

# Waste Reduction and Resource Recovery Plan Goals and Metrics Recommendations September 2018 Draft

## Executive Summary

### Purpose

This document lays out recommendations to fulfill the goals and metrics portion of the Governor's 2017 Executive Order, entitled *Waste Reduction and Resource Recovery Plan for Maryland* (the "EO"). Specifically, the EO calls for the Department to consult with stakeholders and recommend to the Governor:

- An improved method of quantifying and tracking statewide waste diversion;
- Voluntary statewide goals to encourage continuous improvement in sustainable materials management; and
- A method of obtaining business waste diversion data.

In making these recommendations, the Department seeks to incorporate principles of the State's sustainable materials management (SMM) policy, also laid out in the EO. Goals and metrics that take a SMM approach should consider the impacts of materials management throughout the entire lifecycle of products (not just at end-of-life), including through waste prevention. They should be linked to the extent possible with environmental outcomes that the State seeks to achieve. Finally, they should take into account the differences in impacts from different types of materials, and seek to incorporate the most comprehensive data available.

Currently, the Department tracks county and statewide recycling rates and waste diversion rates. The waste diversion rate consists of the recycling rate plus a "source reduction credit" of up to 5 percentage points, based on waste reduction activities conducted by the counties. While these metrics are useful, they have some limitations. In particular, they focus only on end-of-life management of materials, do not necessarily correspond with optimal environmental outcomes, and treat all materials the same in terms of their contribution toward the recycling rate. In addition to these limitations, the Department and counties experience some data limitations, particularly in the collection of commercial sector recycling data, which is provided voluntarily by businesses.

### Recommendations

**Voluntary Statewide Metrics and Goals.** Table ES-1 lists the recommended metrics to be tracked, along with voluntary statewide goals corresponding with each metric. All goals stated are to be achieved by 2035.

**Table ES-1 – Voluntary Statewide Metrics and Goals – Recommendations**

<b>Metric</b>	<b>Goal</b>
Waste generation per capita	Reduction in the amount of waste generated by 10% to 5.5 lbs/person/day
Greenhouse gas (GHG) emissions reductions from materials management	Statewide annual reduction of 1.2 million MTCO <sub>2</sub> e in 2035, compared to a baseline year of 2016
Reduction in energy usage associated with materials management	Statewide annual reduction of 4.3 trillion BTUs in 2035, compared to 2016.
Material-specific recycling rates	Voluntary recycling rate goals for each county of: <ul style="list-style-type: none"><li>• Food scraps – 60%;</li><li>• Yard trimmings – 85%.</li><li>• Glass – 55%;</li><li>• Metal – 75%;</li><li>• Paper products – 65%; and</li><li>• Plastic – 25%.</li></ul>
Overall statewide recycling and waste diversion rate goals	Maintain the goals of 55% recycling and 60% waste diversion currently in the statute, but extend the timeframe to 2035.

**Business Waste Diversion Data.** The following recommendations are made to improve the collection of waste diversion data from businesses.

- The Department should develop an online reporting site where businesses can go to report their waste diversion data. The reporting site will allow one-stop reporting for businesses no matter which county they are located, and will be simplified as much as possible, with clear instructions.
- The Department should promote the new reporting site on its website, through contacts with businesses (such as through the Maryland Green Registry), and with relevant business groups. The Department should notify recycling processors of the website.
- Individual counties should refer other businesses within their jurisdictions to the site to report their waste diversion data.
- The online reporting site should collect email contact information of the businesses reporting, so that businesses can be reminded in a low-cost manner to submit reports annually.
- Waste diversion data collected by the Department through the reporting site should be distributed to counties, in spreadsheet format, so the counties can total waste diversion totals for businesses within their county.

Additionally, the following recommendation is made in order to improve information-sharing across businesses to facilitate waste diversion.

- The Department should work with the Department of Commerce, similar agencies in other states, and private sector stakeholders to promote a materials exchange system in Maryland or the Mid-Atlantic region.

**Source Reduction (SR) Credit System.** The following recommendations are made with respect to the existing SR credit system.

- The Department should maintain the current SR credit system with modifications.
- Food scraps reduction activities should be prioritized in the checklist. They should be given the same status as yard trimmings reduction activities in terms of providing credit.
- The checklist should be revised to allow counties to propose new and innovative SR activities for credit on a case-by-case basis that are not specifically listed on the checklist.

## Introduction

In 2017, Governor Hogan signed Executive Order 01.01.2017.13, entitled *Waste Reduction and Resource Recovery Plan for Maryland* (the EO). Among other initiatives, the EO requires the Maryland Department of the Environment (the Department) to consult with relevant stakeholders to assess and improve the State's methodology for tracking waste generation, recycling, and source reduction in Maryland. Following stakeholder consultation, the Department shall recommend to the Governor:

- An improved method of quantifying and tracking the statewide waste diversion;
- Voluntary statewide goals to encourage continuous improvement in sustainable materials management; and
- A method of obtaining business waste diversion data.

