



APRIL 2021

# Aluminum Sector Snapshot: Environmental Reporting

PREPARED BY THE ALUMINUM ASSOCIATION

# SUMMARY

The U.S. aluminum industry has made significant progress over the past 30 years on key environmental metrics like air, water, waste, energy and greenhouse gas. Importantly, aluminum producers have reduced environmental impact while increasing output – meeting growing domestic demand for the material while demonstrating a commitment to sustainability.

Aluminum is the most abundant metal in the earth's crust and, when processed and refined, is a foundational part of America's essential manufacturing base. As a lightweight, infinitely recyclable and durable material with a remarkable variety of industrial and consumer applications, aluminum provides an innovative solution to many 21st-century challenges.

Despite the impact of the COVID-19 pandemic, the Aluminum Association estimates that in 2020, the North American demand for aluminum was 24.5 billion pounds. This represents a 30.8 percent increase in demand from 2009 when North American demand was 18.7 billion pounds. With demand increasing it is crucial for the aluminum industry to continue to invest in technologies that decrease its environmental impact.

The U.S. aluminum industry represented by the data in this Sector Snapshot is comprised of companies and facilities across the supply chain that refine bauxite into alumina, produce primary aluminum for alumina (smelting), produce secondary aluminum from scrap (recycling), and produce semi-fabricated aluminum products like sheet, foil, extrusions, and cable [1]. Semi-fabricated aluminum products are typically sent to industrial customers for final fabrication into finished products like cans, window frames, automobile parts and aircraft components.

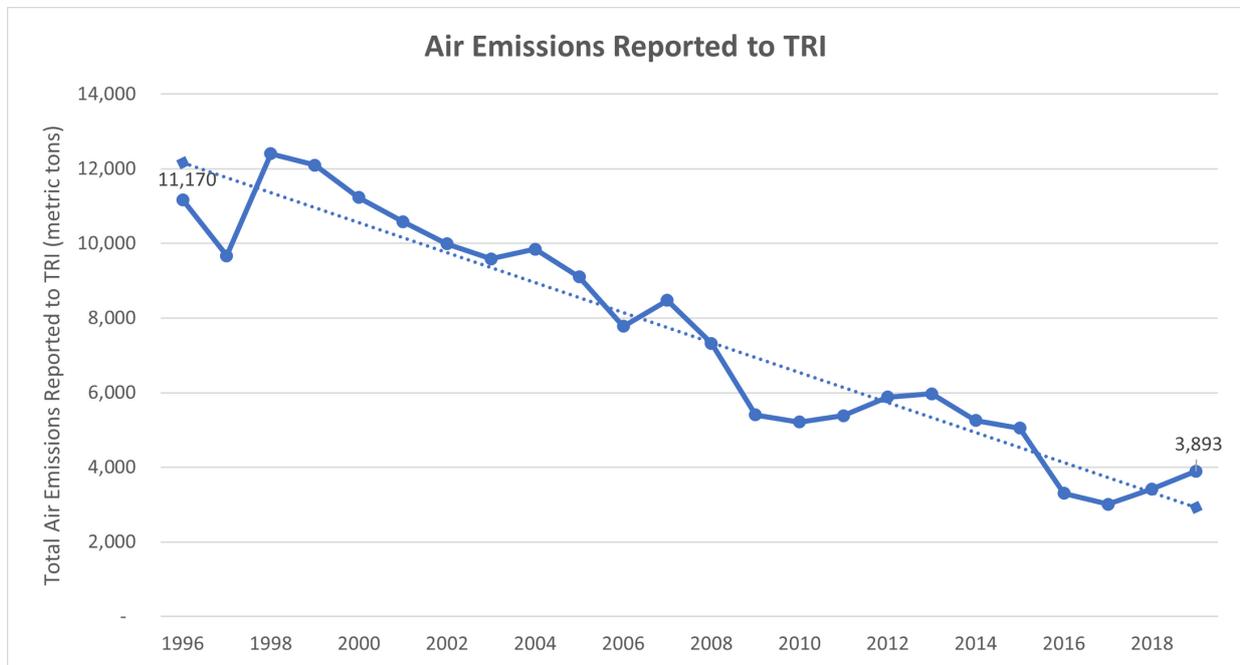
Aluminum companies in the United States have made significant investments in process and technology improvements to facilities and operations over the past three decades. For example, facilities have switched to products such as lubricants and rolling oils that are more environmentally preferable, installed cleaner burner technologies that use less energy in furnaces, replaced older inefficient process equipment with newer technology and upgraded air and water pollution control systems. Implemented at facilities across the country, these improvements have had a cumulatively beneficial effect on sector performance.

