

The Aluminum Can Advantage Key Sustainability Performance Indicators September 2019

Introduction

As the leading voice for the aluminum industry in North America, the Aluminum Association is committed to providing up-to-date, complete and accurate information on industry sustainability. To that end, we are releasing a comprehensive report on key sustainability performance indicators (KPI) for one of our best-known and widely used consumer products – the aluminum can.

Aluminum can scrap is a vital input for the industry and allows can manufacturers to make beverage containers in the most environmentally friendly and economical way possible. Recycling aluminum saves more than 90 percent of the energy needed to produce new, or primary, aluminum.¹

In addition, aluminum’s recycling profile and the high value of the material means that, unlike competing packages like glass and plastic bottles, the aluminum used beverage container (UBC) is most often recycled directly back into itself. This process occurs repeatedly without degradation in product quality. This closed-loop process drives a virtuous cycle of high recycling rates, a large percentage of recycled content in the average aluminum can and an economically sustainable process that effectively subsidizes municipal recycling programs nationwide.

In partnership with our member companies – which are responsible for all of the aluminum can sheet production and most of the aluminum UBC recycling in the United States today – the Aluminum Association has developed a series of KPIs as well as comparative information to provide a complete picture of the aluminum can’s sustainability performance.

The indicators include:

- **Industry Recycling Rate:** Measures the amount of used aluminum can scrap recycled (melted to make new products) by U.S. aluminum producers as a percentage of cans shipped. This rate provides a measure of industry efficiency relative to overall can shipments. This rate includes both domestic and imported can scrap from foreign countries that is reclaimed by U.S. producers as well as used cans that are exported and recycled overseas. The rate is unique to the aluminum industry.
- **Consumer Recycling Rate:** Measures the amount of aluminum can scrap recycled domestically as a percentage of cans available for recycling in the U.S. In order to provide a more accurate representation of U.S. consumer recycling behavior, the consumer rate excludes imported can scrap and also accounts for the movement of unfilled cans into/out of the U.S. The rate is one indication of how well municipal recycling programs are performing nationwide, though it can still be impacted by year-to-year fluctuations in metal flows and commodity prices. Additionally, the rate provides an indication of how much aluminum can scrap is either landfilled, held in inventory, or has otherwise fallen outside the association’s tracking system.

¹ http://www.aluminum.org/sites/default/files/LCA_Report_Aluminum_Association_12_13.pdf

- **Recycled Content:** Measures the proportion of recycled aluminum versus virgin aluminum in the average aluminum can. The recycled content measure is one indicator of environmental stewardship of the aluminum can.
- **Value of Material:** Measures the dollar value per ton of aluminum can scrap. The value of material measure indicates the relative importance of different materials commonly found in the recycling bin to sustaining the financial viability of municipal recycling programs. The data is based on a two-year rolling average of commodity prices for competing material types.

Summary Results

Following are top-level results for key sustainability performance indicators of the aluminum can compared to other beverage packaging options.

	Aluminum Cans	Glass Bottles	Plastic Bottles (PET)
Industry Recycling Rate²	63.6%	N/A	N/A
Consumer Recycling Rate³	49.8%	26.4%	29.2%
Recycled Content⁴	73%	23%	3%
Value of Material⁵	\$1,317/ton	-\$20/ton	\$299/ton

One important methodology change in this year’s report is the average weight of a representative aluminum can. The data is represented by the number of finished empty cans per pound. In the past, the cans were represented by of the standard 12 fl oz. can, which represents the majority of cans shipped domestically. However, in this year’s report, the cans are represented by the weighted average of all size cans shipped to the market. This change means the “average” can is now heavier due to the

² No equivalent data available for glass or plastic bottles.

³ Data for glass and plastic via the Environmental Protection Agency (EPA) Glass: Material-Specific Data: <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/glass-material-specific-data> and “NAPCOR Postconsumer PET Container Recycling Activity in 2017” report: http://www.plasticmarkets.org/jsfcode/srvyfiles/napcor_2017ratereport_final_1.pdf.

