

Introduction to the 2020 TRI National Analysis

Industries and businesses in the United States (U.S.) use many chemicals to make the products we depend on, such as pharmaceuticals, computers, paints, clothing, and automobiles. While most chemicals on the <u>Toxics Release Inventory (TRI) chemical list</u> are managed by these facilities in ways that minimize releases into the environment, releases still occur as part of normal business operations.

It is your right to know what TRI chemicals are being used in your community, how TRI chemical waste is managed including through environmental releases, and whether these quantities are changing over time.

The TRI tracks how industry manages certain toxic chemicals. Information reported each year to the EPA by facilities covering activities such as manufacturing, metal mining, generation of electric power, and hazardous waste management provides insight over time as to chemical waste management changes. The data reported to EPA are publicly available. For calendar year 2020, more than 21,000 facilities reported to EPA's TRI Program.

Each year, in support of its mission to protect human health and the environment, EPA analyzes the most recent TRI data, conducts comparative analyses with TRI data reported for previous years, and publishes its findings in the TRI National Analysis.

TRI Reporting

Under the Emergency Planning and Community Right-to-Know Act (EPCRA) and the Pollution Prevention Act (PPA), facilities that meet TRI reporting requirements must report details about their pollution prevention and waste management activities, including releases, of TRI-listed chemicals that occurred during the prior calendar year to EPA's TRI Program by July 1 of each year.



Watch a short video about the TRI Program and your right to know.

Overview of the 2020 TRI data

The two pie charts below summarize the most recent TRI data: the chart on the left shows the total amount of production-related waste managed through recycling, energy recovery, treatment, and disposal or other releases. The chart on the right shows the proportions of TRI chemical waste released to air, water, and land.





- Facilities reported managing a total of 28.33 billion pounds of TRI-listed chemicals as production-related waste during 2020. Production-related waste managed is the quantity of TRI chemicals in waste resulting from routine operations at facilities. This includes TRI chemicals in wastes that are recycled, combusted for energy recovery, treated, disposed of, or otherwise released into the environment.
 - Of this total, 89% was recycled, combusted for energy recovery, or treated, while 11% was disposed of or otherwise released into the environment.
- For TRI chemicals in wastes that were disposed of or otherwise released, facilities report the quantities of these releases, and whether the releases were to air, water, or land. Most releases occur on site at facilities, but waste containing TRI chemicals may also be shipped off site for disposal, such as to a landfill. As shown in the pie chart on the right, most TRI chemical waste was disposed of to land, which includes landfills, underground injection, and other land disposal practices.



Where are the Facilities that Reported to TRI for 2020 Located?



View Larger Map



TRI Data Considerations

As with any dataset, there are several factors to consider when reviewing results or using Toxics Release Inventory (TRI) data. Key factors associated with the data presented in the TRI National Analysis are summarized below; for more information see <u>Factors to Consider When</u> <u>Using Toxics Release Inventory Data</u>.

 Covered chemicals and sectors. Many industry sectors report information about the management of certain toxic chemicals as waste to TRI. However, TRI does not include information on every chemical, nor does it collect information from all facilities or industry sectors that may manage TRI chemical wastes. A list of the chemicals reportable to the TRI Program as well as a list of the sectors covered by the TRI Program is available on the TRI webpage. Facilities in covered sectors that manufacture, process, or otherwise use TRI-listed chemicals above listed threshold quantities and employ at least ten full-time equivalent employees are required to report to the TRI Program. For most TRI chemicals, the threshold quantities are 25,000 pounds of the chemical manufactured or processed, or 10,000 pounds of the chemical otherwise used during a calendar year.

TRI Reporting is Required

TRI reporting is required for facilities that meet the reporting criteria under Section 313 of the <u>Emergency Planning and</u> <u>Community Right-to-Know Act</u> (EPCRA). EPA investigates cases of EPCRA non-compliance and may issue civil penalties, including monetary fines. Since the TRI Program's creation, EPA has taken more than 3,400 TRI-related enforcement actions. For more information, see the <u>TRI</u> <u>Compliance and Enforcement</u> webpage.

- **TRI trends**. The TRI chemical list has changed over the years. To make sure year-toyear data are optimized for comparison, trend graphs in the TRI National Analysis include only chemicals that were reportable for the entire time period presented. Results which focus only on the year 2020 include all chemicals reportable for 2020. Thus, quantities mentioned in 2020-only analyses may differ slightly from the quantities shown for the year 2020 in multi-year trend analyses.
- **Data quality.** Facilities use their best available data to determine the quantities of chemicals they report to TRI. Each year, EPA conducts an extensive data quality review that includes contacting facilities about potential errors in reported information. This data quality review process helps ensure that the TRI National Analysis is based on accurate and complete information.



- **Risk.** TRI data can be a useful starting point to evaluate whether chemical releases may pose potential risks to human health and the environment. However, the quantity of a chemical release alone is not necessarily an indicator of exposure to the chemical, or the potential health or environmental risks posed by the chemical. In particular, note that:
 - TRI-listed chemicals vary in their toxicity; and
 - The extent of exposure to a chemical depends on many factors such as where the chemical is released, how it is released (i.e., to air, water, or land), the chemical's properties, and what happens to the chemical in the environment.

For more information on the use of TRI data in exposure and risk evaluations, see the <u>TRI and Estimating Potential Risk webpage</u> and <u>Hazard and Potential Risk of TRI</u> <u>Chemicals</u> in the Releases section.

- **COVID-19.** The most recent TRI data reflect chemical waste management activities, including releases, that occurred during calendar year 2020. The COVID-19 public health emergency began in the U.S. in early 2020 and may have affected industrial operations throughout the year. Facilities may submit comments about their industrial activities, and for 2020, many facilities chose to include information on how COVID-19 impacted their operations. Some descriptions of such comments are provided below.
 - **Impacts on facility-wide operations.** Many facilities noted COVID-19-related shutdowns or reduced operations during 2020.
 - Impacts on waste management activities. Facilities commented on how the public health emergency changed their processes. For example, a food manufacturer noted that they used more sanitizing chemical than in the past to meet COVID-related industry requirements. An antibacterial wipe manufacturer reported that increased demand for their product led to an increase in their production and the associated amount of chemical waste generated.
 - **Impacts on pollution prevention activities.** As an example, an abrasive product manufacturer reported that COVID-19 resulted in less capital available to pursue source reduction projects.
- Late submissions, revisions, and withdrawals. TRI reporting forms submitted to EPA or revised after the July 1 reporting deadline may not be processed in time to be included in the National Analysis. After EPA's data quality review, the TRI data are frozen in October and this dataset is used to develop the National Analysis. Any revisions or late submissions received after this date, or withdrawals made after this date, may not be reflected in the National Analysis but are incorporated into the TRI dataset during



the spring data refresh and will be reflected in next year's National Analysis where the data for that reporting year are referenced.

Impact of Late Submissions and Revisions on the National Analysis

To assess the impact of late submissions and revisions on the TRI National Analysis, the 2019 TRI data available in October 2021 were compared to the data that were available a year earlier, which were used to develop the 2019 TRI National Analysis. The difference between these two datasets is due to facilities that submitted late or revised TRI reporting forms. With the updated data, waste managed quantities are slightly higher and release quantities are slightly lower than originally reported: releases are 0.3% lower and waste managed is 0.2% higher than was shown in the 2019 TRI National Analysis.

Quick Facts for 2020





In this figure, the value for "Disposal or Other Releases" in the production-related waste managed pie chart (3.08 billion lb) is greater than the value for "Total Disposal or Other Releases" (3.04 billion lb). There are several reasons that these quantities differ slightly, including:

Double counting. Total disposal or other releases (3.04 billion pound value in the figure) removes "double counting" that occurs when a facility reports transfers of TRI chemicals in waste to another TRI-reporting facility. For example, when Facility A transfers a chemical off site for disposal to Facility B, Facility A reports the chemical as transferred off site for disposal while Facility B reports the same chemical as disposed of on site. In processing the data, the TRI Program recognizes that this is the same quantity of the chemical and



includes it only once in the total disposal or other releases metric. The production-related waste managed metric in TRI, however, considers all instances where the TRI chemical in waste is managed (first as a quantity sent off site for disposal and next as a quantity disposed of on site), and reflects both the off-site transfer and the on-site disposal. Typically, double counting accounts for most of the difference between the two release quantities in the 2020 TRI Quick Facts figure.