Manufacturers in the United States report a range of operational environmental data to the U.S. government, and that data is publicly available. The data in this report comes from U.S. government sources reported to the Environmental Protection Agency (EPA), such as the EPA's [Toxics Release Inventory \(TRI\)](#) and the National Emissions Inventory (NEI).

**Note:** Reported data is publicly available information for U.S. facilities only, so environmental effects from the production or processing of aluminum occurring outside of the United States – even if those products are available in the United States due to import or export activities – is not reflected in this Sector Snapshot. For detailed life-cycle analysis reports on various aluminum products, visit [www.aluminum.org/sustainability](http://www.aluminum.org/sustainability).

[1] Data covers products categorized under NAICS 331313 (alumina and primary aluminum production), 331314 (secondary aluminum production), 331315 (aluminum sheet, plate, and foil manufacturing) and 331318 (other aluminum rolling, drawing, and extruding).

# AIR QUALITY



## What is in this chart?

This chart shows total air emissions, as reported annually to EPA's [Toxics Release Inventory \(TRI\)](#), between 1996 and 2019, by manufacturers in the aluminum industry [2]. Total TRI air emissions for this sector decreased from 11k metric tons in 1996 to just under 4k metric tons in 2019. This represents a 65 percent reduction by aluminum manufacturers over this period.

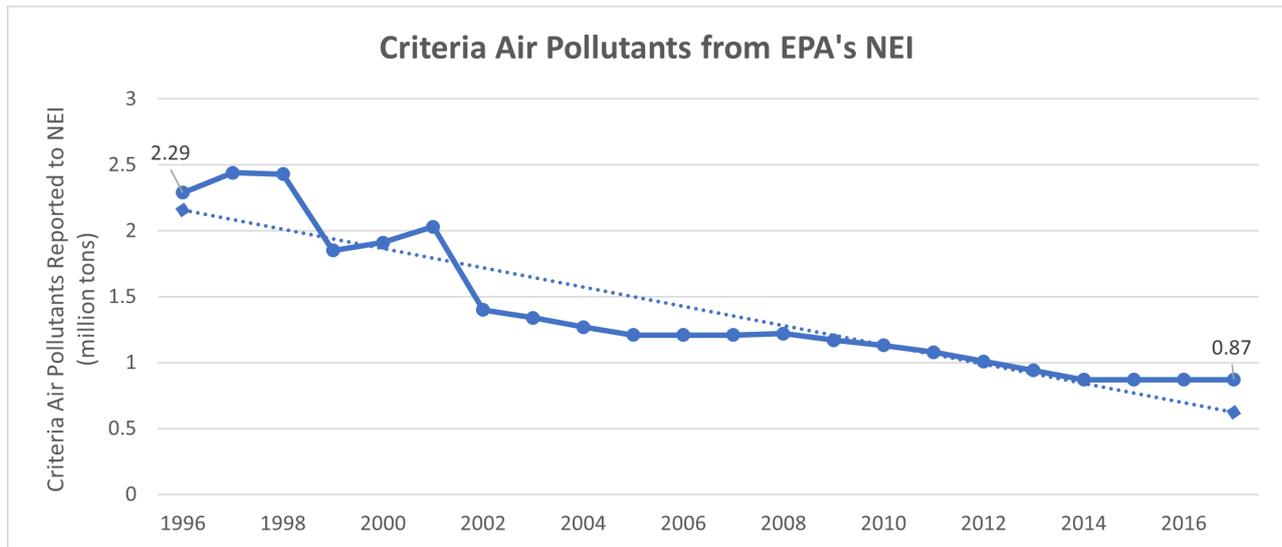
## What are TRI air emissions?

Total air emissions reported to TRI are [EPCRA Section 313 chemicals](#) and include both [fugitive air emissions](#) and [point source air emissions](#). Fugitive air emissions are all releases to air that do not occur through a confined air stream; such emissions may include equipment leaks, releases from building ventilation systems, and evaporative losses from surface impoundments and spills. Point source air emissions, also called stack emissions, are releases to air that occur through a confined air stream, such as stacks, ducts or pipes.

The quantity of releases does not indicate the level of health risk posed by the emissions. TRI data can vary from year to year at the facility and sector levels for a variety of reasons. For questions about specific values, [contact TRI](#).

[2] Those companies classified under NAICS 3313 (Alumina and Aluminum Production and Processing).

