

Briefing Paper Executive Summary

Challenges Facing Recycling in the Northeast

Like other commodities, recyclables have always been subject to market fluctuations. Since the early 1980s, China has been a key market for paper and plastic recyclables collected in residential recycling programs. The Chinese Government's recent policy, which imposes strict standards on the imports of recyclable commodities, is having a dramatic impact on recycling across the U.S. The policy bans the import of mixed paper and plastic unless they meet virtually unachievable contamination limits. The recycling industry has been forced to find alternative markets for the materials China will no longer accept. Higher shipping costs and a flooded market have led to low prices and increased costs to process recyclables to higher quality standards. Cities and towns across the region are feeling the impact of China's recent policies on imports and regional market disruptions as MRF operators seek to alter contracts, charge more for their services, and end revenue sharing. This also comes at a time when landfill tipping fees are increasing.

Over the past decade, the composition of MSW has been evolving with less newsprint, office paper, and glass containers and more plastic packaging and corrugated cardboard. At the same time, the trend toward light-weighting aluminum, steel, and plastic containers to reduce raw material and shipping costs is lightening the waste stream. Packaging innovation has produced lightweight packaging, such as multi-layer, multi-resin pouches, and more products in shelf-stable aseptic cartons (e.g., beverages and soups). The changing waste stream means MRFs are processing lighter weight materials with less scrap value, thus increasing costs.

Increasingly in the northeast and elsewhere in the U.S. recycling has transitioned from a dual stream to a single stream or mixed collection system. These programs collect all recyclables in one container and have been implemented by haulers and municipalities due to their convenience and ease of participation. Trash, including food waste, is collected separately. Single stream programs typically result in more recyclables being collected, but they have also led to a significant rise in contamination of the recyclable materials. Contamination drives up costs, limits the ability to market recyclables, and decreases the value of what is recycled.



Briefing Paper
Northeast Committee on the Environment (NECOE)
Challenges Facing Recycling in the Northeast
Prepared by the Northeast Waste Management Officials' Association
(NEWMOA) & the Northeast Recycling Council (NERC)
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This briefing paper identifies some of the challenges facing residential recycling programs in the northeast. It describes the overall economic benefits of recycling for the region and focuses on paper, glass, and plastic as key materials that are challenging in the current markets for recycled materials.

Background

The overall U.S. municipal solid waste (MSW) recycling and composting rate was approximately 34.7 percent for 2015, according to the U.S. EPA.¹ In many locations, municipal recycling programs focus on paper, plastic, glass, and metal. However, there are differences in what is collected among municipalities.

States in the northeast use inconsistent methodologies for estimating recycling, and many agency staff report low confidence in the available data. Solid waste program staff have reported greater confidence in the disposal data that they collect from permitted facilities. Because of data challenges, this paper does not present or compare the states' recycling rates.

Economics of Recycling

According to the Institute of Scrap Recycling Industries (ISRI), the total number of jobs created directly and indirectly (through suppliers and related jobs) as a result of the recycling of scrap metals, plastics, textiles, glass, and electronics in 2017 in the seven Coalition of Northeast Governors (CONEG) states was approximately 44,112. This translated to more than \$3.25 billion in wages.²

Recycled materials are part of an international marketplace, and many factors impact them. Some of these contribute to market volatility, including the price of oil; the price of virgin resin; transportation costs and access; the value of the U.S. dollar; China's new policies; and the economies of foreign markets. Like other commodities, recyclables have always been subject to market fluctuations.

¹ https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf

² [http://www.isri.org/docs/default-source/recycling-analysis-\(reports-studies\)/economic-impact-2017_updatedfinal.pdf?sfvrsn=4](http://www.isri.org/docs/default-source/recycling-analysis-(reports-studies)/economic-impact-2017_updatedfinal.pdf?sfvrsn=4)

Since the early 1980s, China has been a key market for paper and plastic recyclables collected in residential recycling programs. The Chinese Government's import policies, which imposes strict standards on imports of recyclable commodities, is having a dramatic impact on recycling across the U.S. The policy bans the import of mixed paper and plastic unless they meet virtually unachievable contamination limits. The recycling industry has been forced to find alternative markets for the materials China will no longer accept. Higher shipping costs and a flooded market have led to low prices and increased costs to process recyclables to higher quality standards. According to ISRI, in the first seven months of 2017, 60 percent of U.S. paper, and 36 percent of U.S. plastic went to China. In the same period in 2018, those percentages changed to 40 percent for paper and 5 percent for plastic.³

