



The Aluminum Can Advantage Key Sustainability Performance Indicators June 2017

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. It takes just 8 percent of the energy to produce aluminum from recycled material compared to producing 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 over and over again 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 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.

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

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.

- **Recycled Content:** Measures the proportion of recycled aluminum versus virgin aluminum in the average aluminum can. The recycled content rate 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.
- **Weight:** Measures the weight of the average aluminum can. This measure is an indicator of overall material efficiency and functionality for beverages packaged in aluminum cans. Producing a lighter container for the same volume of beverage indicates significant engineering improvements in can making and efficiency improvements in source reduction and material utilization. For comparative purposes, the data has been normalized on a gram of material per ounce of beverage basis.

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	63.9%	N/A	N/A
Consumer Recycling Rate³	49.4%	39.5%	30.1%
Recycled Content⁴	70%	23%	3%
Value of Material⁵	\$1,186/ton	-(\$17)/ton	\$226/ton
Weight⁶ (gram of material per oz of bev)	1.07 grams	18.92 grams	1.45 grams

² No equivalent data available for glass or plastic bottles.

³ Data for glass and plastic via the Environmental Protection Agency (EPA) “Advancing Sustainable Materials Management 2014 Fact Sheet”: https://www.epa.gov/sites/production/files/2016-11/documents/2014_smm_tablesfigures_508.pdf and “NAPCOR Postconsumer PET Container Recycling Activity in 2015” report http://www.napcor.com/pdf/NAPCOR_2015RateReportFINAL.pdf. This is the latest publicly available information for glass and plastic. The EPA report typically lags for about 2 years in terms of latest available statistics.

⁴ Data for all three containers 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 2015 – February 2017 for various material types via <http://recyclingmarkets.net/>.

⁶ Data for aluminum produced in coordination with the Can Manufacturers Institute. Data for glass and plastic estimated based on publicly available information. Plastic (PET) from study by American Samoa Power Authority Materials Management Office (includes bottle cap in calculation): <http://www.aspower.com/aspaweb/bids/RFP%20NO.%20ASPA14.1216%20ASPA%20AND%20PUBLIC%20JOINT%20VENTURE%20RECYCLING-Appendix%20A.pdf>; Glass from Waste 360: http://www.waste360.com/Recycling_And_Processing/waste_glass_containers_4

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 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.

Also, 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 of time, 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 declined by about four-tenths of one percent in 2016 to 63.9 percent. The change is largely the result of a modest year-over-year drop in the volume of UBCs consumed by the domestic industry, as well as a large drop in UBC exports. At the same time, imports of UBCs grew by nearly one-third in 2016 for the largest volume of UBC imports since tracking began. Continued low metal and scrap prices as well as a strong dollar contributed to the drop in domestic UBCs consumed and consequent increase in imports. The 2016 industry recycling rate remains above its ten-year average of 61.7 percent.

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:

$$\frac{(\text{Pounds of UBC Melted Domestically}^7 + \text{Pounds of UBC Exports}^8)}{\text{Pounds of Cans Shipped by U.S. Producers}^9} =$$

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

$$\frac{\mathbf{1.615 \text{ Billion Pounds of Cans Recycled}}}{\mathbf{2.529 \text{ Billion Pounds of Cans Shipped}}} = \mathbf{63.9\%}$$

⁷ 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.