Non-production related waste. Non-production-related waste refers to TRI chemical
waste that result from one-time events, rather than standard production activities. These
events may include remedial actions, catastrophic events, or other events not associated
with normal production processes. Non-production-related waste is included in a facility's
total disposal or other releases but is not included in its production-related waste managed.

For more information on TRI, the chemicals and industry sectors it covers, the reporting requirements, and to access TRI data, <u>visit the TRI website</u>.



Provide the second se 2020 TRI National Analysis

Pollution Prevention and Waste Management

Each year, the EPA's Toxics Release Inventory (TRI) Program receives information from more than 21,000 facilities on the quantities of TRI-listed chemicals they recycled, combusted for energy recovery, treated for destruction, and disposed of or otherwise released both on and off site as part of their normal operations. These quantities are collectively referred to as production-related waste managed.

Looking at production-related waste managed over time helps track facilities' progress in reducing the amount of chemical waste generated and in adopting waste management practices that are preferable to disposing of or otherwise releasing waste into the environment.

Pollution prevention (P2) is an essential component of sustainable manufacturing practices. EPA encourages facilities to first reduce or eliminate the use of TRI-listed chemicals and the creation of



chemical waste through source reduction, or P2, activities such as material substitutions and process modifications. For waste that is generated, the preferred management method is recycling, followed by combustion for energy recovery, treatment, and, as a last resort, disposal or other release of the chemical waste into the environment in a safe manner. This order of preference is consistent with the national policy established by the Pollution Prevention Act of <u>1990</u>, and is illustrated in the graphic above.

2020 Highlights

- TRI facilities implemented 2,779 new source reduction activities to reduce pollution at its source.
- Facilities managed 28.3 billion pounds of TRI chemical waste, 89% of which was not released due to preferred waste management practices such as recycling.
- Production-related waste managed increased by 5.0 billion pounds (22%) since 2011, driven by • a 6.6-billion-pound (76%) increase in recycling.

TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the Introduction. For more information see Factors to Consider When Using Toxics Release Inventory Data.



Source Reduction Activities

Facilities are required to report new source reduction activities that they initiated or fully implemented during the reporting year. Source reduction (P2) activities eliminate or reduce the use of TRI-listed chemicals and the creation of chemical waste. Other waste management practices, such as recycling and treatment, refer to how chemical waste is managed after it is created and are not source reduction activities.

Source reduction information can help facilities learn from each other's best practices and potentially lead to better environmental stewardship and implementation of more P2 actions. For more information, see the <u>TRI Source Reduction Reporting Fact Sheet</u>.



Note: Facilities report their source reduction activities by selecting from a list of codes that describe their activities. These codes fall into one of eight categories listed in the graph legend and are defined in the <u>TRI Reporting Forms and Instructions</u>.

- In 2020, 1,188 facilities (6% of all facilities that reported to TRI) implemented a combined 2,779 new source reduction activities for 176 chemicals and chemical categories.
- For each chemical form submitted, facilities select from 49 types of source reduction activities across the eight categories shown in the graph. The most reported source reduction category is Good Operating Practices.



- For example, a motor vehicle parts manufacturer reduced the amount of nickel waste produced by implementing quality improvement procedures to reduce manufacturing defects. [Click to view facility details in the TRI P2 Search Tool]
- Facilities also report the methods by which they identified the source reduction opportunities. In 2020, the most reported methods were participative team management and internal pollution prevention audits.

Additional Resources

- See the TRI <u>P2 Data Overview Factsheet</u> for more information on source reduction reporting in recent years.
- Note that facilities may have implemented source reduction activities in earlier years that are ongoing or have been completed. To see details about these activities, <u>use the TRI</u> <u>P2 Search Tool</u>.
- Facilities interested in exploring source reduction opportunities can reach out to their EPA Regional P2 Coordinator to arrange a free or subsidized P2 assessment with a P2 expert. Visit the <u>P2 Resources for Business webpage</u> for more information.



Source Reduction Activities by Chemical and Industry

Source Reduction Activities by Chemical

This figure shows the chemicals with the highest source reduction reporting rates over the last five years by the type of activity.



Note: 1) Limited to chemicals with at least 100 reports of source reduction activities from 2016 to 2020. 2) In this figure, antimony is combined with antimony compounds, although metals and compounds of the same metal are listed separately on the TRI list. 3) Facilities report their source reduction activities by selecting from a list of codes that describe their activities. These codes fall into one of eight categories listed in the graph legend and are defined in the <u>TRI Reporting Forms and Instructions</u>.

From 2016 to 2020:

• TRI facilities reported 19,224 source reduction activities for more than 240 chemicals and chemical categories.



- Chemicals with the highest source reduction reporting rates included styrene, *n*-butyl alcohol, antimony and antimony compounds, N-methyl-2-pyrrolidone (NMP), and dichloromethane (DCM, also known as methylene chloride).
- The type of source reduction activities implemented for these chemicals varied depending on the chemicals' characteristics and how they are used. For example:
 - **Process Modifications,** including optimizing reaction conditions and modifying equipment, layout, or piping, can help reduce the amount of solvents such as dichloromethane (DCM) and *n*-butyl alcohol needed for a process.
 - Raw Material Modifications include the use of alternative materials in the manufacturing process, such as replacing styrene, a chemical used to make plastics, and replacing antimony compounds, which are used in electronics, batteries, and as a component of flame retardants.
 - Inventory Control includes activities to reduce excess stores of chemicals, reducing waste from disposal of expired materials. Chemicals such as styrene may degrade over time, especially when exposed to heat, light, or air.

Facilities may also report additional details about their source reduction activities in an optional text field of the TRI reporting form.

Examples of optional source reduction information for 2020:

- **Styrene**: A plastic products manufacturer reduced styrene waste by purchasing materials from their vendor with lower styrene content than their previous product. [Click to view facility details in the TRI P2 Search Tool]
- **Antimony and antimony compounds**: A plastic products manufacturer changed production schedules to reduce the amount of antimony scrap produced during product changeovers. [Click to view facility details in the TRI P2 Search Tool]
- *n*-Butyl alcohol: A kitchen cabinet manufacturer eliminated use of a solvent-based stain which contained *n*-butyl alcohol and switched to a water-based stain. [Click to view facility details in the TRI P2 Search Tool]

You can <u>compare facilities' waste management methods and trends for any TRI chemical by</u> <u>using the TRI P2 Search Tool</u>.



Source Reduction Activities by Industry

This figure shows the industries with the highest source reduction reporting rates over the last five years by the types of activities these sectors implemented.



Note: 1) Limited to industries with at least 100 source reduction activities reported from 2016 to 2020. 2) Facilities report their source reduction activities by selecting from a list of codes that describe their activities. These codes fall into one of eight categories listed in the graph legend and are defined in the <u>TRI Reporting Forms and Instructions</u>.

From 2016 to 2020:

- The five industry sectors with the highest source reduction reporting rates were plastics and rubber products, computers and electronic products, miscellaneous manufacturing (e.g., medical equipment), furniture manufacturing, and printing.
- For most sectors, Good Operating Practices was the most frequently reported type of source reduction activity. Other commonly reported source reduction activities varied by sector. For example, computers and electronic products manufacturers frequently



reported modifications to their raw materials and products, often associated with the elimination of lead-based solder.

Facilities may also report additional details to TRI about their source reduction activities, as shown in the following examples.

Examples of optional source reduction information for 2020:

- **Plastics and Rubber Products Manufacturing:** A plastic products manufacturer reduced its ethylbenzene waste by replacing ethylbenzene in paints and solvents with a more environmentally friendly option. [Click to view facility details in the TRI P2 Search Tool]
- Miscellaneous Manufacturing: A surgical and medical instrument manufacturer reduced nitric acid waste by implementing software improvements to reduce downtime.
 [Click to view facility details in the TRI P2 Search Tool]
- **Furniture Manufacturing**: A wood cabinet manufacturer replaced a line of colors with new colors which contain little to no xylene compared with the old line. [Click to view facility details in the TRI P2 Search Tool]

You can view all reported pollution prevention activities and compare facilities' waste management methods and trends for any TRI chemical by using the TRI P2 Search Tool.



Green Chemistry Activities

Green chemistry is the design of chemical products that are safer and processes that use safer inputs, minimal energy and are efficient (i.e., minimize the creation of waste). In the waste management hierarchy, green chemistry is one way to achieve source reduction. Advancements in green chemistry allow industry to prevent pollution at its source by, for example, designing or modifying manufacturing processes to optimize use of resources and reduce the creation of TRI chemical waste.