The latest round of Chinese tariffs may have impacts as well. This summer, the Chinese Government announced that it plans to levy a 25 percent tariff on old corrugated cardboard (OCC) and other recovered fiber, in retaliation to U.S. tariff proposals.⁴ These tariffs went into effect on August 23. According to *Resource Recycling*, China's Ministry of Commerce on August 8 issued the latest list of tariffs the country is planning to implement on imports of goods from both the U.S. and Canada.⁵ The list identifies OCC and all other recovered fiber materials among the product codes that would be subject to a 25 percent duty. The action also covers all scrap plastics sent to China, as well as a number of scrap metals.⁶

Cities and towns across the region are feeling the impact of China's policies and regional market disruptions as MRF operators seek to alter contracts, charge more for their services, and end revenue sharing. In many communities, the per ton cost of recycling now exceeds that of trash disposal, even though landfill tipping fees are increasing. Despite these present challenges, when viewed as a long-term strategy, recycling has helped cities and towns, boosted the region's economy and provided jobs, and improved the environment. MRFs are an important part of local economies and with the evolving economics for recycling programs, state and local agencies need to continue to support their activities and the jobs they support.

Changing Materials in the Recycling Stream

Over the past decade, the composition of MSW has been evolving with less newsprint, office paper, and glass containers and more plastic packaging and corrugated cardboard. At the same time, the trend toward light-weighting aluminum, steel, and plastic containers to reduce raw material and shipping costs is lightening the waste stream.

Demand for paper in newsprint and products, other than for corrugated cardboard, has declined for at least the past decade. The most dramatic reduction has been in newspaper use. This is due to the increased use of electronic devices and the light-weighting of newsprint. North American newsprint shipments went from about 19.2 million metric tons in 2000 to 5.662 million metric

³ Reported as part of a September 2018 email exchange between ISRI and NERC.

⁴ <https://www.waste360.com/financials/current-state-recovered-paper-markets>

⁵ <https://resource-recycling.com/recycling/2018/08/08/china-to-enact-tariffs-on-occ-and-other-recycled-paper/>

⁶ <https://resource-recycling.com/recycling/2018/08/08/china-to-enact-tariffs-on-occ-and-other-recycled-paper/>; <https://www.waste360.com/legislation-regulation/chinas-changing-import-regulations-what-does-it-all-mean>

tons in 2017.⁷ Newspaper historically made up 60 percent of the recyclables collected, and all types of paper made up 80 percent of the materials that the MRFs received.⁸

Packaging innovation has brought lightweight packaging, such as multi-layer, multi-resin pouches, and more products in shelf-stable aseptic cartons (e.g., beverages and soups). The changing waste stream means MRFs are processing lighter weight materials with less scrap value, thus increasing costs.⁹ Therefore, recyclers need to process more material to generate a ton of recyclables. Processing costs are incurred by volume, but revenue is by weight. These shifts and the others outlined above have been affecting the business models that have long dictated the designs of the MRFs.

Trends in Municipal Collection for Recycling

Increasingly in the northeast and elsewhere in the U.S. recycling has transitioned from a dual stream to a single stream, or mixed collection system. These programs collect all recyclables, including glass, paper, plastic, and metal in one container and have been implemented by haulers and municipalities due to their convenience and ease of participation. Trash, including food waste, is collected separately. The use of single stream recycling (SSR) has grown rapidly in the region during the past five years. For example, there were 81 communities in Massachusetts with SSR systems in 2011; by 2017 146 communities had transitioned.¹⁰ In most single stream programs, the traditional 18-gallon recycling bin has been replaced by a 64- or 95-gallon cart. Single stream programs typically result in significantly more recyclables being collected due to the convenience for residents and allow additional space for a bulky recycling stream.

Coupled with the growth of single stream collection and the use of large containers, there has been a significant rise in contamination of the recyclable materials. Contaminants are those materials that are not “wanted” by the end-market. For example, a paper recycler does not want glass, wet paper, plastic bags, or other materials in a bale. These items constitute contamination. Contamination drives up costs, limits the ability to market recyclables, and decreases the value of what is recycled.