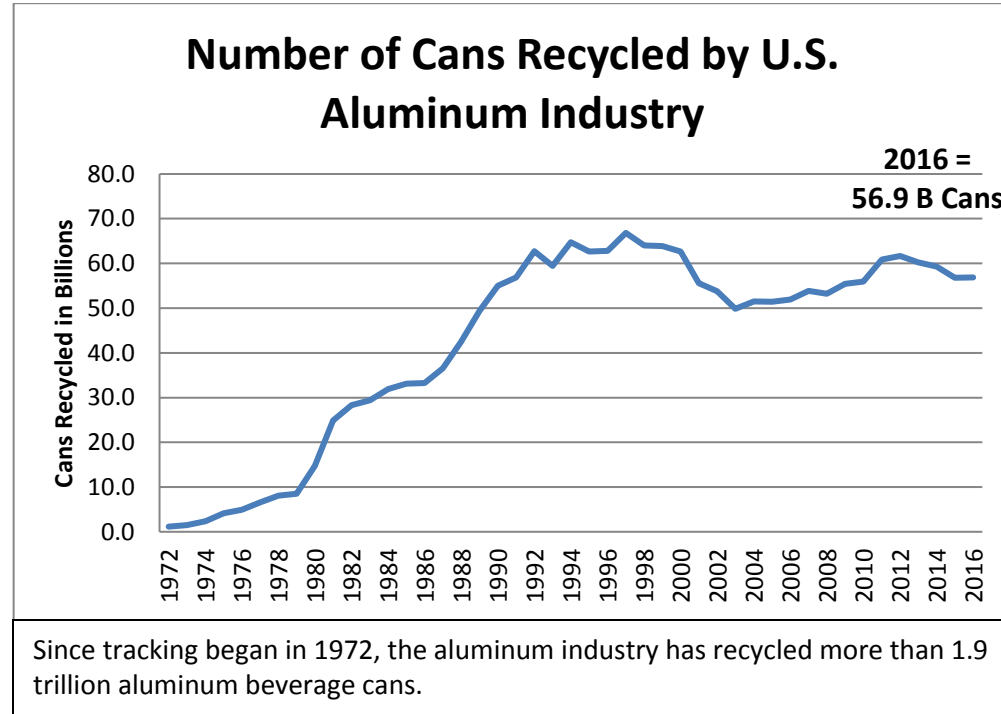
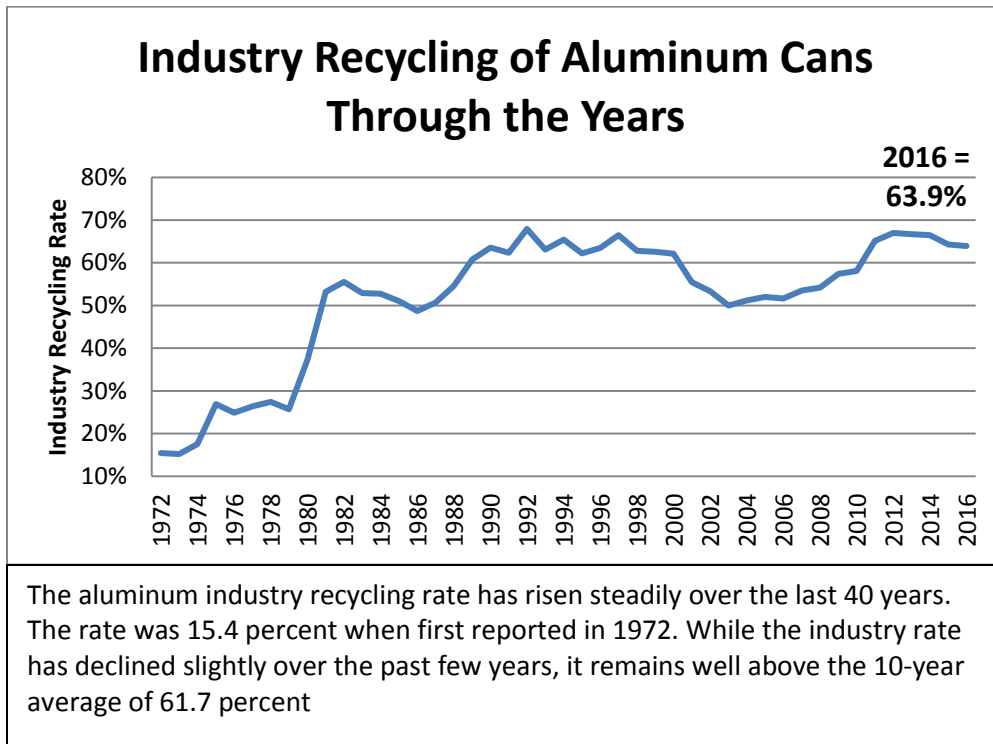
⁸ Foreign Trade Division. U.S. Bureau of the Census, U.S. Department of Commerce. Trade statistics derived from U.S. Customs reports. HTS 7602000030: Aluminum beverage container scrap. HTS 7612901030: Aluminum cans of a capacity not exceeding 355 ml.