In addition to the specific directives above, the EO lays out a new sustainable materials management (SMM) policy for the State. This policy provides a set of principles that can guide the development of new metrics and goals. SMM is a way of rethinking how society uses and manages materials to minimize their negative impacts and achieve sustainability. It is a broader approach than traditional solid waste and recycling planning. Specifically, metrics and goals that take a SMM approach should:

- Consider the impacts of materials management throughout the lifecycle of products, not just at end-of-life;
- Be linked to environmental outcomes, such as reductions in greenhouse gas (GHG) emissions and energy usage;

### Maryland's SMM Policy

It is the policy of the State that solid waste and recycling planning should, to the extent practicable, seek to:

- (1) Minimize the environmental impacts of materials management over their entire life cycles, including from product design to production, consumption, and end-of-life management;
- (2) Conserve and extend existing in-State disposal capacity through source reduction, reuse, and recycling;
- (3) Capture and make optimal use of recovered resources, including raw materials, water, energy, and nutrients; and
- (4) Work toward a system of materials management that is both environmentally and economically sustainable in the long term.

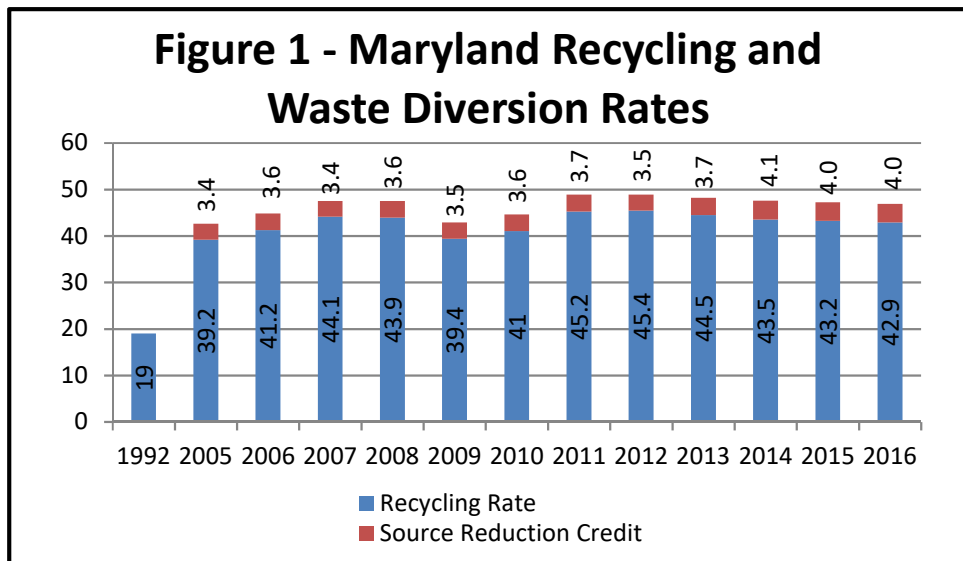
- Recognize that the types of materials managed are as important as the overall tons, in terms of environmental impact; and
- Seek to incorporate the most comprehensive data available, including from the commercial sector.

## Current Metrics and Goals

Currently, the primary metrics tracked in Maryland are those established under the Maryland Recycling Act (MRA). These include county and statewide recycling rates and waste diversion rates. The waste diversion rate consists of the recycling rate plus a “source reduction credit” of up to 5 percentage points. The credit is derived from activities that the counties report having conducted to reduce the generation of waste (*e.g.*, conducting waste prevention outreach). Under the MRA, counties are required to plan for and meet minimum recycling rates of 20 or 35 percent, depending on their populations. In 2012, the State established a voluntary statewide goal of 55 percent recycling and 60 percent waste diversion by 2020.

Figure 1 below shows historical statewide recycling and waste diversion rates. Maryland’s waste diversion rate has increased steadily from a 19% recycling rate in 1992 to the 46.9% waste diversion (*i.e.*, 42.9% recycling rate + 4% source reduction credit) rate in 2016. While this waste diversion rate is good news, the rate has stabilized over the last 12 years. This recent trend is in line with the national trend toward the stabilization of recycling rates. There are a number of possible reasons for this.

- As recycling rates increase, it becomes more difficult to sustain the same rate of progress since the most easily recyclable and higher-value materials have already been captured, leaving materials that are technologically, logistically, or economically challenging to recycle. (The same principle applies to generators that are relatively difficult to reach, such as those in rural areas where efficient collection is difficult.)
- The composition of the waste stream changes over time. With technological advances, many products have been redesigned to be lighter, particularly packaging. Some light-weighting is achieved by replacing heavy but recyclable materials with lighter but not as recyclable materials, such as film plastics. To the extent that highly recyclable materials compose a smaller share of the waste stream relative to less frequently recycled materials, it becomes more difficult to improve a weight-based recycling rate.
- A third consideration is that markets for recyclables are variable and can impact the recycling rate. A recent example is the impacts to recycling markets resulting from tightening import policies in China and other significant importers of U.S. recyclables. (Note, however, that any impact from these policies would be too recent to be captured in available Maryland data.)



There are some advantages to tracking recycling and waste diversion rates. They are relatively simple to calculate and understand, and they are useful to track progress over long periods of time because of the availability of historical recycling rate data. They also provide an indication of what is occurring with materials at end-of-life, which is why they are an important aspect of the MRA. However, to move toward a broader SMM policy, it will be useful to track additional metrics that provide a more complete picture, taking into account all lifecycle phases of materials, environmental impacts, and material-specific data.