Six of the TRI source reduction codes facilities can choose from are specific to green chemistry activities, although green chemistry practices may also fit under other codes. This figure shows the chemicals where facilities implemented green chemistry practices at the highest rates over the last five years by sector. Several examples follow the figure.



Note: In this figure, the metals (zinc and lead) are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list.

• Since 2016, facilities have reported 1,011 green chemistry activities for 109 TRI chemicals and chemical categories.



- Green chemistry activities were reported most frequently for methanol, zinc and zinc compounds, lead and lead compounds, toluene, and ammonia.
- The chemical manufacturing and fabricated metals manufacturing sectors reported the highest number of green chemistry activities.
- Chemical manufacturers used green chemistry to reduce or eliminate their use of TRI solvent and reagent chemicals, such as methanol, toluene, and ammonia. For example:
 - An adhesives manufacturer removed methanol from most of its product formulations by replacing it with another, not TRI-reportable, chemical. [Click to view facility details in the TRI P2 Search Tool]
- Fabricated metal producers and transportation equipment manufacturers applied green chemistry techniques to reduce or eliminate their use of metals. For example:
 - A metal anodizing, plating, and polishing facility installed an electronic Key Performance Indicator board to monitor cycle time and reduce the amount of zinc used per cycle. [Click to view facility details in the TRI P2 Search Tool]

Additional Resources

Source reduction activities such as green chemistry activities are the preferred way to reduce the creation of chemical wastes. These resources have more information on green chemistry:

- <u>EPA's TRI Toxics Tracker</u>: green chemistry examples for a specific chemical and/or industry.
- <u>EPA's Green Chemistry program</u>: information about green chemistry and EPA's efforts to facilitate its adoption.
- <u>EPA's Safer Choice program</u>: information about consumer products with lower hazard.
- For more details on the types of green chemistry activities reported to TRI and trends in green chemistry reporting, see <u>The Utility of the Toxics Release Inventory (TRI) in</u> <u>Tracking Implementation and Environmental Impact of Industrial Green Chemistry</u> <u>Practices in the United States</u>.



Reported Barriers to Source Reduction

Facilities also have the option to inform EPA of barriers that prevented them from implementing new source reduction activities. Analyzing the barriers to source reduction reported by facilities helps identify where more research is needed, for example, to address technological challenges or develop viable alternatives. It may also allow for better communication between those that have knowledge of source reduction practices and those that are seeking additional assistance. This figure shows the types of barriers facilities reported for metals and for all other (nonmetal) TRI chemicals.



Note: Facilities have the option to report barriers to source reduction by selecting from nine codes. These codes are defined in the *TRI Reporting Forms and Instructions*.



From 2016 to 2020:

- Facilities reported barriers to implementing source reduction for 329 chemicals and chemical categories.
- The barrier *no known substitutes* was the most frequently reported barrier for both metals and non-metals.
- For the *no known substitutes* barrier for metals, many facilities reported the presence of the TRI metal in their raw materials (e.g., metal alloys) as the reason why they could not implement source reduction activities. Examples include:
 - An iron and steel mill reported that mercury is contained in trace quantities in the scrap used for steel production and no equivalent substitutes are available.[Click to view facility details in the TRI P2 Search Tool]
 - An organic chemical manufacturer reported that chromium is a component of a catalyst that does not currently have a viable alternative based on process limitations. [Click to view facility details in the TRI P2 Search Tool]
- *Further source reduction not feasible* was the next most common barrier for both metals and non-metals. Facilities select this barrier code when additional reductions do not appear feasible. For example:
 - A glass container manufacturer reported that it is already maximizing the use of recycled glass, or cullet, to reduce lead-containing waste and lead emissions from production, and that further reductions are not feasible. [Click to view facility details in the TRI P2 Search Tool]
- You can view source reduction barriers for any TRI chemical by using the TRI P2 Search Tool.



Waste Management

Facilities report the quantities of TRI-listed chemicals they dispose of or otherwise release into the environment as a result of normal industrial operations. In addition, facilities report the quantities of these chemicals that they manage through preferred methods including recycling, combusting for energy recovery, and treating for destruction. This figure shows the 10-year trend in these quantities, collectively referred to as <u>production-related waste managed</u>.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Since 2011, production-related waste managed increased by 5.0 billion pounds (22%), driven by increased recycling.
 - Disposal and other releases decreased by 1.1 billion pounds (-27%).
 - Treatment decreased by 793 million pounds (-11%).
 - Energy recovery increased by 298 million pounds (12%).
 - Recycling increased by 6.6 billion pounds (76%), a trend largely driven by several facilities that each reported recycling one billion pounds or more annually in recent years.



- The number of facilities that report to TRI has declined by 4% since 2011. Reasons for this decrease include facility closures, outsourcing of operations to other countries, and facilities reducing their manufacture, processing, or other use of TRI-listed chemicals to below the reporting thresholds.
- Note that the 2020 TRI data reflect chemical waste management activities that occurred during calendar year 2020, which may have been impacted by the COVID-19 public health emergency, which began in the U.S. in early 2020.

Facilities report both on- and off-site waste management. The following chart shows the relative quantities of on-site and off-site waste management methods for 2020.



For 2020, 88% of production-related waste was managed on site.

- Most production-related waste managed off site is recycled. Most of this recycling is reported by the primary and fabricated metals sectors. Facilities in these sectors often send scrap metal off site for recycling.
- The 2020 distribution of waste managed on site and off site is similar to previous years.



Waste Management by Chemical and Industry

Waste Managed by Chemical

This figure shows the TRI chemicals that were managed as waste in the greatest quantities from 2011 to 2020.



Note: 1) For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented. 2) In this figure, the metals (lead and zinc) are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list.

From 2011 to 2020:

 Facilities reported production-related waste managed for more than 500 chemicals and chemical categories from 2011 to 2020. The chart above shows the nine chemicals that had the largest quantities of production related waste. Together, management of these chemicals represents 53% of the total production-related waste quantities reported to TRI.



- Of the chemicals shown above, facilities reported increased quantities of waste managed for: cumene, methanol, dichloromethane (methylene chloride), toluene, ethylene, and *n*-hexane.
 - Waste managed of ethylene increased by 471 million pounds (47%).
 - Dichloromethane waste managed increased over 10-fold, due to 2 facilities that started recycling large quantities of the chemical, one starting in 2013 and the other starting in 2018.
 - Cumene recycling increased over 20-fold, mostly driven by one facility reporting recycling over 3.4 billion pounds of cumene annually from 2014 to 2020. [Click to view facility details in the TRI P2 Search Tool]
 - *n*-Hexane waste managed increased by 630 million pounds (78%) mostly driven by one soybean processing facility which has reported more than 750 million pounds of *n*-hexane recycling annually since 2012. [Click to view facility details in the TRI P2 Search Tool
 - Methanol waste managed increased by 12.6 million pounds (1%)
 - Toluene waste managed increased by 51.8 million pounds (4%)

From 2019 to 2020:

- Quantities of TRI chemical waste decreased for numerous chemicals, including:
 - Ethylene decreased by 305 million pounds (-17%)
 - Lead and lead compounds decreased by 237 million pounds (-20%)
 - Toluene decreased by 214 million pounds (-13%)
 - Zinc and zinc compounds decreased by 144 million pounds (-11%)
 - Hydrochloric acid decreased by 144 million pounds (-14%)
 - Methanol decreased by 92 million pounds (-4%)
- Quantities of TRI chemical waste managed increased for other chemicals including:
 - Dichloromethane waste increased by 130 million pounds (4%)
 - *n*-Hexane increased by 100 million pounds (8%)
- Quantities of cumene waste managed remained about the same (<1% change).



Waste Managed by Industry

This figure shows the industry sectors that managed the most TRI chemical waste from 2011 to 2020.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- The percent contribution of each of the top sectors to production-related waste managed has remained relatively constant since 2011 with the exception of chemical manufacturing, which accounted for 39% of all production-related waste managed in 2011 and increased to 57% in 2020.
- Three of the sectors shown in the graph increased their quantity of waste managed:



- Chemical manufacturing increased by 6.9 billion pounds (79%)
- Food manufacturing increased by 700 million pounds (58%)
- Petroleum products manufacturing increased by 260 million pounds (27%)
- The quantity of waste generated in some industries fluctuates considerably from year to year due to changes in production or other factors. For example, quantities of waste managed reported by metal mining facilities can change significantly based on differences in the composition of waste rock.