⁹ 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
Pounds of UBC Melted Domestically (MMlbs)	1,669.2	1,664.0	1,658.4	1,637.3	1,480.1	1,525.8
+ Pounds of UBC Exports (MMlbs)	92.8	108.7	62.9	62.1	145.1	89.6
= Pounds of Cans Recycled (MMlbs)	1,762.0	1,772.8	1,721.4	1,699.4	1,625.2	1,615.4
/ Pounds of Cans Shipped by U.S. Producers (MMlbs)	2,708.4	2,644.0	2,581.3	2,555.7	2,528.7	2,529.2
= Industry Recycling Rate	65.1%	67.0%	66.7%	66.5%	64.3%	63.9%

Charts & Graphs



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.

The consumer recycling rate for aluminum cans declined significantly in 2016 from 54.5 percent to 49.4 percent. Like most recycled commodities, aluminum prices have declined in recent years. From May 2015 through December 2016, the average buying price for UBCs was around \$0.60/pound compared to about \$0.83 per pound in 2014.¹⁰ The decline in the buying price of UBCs may have prompted sellers to hold onto the metal longer, waiting for prices to recover. When coupled with an even sharper decline in the all-in price for aluminum (London Metal Exchange + U.S. Midwest Premium), scrap consumers may have also had more incentive to purchase and substitute other metal sources (primary or other secondary aluminum) into their stream. While the industry imported an increased number of UBCs in 2016 to make up for this drop in domestic supply, the consumer recycling rate excludes can scrap imported from other countries in its calculation, leading to a more dramatic year-over-year fluctuation. The 2016 consumer recycling rate is slightly below its ten-year average of 52.1 percent.

The consumer recycling rate 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. In 2016, 44.5 billion cans – nearly \$760 million worth of aluminum -- were diverted from the recycling stream 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 on the economy through lost jobs.

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:

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

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

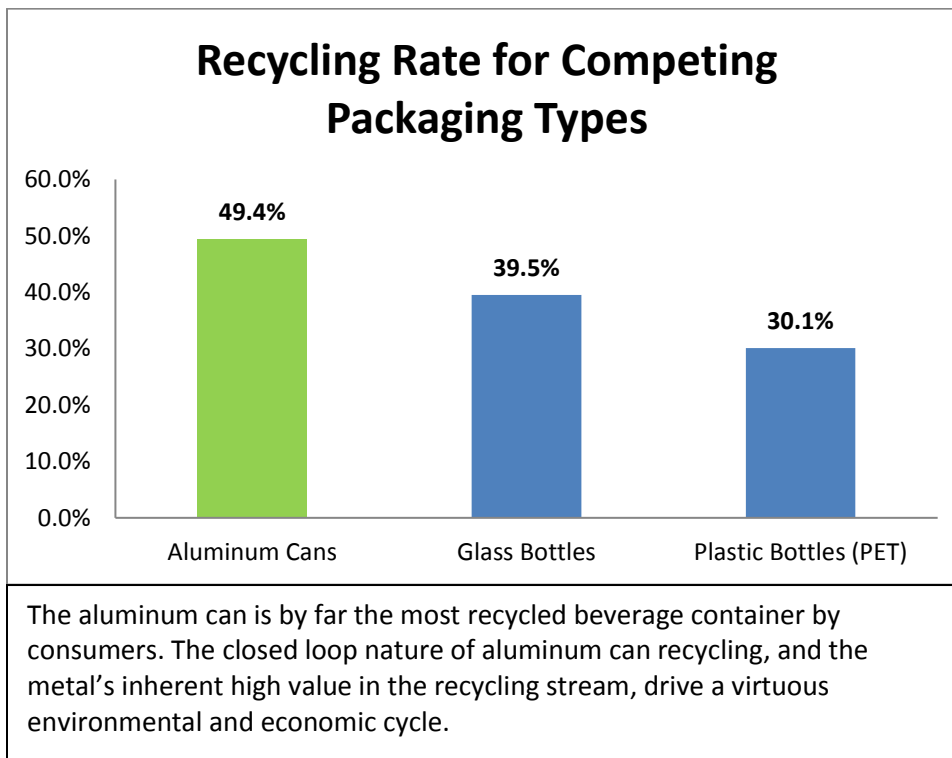
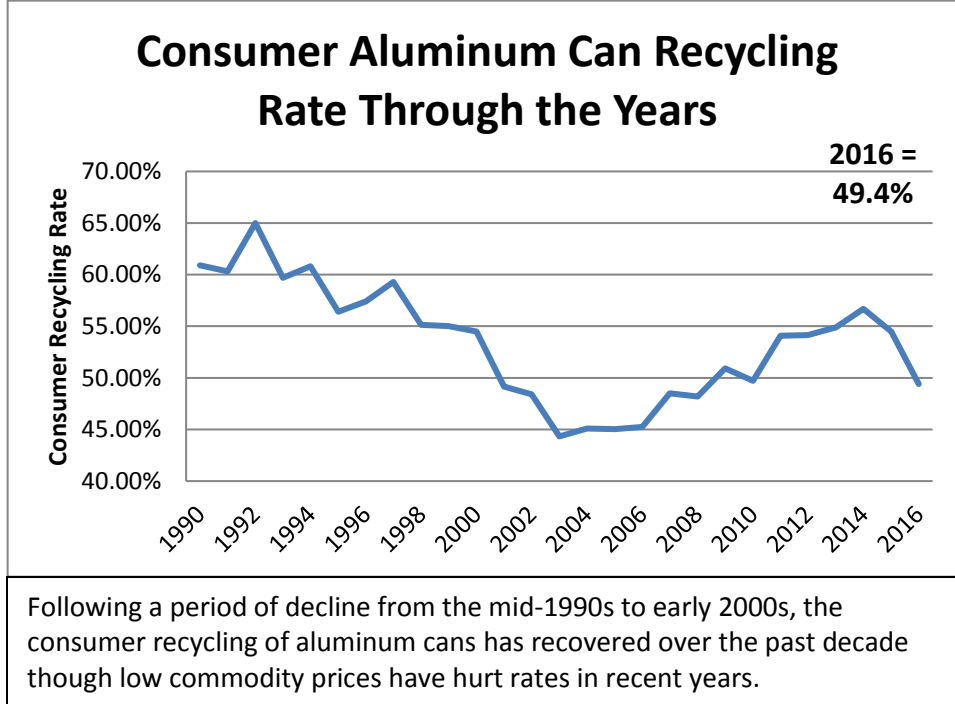
$$\frac{1.232 \text{ Billion Pounds of Cans Recycled by U.S. Consumers}}{2.494 \text{ Billion Pounds of Cans Shipped Corrected for Imports \& Exports}} = 49.4\%$$

¹⁰ [USGS Mineral Industry Surveys](#)

Consumer Recycling Rate Calculation History

	2011	2012	2013	2014	2015	2016
Pounds of UBC Melted Domestically (MMlbs)	1,669.2	1,664.0	1,658.4	1,637.3	1,480.1	1,525.8
+ Pounds of UBC Exports (MMlbs)	92.8	108.7	62.9	62.1	145.1	89.6
- Pounds of UBC Imports (MMlbs)	329.7	367.8	333.1	286.8	291.8	383.8
= Pounds of Cans Recycled by U.S. Consumers (MMlbs)	1,432.3	1,405.0	1,388.2	1,412.6	1,333.4	1,231.6
/ Pounds of Cans Shipped by U.S. Producers (MMlbs)	2,708	2,644	2,581	2,556	2,529	2,529
- Pounds of Exported Unfilled Cans (MMlbs)	76	70	67	82	101	61
+ Pounds of Imported Unfilled Cans (MMlbs)	16	20	15	17	17	26
= Pounds of Cans Shipped Corrected for Imports & Exports (MMlbs)	2,648	2,594	2,529	2,491	2,445	2,494
= Consumer Recycling Rate	54.1%	54.2%	54.9%	56.7%	54.5%	49.4%

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, Logan, Novelis, Tri-Arrows and Wise. These companies provide data to determine the composition of an average aluminum can. The time period for the survey data was 2012.