⁴ Data for glass and plastic have not changed since the 2015 KPI report. Data for glass and plastic via the Environmental Protection Agency (EPA) Individual Waste Reduction Model (WARM): https://www.epa.gov/sites/production/files/2016-03/documents/warm_v14_containers_packaging_non-durable_goods_materials.pdf

⁵ Data based on a two-year rolling average of commodity prices from February 2017 – February 2019 for various material types via <http://recyclingmarkets.net/>.

inclusion of larger size cans such as 16 oz. and 24 oz., etc. This has led to a minor decline in recycling rates for both the industry and consumer rates. This is because the total quantity of UBC scrap consumed during a year is measured by weight while the total shipment of cans is measured by the number of cans. The change in calculation methodology starts from the 2017 rates.

Industry Recycling Rate

Background

The industry recycling rate indicates the amount of aluminum can scrap recycled by U.S. aluminum producers as a percentage of finished cans shipped by the industry during a one-year time period. In basic terms, the rate provides an indication of industry stewardship and efficiency in managing the metal. This rate includes imported can scrap as well as used beverage cans that are exported and recycled overseas. Imports in particular have become an increasingly important feedstock for U.S. can recyclers in recent years. The quantity of scrap recycled is measured directly at the point where processed (e.g. contamination removed) UBCs are fed into melting furnaces. This means that the aluminum is truly recycled, not simply “available for recycling” – the standard for some material recycling rates.

Further, aluminum cans are most often recycled in a “closed loop” while glass and plastic are often down-cycled into other products such as road pavement or carpet fiber. Though the recycled material in these cases is diverted into another product for some period, it will ultimately end up in the landfill. Aluminum, by contrast, is generally recycled directly back into itself and, accordingly, never has to end up in a landfill.

The industry recycling rate increased marginally in 2018 to 63.6 percent. This exceeds the 20-year average industry recycling rate of 59.1 percent and is an indicator of the industry’s commitment to using recycled material in aluminum can production.

Methodology

The Aluminum Association industry recycling rate is based on survey input of UBC melting facilities including can sheet producers, can manufacturers and secondary producers of aluminum, representing nearly all can recycling activity in the United States. The calculation to determine the rate is as follows:

$$\frac{(\text{Pounds of UBC Melted Domestically}^6 + \text{Pounds of UBC Exports}^7)}{\text{Pounds of Cans Shipped by U.S. Producers}^8} =$$

$$\frac{\text{Pounds of Cans Recycled by Industry} =}{\text{Pounds of Cans Shipped by U.S. Producers}}$$

$$\frac{\mathbf{1.669 \text{ Billion Pounds of Cans Recycled}}}{\mathbf{2.623 \text{ Billion Pounds of Cans Shipped}}} = \mathbf{63.6\%}$$

⁶ Input weight of used beverage can scrap melted during the year. Figures derived from survey of aluminum mills and secondary producers conducted by Aluminum Association and Institute of Scrap Recycling Industries. Estimated full coverage. Includes imported UBCs since mills purchase scrap from scrap processors, brokers and traders who do not identify source.

⁷ Foreign Trade Division. U.S. Bureau of the Census, U.S. Department of Commerce. Trade statistics derived from U.S. Customs reports. HTS 7602000030: Aluminum beverage container scrap. HTS 7612901030: Aluminum cans of a capacity not exceeding 355 ml.