Paper

According to EPA’s latest estimates, paper is approximately 26 percent of total MSW in the U.S.¹¹ The overall U.S. paper and paperboard recovery rate dipped from 67.2 percent in 2016 to 65.8 percent in 2017.¹² Paper collection and recycling focuses in general on newsprint, office paper, magazines, cardboard, and boxboard. There has been a 20 percent decline in mixed-paper exports as a result of China’s imposition of recovered paper import restrictions.¹³ Single stream recycling has resulted in an increase in the amount of “mixed paper” that comes out of MRFs, that is low value and until 2018 was shipped abroad, mostly to China. Old corrugated cardboard is the only paper being shipped to China in significant quantities now. With the ongoing National Sword’s tight contamination limits on mixed paper, the overall decline in material exported to

⁷ <https://www.paperrecycles.org/statistics/recovery-of-old-newspapers-mechanical-papers>

⁸ April 27, 2015, Dylan de Thomas, Resource Recycling presentation to the Maine Resource Recovery Association

⁹ Susan Robinson, Waste Management, November 13, 2014 Presentation, EPA SMM Webinar Academy - http://www2.epa.gov/sites/production/files/2015-09/documents/changng_wste_stream.pdf.

¹⁰ <https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns>

¹¹ https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf

¹² <https://www.paperrecycles.org/statistics/paper-paperboard-recovery>

¹³ As reported by ISRI to NERC via email.

China is expected to continue until the ban on all material imports for recycling takes place in 2020.

Demand for cardboard has increased significantly since 1990 due to the increase in e-commerce packages and shipment of products directly to consumers. There are important markets for OCC in the U.S. and Canada. Consumption of recovered paper at U.S. paper and paperboard mills rose about 1 percent in 2017 and has grown steadily within the past five years, resulting in a cumulative increase of about 5 percent since 2012.¹⁴ Other domestic uses of recovered paper include use as a base material for insulation and molded paper products. Demand for other types of paper has been dropping, particularly newsprint (as noted above.).

Plastics

According to EPA's latest estimates, plastic is approximately 13 percent by weight of total MSW in the U.S.¹⁵ In the past, the high demand for collection of plastic for recycling focused on number 1 polyethylene terephthalate (PET), (e.g., containers for liquids and food and fibers for clothing) or number 2 high-density polyethylene (HDPE) (e.g., certain plastic bottles, lumber, piping, food storage containers, and bags), but the National Sword restrictions have had a significant impact on the market for these materials. Many communities also collect numbers 3, 4, 5, 6, and 7, however markets for some of these materials are less prevalent. The markets for number 5 plastic (polypropylene) has been growing because of its use in containers, caps, packaging, and other products.

The Association of Plastic Recyclers¹⁶ is working with MRFs and processors, who convert plastic into useable materials (e.g., pellets) and sell it to end users to help smooth out market fluctuations for recycled plastics. This includes creating specifications for new types of materials to ensure that end users for those materials obtain what they can use.

Glass

According to EPA's latest estimates, glass is approximately 4.4 percent of total MSW in the U.S.¹⁷ Glass collection and recycling at the curb focuses on mixed colored and clear glass. There is a demand for high-quality glass cullet.¹⁸ Of the seven CONEG states, five have bottle bill programs. Glass from these programs is generally clean and is shipped directly to the glass processors (not through MRFs) and then is primarily shipped to glass bottle and fiberglass manufacturers.

NERC recently released the results of a 2017 survey on MRF glass¹⁹ in the 11-state NERC region (includes Delaware, New Jersey, Pennsylvania, and Maryland in addition to the seven CONEG states). In 2017, there were six glass manufacturers – five glass container and one fiberglass – in the Northeast. There were ten glass processing facilities in the NERC region. In

¹⁴ <https://www.paperrecycles.org/statistics/paper-paperboard-recovery>

¹⁵ https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf

¹⁶ <http://www.plasticsrecycling.org/>

¹⁷ https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf

¹⁸ <http://www.gpi.org/>; Cullet.net: <http://www.cullet.net/cgi-bin/mexview.cgi?wsc=01-0901>

¹⁹ <https://nerc.org/documents/Glass/Northeast%20Recycling%20Council%20-%20MRF%20Glass%20Survey%20Report.pdf>

the New England states, there was one glass container manufacturer and one fiberglass manufacturer.²⁰

In 2018, several market changes significantly affected the recycled glass markets. As a general rule, glass does not move more than 500 miles from the collection point for processing/use due to its weight and the cost of transportation. The closure of two facilities in New England have left the region without a nearby glass processing and container end market for MRF glass. A Massachusetts-based glass container manufacturer that used a significant amount of recycled glass closed in March 2018, and a facility in Rhode Island also closed that spring.²¹