This survey is conducted by the Aluminum Association every 4 to 5 years. The previous figure was calculated using 2007 data and found a 68 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:

13 grams (Average aluminum can weight):

3.9 grams = Primary aluminum¹¹ = 30%

5.6 grams = Post-consumer scrap¹² = 43%

3.5 grams = Post-industrial scrap¹³ = 27%

Recycled Content = 70%

More detail on the calculation methodology is available at www.aluminum.org/sustainabilityreports.

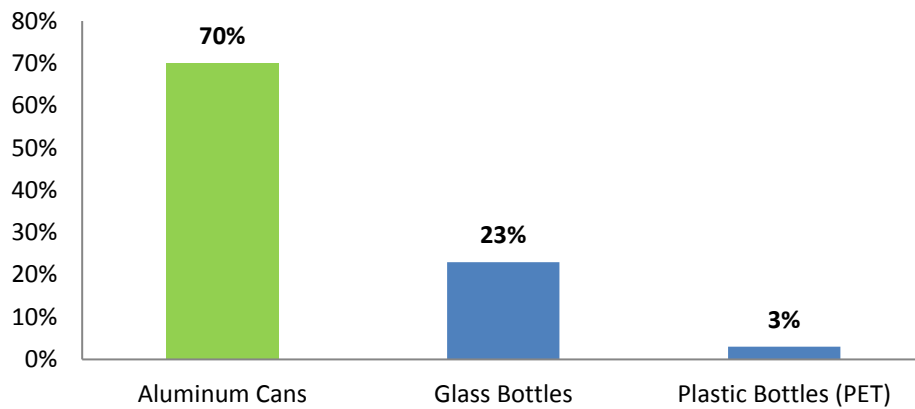
¹¹ Newly produced aluminum.

¹² UBC and other scrap from the consumer waste stream.

¹³ Scrap generated from the can manufacturing process and recycled back into the manufacturing process.

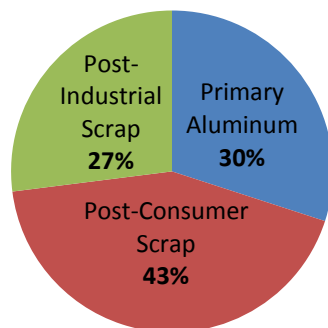
Charts & Graphs

Recycled Content for Competing Packaging Types



The high recycling rates and closed loop nature of aluminum can recycling mean that aluminum cans contain far more recycled content than competing packaging types. Unlike other package types, aluminum cans are most often recycled directly back into themselves not downcycled into new products which will ultimately end up in landfills.

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 the can manufacturing process.