# AIR QUALITY



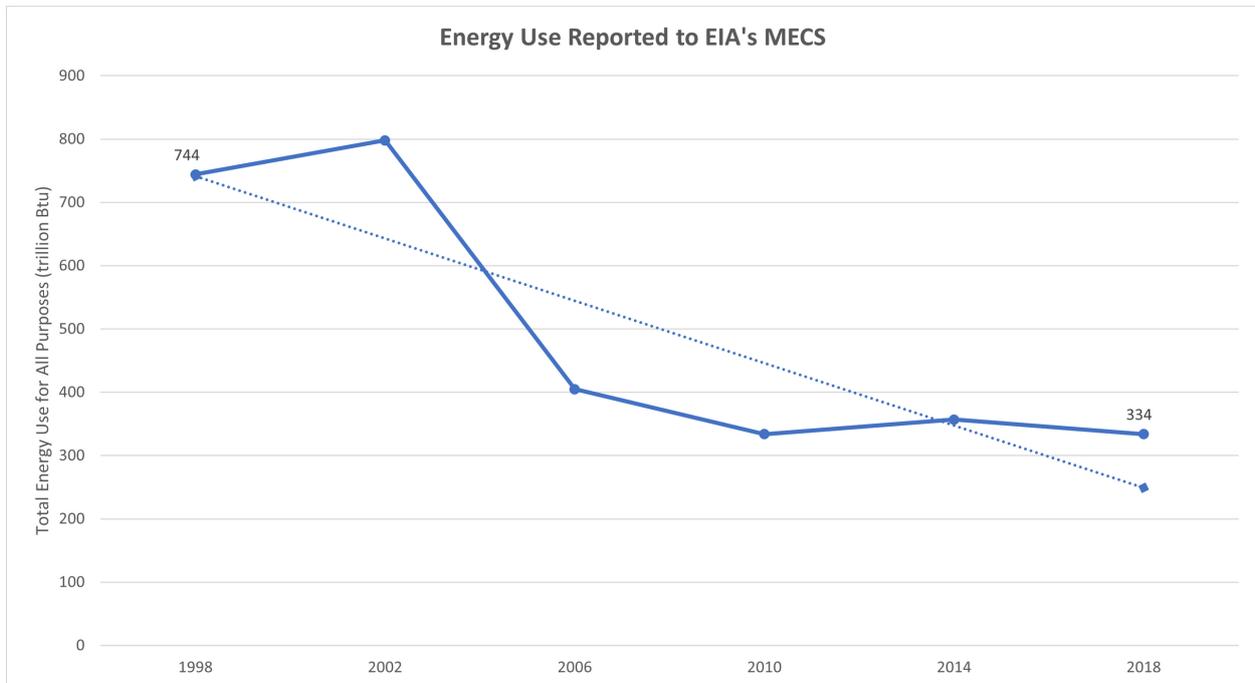
## What is in this chart?

This chart shows criteria air pollutant (CAP) emission estimates, as captured in EPA's National Emissions Inventory (NEI) between 1996 to 2017, for establishments classified within NEI as metals processing. CAP emissions for this sector decreased from 2.3 million tons in 1996 to 873,000 tons in 2017, a 62 percent reduction.

## What are TRI air emissions?

CAPs and precursors include lead, carbon monoxide, nitrogen oxide, sulfur dioxide, particulate matter (PM) 10 microns in diameter or less, PM 2.5 microns in diameter or less and ozone.