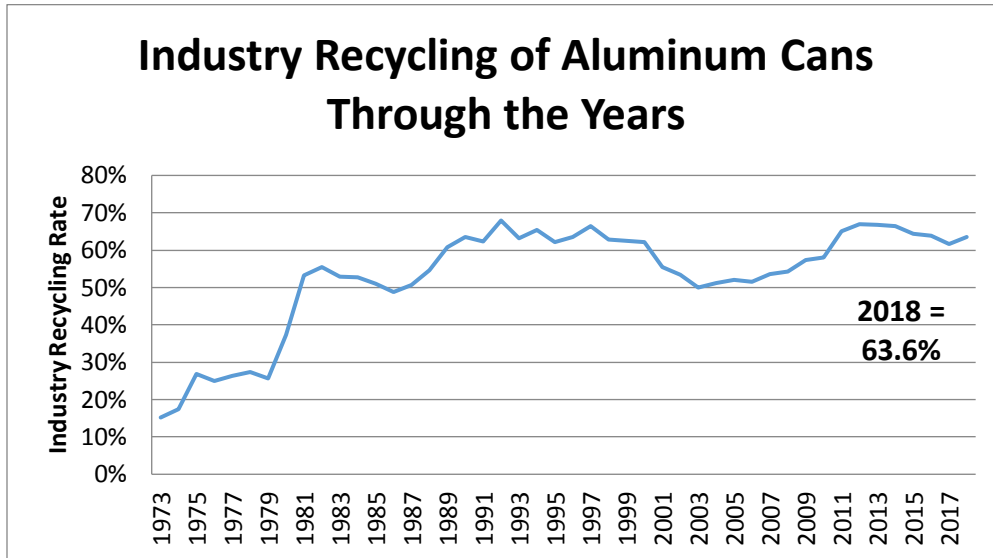
⁸ Survey of U.S. can manufacturers conducted by Can Manufacturers Institute. Reported shipments of aluminum beverage cans lagged one quarter. Estimated full coverage - Includes exports.

Industry Recycling Rate Calculation History

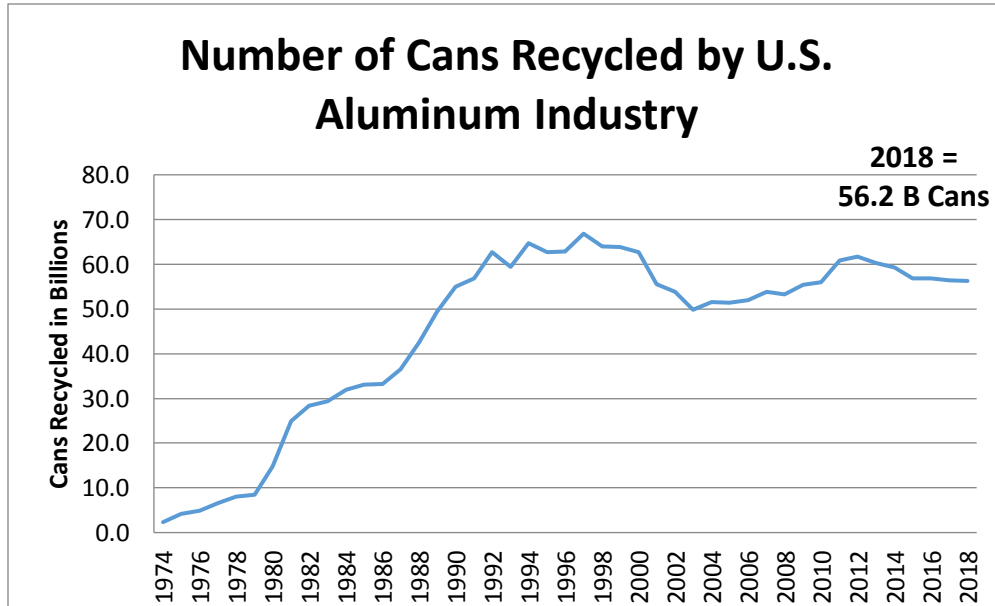
	2011	2012	2013	2014*	2015*	2016*	2017	2018
Pounds of UBC Melted Domestically (MMlbs)	1,669.2	1,664.0	1,658.4	1,637.3	1,480.1	1,541.6	1,615.80	1,577.0
+ Pounds of UBC Exports (MMlbs)	92.8	108.7	62.9	62.1	145.1	89.6	58.8	91.6
= Pounds of Cans Recycled (MMlbs)	1,762.0	1,772.8	1,721.4	1,699.4	1,625.2	1,631.2	1,674.6	1,668.6
/ Pounds of Cans Shipped by U.S. Producers (MMlbs)	2,708.4	2,644.0	2,581.3	2,581.3	2,550.6	2,512.2	2,645.7	2,622.6
= Industry Recycling Rate	65.1%	67.0%	66.7%	65.8%	63.7%	64.9%	63.3%	63.6%