NERC's survey found that the 45 MRFs (out of 91 contacted) that responded handled about 411,000 tons per year of glass in 2017. Some MRFs are not able to produce the quality of glass that manufacturers can use. Glass fines often end up mixed with the facility's residue that contains dirt and small-sized paper, plastic, and metal contamination. For the 45 MRFs that responded to NERC's survey, about 54 percent of their glass was sent to a glass processor to be cleaned, about 24 percent was used as alternative daily cover, and almost 15 percent was landfilled as trash.²² Other uses, including use as aggregate and road-base aggregate are a much smaller percentage. Some MRFs have recently started to employ more sophisticated sorting technology that improves the quality of recovered glass or to conduct an additional processing step to recover a cleaner glass product from the residue. Encouraging other MRFs to make the similar investments could be an important aspect of addressing this challenge. NERC found that the primary issues with recycled glass for the MRFs are the wear and tear on their equipment, lack of markets, contamination, and cost.²³

In the northeast, there are several new glass processing/recycling facilities that are about to open. Pace Glass is one example, and they are building a mixed glass plant in New Jersey that will begin operations next year. The company has spent about \$90 million on the new facility, which some claim will be the largest in the world. Once operational, the plant is expected to process anywhere from 550,000 to 750,000 tons per year and handle at least all of the mixed glass that is generated in New Jersey.²⁴ The glass is converted to cullet, which can either be transported to nearby manufacturing facilities or placed into onsite melting furnaces. The residual dust can be sold as filler for a variety of different products.²⁵ Another company, Urban Mining Northeast, is working to open a facility in Connecticut to use mixed glass to make a cement replacement product, called Pozzotive.²⁶ They predict that once they are fully operational, they will be able to consume all of the MRF glass in Connecticut. They are currently working on the necessary CT DEEP permits and hope to start taking glass next summer.

Some communities have begun to try to improve the quality of collected glass by adding drop-off locations. A few municipalities are piloting or considering trying this approach by carefully installing drop-offs that are conveniently accessible for residents. In Connecticut, for example,

²⁰ Glass Packaging Institute's Glass Resource locator: <http://www.gpi.org/glass-resource-locator>

²¹ <https://nerc.org/documents/Glass/Northeast%20Recycling%20Council%20-%20MRF%20Glass%20Survey%20Report.pdf>, p. 12.

²² <https://nerc.org/documents/Glass/Northeast%20Recycling%20Council%20-%20MRF%20Glass%20Survey%20Report.pdf>, p. 12.

²³ <https://nerc.org/documents/Glass/Northeast%20Recycling%20Council%20-%20MRF%20Glass%20Survey%20Report.pdf>, p. 4.

²⁴ <https://www.wastedive.com/news/pace-glass-Valiotis-national-ambitions-northeast/538699/>

²⁵ <https://waste-management-world.com/a/pace-glass-begins-construction-of-worlds-largest-glass-recycling-facility>

²⁶ <http://www.urbanminingne.com/>

DEEP is evaluating proposals for several pilot programs in communities allowing them to collect glass separately from curbside collection. In Massachusetts, two communities are establishing regional sites to convert glass to processed glass aggregate. Mass DEP grants are funding their equipment and start-up costs, and communities that deliver glass to a regional site will be required to take back an equivalent amount in processed glass aggregate for use in public works drainage and constructions projects.

Education & Outreach

SSR programs usually provide large bins to residents for collection of recyclables. This has greatly increased the amount of material that programs are collecting. However, the education of residents in the programs has not kept up. Depending on the location, neighboring cities and towns may have different materials that they collect for recycling. Anecdotally, it appears as though the local investment in recycling education programs had been in decline in many areas in the region until recently; and creating cross-community education programs is challenging since the collection systems differ.

In general, municipalities communicate with households about what is recyclable at the curb or transfer stations. Nevertheless, people are often confused about what to put in their SSR bins. The changes in the waste streams described above have added to this confusion. Residents include materials that they “wish” were recyclable. In a Mass DEP market research survey, 48 percent of respondents characterize themselves as “wishful recyclers”, meaning they put items in the recycling bin that MRFs are not designed to sort and recover, such as plastic bags, Styrofoam, large metal objects, textiles, and garden hoses.²⁷ Researchers concluded that while the public believes they are doing a good job recycling, and that it’s easy and they know the rules, in fact, they are misinformed and do not know the rules. A lesson from this study is that state programs and municipalities need to do a better job recalibrating the public’s understanding of what can and cannot be recycled in the bin, while being careful not to discourage people or make them feel that the programs are slapping their hands.

Massachusetts DEP has launched a Recycling IQ Toolkit to help municipalities address SSR contamination.²⁸ They are providing grants to communities to implement the toolkit. Connecticut DEEP has developed a “What’s IN, What’s OUT” campaign that involves a universal list of recyclables for the State, and they are conducting a variety of programs to educate residents on the list.²⁹ Massachusetts has recently launched a “Recycle Smart”, effort that focuses on educating residents about proper recycling.³⁰

Some municipal recycling and state programs in the region have recently launched public education campaigns combined with greater enforcement, which could provide models for others. The Recycling Partnership³¹, Waste Management³², and Keep America Beautiful have also launched public education campaigns to address the challenges outlined above.