From 2019 to 2020:

- Industry sectors that reported the greatest changes in waste management quantities were:
 - Chemical manufacturing decreased by 1.1 billion pounds (-7%)
 - Petroleum products manufacturing decreased by 556 million pounds (-29%), mostly driven by decreases in quantities of hydrogen sulfide treated. Note that hydrogen sulfide was not reported prior to reporting year 2012 and is not included in the chart above.
 - Food manufacturing increased by 452 million pounds (31%)



Non-Production-Related Waste

Non-production-related waste refers to quantities of Toxics Release Inventory (TRI) chemicals disposed of or released, or transferred off site for disposal, treatment, energy recovery, or recycling, as the result of one-time events rather than due to standard production activities. These events may include remedial actions, catastrophic events such as natural disasters, or other one-time events not associated with normal production processes. Non-production-related waste is included in a facility's total disposal or other releases but is not included in its production-related waste managed. The following graph shows the quantities of non-production-related waste reported to TRI for 2020.



- For 2020, 479 facilities reported a total of 5.3 million pounds of one-time, nonproduction-related releases of TRI chemicals. This represents 0.02% of total waste managed in 2020.
- Non-production-related waste from all facilities has been below 20 million pounds every year since 2011, except for 2013 when one facility reported a one-time release of 193 million pounds.



Waste Managed by Parent Company

Facilities that report to the Toxics Release Inventory (TRI) provide information about their parent company. For TRI reporting purposes, the parent company is the highest-level company located in the United States.

Waste Managed by Parent Company

This figure shows the parent companies whose facilities reported the most production-related waste managed for 2020. Facilities outside of the manufacturing sector, such as electric utilities and coal and metal mines, are not included in this chart because those facilities' activities do not lend themselves to the same types or degree of source reduction opportunities as the activities at manufacturing facilities.

Note that these manufacturing facilities manage most of their waste through EPA's preferred waste management methods—recycling, energy recovery, or treatment—rather than releasing it into the environment.







Notes: 1) This figure uses EPA's standardized parent company names. 2) To view facility counts by parent company, hover over the bar graph. 3) One facility, Incobrasa Industries Ltd, does not report a parent company but it is included in this figure because it reported a comparable quantity of production-related waste managed.

Four of these parent companies reported implementing new source reduction activities in 2020. Some reported additional (optional) descriptive information about their source reduction activities. For example, a Honeywell International Inc. facility trains and qualifies manufacturing employees on manufacturing processes and chemical use to conserve chemicals and sustain product quality. [Click to view facility details in the TRI P2 Search Tool]



Source Reduction Activities by Parent Company

This figure shows the parent companies whose facilities implemented the most source reduction activities for 2020. Facilities outside of the manufacturing sector, such as electric utilities and coal and metal mines, are not included in this chart because those facilities' activities do not lend themselves to the same source reduction opportunities as the activities at manufacturing facilities.

Facilities report their source reduction activities by selecting codes that describe their activities. These codes fall into one of eight categories listed in the graph legend and are defined in the <u>TRI Reporting Forms and Instructions</u>.



Notes: 1) This figure uses EPA's standardized parent company names. 2) To view facility counts by parent company, hover over the bar graph.



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Good Operating Practices, such as improving maintenance scheduling and installation of quality monitoring systems, are the most commonly reported types of source reduction activities for these parent companies. Spill and Leak Prevention and Process Modifications are also commonly reported.

Some of the facilities in these parent companies submitted additional optional text in their TRI reporting forms that describes their pollution prevention activities. For example, a plastics material and resin manufacturing facility owned by Berkshire Hathaway Inc. electropolished thermowells to smooth the surfaces and prevent product build-up that would become waste. [Click to view facility details in the TRI P2 Search Tool]

You can <u>find P2 activities reported by a specific parent company and compare facilities' waste</u> management methods and trends for any TRI chemical by using the TRI P2 Search Tool.



Releases of Chemicals

Release or disposal of chemical waste into the environment occurs in several ways. Facilities may release chemical waste directly into the air or water or dispose of it on land, or ship (transfer) wastes that contain Toxics Release Inventory (TRI) chemicals to an off-site location for disposal. Release and disposal practices are subject to a variety of regulatory requirements and restrictions designed to minimize potential exposure or harm to human health and the environment.

Facilities are required to report the quantities of TRI-listed chemicals they release into the environment. Evaluating these release data helps to:

- identify potential concerns in communities,
- better understand potential risks chemical releases may pose, and
- identify opportunities for engagement or technical assistance to mitigate potential associated risks.

It is important, however, to understand that the quantity of releases is not necessarily an indicator of health impacts posed by the chemicals. Potential risks to human health from releases of TRI chemicals are determined by many factors, as discussed in the section <u>Hazard and Potential Risk of TRI Chemicals</u>.

Use the interactive chart below to explore the 2020 TRI

chemical releases by industry sector, chemical, or state/territory. <u>Visit the full TRI National</u> <u>Analysis data visualization dashboard</u> to explore even more information about releases of chemicals.

Helpful Concepts

What is a release?

In the context of TRI, a "release" of a chemical generally refers to a chemical that is emitted to the air, discharged to water, or disposed of in some type of land disposal unit. Most TRI releases happen during routine production operations at facilities. To learn more about what EPA is doing to help limit the release of toxic chemicals into the environment, see the <u>EPA laws and regulations</u> webpage.





2020 Highlights

- Facilities released 3.0 billion pounds of TRI chemicals, a 27% decrease since 2011.
- Air releases decreased 34% from 2011 to 2020, driven by reduced air emissions from electric utilities.
- 2020 data include data on newly-added per- and polyfluoroalkyl substances (PFAS). Facilities submitted data for 43 distinct PFAS.

Note that the 2020 TRI data reflect chemical waste management activities that occurred during calendar year 2020, which may have been impacted by the COVID-19 public health emergency as discussed in the <u>Introduction</u>.

TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the <u>Introduction</u>. For more information see <u>Factors to Consider When Using Toxics Release Inventory Data</u>.



Releases Trend

The following graph shows the 10-year trend in total disposal or other releases of TRI chemicals (also referred to as "total releases"). Many factors can affect trends in releases at facilities, including production rates, management practices, the composition of raw materials used, and the installation of control technologies.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Total disposal or other releases of TRI chemicals decreased by 27%.
 - Reduced land disposal from metal mines and electric utilities, as well as reduced air emissions from electric utilities were the most significant contributors to the decline.
- Air releases decreased by 34%, on-site land disposal decreased by 27%, surface water discharges decreased by 13%, and off-site disposal decreased by 16%.
- The number of facilities that reported to TRI declined by 4%.

From 2019 to 2020:

• Total disposal or other releases decreased by 10%, mainly driven by a 10% decrease in land disposal.



 Quantities released into the air decreased by 9%, quantities transferred off site for disposal decreased by 18%, and quantities discharged into surface water decreased by 4%.



Releases by Chemical and Industry

Releases by Chemical

Release quantities of 8 chemicals made up 74% of total releases.



Note: 1) In this figure, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g., lead is listed separately from lead compounds).



Releases by Industry

The metal mining sector accounted for 45% of releases (1.37 billion pounds), which were primarily in the form of on-site land disposal. Learn more about this sector in the <u>Metal Mining</u> <u>sector profile</u>.




2020 TRI National Analysis www.epa.gov/trinationalanalysis/ February 2022

Hazard and Potential Risk of TRI Chemicals

The chemical release data collected and made publicly available in the Toxics Release Inventory (TRI) are reported in pounds, except for dioxin and dioxin-like compounds, which are reported in grams. The quantity of releases is not necessarily an indicator of risk to humans or the environment because TRI data generally cannot indicate the extent of exposure to chemicals. However, TRI data can be used as a starting point to evaluate exposure and potential risks to human health and the environment.

Human health risks that may result from exposure to chemicals are determined by many factors, as shown in the figure below. The TRI database contains some of this information, including what chemicals are released from reporting facilities; the amount of each chemical released; and the environmental medium to which they are released.

Overview of Factors that Influence Risk





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It is important to keep in mind that while the TRI database includes information on many toxic chemicals used by industry, it does not cover all facilities, all chemicals, or all sources of releases of TRI chemicals in communities. Other potential sources of TRI chemicals or other chemicals, such as those in exhaust from cars and trucks, chemicals in consumer products, and chemical residues in food and water, are not tracked by TRI.

To provide context on the relative hazards and potential for risks posed by releases of TRI chemicals by facilities, the TRI Program uses EPA's <u>Risk-Screening Environmental Indicators</u> (<u>RSEI</u>) model.