*Some data updated to reflect corrected reporting errors in prior year data sets.

Charts & Graphs



The aluminum industry recycling rate has risen steadily over the last 40 years. The rate was 15.4 percent when first reported in 1972. The industry recycling rate remains above 63 percent – exceeding the 20-year average of 59.1 percent.



Since tracking began in 1972, the aluminum industry has recycled more than 2 trillion aluminum beverage cans.

Consumer Recycling Rate

Background

The consumer recycling rate provides a measure of the amount of *domestic* aluminum can scrap recycled as a percentage of cans available for recycling in the U.S. during a one-year time period. This rate excludes can scrap imported from foreign countries to provide a more accurate representation of consumer recycling behavior in the United States. The rate provides a snapshot of how well municipal recycling programs are performing nationwide though it can still be impacted by year-to-year fluctuations in metal flows and commodity prices. It also indicates the amount of aluminum can scrap that either finds its way to the landfill every year, was held in inventory or otherwise fell outside the Association's tracking system.

The consumer recycling rate for aluminum cans jumped nearly 5 points to 49.8 percent in 2018 from 45.1 percent in 2017. The new recycling rate nears the 20-year average of 50.1 percent. Aluminum represents about 1 percent of the recyclable household waste stream by volume and yet represents about 17 percent of the stream's value⁹. Further, multiple independent studies have concluded that aluminum is the only beverage container type in the bin that more than covers its cost of collection and processing in municipal recycling programs.

However, 45.2 billion cans – more than \$800 million worth of aluminum – were diverted from the recycling stream in 2018 and could otherwise have been responsibly recycled and made into new cans. This loss has a significant negative impact on the environment through wasted energy and resources, and on the economy through lost jobs.

Increasing aluminum can recycling rates is a concrete step that can save resources and energy, grow the economy and help shore up recycling systems of all types in the United States.

Methodology

The Aluminum Association consumer recycling rate is based on survey input from can sheet producers, can manufacturers and secondary producers of aluminum, representing nearly all can recycling activity in the United States. The calculation to determine the rate is as follows:

$$\frac{(\text{Pounds of UBC Melted Domestically}^6 + \text{Pounds of UBC Exports}^7 - \text{Pounds of UBC Imports}^7)}{(\text{Pounds of Cans Shipped by U.S. Producers}^8 - \text{Pounds of Exported Unfilled Cans}^7 + \text{Pounds of Imported Unfilled Cans}^7)}$$

$$\frac{\text{Pounds of Cans Recycled by U.S. Consumers} =}{\text{Pounds of Cans Shipped Corrected for Imports \& Exports}}$$

$$\frac{\mathbf{1.329 \text{ Billion Pounds of Cans Recycled by U.S. Consumers} =}{\mathbf{2.670 \text{ Billion Pounds of Cans Shipped Corrected for Imports \& Exports}} \quad \mathbf{49.8\%}$$