# ENERGY USE



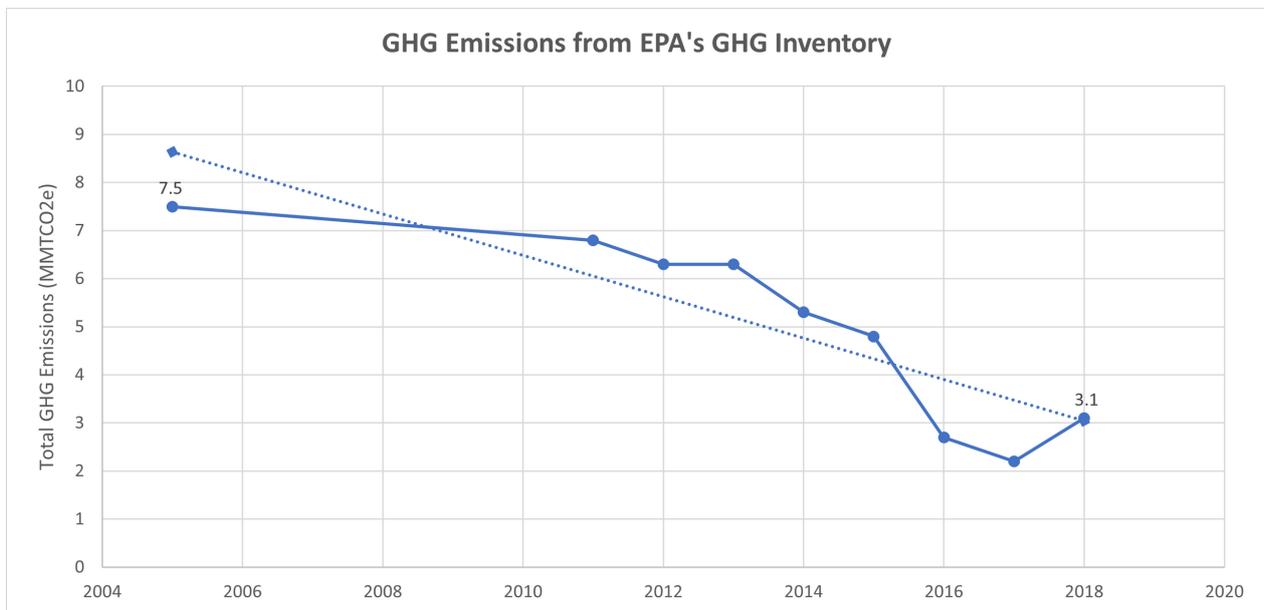
## What is in this chart?

This chart shows consumption of energy for all purposes, as reported to the [Energy Information Administration's Manufacturing Energy Consumption Survey](#) between 1998 and 2018, by manufacturers in the aluminum industry. Energy consumption for this sector decreased from 750 trillion Btu in 1998 to 334 trillion Btu in 2018. This represents a 55 percent reduction in consumption of energy.

## What is consumption of energy for all purposes?

The term "[energy consumption for all purposes](#)," also referred to as energy use, is the amount of primary energy consumption by the aluminum industry for its manufacturing and business activities.

# GHG EMISSIONS



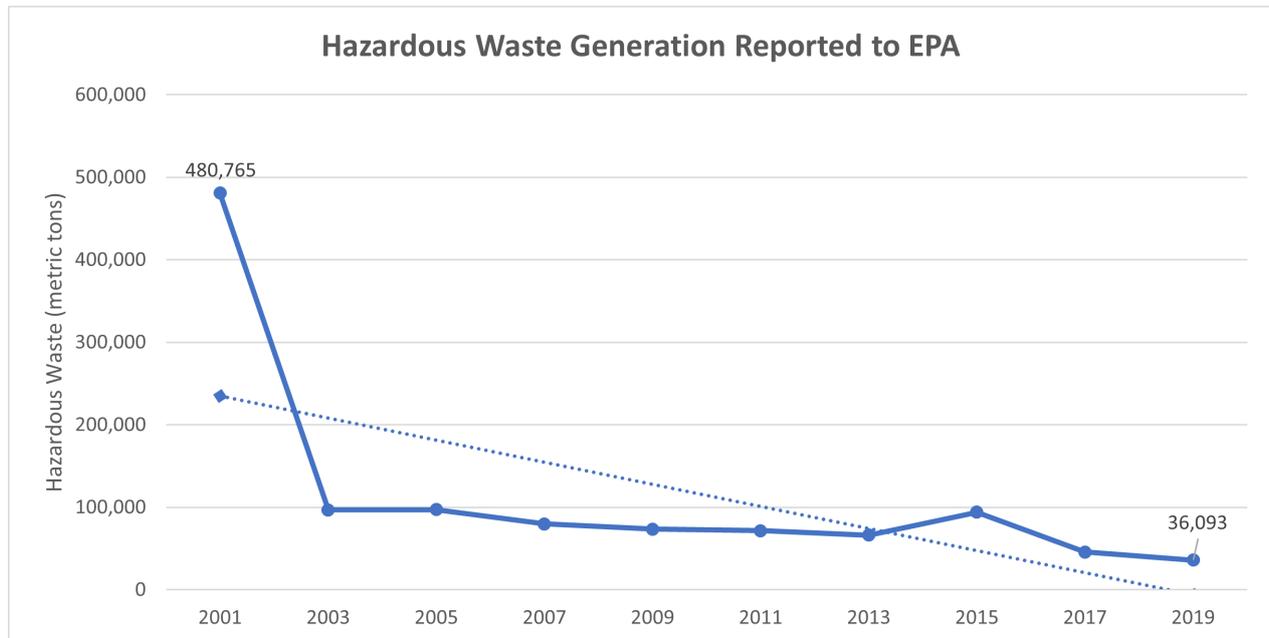
## What is in this chart?