## New Metrics and Goals

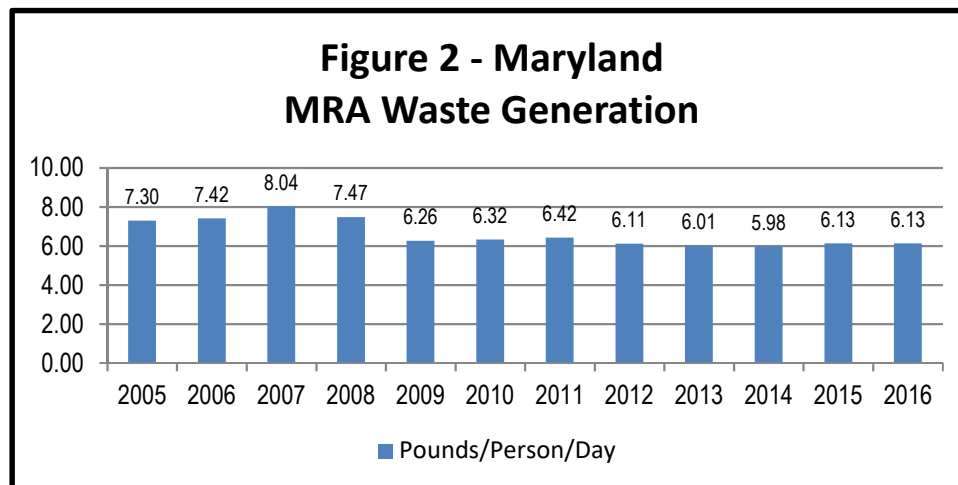
### Waste Generation Per Capita

**Background.** Waste generation per capita provides an indication of the total amount of waste that is produced for disposal or recycling, while controlling for changes in population over time. This metric allows for tracking upstream changes that avoid waste before it occurs, including in the materials extraction, manufacturing, distribution, sale, and consumption lifecycle phases. The following are examples of progress that would be captured in per capita waste generation but not in a recycling rate:

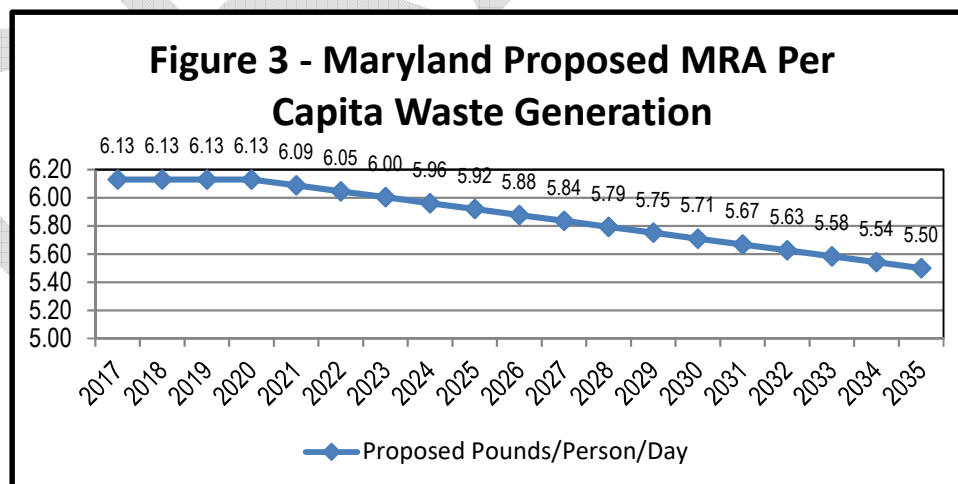
- A business redesigns a product so that it has a longer life span, is more easily repaired, or requires less packaging;
- A university transitions to reusable food service-ware;
- A business converts a major process to an electronic system, reducing paper usage; and
- A resident manages yard trimmings and food scraps in a backyard compost bin rather than setting them out at the curb.

Maryland generated a high of 8.04 lbs./person/day of MRA waste in 2007. Generation was consistently above 7 lbs./person/day prior to the great recession in 2009. Beginning in 2009, MRA waste generation in Maryland dropped to 6.26 lbs./person/day ( $\approx 17\%$  drop) and has consistently stayed around the 6 lbs./person/day level. In 2016, the last year for which data is

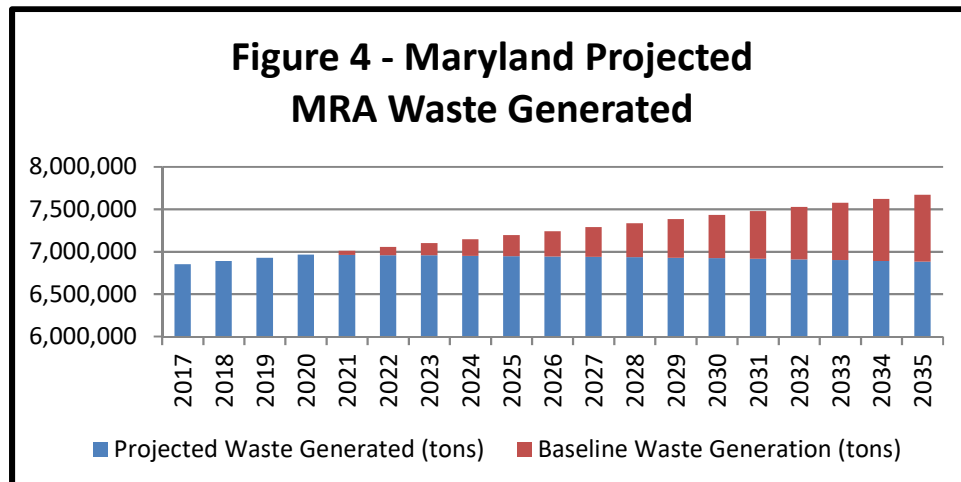
available, Maryland generated 6.13 lbs./person/day of MRA waste. Figure 2 shows the historical waste generation per capita.