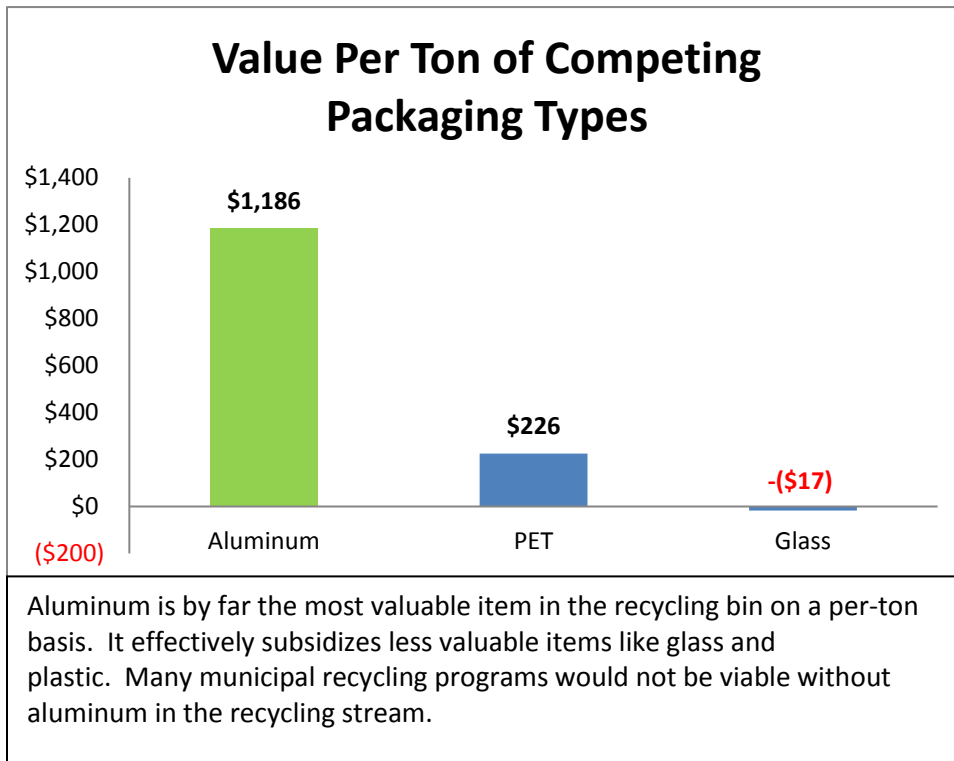
Value of Material

Background

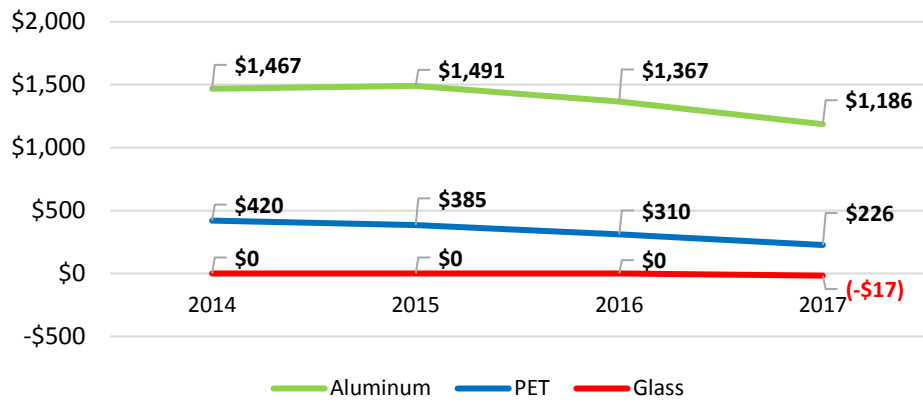
The value of material data measures the dollar value of aluminum can scrap. Many municipal recycling programs rely on re-selling the material collected in curbside bins to help subsidize their programs. The high value of aluminum in the scrap stream means that, without it, very few curbside pickup programs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

Methodology

This data is based on a two-year rolling average of commodity prices from February 2015 – February 2017 for various material types via <http://recyclingmarkets.net/>.



Beverage Container Recycling Value Per Ton Through the Years



Commodity prices for aluminum can and other used beverage container scrap have declined significantly in recent years. The value per ton of aluminum can scrap, for example, has dropped nearly 20 percent over the past few years. This decline in prices has placed downward pressure on recycling rates for all products.