This chart shows greenhouse gas (GHG) emission estimates, based on national data from EPA's [Inventory of U.S. Greenhouse Gas Emissions and Sinks](#) between 2005 and 2018, from U.S. manufacturers in the aluminum industry. GHG emissions for this sector decreased from 7.5 million metric tons of carbon dioxide equivalent (MMTCO<sub>2</sub>e) in 2005 to 3.1 MMTCO<sub>2</sub>e in 2018. This represents a 59 percent reduction. It also is the equivalent of eliminating the carbon dioxide emissions from over 740,000 homes each year. (Calculated using <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>)

## What are GHG emissions?

GHGs are gases that trap heat when emitted to the atmosphere. Aluminum manufacturing operations generate GHG emissions. Releases of GHGs are subject to regulatory requirements under the Clean Air Act.

# WASTE



## What is in this chart?

This chart shows the annual quantity of hazardous waste generated, as reported annually to EPA's National Biennial Resource Conservation and Recovery Act of 1976 (RCRA) Hazardous Waste Report between 2001 and 2019, by establishments from manufacturers in the aluminum industry. Hazardous waste generation for this sector decreased from just over 480k metric tons in 2001 to about 36k metric tons in 2019. This represents a nearly 93 percent reduction in hazardous waste generated.

## What is RCRA hazardous waste?

The term "RCRA hazardous waste" refers to solid waste that has been assigned a Federal Hazardous Waste Code and is regulated by RCRA. Generators of hazardous waste are subject to EPA's national system for solid waste control. Hazardous waste generators and transporters, as well as facilities that treat, store, and dispose of hazardous waste are subject to EPA regulation, including permitting.

# WASTE



## What is in this chart?

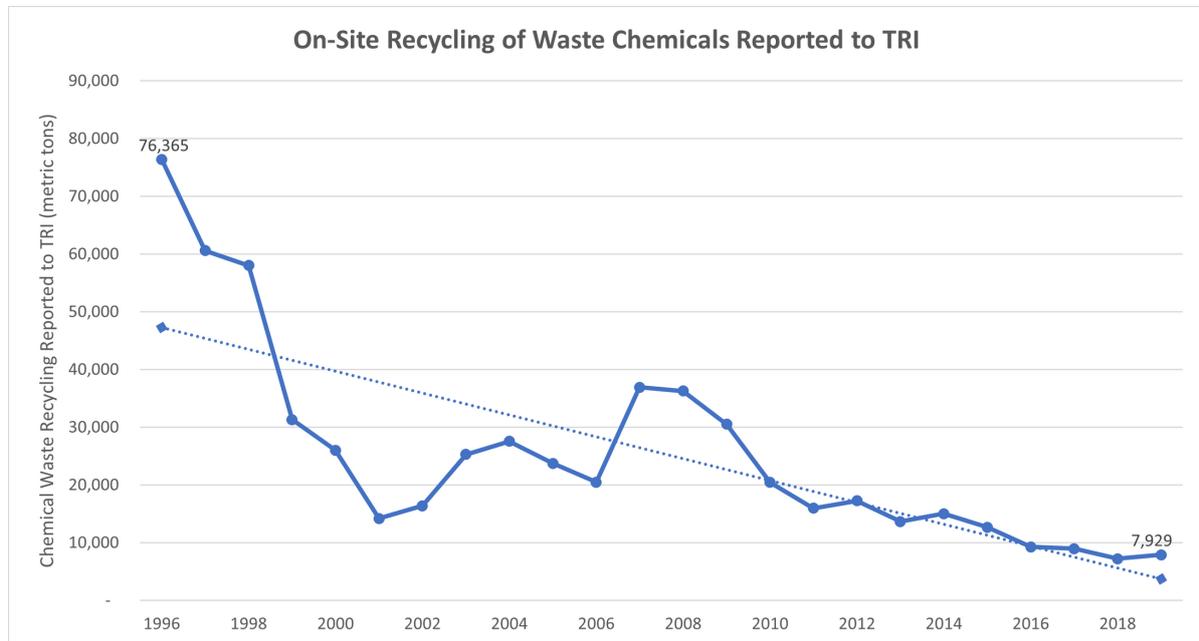
This chart shows production-related waste managed, as reported annually to EPA's Toxics Release Inventory (TRI) between 1996 and 2019, by manufacturers in the aluminum industry. Production-related waste managed for this sector decreased from just over 181k metric tons in 1998 to just over 99k metric tons in 2019. This represents a 45 percent decrease in production-related waste management.