The EPA developed the screening-level RSEI model to characterize trends in the potential hazards and relative potential risks of releases reported to TRI, and to compare and help identify geographic areas, industry sectors, and chemical releases that may be associated with significant potential human health risks. RSEI incorporates information from the TRI together with factors such as the chemical's fate and transport through the environment, each chemical's relative toxicity, and potential human exposure. RSEI model results can be used to help establish priorities for further investigation and to look at changes in potential human health impacts over time.

Helpful Concepts

The *hazard* of a chemical is its inherent ability to cause an adverse effect on health (e.g., cancer, birth defects).

Exposure is how a person comes into contact with a chemical (e.g., inhalation, ingestion) and can be described in terms its magnitude (how much), frequency (how often), and duration (how long).

The likelihood that a toxic chemical will cause an adverse health effect is often referred to as *risk*. Risk is a function of hazard and exposure.

RSEI enables the comparision of relative risk-related results by calculating numerical values that reflect the potential risk-related impacts of TRI chemicals. RSEI produces hazard estimates (RSEI Hazard) and risk scores (RSEI Score) that represent potential harm and relative potential risks to human health following exposure to a TRI chemical:

- **RSEI Hazard** estimates consist of the pounds released multiplied by the chemical's toxicity weight. They do not include any exposure modeling or population estimates.
- A RSEI Score is an estimate of relative potential human health risk. It is a unitless
 value that accounts for the magnitude of the release quantity of a chemical, the fate and
 transport of the chemical throughout the environment, the size and locations of
 potentially exposed populations, and the chemical's inherent toxicity.

Both RSEI Score and RSEI Hazard provide greater insight on potential impacts than consideration of TRI release quantities alone. More information on RSEI and its applications are available at <u>EPA's RSEI website</u>.



Hazard Trend

RSEI Hazard estimates provide insight on the potential human health impacts of TRI chemicals beyond consideration of release quantities alone. The following graph shows the 10-year trend in calculated RSEI Hazard values compared to the trend in the corresponding pounds of TRI chemicals released or transferred that are modeled using RSEI.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented. RSEI Hazard values and corresponding pounds include only on-site air releases (Air Releases), on-site water releases (Water Releases), transfers to POTWs, and transfers to incineration.

- The overall calculated RSEI Hazard values for the above waste management activities decreased by 37%, while their corresponding pounds decreased by 19%. This indicates that TRI reporting facilities are not only releasing or transferring fewer pounds of TRI chemicals for these activities but are also releasing or transferring proportionately fewer pounds of the more toxic chemicals.
- The increase in RSEI hazard from 2017 to 2018 was driven by two large transfers to incineration of hydrazine and nitroglycerin, and an increase in air releases of ethylene oxide from one facility in Seadrift, TX.



Risk-Screening Trend

EPA's RSEI model also produces relative risk-related "scores". RSEI Score is a descriptor of relative potential risks to human health from exposure to TRI chemicals following release of the chemicals from facilities. RSEI Scores for a given year can be compared to other RSEI Scores from other years. RSEI Scores are different from RSEI Hazard estimates in that they consider the location of the chemical release or transfer, what happens to the chemical in the environment, and the route and extent of potential human exposure. The following graph shows the 10-year trend in calculated RSEI Score values compared to the trend in the corresponding pounds of TRI chemicals released or transferred.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented. RSEI Score values and corresponding pounds include only on-site air releases (Air Releases), on-site water releases (Water Releases), transfers to POTWs, and transfers to incineration.

From 2011 to 2020:

 The overall calculated RSEI Score values decreased by 46%, while their corresponding pounds decreased by 19%. This indicates that TRI reporting facilities are not only releasing or transferring fewer pounds of TRI chemicals for these activities but are releasing proportionately fewer quantities of the more toxic TRI chemicals, and that exposure to the chemicals has decreased. While RSEI Score does not describe what the



actual risks from these chemicals are to human health, the overall decreases in RSEI Score indicates the that the overall risks, whatever they may be, have declined from 2011 to 2020.

- Of the types of releases modeled by RSEI, on-site air releases, by far, contributed the most to the RSEI Score values.
 - The decrease in RSEI Score values for on-site air releases was driven in part by large decreases in ethylene oxide from two facilities.

RSEI Dashboard

• Use the EPA's <u>Risk-Screening Environmental Indicators (RSEI) EasyRSEI Dashboard</u> to view the national trend in RSEI Hazard and RSEI Score, or use the Dashboard's filter capabilities to view other RSEI information for a specific chemical or location of interest.



Air Releases

Emissions of TRI chemicals into the air continue to decline, driving decreased total releases. These releases include both <u>fugitive air emissions</u> and <u>stack air emissions</u>.

This graph shows the 10-year trend in the pounds of chemicals released into the air. EPA regulates emissions of chemicals into air under the <u>Clean Air Act</u>, which requires facilities that are major sources of air pollutants to obtain and comply with an operating permit.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- Releases into the air decreased by 34% (-277 million pounds).
 - Since 2011, air releases of hydrochloric acid, sulfuric acid, hydrogen fluoride, toluene, and methanol decreased by the greatest quantities.
 - This decrease was driven by electric utilities due to: decreased emissions of hydrochloric acid and sulfuric acid; a shift from coal to other fuel sources (e.g., natural gas); and the installation of pollution control technologies at coal-fired power plants.
 - Note that only those electric utilities that combust coal or oil to generate power for distribution into commerce are covered under TRI reporting requirements. Therefore, electric utilities that shift from combusting coal



or oil to entirely using other fuel sources (such as natural gas) are not required to report to TRI.

- Air releases of chemicals classified as carcinogens by the Occupational Safety and Health Administration (OSHA) also decreased; see the <u>Air Releases of OSHA Carcinogens figure</u>.
- For trends in air releases of other chemicals of special concern, including lead and mercury, see the Chemicals of Special Concern section.

In 2020:

- The TRI chemicals released into the air in the largest quantities were ammonia and methanol.
- Air releases of TRI chemicals decreased by 9% since 2019.





This graph shows the 10-year trend in <u>RSEI Scores</u> for TRI air releases.

Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- The chemicals that contributed the most to the RSEI Score values for air releases are ethylene oxide and chromium.
- As shown in the Pounds Released chart, facilities reported considerably more stack air releases than fugitive air releases, but their relative contributions to the RSEI Score values have been similar in recent years, as shown in the "RSEI Score" chart. This is because chemicals released through stacks tend to be dispersed over a wider area than fugitive air releases, resulting in lower average concentrations. As a result, surrounding populations have less chance of being exposed to chemicals released through stacks compared to fugitive emissions.
- For a complete, step-by-step description of how EPA's RSEI model derives and models RSEI Score values from stack air emissions and fugitive air emissions, see "Section 5.3: Modeling Air Releases" in Chapter 5 ("Exposure and Population Modeling") of <u>EPA's Risk-Screening Environmental Indicators (RSEI) Methodology.</u>
- For general information on how RSEI Scores are estimated, see <u>Hazard and Potential</u> <u>Risk of TRI Chemicals.</u>



Air Releases by Chemical

This pie chart shows which TRI chemicals were released into the air in the greatest quantities during 2020.



Note: Percentages do not sum to 100% due to rounding.

- Ammonia: Facilities that manufacture nitrogen-based fertilizers accounted for 44% of the ammonia released to air during 2020.
- Methanol: The paper manufacturing sector released the most methanol to air.
- *n*-Hexane: Air releases were primarily from food manufacturing facilities.
- Sulfuric acid and hydrochloric acid: In 2020, 78% of sulfuric acid and 28% of hydrochloric acid air emissions were reported by facilities in the electric utilities sector.

Air Releases by Industry

This pie chart shows the TRI-covered industry sectors that reported the largest quantities of TRI chemicals released into the air during 2020.





- Facilities in the chemical manufacturing, paper manufacturing, and electric utility sectors accounted for the largest releases of TRI chemicals to air during 2020.
 - Chemical manufacturing: Air releases were mostly of ammonia (46%) and ethylene (10%).
 - Paper manufacturing: Air releases were primarily methanol (65%).
 - Electric utilities: Air releases were mostly of sulfuric acid aerosols (62%).



Water Releases

TRI chemicals released into streams or other water bodies are referred to as "water releases" or "surface water discharges." They are regulated under the Clean Water Act and often require permits under the <u>National Pollutant Discharge Elimination System (NPDES)</u>.