Weight

Background

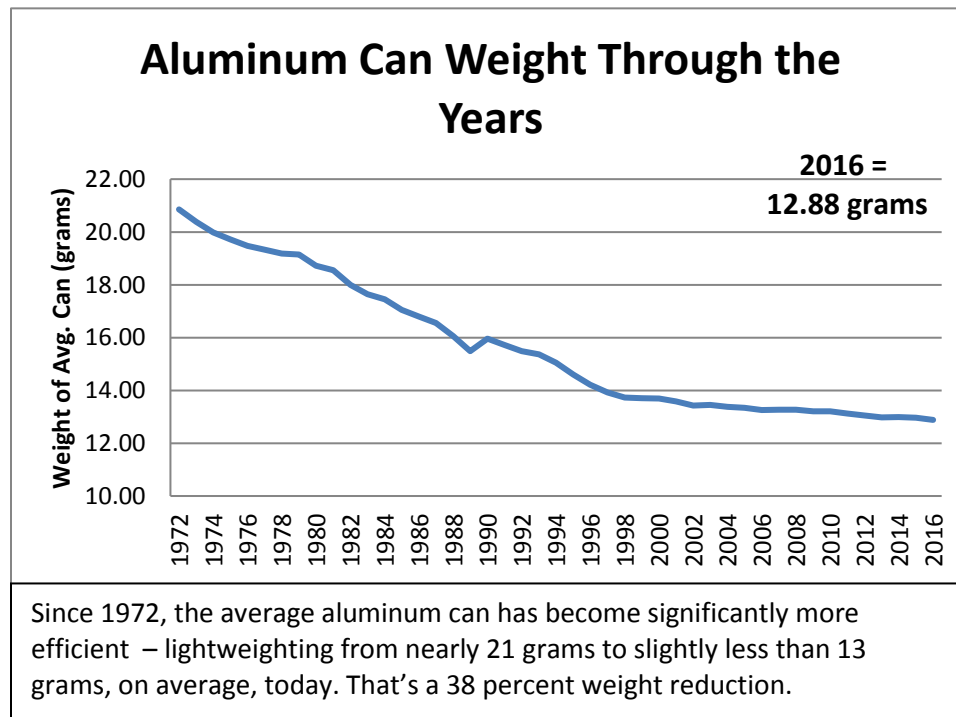
Since 1972, the Aluminum Association, in partnership with the Can Manufacturers Institute, has released data on the weight of the average aluminum can. During the time period, the weight of the average can has declined by nearly 40 percent due to improved production processes and efficiencies. Producing a lighter container for the same volume of beverage indicates significant engineering improvements in can making and efficiency improvements in material utilization.

The weight reduction allows beverage makers to ship cans more efficiently. In fact, the reduction in can weight translates into both transportation energy and cost savings for beverage brands that package their products in cans.

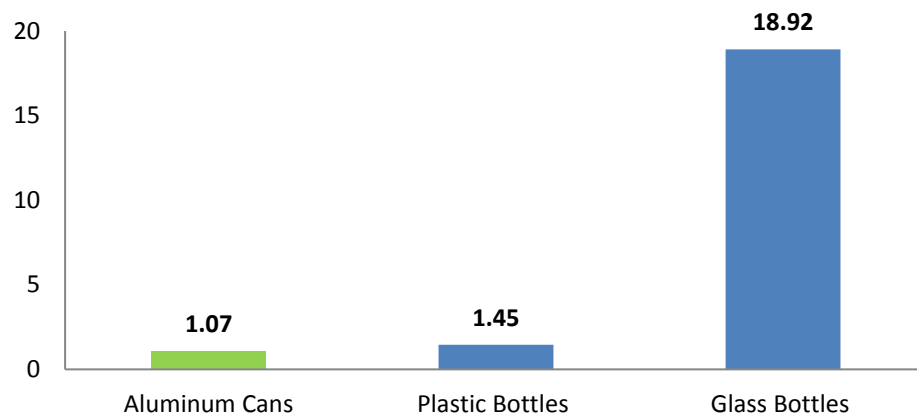
While comprehensive data on glass beer bottles and plastic (PET) soda bottles is not available, we have also estimated the amount of material per ounce of beverage packaged based on publicly available sources.

Methodology

Prior to 1989, the average weight of an aluminum can was based on an Aluminum Association can weight survey. Since 1989, the average weight is based on a survey conducted by the [Can Manufacturers Institute](#).



Material Weight Per Ounce of Beverage Packaged (grams)



Aluminum cans require less material (by weight) than competing packaging types. The weight reduction allows beverage makers to ship cans more efficiently and translates into both transportation energy and cost savings for beverage brands that package their products in cans. A 2016 study found that these efficiencies mean aluminum has the lowest carbon footprint among competing packaging types in the use phase. Learn more at <http://www.aluminum.org/sustainabilityreports>.