## What is production-related waste managed?

The term "production-related waste managed" refers to non-accidental chemical waste generated at a facility. It reflects on-site environmental releases (minus non-routine, one-time events), on-site waste management (such as recycling, treatment, or combustion for energy recovery) and off-site transfers for disposal, treatment, recycling or energy recovery. Data on production-related waste managed are available through TRI.

The quantity of releases does not indicate the level of health risk posed by the waste managed. TRI data can vary from year to year at the sector and facility levels for a variety of reasons. For questions about specific values, contact TRI. In addition to TRI reporting, aluminum production operations are subject to statutory and regulatory requirements, including permitting.

# WASTE



## What is in this chart?

This chart shows the on-site recycling of waste chemicals, as reported annually to EPA's Toxics Release Inventory (TRI), between 1996 and 2016, by manufacturers in the aluminum industry. On-site recycling of waste chemicals for this sector decreased from just over 76k metric tons of waste chemicals in 1996 to just under 8k metric tons in 2019. This represents a 90 percent decrease in the on-site recycling of waste chemicals.

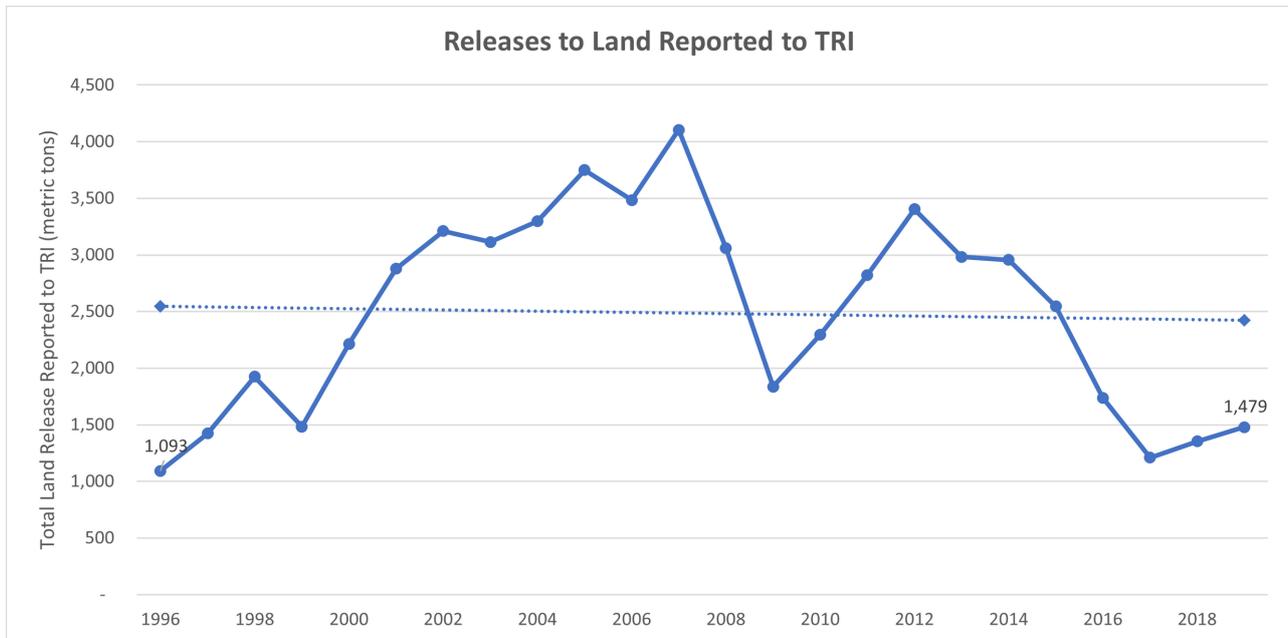
This decrease is consistent with the overall decline in production-related waste reported to TRI. This is to be expected as less reportable waste generated provides less reportable waste available for on-site recycling.

## What is production-related waste managed?

The term "on-site recycling of waste chemicals" refers to solvent recovery and metals recovery to extract toxic chemicals. To be reported as "on-site recycling of waste chemicals" under TRI, the chemicals or waste containing the chemicals must undergo a recovery step prior to being reused. The choice of recycling method depends on the nature of the chemicals. Data on on-site recycling of waste chemicals are available through TRI.