The following graph shows the 10-year trend in the pounds of TRI chemicals discharged into water bodies.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- Discharges of TRI chemicals into surface water decreased by 29 million pounds (-13%). Most of this decline was due to reduced releases of nitrate compounds.
 - Nitrate compounds are often formed as byproducts during wastewater treatment processes such as when nitric acid is neutralized, or when nitrification takes place to meet standards under EPA's effluent guidelines. More nitrate compounds are released into the water than any other TRI chemical.



In 2020:

• Nitrate compounds alone accounted for 91% of total TRI water releases.

The following graph shows the 10-year trend in <u>RSEI Scores</u> for TRI chemicals directly released into water bodies.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- The biggest chemical contributors to the RSEI Scores for water releases from 2011 to 2020 were arsenic compounds and nitroglycerin.
- The increase from 2011 to 2012 was driven in part by increases in discharges of hexachlorobenzene and nitroglycerin.
- For a complete, step-by-step description of how EPA's RSEI model derives and models RSEI Score values from surface water discharges of TRI chemicals, see "Section 5.4: Modeling Surface Water Releases" in Chapter 5 ("Exposure and Population Modeling") of EPA's Risk-Screening Environmental Indicators (RSEI) Methodology.
- For general information on how RSEI Scores are estimated, see <u>Hazard and Potential</u> <u>Risk of TRI Chemicals.</u>



Water Releases by Chemical

This pie chart shows which TRI-listed chemicals were released into water bodies in the largest quantities during 2020.



Note: 1) In this chart, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g., manganese is listed separately from manganese compounds). 2) Percentages do not sum to 100% due to rounding.

 Nitrate compounds accounted for 91% of the total quantity of TRI chemicals released to water in 2020. Nitrate compounds dissolve in water and are commonly formed as part of facilities' onsite wastewater treatment processes. The food manufacturing sector contributed 44% of total nitrate compound releases to water, due to the treatment required for biological materials in wastewater, such as from meat processing facilities.

What Are Nitrate Compounds?

Nitrate compounds are a group of chemicals with relatively low toxicity to humans, but in nitrogen-limited waters, nitrates have the potential to cause increased algal growth leading to eutrophication in the aquatic environment. <u>See EPA's Nutrient</u> <u>Pollution webpage for more information</u> about the issue of eutrophication.



• Methanol, manganese compounds, and ammonia were released in the next-largest quantities, and, in terms of combined mass, accounted for 6% of the chemicals released into water.

Water Releases by Industry

This pie chart shows the TRI-covered industry sectors that reported the largest quantities of TRI chemicals released into water bodies during 2020.



- Facilities in the food manufacturing sector accounted for 40% of water releases of TRI chemicals for 2020 and approximately one-third of annual water releases over the past ten years.
 - Nitrate compounds accounted for 99% of the total quantity of water releases from the food manufacturing sector. Nitrate compounds are relatively less toxic to humans than many other TRI chemicals discharged into surface waters but are formed in large quantities by this sector during wastewater treatment processes due to the high biological content of wastewater.



Land Disposal

Land disposal includes disposal of TRI chemicals in landfills, underground injection wells, surface impoundments, or other types of containment. Land disposal of chemicals is often regulated by EPA under the <u>Resource Conservation and Recovery Act (RCRA)</u>. RCRA design standards for landfills and surface impoundments include a double liner, a leachate collection and removal system, and a leak detection system. Operators of these disposal units must also comply with RCRA inspection, monitoring, and release response requirements.

This graph shows the 10-year trend in TRI chemicals disposed of to land on site at facilities. The metal mining sector accounts for most of this disposal.

Land Disposal, All Sectors



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- On-site land disposal has fluctuated over the last ten years.
- The decreases since 2017 were driven primarily by decreases in TRI chemical quantities disposed of on site to land by metal mines.



 "All Other Land Disposal" in the figure includes disposal to soil (land treatment/application farming) and any other land disposal including the disposal of TRI chemicals contained in waste rock at metal mines.

Land releases from metal mines:

Trends in land disposal were largely driven by the metal mining sector, which accounted for 70% of land disposal quantities for 2020. Select the "Land Disposal, Excluding Metal Mining" button to view the land disposal trend without data from metal mines.

 The TRI chemicals disposed to land by metal mines in 2020 were primarily zinc compounds (29%), lead compounds (29%), and arsenic compounds (22%).

Metal mining facilities typically handle large volumes of material. Besides production volume, one factor cited by

Helpful Concepts

What is underground injection?

Underground injection involves placing fluids underground in porous formations through wells. EPA regulates underground injection through its Underground Injection Control Program under the Safe Drinking Water Act.

<u>What is a surface</u> <u>impoundment?</u>

Surface impoundments are natural or artificial depressions, excavations, or diked areas used to hold liquid waste. Construction of surface impoundments must follow criteria including having a double liner and leak detection system. Surface impoundments are sometimes regulated through the Resource Conservation and Recovery Act.

facilities as a contributor to the changes in quantities of waste managed is the chemical composition of the extracted ore, which can vary substantially from year to year. In some cases, small changes in the ore's composition can impact whether TRI chemicals in ore qualify for a concentration-based exemption from TRI reporting in one year but not in the next year or vice versa.

Regulations require that waste rock, which contains TRI chemicals, be placed in engineered piles, and may also require that waste rock piles, tailings impoundments, and heap leach pads be stabilized and re-vegetated to provide for productive post-mining land use.

For more information on the mining industry, see the Metal Mining sector profile.

This graph shows the 10-year trend in on-site land disposal, excluding quantities reported by the metal mining sector. The metal mining sector accounts for about 70% of the quantities of TRI chemicals disposed to land in most years.





Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- Total on-site land disposal for all industries other than metal mining was relatively steady for most of the time period presented except for reductions in 2019 and 2020.
- The recent decrease in land disposal for industries other than metal mining was driven by reduced releases to land reported by electric utilities. Land releases from electric utilities have been steadily decreasing since 2014, but the decreases were larger for 2019 and 2020 than in other recent years.
 - For 2011, the first year on this chart, electric utilities reported disposing of 284 million pounds of chemical waste to land, more than any other sector except metal mining. For 2020, the sector reported 118 million pounds of land disposal, a 58% reduction.
 - Note that only those electric utilities that combust coal or oil to generate power for distribution into commerce are covered under TRI reporting requirements.



Electric utilities that shift from combusting coal or oil to entirely using other fuel sources (such as natural gas) are not required to report to TRI. For more information on this sector, see the <u>Electric Utilities sector profile</u>.

In 2020:

- Excluding the quantities of TRI chemicals disposed of to land by metal mines, the chemicals disposed of on site to land in the largest quantities were: barium and barium compounds (15%), manganese and manganese compounds (13%), and zinc and zinc compounds (11%).
- Excluding metal mines, most on-site land disposal quantities were reported by the chemical manufacturing, electric utilities, primary metals, and hazardous waste management sectors.



Land Disposal by Chemical & Industry

Land Disposal by Chemical

This pie chart shows the chemicals disposed of to land on site in the greatest quantities during 2020. The metal mining sector accounts for most of this disposal. To view the chemicals disposed of to land by sectors other than metal mining, toggle to the "Land Disposal, Excluding Metal Mining" chart.



Note: In this chart, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g., lead is listed separately from lead compounds).

The metal mining sector alone was responsible for 91% of the zinc, lead, and arsenic disposed of to land in 2020. These 3 chemicals comprised 62% of the total quantities of TRI chemicals released to land. Toggle to the "Land Disposal, Excluding Metal Mining" chart to see the chemicals released in the greatest quantities by other sectors, which shows a wider array of chemicals.



This pie chart shows the chemicals disposed of to land on site in the greatest quantities during 2020, excluding quantities disposed of by facilities in the metal mining sector.



Note: In this chart, metals are combined with their metal compounds, although metals and compounds of the same metal are listed separately on the TRI list (e.g., lead is listed separately from lead compounds). Percentages do not sum to 100% due to rounding.

- When the metal mining sector is excluded, a wider variety of chemicals contribute to most of the land releases. Seven different chemicals, for example, comprised 64% of land releases, as opposed to three chemicals comprising a comparable 62% of releases when metal mining is included (as shown on the "Land Disposal, All Sectors" chart).
- Barium: Most land releases were from the electric utilities sector.
- Manganese: Most land releases were from the chemical manufacturing and primary metals sectors.
- Zinc: Most land releases were from the primary metals sector.