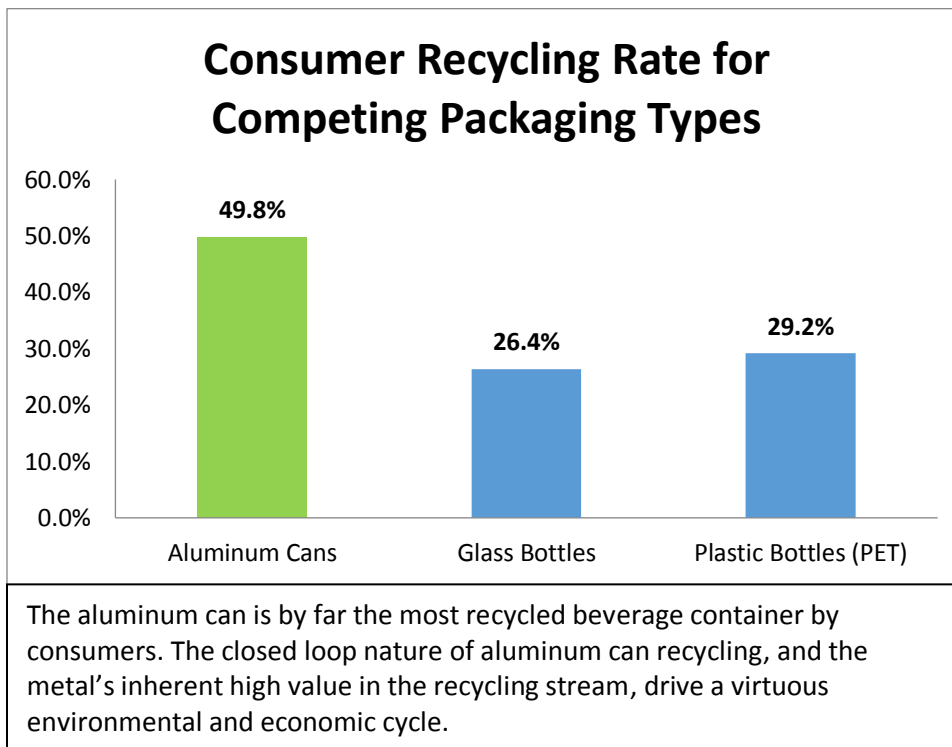
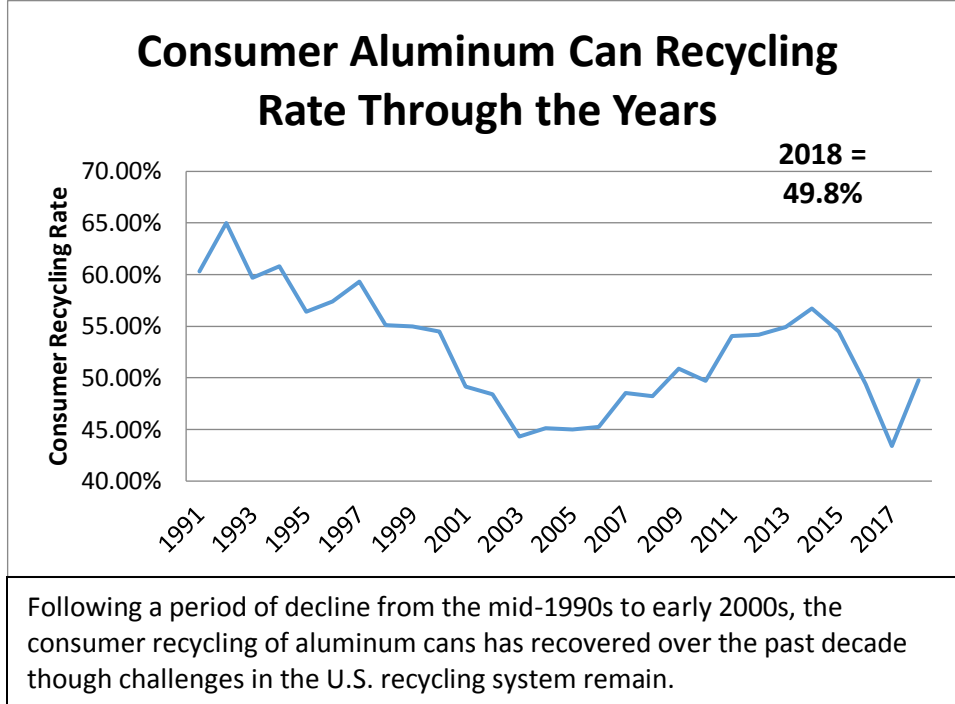
⁹ [Ball Corporation](#)