The quantity of releases does not indicate the level of health risk posed by the chemicals recycled. TRI data can vary from year to year at the sector and facility levels for a variety of reasons. For questions about specific values, contact TRI. In addition to TRI reporting, aluminum production operations are subject to statutory and regulatory requirements, including permitting.

# LAND MANAGEMENT OF TRI CHEMICALS



## What is in this chart?

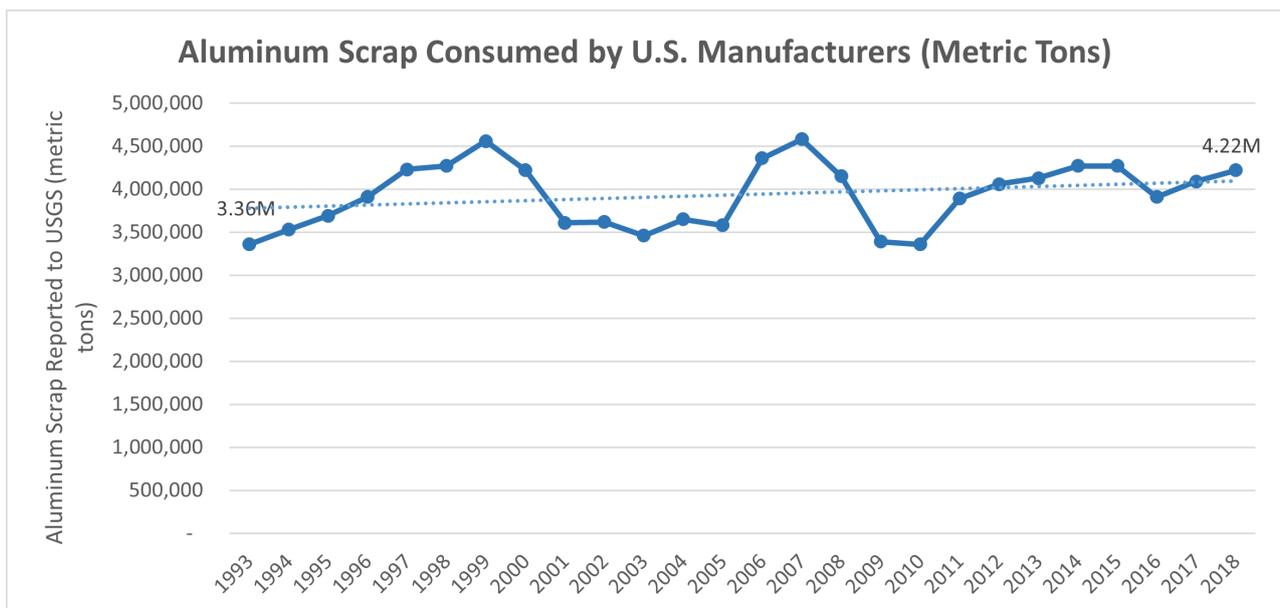
This chart shows the quantity of TRI listed chemicals released to land, as reported annually to EPA's [Toxics Release Inventory \(TRI\)](#) between 1996 and 2019, by manufacturers in the aluminum industry. Land releases for this sector increased from just over 1k metric tons in 1996 to just under 1.5k metric tons in 2019.

## What are releases to land reported to TRI?

The term "[releases to land](#)" refers to the regulated disposal of toxic chemicals in landfills (areas in which wastes are buried) or surface impoundments (uncovered holding areas which are designed to hold an accumulation of liquid wastes or waste containing free liquids), other land disposal methods (such as waste piles), and other releases to land (such as spills or leaks). Land releases also include injection into underground wells. Data on releases to land are available through [TRI](#).

The quantity of releases does not indicate the [level of health risk posed](#) by the chemicals. TRI data can vary from year to year at the sector and facility levels for a variety of reasons. For questions about specific values, [contact TRI](#).