Land Disposal by Industry



This pie chart shows the TRI-covered industry sectors that reported the greatest quantities of on-site land disposal of TRI chemicals during 2020.



- Metal mines accounted for most of the TRI chemicals disposed of to land in 2020.
- The relative contribution by each industry sector to on-site land disposal has not changed considerably in recent years.



Chemicals of Special Concern

In this section, we take a closer look at some of the Toxics Release Inventory (TRI) chemicals that are persistent, bioaccumulative, and toxic (PBT) and are classified as chemicals of special concern, including lead and lead compounds, mercury and mercury compounds, dioxin and dioxin-like compounds.

PBTs are toxic, break down very slowly in the environment, and tend to build up in the tissue of organisms throughout the food web. These organisms serve as food sources for other organisms, including humans, that are sensitive to the toxic effects of PBT chemicals.

Reporting thresholds for the 16 chemicals and 5 chemical categories designated as <u>PBTs on the</u> <u>TRI chemical list</u> are lower than for other TRI chemicals. Thresholds vary by chemical but range from 10 pounds to 100 pounds for most PBTs, or 0.1 grams for dioxin and dioxin-like compounds.



Lead Releases Trend

This graph shows the 10-year trend in the pounds of <u>lead and lead compounds</u> disposed of or otherwise released by facilities in all TRI reporting industry sectors including metal mines, manufacturing facilities, hazardous waste management facilities and electric utilities.



From 2011 to 2020:

• Releases of lead and lead compounds fluctuated between 2011 and 2020.

Learn more about lead

<u>Visit EPA's lead homepage for more</u> information about lead and EPA's actions to reduce lead exposures.

• Land disposal by metal mines drives the annual lead and lead compound releases. For 2020, for

example, metal mines reported 88% of all releases of lead and lead compounds, which was almost all land disposal.

From 2019 to 2020:

• Total releases of lead and lead compounds decreased by 28% (180 million pounds), driven by a decrease in releases of lead compounds from the metal mining sector.



This graph shows the 10-year trend in lead and lead compounds disposed of or otherwise released, but excludes quantities reported by the metal mining sector.



- For sectors other than metal mining, releases of lead and lead compounds fluctuated between 2011 and 2020.
- Among sectors other than metal mining, most releases of lead and lead compounds were from the hazardous waste management and primary metals sectors.



Lead Air Releases Trend





From 2011 to 2020:

- Air releases of lead and lead compounds decreased by 46%. The primary metals and electric utilities industry sectors have driven this decrease.
- The primary metals sector, which includes copper smelting and iron and steel manufacturing, reported the greatest quantities of releases of lead and lead compounds to air.

- Air releases of lead and lead compounds decreased by 13%. The largest decreases in air releases of lead and lead compounds were from the primary metals and plastics and rubber products manufacturing sectors.
- In 2020, 37% of air releases of lead were from the primary metals industry sector.



Mercury Air Releases Trend

This graph shows the 10-year trend in the pounds of <u>mercury and mercury compounds</u> released to air by facilities that reported to TRI.



From 2011 to 2020:

- Releases of mercury and mercury compounds to air decreased by 64%.
- Electric utilities drove the decline in mercury air emissions, with an 88% reduction (-51,000 pounds). The decrease was driven by a shift from coal to other fuel sources (e.g., natural gas) and by

Learn more about mercury

<u>Visit EPA's mercury homepage for more</u> <u>information about mercury and EPA's actions</u> <u>to reduce mercury exposures</u>.

the installation of pollution control technologies at coal-fired power plants.

 Note that only those electric utilities that combust coal or oil to generate power for distribution into commerce are covered under TRI reporting requirements. Therefore, electric utilities that shift from combusting coal or oil to entirely using other fuel sources (such as natural gas) are not required to report to TRI.

From 2019 to 2020:

• Releases of mercury and mercury compounds to air decreased by 7%.



 The primary metals sector, which includes iron and steel manufacturers, accounted for 37% of the air emissions of mercury and mercury compounds reported to TRI for 2020. The electric utilities sector, which released the second-most mercury and mercury compounds to air, accounted for 21% of these air emissions for 2020.



Dioxins Releases Trend

<u>Dioxin and dioxin-like compounds</u> ("dioxins") are persistent bioaccumulative toxic (PBT) chemicals characterized by EPA as probable human carcinogens. Dioxins are the byproducts of

many forms of combustion and several industrial chemical processes.

TRI requires facilities to report data on the 17 individual members (congeners) that make up the TRI dioxin and dioxinlike compounds category. While each of the dioxin congeners causes the same toxic effects, they do so at different levels of exposure because of their varying toxic potencies. As a result, the mix of dioxins from one source can have a very different toxic potency than the same total amount of a different mix of dioxins from another source.

EPA accounts for the differences in toxic potency of the dioxin congeners using Toxic Equivalency (TEQ) values. TEQs help the

Helpful Concepts

Toxic Equivalent Factor (TEF) Each dioxin congener is assigned a TEF that compares that compound's toxicity to the most toxic dioxin in the category.

Toxic Equivalency (TEQ)

A TEQ is calculated by multiplying the reported grams of each congener by its corresponding TEF and summing the results, referred to as grams-TEQ.

Learn more about dioxins.

public better understand the toxicity of dioxin releases and are useful when comparing releases of dioxins from different sources or different time periods, where the mix of congeners may vary.

This graph shows the trend in the grams of dioxin releases from 2011 to 2020. Note that the dioxins chemical category is reported in grams while all other TRI chemicals are reported in pounds.





From 2011 to 2020:

- Dioxin releases increased by 81%. Most of the overall increase can be attributed to increased releases from two organic chemical manufacturing facilities and one hazardous waste management facility.
 - Toxicity equivalents (grams-TEQ) decreased by 12%, indicating that the overall toxicity of dioxin releases decreased despite an increase in the quantity released.
 This is due to changes in which dioxin congeners were released.

- Releases of dioxins decreased by 5%, driven by decreased releases reported by a smelting and refining facility and an organic chemical manufacturing facility.
 - Toxicity equivalents (grams-TEQ) decreased by 31%. This is largely due to one primary metal manufacturing facility reporting more dioxin toxicity-equivalents than any other facility for 2019, but reported a 96% reduction in grams and 90% reduction in grams-TEQ released for 2020.
- In 2020, most of the dioxin releases were disposed of on site to land (50%) or disposed or otherwise released off site (48%).



Dioxins Releases by Industry

The following two pie charts compare the TRI-covered industry sectors that reported the greatest releases of dioxins in grams to those that reported the greatest releases of grams in toxicity equivalents (grams-TEQ). Note that only data from those reporting forms that provided the congener detail for calculating grams-TEQ are included in these charts.





• Various industry sectors may dispose of or otherwise release very different mixes of dioxin congeners.



- The chemical manufacturing industry accounted for 60% and the primary metals sector for 13% of total grams of dioxins released.
- In terms of toxicity equivalents, however, the primary metals sector accounted for 46% and the chemical manufacturing sector for 20% of the total grams-TEQ.



Occupational Safety and Health Administration (OSHA) Carcinogens

Air Releases

Some chemicals that are reportable to the TRI Program are included on OSHA's list of carcinogens. EPA refers to these chemicals as TRI OSHA carcinogens. These chemicals are either known or believed to cause cancer in humans. A list of the TRI carcinogens can be found in the <u>TRI basis of OSHA carcinogens technical document</u>. This graph shows the 10-year trend in air releases of TRI OSHA carcinogens.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

- Air releases of these carcinogens decreased by 9%.
- Air releases of many OSHA carcinogens decreased, with reductions in most sectors. However, decreases were partially offset by increases in releases of styrene from the plastics and rubber products manufacturing sector and the transportation equipment manufacturing sector.
- In 2020, air releases of OSHA carcinogens consisted primarily of styrene (47% of the air releases of all OSHA carcinogens), acetaldehyde (13%) and formaldehyde (8%).



Ethylene Oxide Releases Trend

This section focuses on one of the TRI OSHA carcinogens, ethylene oxide. The figure below presents the 10-year trend in releases of ethylene oxide as reported to TRI by about 115 facilities per year.



• From 2011 to 2020, releases of ethylene oxide decreased by 166,000 pounds (-54%), driven by reductions in air releases.



- From 2019 to 2020, releases of ethylene oxide decreased across most sectors. Most individual facilities also reported lower releases of ethylene oxide from 2019 to 2020.
- Two chemical manufacturers in Texas reported that they had large one-time (non-productionrelated) releases of ethylene oxide to air in 2018 and 2019, driving the increase from 2017 to 2018 and the decrease from 2018 through 2020.