**Recommendations.** The Department recommends a goal to reduce the amount of MRA waste generated by 10% to 5.5 lbs/person/day by 2035. The proposed 10% reduction was deemed reasonable based upon the 17% reduction in 1 year that occurred from 2008 to 2009, and maintained through 2016. National data has begun to show a decoupling of waste generation and gross domestic product, suggesting that reductions in per capita generation are possible even outside economic downturns. Figure 3 shows the proposed MRA waste generation rates through 2035. Figure 4 shows the total tons of MRA waste generation with the proposed goal, compared with the baseline tons of generation (assuming no reduction in per capita waste generation).







## GHG Emissions Reductions from Waste Diversion

**Background.** One of the most important environmental outcomes associated with waste diversion is a reduction in GHG emissions. Maryland has a goal to reduce overall GHG emissions by 25% by 2020 and 40% by 2030, relative to 2006 levels. The EPA Waste Reduction Model (WARM) calculates GHG (MTCO<sub>2</sub>E) emissions and energy (BTU) usage of associated with different materials management scenarios. The WARM model is a lifecycle accounting tool, meaning that it factors in emissions from the entire lifecycle: raw materials extraction, manufacturing or processing, transportation, use, and end-of-life management. As a SMM metric, tracking GHG emissions reductions has the following advantages:

- Includes the impacts of source reduction, recycling, composting, landfilling, and combustion over the lifecycle of materials;
- Accounts for the differing impacts of different types of materials; and
- Is directly linked to an environmental outcome that the State seeks to achieve.

The following WARM table (Table 1) compares GHG savings of managing materials in different ways. The data has been adjusted to assign landfilling a neutral value (0) to make comparing items to landfilling easier. A negative value means a GHG emissions reduction vs. landfilling. The greater the negative value the greater the savings. For most materials, the benefit of source reduction exceeds that of recycling, and the magnitude of impacts varies significantly by material, underscoring the importance of a metric that captures these nuances.

**Table 1 - Greenhouse Gas Values for 1 Ton of Material**

Material	GHG Emissions per Ton of Material Source Reduced (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Recycled (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Landfilled (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Combusted (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Composted (MTCO <sub>2</sub> E)	GHG Emission per Ton of Material Anaerobically Digested
Aluminum Cans	(4.93)	(9.13)	0.00	0.02	NA	NA
Aluminum Ingot	(7.49)	(7.21)	0.00	0.02	NA	NA
Asphalt Concrete	(0.13)	(0.10)	0.00	NA	NA	NA

Material	GHG Emissions per Ton of Material Source Reduced (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Recycled (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Landfilled (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Combusted (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Composted (MTCO <sub>2</sub> E)	GHG Emission per Ton of Material Anaerobically Digested
Asphalt Shingles	(0.21)	(0.11)	0.00	(0.37)	NA	NA
Beef	(30.59)	NA	0.00	(0.68)	(0.72)	(1.26)
Branches	NA	NA	0.00	0.33	0.36	NA
Bread	(1.21)	NA	0.00	(0.68)	(0.72)	(1.26)
Carpet	(3.84)	(2.38)	0.00	1.06	NA	NA
Clay Bricks	(0.29)	NA	0.00	NA	NA	NA
Concrete	NA	(0.03)	0.00	NA	NA	NA
Copper Wire	(7.03)	(4.73)	0.00	0.01	NA	NA
Corrugated Containers	(5.83)	(3.35)	0.00	(0.74)	NA	NA
Dairy Products	(2.28)	NA	0.00	(0.68)	(0.72)	(1.26)
Dimensional Lumber	(1.02)	(1.45)	0.00	0.40	NA	NA
Drywall	(0.15)	0.09	0.00	NA	NA	NA
Fiberglass Insulation	(0.40)	NA	0.00	NA	NA	NA
Fly Ash	NA	(0.89)	0.00	NA	NA	NA
Food Waste	(4.20)	NA	0.00	(0.68)	(0.72)	(0.60)
Food Waste (meat only)	(15.64)	NA	0.00	(0.68)	(0.72)	(1.26)
Food Waste (non-meat)	(1.30)	NA	0.00	(0.68)	(0.72)	(1.26)
Fruits and Vegetables	(0.98)	NA	0.00	(0.68)	(0.72)	(1.26)
Glass	(0.55)	(0.30)	0.00	0.01	NA	NA
Grains	(1.16)	NA	0.00	(0.68)	(0.72)	(1.26)
Grass	NA	NA	0.00	(0.31)	(0.28)	NA
HDPE	(1.49)	(0.89)	0.00	1.21	NA	NA
LDPE	(1.82)	NA	0.00	1.22	NA	NA
Leaves	NA	NA	0.00	0.34	0.37	NA
LLDPE	(1.60)	NA	0.00	1.21	NA	NA
Magazines/third-class mail	(8.21)	(3.46)	0.00	0.02	NA	NA
Medium-density Fiberboard	(1.35)	(1.59)	0.00	0.27	NA	NA
Mixed Metals	(3.72)	(4.36)	0.00	(1.04)	NA	NA
Mixed MSW	NA	NA	0.00	(0.42)	NA	NA
Mixed Organics	NA	NA	0.00	(0.36)	(0.36)	NA
Mixed Paper (general)	(6.24)	(3.66)	0.00	(0.64)	NA	NA
Mixed Paper (primarily from offices)	(7.58)	(3.76)	0.00	(0.64)	NA	NA
Mixed Paper (primarily residential)	(6.11)	(3.60)	0.00	(0.58)	NA	NA
Mixed Plastics	(1.94)	(1.04)	0.00	1.20	NA	NA
Mixed Recyclables	NA	(2.86)	0.00	(0.48)	NA	NA
Newspaper	(3.95)	(1.93)	0.00	0.24	NA	NA