# ALUMINUM SCRAP CONSUMED BY U.S. MANUFACTURERS



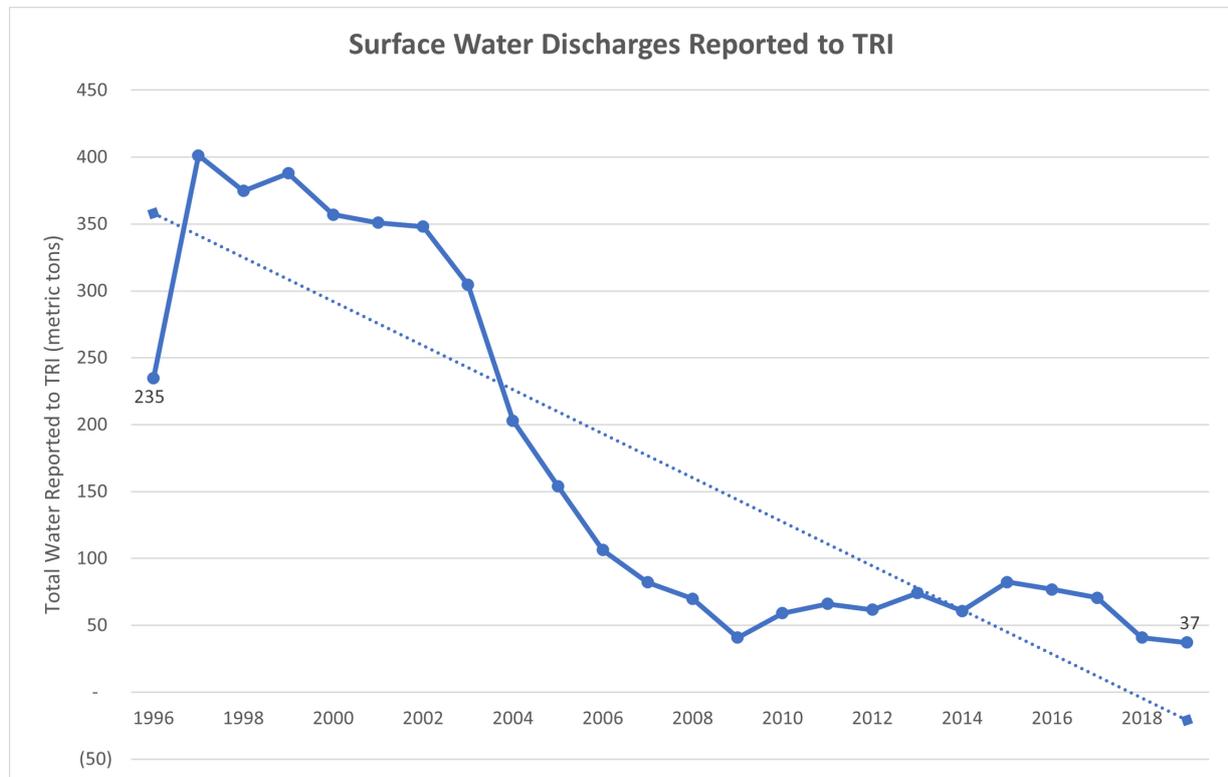
## What is in this chart?

This chart shows the quantity of aluminum scrap consumed by U.S. Manufacturers, as published in the Aluminum Minerals Yearbook by the [U.S. Geological Survey](#) between 1993 and 2018. The quantity of scrap recycled for domestic product manufacturing increased from 3.36 million metric tons in 1993 to 4.22 million metric tons in 2018. This represents a 25.6 percent increase in aluminum scrap consumed by U.S. manufacturers. It is worth noting that the United States also exports a significant amount of aluminum scrap to be recycled in other countries each year. The overall trend for scrap export is decreasing while domestic consumption is increasing.

## What are recycled goods?

The most commonly recognized consumer recycling programs are curbside and municipal. In these programs, items like beverage cans, aluminum foil, aluminum baking trays and pie pans are recycled. In addition, most of aluminum scrap is collected from buildings, infrastructural equipment and facilities, transportation equipment (automobiles, aircrafts, trains, etc.) and durable goods. Aluminum recovered from these products and facilities serves as a critical feedstock of raw material for making new aluminum products.

# TRI CHEMICALS DISCHARGED TO SURFACE WATER



## What is in this chart?

This chart shows the quantity of TRI listed chemicals discharged to surface waters, as reported annually to EPA's [Toxics Release Inventory \(TRI\)](#), between 1996 and 2019, by manufacturers in the aluminum industry. Surface water discharges for this sector decreased from 235 metric tons in 1996 to 37 metric tons in 2019. This represents an 84 percent reduction in TRI chemicals discharged to surface water.

## What are discharges to surface water?

Surface water discharges include discharges from contained sources, such as industrial process outflow pipes or open trenches, to streams, rivers, lakes, oceans and other bodies of water. Data on surface water discharges are available through [TRI](#).

The quantity of discharges does not indicate the level of health risk posed by the nature of the discharge. TRI data can vary from year to year at the sector and facility levels for a variety of reasons. For questions about specific values, [contact TRI](#). In addition to TRI reporting, aluminum production operations are subject to statutory and regulatory requirements, including permitting.