Consumer Recycling Rate Calculation History

	2011	2012	2013	2014*	2015	2016*	2017	2018
Pounds of UBC Melted Domestically (MMlbs)	1,669.2	1,664.0	1,658.4	1,637.3	1,480.1	1,541.6	1,615.8	1577.0
+ Pounds of UBC Exports (MMlbs)	92.8	108.7	62.9	62.1	145.1	89.6	58.8	91.6
- Pounds of UBC Imports (MMlbs)	329.7	367.8	333.1	286.8	291.8	383.7	475.0	339.5
= Pounds of Cans Recycled by U.S. Consumers (MMlbs)	1,432.3	1,405.0	1,388.2	1,412.6	1,333.4	1,247.5	1,199.6	1,329.1
/ Pounds of Cans Shipped by U.S. Producers (MMlbs)	2,708.4	2,644.0	2,581.3	2,581.3	2,550.6	2,512.2	2,645.7	2,622.6
- Pounds of Exported Unfilled Cans (MMlbs)	76	70	67	82	101	61	11	6
+ Pounds of Imported Unfilled Cans (MMlbs)	16	20	15	17	17	26	23	54
= Pounds of Cans Shipped Corrected for Imports & Exports (MMlbs)	2,648	2,594	2,529	2,516	2,467	2,477	2,658	2,670
= Consumer Recycling Rate	54.1%	54.2%	54.9%	56.1%	54.1%	50.4%	45.1%	49.8%

*Some data updated to reflect corrected reporting errors in prior year data sets.

Charts & Graphs



Recycled Content

Background

Recycled content data measures the proportion of recycled aluminum versus new or virgin aluminum in the average aluminum can. High recovery rates for aluminum along with the closed loop nature of can recycling truly sets the aluminum can apart as a sustainable package type. In contrast to glass and plastic bottles, a large percentage of the average aluminum can is made from recycled material.

The high recycled content in the average aluminum can is an indicator of environmental stewardship of the package.

The recycled content of the can contains metal from both post-consumer and post-industrial scrap sources. However, the calculation excludes internal run-around scrap metal (metal generated during a manufacturing process that is subsequently recycled on-site).

The Association's recycled content figure follows the guidelines and definitions laid out by the Federal Trade Commission (FTC) "Green Guides" as well as UL Environment, an environmental label certification company. The approach also aligns with ISO compliance according to the 14021 standard in section 7.8.1.

Methodology

The Aluminum Association recycled content figure for the aluminum can is based on a survey of the five main producers of aluminum can sheet in the United States – Alcoa, Constellium, Logan, Novelis, and Tri-Arrows. These companies provide data to determine the composition of an average aluminum can. The survey is also part of the Aluminum Association's beverage can life cycle assessment (LCA) studies. Data is collected by asking the responders to report the total annual quantities of different source of metal inputs into can sheet ingot and can sheet productions as well as other inputs of material and energy, and releases of environmental emissions and wastes. The latest time periods for the survey were 2016 and 2017. The recycled content number is the average of the two time periods.

This survey is conducted by the Aluminum Association every 4 to 5 years. The previous figure was calculated using 2012 data and found a 70 percent total recycled content figure for the average aluminum can. This compares to an average of 23 percent recycled content for glass and 3 percent recycled content for plastic (PET) according to EPA estimates.⁴

Results from the latest aluminum can recycled content survey are reflected below (when scaled into a full can without counting the internal scrap as a metal source):

12.99 grams (metallic weight of an average aluminum can):

3.57 grams = Primary aluminum¹⁰ = 27%

5.60 grams = Used beverage can (UBC) scrap = 43%

0.86 grams = Non-UBC post-consumer scrap¹¹ = 7%

¹⁰ Newly produced virgin aluminum and added alloying elements.