Material	GHG Emissions per Ton of Material Source Reduced (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Recycled (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Landfilled (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Combusted (MTCO <sub>2</sub> E)	GHG Emissions per Ton of Material Composted (MTCO <sub>2</sub> E)	GHG Emission per Ton of Material Anaerobically Digested
Office Paper	(9.19)	(4.08)	0.00	(1.71)	NA	NA
Personal Computers	(50.51)	(2.52)	0.00	(0.21)	NA	NA
PET	(2.22)	(1.14)	0.00	1.19	NA	NA
Phonebooks	(5.40)	(1.82)	0.00	0.24	NA	NA
PLA	(0.45)	NA	0.00	0.99	1.49	NA
Poultry	(3.01)	NA	0.00	(0.68)	(0.72)	(1.26)
PP	(1.57)	NA	0.00	1.21	NA	NA
PS	(2.52)	NA	0.00	1.58	NA	NA
PVC	(1.97)	NA	0.00	0.62	NA	NA
Steel Cans	(3.08)	(1.83)	0.00	(1.59)	NA	NA
Textbooks	(10.29)	(4.33)	0.00	(1.71)	NA	NA
Tires	(4.30)	(0.40)	0.00	0.49	NA	NA
Vinyl Flooring	(0.63)	NA	0.00	(0.35)	NA	NA
Wood Flooring	(3.19)	NA	0.00	0.09	NA	NA
Yard Trimmings	NA	NA	0.00	0.00	0.03	NA

**Recommendation.** The Department recommends a goal to reduce the annual GHG emissions from materials management by 1.2 million MTCO<sub>2</sub>e by 2035, compared to a baseline year of 2016.<sup>1</sup> For comparison, this would be the equivalent of removing 245,280 passenger vehicles from the road. This goal could be met with a 10% reduction in waste generated per capita (described above),<sup>2</sup> as well as an increase in recycling to meet the material-specific goals described below. It is important to note that meeting this goal will require not only reducing GHG emissions from materials management from their 2006 levels, but also avoiding the increase in GHG emissions that would otherwise occur by 2035 in a business-as-usual scenario in which waste generation is expected to increase as population increases.

## Energy Savings from Waste Diversion

**Background.** Similar to GHG emissions reductions the Department can estimate the energy savings associated with different scenarios of materials management. The following WARM table (Table 2) compares energy savings of managing materials in different ways. The data has been adjusted to assign landfilling a neutral value (0) to make comparing items to landfilling easier. A negative value means a reduction in energy use vs. landfilling. The greater the negative value the greater the savings.

<sup>1</sup> Reduction goals are based upon the EPA's v14 WARM. An update of the target GHG reduction shall occur when the model used for the projection is updated or changed. Future GHG totals will be based upon the same model as used for the GHG target.

<sup>2</sup> This assumes that the 10 percent reduction in per capita waste generation occurs evenly across each material.

**Table 2 - Energy Values for 1 Ton of Material**

<b>Material</b>	<b>Energy Savings per Ton of Material Source Reduced (million BTU)</b>	<b>Energy Savings per Ton of Material Recycled (million BTU)</b>	<b>Energy Savings per Ton of Material Landfilled (million BTU)</b>	<b>Energy Savings per Ton of Material Combusted (million BTU)</b>	<b>Energy Savings per Ton of Material Composted (million BTU)</b>	<b>Energy Savings per Ton of Material Anaerobically Digested (million BTU)</b>
Aluminum Cans	(89.96)	(153.03)	0.00	0.33	NA	NA
Aluminum Ingot	(127.22)	(114.12)	0.00	0.33	NA	NA
Asphalt Concrete	(1.95)	(1.49)	0.00	NA	NA	NA
Asphalt Shingles	(3.40)	(2.70)	0.00	(8.80)	NA	NA
Beef	(63.86)	NA	0.00	(2.04)	0.60	(1.38)
Branches	0.00	NA	0.00	(2.48)	0.58	NA
Bread	(6.50)	NA	0.00	(2.04)	0.60	(1.38)
Carpet	(91.33)	(21.74)	0.00	(7.46)	NA	NA
Clay Bricks	(5.40)	NA	0.00	NA	NA	NA
Concrete	NA	(0.38)	0.00	NA	NA	NA
Copper Wire	(122.63)	(82.86)	0.00	(0.81)	NA	NA
Corrugated Containers	(22.07)	(9.72)	0.00	(6.39)	NA	NA
Dairy Products	(14.25)	NA	0.00	(2.04)	0.60	(1.38)
Dimensional Lumber	(3.90)	0.36	0.00	(8.11)	NA	NA
Drywall	(3.83)	(2.89)	0.00	NA	NA	NA
Fiberglass Insulation	(5.00)	NA	0.00	NA	NA	NA
Fly Ash	NA	(5.04)	0.00	NA	NA	NA
Food Waste	(14.54)	NA	0.00	(2.04)	0.60	(1.38)
Food Waste (meat only)	(43.58)	NA	0.00	(2.04)	0.60	(1.38)
Food Waste (non-meat)	(7.15)	NA	0.00	(2.04)	0.60	(1.38)
Fruits and Vegetables	(5.05)	NA	0.00	(2.04)	0.60	(1.38)
Glass	(7.17)	(2.40)	0.00	(0.77)	NA	NA
Grains	(5.62)	NA	0.00	(2.04)	0.60	(1.38)
Grass	(0.19)	NA	0.00	(2.67)	0.39	NA
HDPE	(61.48)	(50.47)	0.00	(19.61)	NA	NA
LDPE	(71.29)	NA	0.00	(19.51)	NA	NA
Leaves	(0.16)	NA	0.00	(2.64)	0.42	NA
LLDPE	(66.64)	NA	0.00	(19.57)	NA	NA
Magazines/third-class mail	(33.27)	(0.73)	0.00	(4.93)	NA	NA
Medium-density Fiberboard	(12.18)	0.60	0.00	(8.14)	NA	NA
Mixed Metals	(50.88)	(66.26)	0.00	(11.26)	NA	NA
Mixed MSW	NA	NA	0.00	(4.57)	NA	NA
Mixed Organics	NA	NA	0.00	(2.32)	0.52	NA
Mixed Paper (general)	(29.23)	(0.29)	0.00	(6.46)	NA	NA