²⁷ <http://www.mass.gov/eea/docs/dep/public/committee-4/recpart15.pdf>

²⁸ <https://mdep.app.box.com/s/koy7igtfnlsqnl0dyjoi3k1tehe3zcj7>

²⁹ <http://www.recyclect.com/>

³⁰ <https://recyclesmartma.org/>

³¹ www.recyclingpartnership.org

³² See “Recycle Often. Recycle Right” at www.recycleoftenrecycleright.com

What NEWMOA & NERC Are Doing to Address These Challenges

In 2017, NERC and NEWMOA created a partnership to implement a Joint Strategic Action Plan³³ that among other strategies set out to address recyclables collection strategies and impacts on manufacturing/end-users. In 2018, they jointly organized a series of well-attended national webinars highlighting models and successful programs to address contamination from SSR, including the programs underway in Massachusetts and Connecticut.³⁴ They also began a conversation among the state programs about how to harmonize recycling symbols and images so that they are consistent around the region.³⁵ That discussion is ongoing.

In 2019, the groups are working with the Recycling Partnership³⁶ to host a workshop in the spring focused on what municipalities can do to address SSR contamination and how to develop a successful program. The workshop will target state and local government officials.

In 2018, NERC launched a Regional Recycling Markets Committee, composed of state officials and others that focuses on ways to incentivize and expand markets for recyclables in the region. Initial priorities are mixed paper markets and addressing contamination. NEWMOA is involved in the committee, which is meeting monthly and intends to develop recycling market resources, and recommendations for addressing mixed paper markets and improving the quality of collected residential recyclables and processed at MRFs.

In October 2017, NERC developed a committee of state officials and others that focuses on glass collection and recycling that has been meeting regularly. In early October 2018, it published the report noted above based upon an extensive survey and interviews of MRFs and end markets.

Over the summer and fall of 2018, NEWMOA and NERC have been meeting regularly with a group of national solid waste organizations, including Keep American Beautiful (KAB), the Solid Waste Association of North America (SWANA), the Institute of Scrap Recycling Industries (ISRI), the National Waste and Recycling Association (NWRA), and EPA Headquarters, to discuss development of a national campaign focused on educating residents about proper recycling and what not to include in their recycling bins. As of October 2018, the group had not yet agreed upon a single education campaign, but work is continuing.

Lastly, NERC's fall 2018 conference – October 30 -31— in Hartford, CT focused on the “Future of MRFs”.³⁷

About NEWMOA

The Northeast Waste Management Officials' Association (NEWMOA) is a non-profit, non-partisan, interstate association whose membership is composed of the state environment agency programs that address pollution prevention, toxics use reduction, sustainability, materials management, hazardous waste, solid waste, emergency response, waste site cleanup, underground storage tanks, and related environmental challenges in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

³³ http://newmoa.org/publications/Joint_NEWMOA-NERC_Strategic_Action_Plan-June_2017.pdf

³⁴ <http://www.newmoa.org/events/event.cfm?m=321>; <http://www.newmoa.org/events/event.cfm?m=314>; <http://www.newmoa.org/events/event.cfm?m=307>.

³⁵ <http://www.newmoa.org/events/event.cfm?m=327>

³⁶ <https://recyclingpartnership.org/>

³⁷ See <https://nerc.org/conferences-and-workshops/event-agenda>

NEWMOA' mission is to provide a strategic forum for effectively solving environmental problems through collaborative regional initiatives that:

- Advance pollution prevention and sustainability
- Promote safer alternatives to toxic materials in products
- Identify and assess emerging contaminants
- Facilitate adaption to climate change and mitigate greenhouse gas sources
- Promote reuse and recycling of wastes and diversion of organics
- Support proper management of hazardous and solid wastes
- Facilitate clean-up of contaminant releases to the environment

For more information, visit www.newmoa.org.

About NERC

The Northeast Recycling Council (NERC) is a multi-state non-profit organization whose programs emphasize source reduction, reuse, recycling, composting, environmentally preferable purchasing (EPP), and decreasing the toxicity of the solid waste stream in the 11-state region comprised of Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Maryland, Pennsylvania, Rhode Island, and Vermont. Its mission is to minimize waste, conserve natural resources, and advance a sustainable economy through facilitated collaboration and action. For more information, visit <https://nerc.org/>.

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