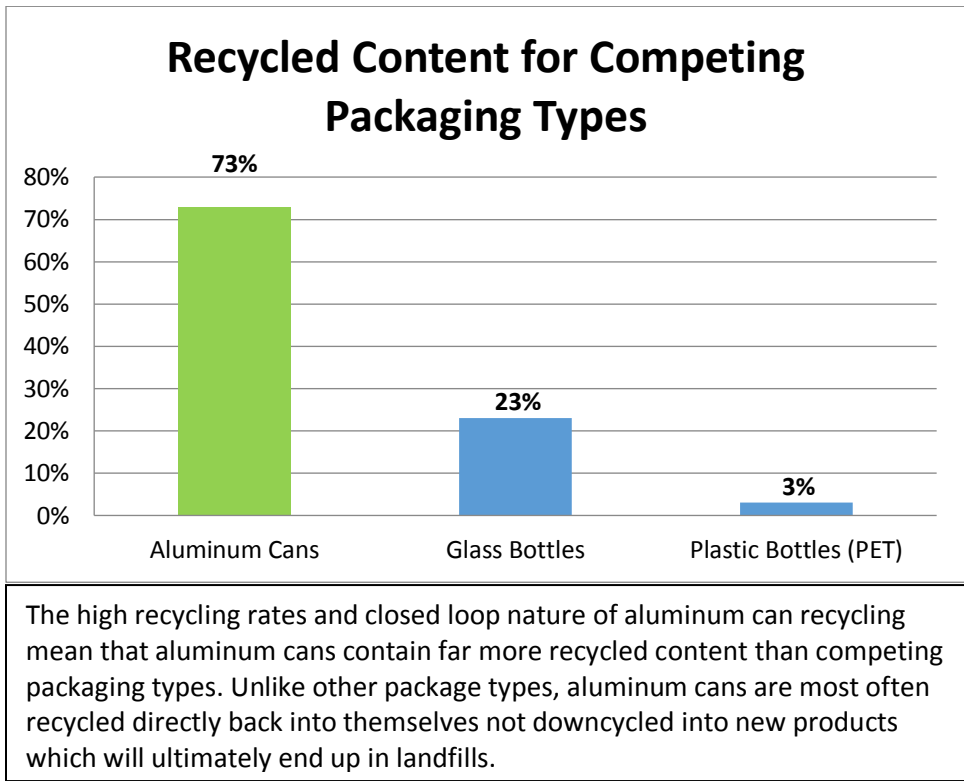
¹¹ Non-UBC scrap from end-of-life products from other market sectors.

2.96 grams = Post-industrial scrap¹² = 23%

Recycled Content = 73%

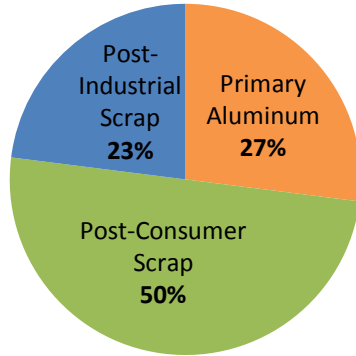
More detail on how aluminum cans are made, what source of metals are used, and on the calculation methodology is available at www.aluminum.org/sustainabilityreports.

Charts & Graphs



¹² This includes scrap generated from the can manufacturing process and recycled back into the manufacturing process, as well as manufacturing scrap from other market sectors such as building and transportation.

Recycled Content of the Average Aluminum Can



By far the largest percentage of material in the average aluminum can is post-consumer scrap generated from the UBC recycling stream and other scrap sources. Another large percentage of recycled content comes from scrap generated during manufacturing processes.