Material	Energy Savings per Ton of Material Source Reduced (million BTU)	Energy Savings per Ton of Material Recycled (million BTU)	Energy Savings per Ton of Material Landfilled (million BTU)	Energy Savings per Ton of Material Combusted (million BTU)	Energy Savings per Ton of Material Composted (million BTU)	Energy Savings per Ton of Material Anaerobically Digested (million BTU)
Mixed Paper (primarily from offices)	(34.46)	(56.22)	0.00	(5.93)	NA	NA
Mixed Paper (primarily residential)	(28.47)	(27.66)	0.00	(6.45)	NA	NA
Mixed Plastics	(54.69)	(39.11)	0.00	(13.90)	NA	NA
Mixed Recyclables	NA	(11.99)	0.00	(6.51)	NA	NA
Newspaper	(36.51)	(16.54)	0.00	(7.58)	NA	NA
Office Paper	(36.07)	(9.55)	0.00	(5.87)	NA	NA
Personal Computers	(957.01)	(30.30)	0.00	(6.54)	NA	NA
PET	(50.53)	(32.14)	0.00	(10.40)	NA	NA
Phonebooks	(40.25)	(11.98)	0.00	(7.58)	NA	NA
PLA	(30.96)	NA	0.00	(8.21)	(0.85)	NA
Poultry	(26.46)	NA	0.00	(2.04)	0.60	(1.38)
PP	(66.86)	NA	0.00	(19.58)	NA	NA
PS	(75.26)	NA	0.00	(17.67)	NA	NA
PVC	(48.62)	NA	0.00	(7.73)	NA	NA
Steel Cans	(30.15)	(20.24)	0.00	(17.41)	NA	NA
Textbooks	(35.07)	(0.50)	0.00	(5.87)	NA	NA
Tires	(71.98)	(3.83)	0.00	(28.79)	NA	NA
Vinyl Flooring	(11.00)	NA	0.00	(7.73)	NA	NA
Wood Flooring	(14.72)	NA	0.00	(10.66)	NA	NA
Yard Trimmings	(0.14)	NA	0.00	(2.62)	0.44	NA

**Recommendation.** The Department recommends a goal of a Statewide reduction of the annual energy usage associated with materials management by 4.3 trillion BTUs<sup>3</sup> by 2035, compared to 2016. For comparison, this would be the equivalent of conserving 735,885 barrels of oil. As with the GHG emissions goal discussed above, this goal could be met with the 10 percent reduction in per capita waste generation and an increase in recycling to meet the material specific rates discussed below.

## Voluntary Material-Specific Recycling Rates for Each County

**Background.** A more detailed look at the MRA materials recycled reveals varying degrees of recycling success. Using data compiled by the Department's 2016 Maryland Statewide Waste Characterization Study, the Department is able to estimate the amount of specific materials disposed in Maryland. This, along with data on the tons of each material recycled in Maryland

<sup>3</sup> Saving goals based upon the EPA's v14 WARM. An update of the target BTU savings shall occur when the model used for the projection is updated or changed. Future BTU totals will be based upon the same model as used for the BTU target.

(reported by the counties) allows for calculation of an estimated recycling rate for specific MRA materials. The data shows that Maryland recycled:

- Food scraps – 15%;
- Yard trimmings – 85.3%;
- Glass – 36.7%;
- Metal – 74.2%;
- Paper products – 45.5%; and
- Plastic – 13.7%.

