boost the resilience of local recycling systems and achieve long-term sustainable waste management goals:

Conduct an economic analysis of your current waste management operations.

Costs and revenues have changed significantly over the past year. Before considering any changes to your current operations it is important to know the terms of any contracts, the local costs of hauling and processing, what revenue you are still able to gain from recyclable commodities and where shortfalls may have developed within the system.

Work with contractors

Municipalities, haulers and processors are all in this together. Adjusting or renegotiating the terms of these contracts ahead of schedule will probably be the most common reaction to the new market conditions. Cities should prioritize agreements that are short-term, or that contain risk sharing provisions in anticipation of increasingly uncertain conditions. Palm Beach County's and San

Antonio's modifications were described above, and other cities are taking similar approaches. In almost every city, local governments depend on contractors for the overall success of the system.

Ensure fees and rates reflect current costs.

Even without the recent international import restrictions, the costs of hauling and processing materials are rising due to transportation, wages and capital improvement expenditures. Examine your current subscriber fees and hauling rates to ensure that they have kept pace with inflation, rising costs and market fluctuations. If a process for regular fee and rate evaluation does not currently exist, establish one, but remember that unforeseen circumstances may warrant reevaluation. Ensure that your contractors provide backup information and justification for any rate and fee increase requests.

Evaluate local policies and economic incentives.

Local recycling systems are built around a framework of local policies, regulations and ordinances. Cities should ensure that these frameworks reflect the overall goals for how materials are handled locally and make updates or modifications as necessary. These frameworks can also provide economic, as

well as legal, incentives for recycling. This is particularly important in cases where a city's haulers and processors have business models that are fundamentally misaligned or in conflict with the city's model. Strategic changes to these local policy frameworks can incentivize recycling while making landfilling less attractive.

Explore local and unconventional markets.

Domestic markets are beginning to show signs of growth and expansion to fill the void that China has left in the commodities market. Collaborate with your local economic development office to evaluate your current markets and identify new local and regional opportunities for unconventional or novel uses of your city's recycling commodities. Cities can also use policy, such as tax breaks and recycled materials minimums in procurement, to incentivize and accelerate the creation of these new markets.

Consider your streams.

Study how you can modify your recycling streams to minimize contamination and capitalize on the most valuable commodities within the stream. Many cities have successfully banned certain items from

recycling bins by using fines and citations to encourage proper behavior, as well as prohibiting certain items from trash streams. A waste characterization study like Fort Collins' can help identify the existing composition of both waste and recycling streams as well as inform opportunities for improvement. Commodities that are relatively easy to regulate for the purpose of increasing commodity sales may include cardboard and glass.

Examine asset ownership and consider infrastructure investments.

Although many cities must rely on private facilities and contractors to sort and process their materials, some have the option to develop their own capital assets and infrastructure. Municipal bonds may alleviate construction cost barriers, and facility operation can be contracted out to private companies. Infrastructure investments can also include equipment and technology upgrades that help a facility sort materials and minimize contamination, such as new optical or robotic sorters. This kind of strategy gives municipalities a much greater degree of control over their ability to process and market commodities.

When pursuing any of these recommendations, remember:



Weigh significant changes carefully. Major shifts, such as the outright elimination of previously accepted materials in recycling streams, should not be made hastily. The consumer behavior that contributes to the success of the U.S. recycling system has taken decades to cultivate, and changes can quickly undo years of education and outreach efforts to increase waste diversion. The market continues to rapidly change and evolve, and strategies to manage the issues should be thoughtful, not reactionary.

Educate the public. Education can take many forms and can be used to shape behavior. Outreach campaigns have helped to triple our recycling rate over the past 30 years, and they can make a difference in our mission to combat contamination and recycle properly. Strategies like using bill inserts and social media platforms, and praising residents and businesses for recycling correctly, can be effective. In addition, negative reinforcement has proven to be a successful strategy and can include simple citations and fines.

Use existing toolkits and networks.

Several private, nonprofit and membership association organizations have developed toolkits for municipalities to use to encourage proper recycling. A few examples include:

- Waste Management, the largest materials management company in North America, offers a variety of resources through its *Recycle Often. Recycle Right.* website (www.recycleoftenrecycleright.com).
- The Recycling Partnership (www.recyclingpartnership.org) offers several educational and marketing toolkits, as well

as research and best practices guidance, grant programs and technical assistance.

- The National Recycling Coalition (www.nrcrecycles.org) is a membership and advocacy organization that works to promote and enhance recycling in the United States. It offers its members educational resources such as webinars, articles and events, and advocates for policy that supports sustainable materials management.
- The Solid Waste Association of North America, or SWANA (www.swana.org), is a membership and advocacy organization focused on the responsible use of waste as a resource. SWANA offers certifications and trainings to its members as well as conferences to encourage networking and strategic partnerships.

Work with partners. Government partnerships can take a variety of forms, such as interdepartmental collaboration within municipal governments to examine economic development strategies, working with the private sector to incentivize processing and use of recycled materials, and partnering with other public and private entities such as research institutions and neighboring governments. Notably, partnerships with research institutions – including private think tanks, non-profits and universities – can help cities better understand the larger and longer-term market and development strategies associated with recycling. Meanwhile, regional collaboration with neighboring local governments can be invaluable to the alignment of policies and strategies for the benefit of larger geographic areas and populations.

Endnotes

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