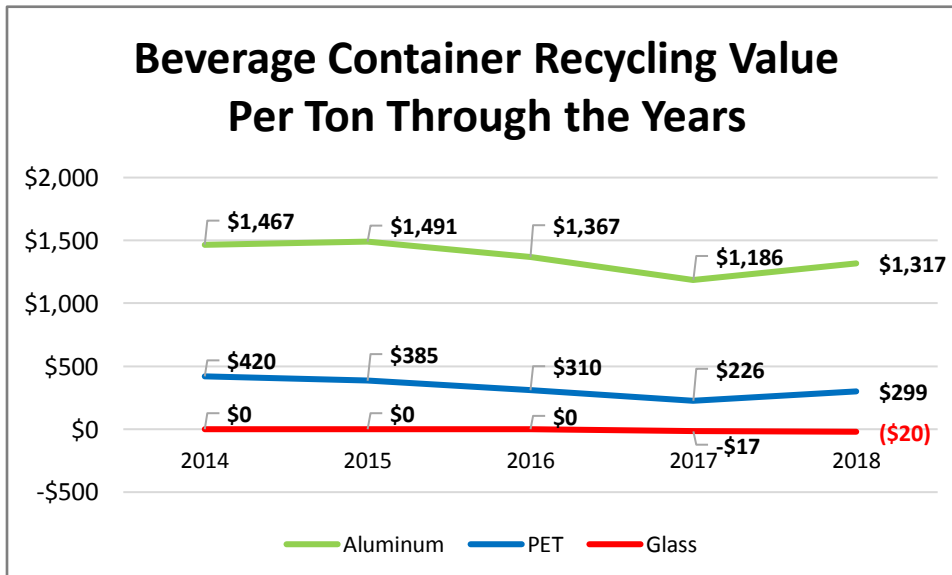
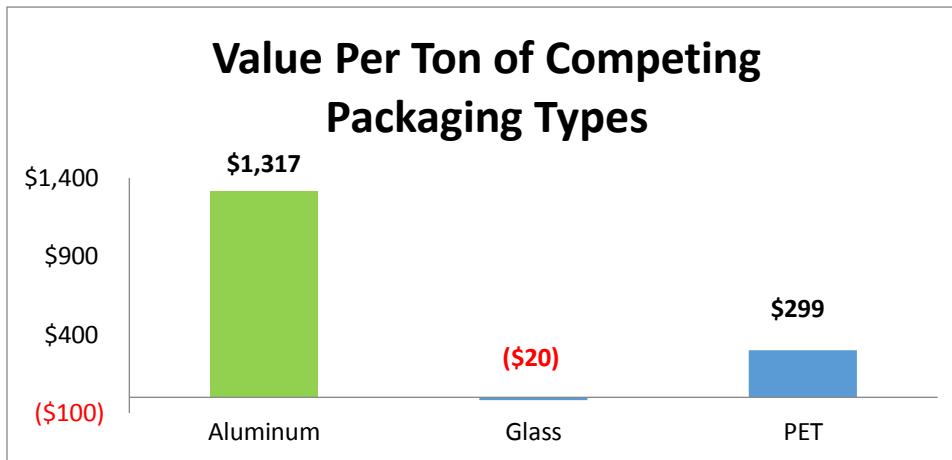
Value of Material

Background

The value of material data measures the dollar value of aluminum can scrap. Many municipal recycling programs rely on re-selling the material collected in curbside bins to help subsidize their programs. The high value of aluminum in the scrap stream means that, without it, very few curbside pickup programs would be financially viable.

Methodology

This data is based on a two-year rolling average of commodity prices from February 2017 – February 2019 for various material types via <http://recyclingmarkets.net/>.



Aluminum is by far the most valuable item in the recycling bin on a per-ton basis. It effectively subsidizes less valuable items like glass and plastic. Many municipal recycling programs would not be viable without aluminum in the recycling stream.