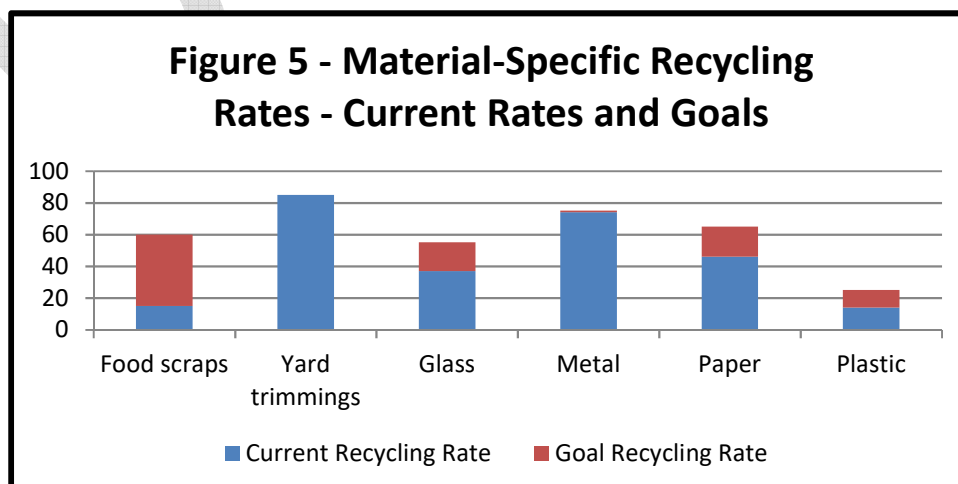
Tracking material-specific recovery rates by county can ensure that all counties operate effective recycling programs and that Statewide goals are the result of participation by all counties. Also, taking a material-specific recovery approach at le

ast partly resolves the light-weighting concern expressed by counties when calculating an overall recycling rate. Finally, a material-specific approach will allow counties and the State to target specific materials lagging in recovery and to more effectively expend limited outreach and other resources.

**Recommendation.** The Department recommends the following voluntary, material-specific recycling rate goals by 2035.

- Food scraps – 60%;
- Yard trimmings – 85%;
- Glass – 55%;
- Metal 75%;
- Paper products – 65%; and
- Plastic – 25%.

Assuming the above rates are reached by 2035, the overall Statewide recycling rate would equal approximately 55%. The Department therefore recommends maintaining the 55% recycling rate and 60% waste diversion rate goal in the statute at §9-1706.1 of the Environment Article, Annotated Code of Maryland, but striving to achieve the rate by 2035. Figure 5 shows the current material-specific recycling rates versus the proposed goals.



The goals were selected with a variety of considerations, including the current recycling rate, the feasibility of increasing recycling in the future, and the environmental benefit derived from additional recycling of each material. A brief summary of these considerations is as follows:

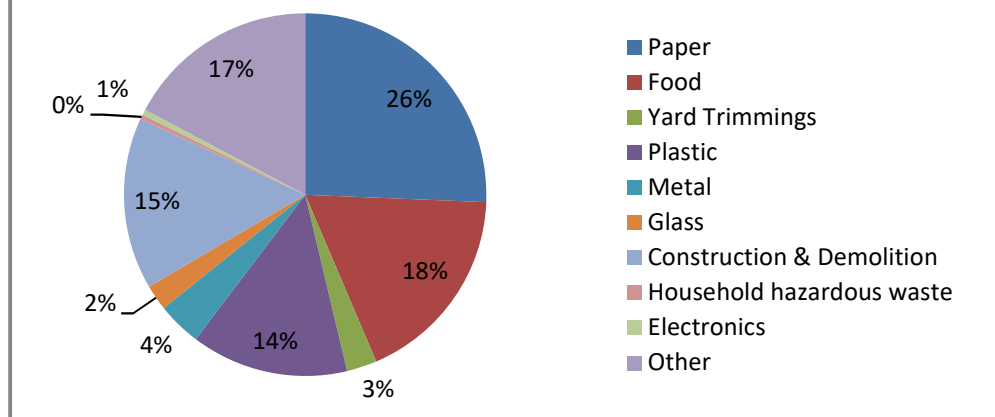
- **Food scraps** have the largest proposed increase in the recycling rate. While food scraps recycling is not the largest contributor to GHG emissions reductions on a per-ton basis (see Table 1), food scraps make up a large portion of the waste stream, and at a relatively low current recycling rate of 15 percent, there is significant potential to recover additional material. Maryland has seen a slow but steady growth in food recycling infrastructure, and this is expected to continue in the future.
- **Yard trimmings** recycling is already very high at over 85 percent, thus the Department is recommending that this rate be maintained as it may be more feasible for additional efforts to focus on source reduction (e.g. on site management) of the remaining material that is not easily captured.
- **Glass** recycling and source reduction benefits relate more to energy savings rather than GHG reductions (though there are GHG benefits, also). Glass can also be recycled with no loss in quality (unlike paper). Additionally, for every ton of glass recycled, 1,300 pounds of sand, 410 pounds of soda ash, 380 pounds of limestone, and 160 pounds of feldspar are saved.<sup>4</sup>
- **Metal** recycling is similarly very high already at over 74 percent; therefore the Department recommends a goal to increase the rate slightly.
- **Paper:** The goal to increase paper recycling to 65 percent is ambitious, but paper is deemed to be a target material because it makes up a large portion of the waste stream and on a per-ton basis, contributes some of the greatest GHG emissions reductions from recycling of any material category. Additional progress on paper is likely feasible, as some materials such as cardboard are widely recyclable but are still found in significant portions in Maryland's disposed waste stream.
- **Plastic** has the lowest current recycling rate, so there is some opportunity for improvement. However, the Department also acknowledges that plastic is a diverse material stream, portions of which are currently difficult to recycle effectively. Plastic makes up a relatively small portion of the waste stream and contributes less toward GHG emissions reductions, per ton, than paper.

Figure 6 shows the portion of Maryland's disposed waste stream currently made up of each material category. This provides an indication of the material remaining to be captured.

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<sup>4</sup> "Unmatched Environmental Benefits," Glass Packaging Institute ([www.gpi.org](http://www.gpi.org)), accessed July 11, 2018.

**Figure 6 - Components of the Disposed Waste Stream**



## Business Waste Diversion Data

**Background.** Recycling tonnage data is currently reported to the Department annually by the counties, as required under the MRA. Counties have accurate data on the materials they manage directly, which are primarily residential materials. State law does not require businesses that generate waste and recyclables to report recycling to the Department or the counties. Because most recycling facilities do not require solid waste permits and therefore do not have reporting requirements, the Department does not necessarily obtain recycling data from the facilities that accept commercial sector recyclables either. In the absence of mandatory business reporting, counties have taken varying approaches to trying to obtain commercial sector recycling data, including passing mandatory business reporting laws and conducting outreach and incentive programs. Anecdotally, the Department learns about innovative business recycling activities through voluntary programs like the Maryland Green Registry. However, it is likely that a significant quantity of business recycling is not being captured in current metrics.

In past stakeholder consultation initiatives and in a January 2018 meeting with the counties during the development of these recommendations, there was significant discussion regarding whether commercial sector reporting should be made mandatory and, if so, who should report (businesses, processors, haulers, or all of these).

Individual business reporting would be the most accurate and county-specific, and would provide for the least chance of double-counting. However, this would require an additional responsibility on businesses, as businesses do not know the specifics of their waste generated. Volume-based estimates have limited accuracy because, for example, an estimate based on number and size of dumpsters would assume that each dumpster is always full upon pickup. For the businesses to obtain the information from haulers, the haulers would need to track and report waste pick-up business-by-business and record the totals as pick-up occurs. Additional hauler hardware resources would be necessary for haulers to track and report the data by weight. Additionally, the large number of businesses in the State would make tracking the individual reports and ensuring

compliance of all businesses very difficult and would likely exceed available county and Department resources.

As it stands now, hauler and processor data is more accurate than data provided by businesses because it is scale-house data rather than estimates by businesses. However, both have their disadvantages. Haulers cross county lines when collecting waste. As a result, county origination totals are estimated. Processor reporting would exclude material that goes directly to an out-of-state processor as out-of-state facilities would not be subject to Maryland reporting requirements. Additionally, extra care would need to be taken to not double-count materials that are captured by multiple processors. Most recyclers and haulers are not currently regulated at the state level and any reporting requirement would involve new regulation of these entities.

For the reasons above, there has not been consensus among stakeholders on mandatory reporting. The Department therefore seeks to encourage more voluntary reporting by reducing reporting burdens. There is a general consensus that the Department's current options (*i.e.*, Microsoft Word and Excel surveys) for reporting waste diversion data are adequate. However, a system where counties and businesses are able to report on-line would be beneficial in simplifying the reporting and encouraging greater participation from the commercial sector.

A separate, though somewhat related issue regarding commercial and industrial sector recycling information is how businesses can better communicate with one another on the availability of and need for materials. With better and more timely information, surplus materials or byproducts generated by one business can more efficiently be put to use by another business. A materials exchange is one way to achieve this goal. The concept is to provide a simple, real-time platform for advertising the availability of materials and facilitating or even completing transactions electronically. While examples of this exist in several states or regions, there is currently no organized materials exchange serving Maryland.

### **Recommendations.**

- The Department should develop an online reporting site where businesses can go to report their waste diversion data. The reporting site will allow one-stop reporting for businesses no matter which county they are located, and will be simplified as much as possible with clear instructions.
- The Department should promote the new reporting site on its website, through contacts with businesses (such as through the Maryland Green Registry), and with relevant business groups. The Department should notify recycling processors of the website.
- Individual counties should refer other businesses within their jurisdictions to the site to report their waste diversion data.
- The online reporting site should collect email contact information of the businesses reporting, so that businesses can be reminded in a low-cost manner to submit reports annually.
- Waste diversion data collected by the Department through the reporting site should be distributed to counties, in spreadsheet format, so the counties can total waste diversion totals for businesses within their county.
- The Department should work with the Department of Commerce, similar agencies in other states, and private sector stakeholders to promote a materials exchange system in



Maryland or the Mid-Atlantic region. The materials exchange should include an online system that makes it easier for businesses to communicate with each other on surplus materials that are available or needed. The Department should explore opportunities to build on the MdRecycles.org recycling market directory and materials exchange systems in operation elsewhere in the U.S. Any data generated through the materials exchange system could be used to further improve the Department's commercial sector waste diversion data.

## Source Reduction (SR) Credit System

**Background.** The State's SR credit system is successful. In 2016, 13 of Maryland's jurisdictions were able to add from 1 point to 5 points to their waste diversion rates by conducting SR activities as a waste reduction strategy. The result was a Statewide SR credit of 4%. However, like the State's recycling rate, the SR credit has stabilized over time (See Figure 1 above).

Some counties have recommended elevating the status of food scraps activities in the SR checklist to accurately reflect the current conditions of food recovery in Maryland. Adding additional activities to the checklist should better document and increase SR activities occurring in Maryland and consequently, Maryland's SR credit. While the SR credit is not a measure of actual, measured tons of source reduction, it reflects and provides recognition for important activities that counties conduct to encourage waste prevention in their communities.

**Recommendations.** It is recommended that the current SR credit system remain with modifications. The changes include elevating food scrap reduction activities to the same status as yard trimmings in terms of providing credit, and adding the opportunity for counties to propose new and innovative SR activities for credit on a case-by-case basis that are not specifically listed on the checklist.