Learn More About Ethylene Oxide

Ethylene oxide is a human carcinogen, meaning that it is known to cause cancer in humans. In 2021, <u>EPA extended TRI</u> <u>reporting requirements</u> to certain contract sterilization facilities that use ethylene oxide. This action became effective for the 2022 reporting year with the first reports for these particular facilities due on July 1, 2023.

Learn More about Ethylene Oxide.



Per- and Polyfluoroalkyl Substances (PFAS)

Recently, <u>172 per- and polyfluoroalkyl substances (PFAS)</u> were added to the list of chemicals covered by TRI. Facilities reported their releases and waste management practices for these PFAS for the first time for 2020. The TRI reporting threshold for these PFAS is 100 pounds, which is lower than the thresholds for most TRI chemicals. PFAS have been manufactured and used in a variety of industries in the United States and around the globe since the 1940s, and they are still being used today. Harmful PFAS are an urgent public health and environmental issue facing communities across the United States because current scientific research suggests that exposure to certain PFAS may lead to adverse health effects. PFAS on the TRI chemical list include compounds such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). Note that definitions of which chemicals are considered PFAS vary, and the 172 substances required to be reported to TRI do not include all PFAS. See EPA's <u>PFAS Explained</u> page for more information about these chemicals and EPA actions related to PFAS.

This map shows the locations of the facilities that reported a PFAS to TRI for 2020, sized by their relative releases. Click on a facility for details on the facility location and its TRI PFAS



Note: One facility in the food manufacturing sector erroneously reported for a PFAS instead of another chemical and has withdrawn the PFAS form. That facility is not included in this map.


This chart shows the number of facilities in each sector reporting for any of the 172 PFAS for 2020.



Note: One facility in the food manufacturing sector erroneously reported for a PFAS instead of another chemical and has withdrawn the PFAS form. That facility is not included in this chart.

- Most facilities reporting for PFAS were in the chemical manufacturing sector or the hazardous waste management sector.
 - No reports for PFAS were received from any federal facilities, <u>although some</u> <u>Department of Defense facilities have used PFAS</u> in the past. Discontinuing certain uses of PFAS may be a factor since the 2019 National Defense Authorization Act, which added PFAS to the TRI chemical list, also included provisions to phase out the use of PFAS in certain circumstances by the Department of Defense.
- Facilities reported for 43 different PFAS. The most commonly reported PFAS were perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS) and its potassium salt, and hexafluoropropylene oxide dimer acid (HFPO-DA) and its ammonium salt.



PFAS Waste Management

This chart shows how PFAS waste was managed. Hover over the chart to see the pounds of waste managed by each method. For more details on quantities released, toggle to the "Releases only" figure.



Note: 1) Note: This analysis excludes PFAS releases reported from one facility that has withdrawn its report. 2) Percentages do not sum to 100% due to rounding.

- Most PFAS waste was treated or recycled.
- The hazardous waste management and chemical manufacturing sectors managed the most PFAS waste.
 - Hazardous waste management facilities reported the most treatment.
 - Recycling was reported almost exclusively by chemical manufacturing facilities.



This chart shows PFAS releases by medium. Hover over the chart to see the pounds released to each medium.



Note: This analysis excludes PFAS releases reported from one facility that has withdrawn its report.

- Of the quantities of PFAS released, most were disposed of on site to land or transferred off site for disposal.
- The chemical manufacturing sector reported the most releases (78%).



Comparing Industry Sectors

This section examines how industry sectors manage Toxics Release Inventory (TRI) chemical waste. Looking at data from individual sectors can highlight progress made in improving environmental performance and reveal opportunities for better waste management practices.

Industries subject to TRI reporting requirements vary substantially in size, scope, and business type. As a result, the amounts and types of chemicals used, generated, and managed by facilities across industrial sectors often differ. For facilities in the same sector, however, the processes, products, and regulatory requirements are often similar, resulting in similar use, manufacture or processing of TRI chemicals.

This section presents trends in key sectors' <u>production-related waste managed</u>, including TRI chemical <u>releases</u> into the environment. For analytical purposes, the TRI Program has combined the North American Industry Classification System (NAICS) codes at the 3- and 4-digit levels, creating 29 industry sector categories. To learn more about which business activities are subject to TRI reporting requirements, <u>see this list of covered NAICS codes</u>.

The following pie chart shows the quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases. For more details on quantities released, toggle to the "Releases only" figure.





Seven industry sectors reported 89% of the TRI production-related waste managed in 2020. Most of this waste originated from the chemical manufacturing sector (56%).



This pie chart shows that 4 of the 29 TRI sectors accounted for 76% of the quantities of TRI chemicals disposed of or otherwise released: metal mining (45%), chemical manufacturing (16%), primary metals (8%), and electric utilities (7%).

For more details on how the amounts and proportions of TRI chemicals managed as waste have changed over time, see the <u>production-related waste managed by industry trend graph</u>.

For more information on the breakdown of these releases by environmental medium, see <u>air</u> releases by industry, <u>water releases by industry</u> and <u>land disposal by industry</u>.

TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the <u>Introduction</u>. For more information see <u>Factors to Consider When Using Toxics Release Inventory Data</u>.



Manufacturing Sectors

This section examines how TRI chemical wastes are managed in the manufacturing sectors (defined as facilities reporting their primary NAICS codes as 31-33).



This map shows the locations of the manufacturing facilities that reported to TRI for 2020, sized by their relative releases. Click on a facility for details on its TRI reporting.





Manufacturing Facilities Reporting to TRI, 2020 View Larger Map

For 2020, nearly 90% of the facilities that reported to TRI were in a manufacturing sector. Manufacturing sectors accounted for most (89%) of the 28.3 billion pounds of productionrelated waste managed for 2020. Two subsectors of manufacturing, <u>chemical manufacturing</u> and <u>cement manufacturing</u>, are highlighted in more detail later in this section.

The TRI-covered industry sectors not categorized under manufacturing include <u>metal mining</u>, coal mining, <u>electric utilities</u>, chemical wholesalers, petroleum terminals, hazardous waste management, and others.



Manufacturing Waste Management Trend

The following graph shows the 10-year trend in TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by the manufacturing sectors. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Quantities of production-related waste managed by the manufacturing sectors increased through 2018. Since then, quantities of waste managed have decreased.
- From 2011 to 2020, releases and treatment of chemical waste decreased, while recycling and combustion for energy recovery increased.
- It is important to consider the influence the economy has on wastes generated. This
 figure includes the trend in the manufacturing sectors' value added (represented by the
 black line as reported by the <u>Bureau of Economic Analysis, Value Added by Industry</u>).
 Since 2011, value added by the manufacturing sectors increased by 11%.



 Waste managed by the manufacturing sectors increased by 35% since 2011, driven by increased recycling. The large increase in recycled chemical waste starting in 2014 was driven by several facilities that each reported recycling one billion pounds or more annually in recent years.

What is Value Added?

An industry's value added is the market value it adds in production; it is the difference between the price at which it sells its products and the cost of its inputs. Value added for all U.S. industries combined is equal to the nation's gross domestic product.

From 2019 to 2020:

- Production-related waste managed decreased by 1.9 billion pounds (-7%), while value added decreased slightly (-3%). Annual changes in waste managed are driven by a few facilities.
- In 2020, only 5% of the manufacturing sectors' production-related waste generated was released into the environment, while the rest was managed through treatment, energy recovery, and recycling.



Manufacturing Releases Trend

The following graph shows the 10-year trend in annual quantities of TRI chemicals released by facilities in the manufacturing sectors.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- TRI chemical releases from the manufacturing sectors decreased by 11%, primarily due to reductions in air emissions (70.1 million pounds) and on-site land disposal (38.7 million pounds).
- Releases to water declined by 11% and off-site disposal or other releases declined by 8%.

From 2019 to 2020:

• Releases decreased by 126 million pounds (-9%). Decreases in disposal or other releases reported by facilities in the primary metals manufacturing sector accounted for more than half of this change.



Source Reduction in the Manufacturing Sectors:

In 2020, 6% of manufacturing facilities initiated over 2,600 source reduction activities to reduce TRI chemical use and waste creation. The most commonly reported types of source reduction activities were Good Operating Practices and Process Modifications. For example:

- A kitchen cabinet manufacturing facility reduced its use of xylene by switching to high solid coatings which require less material to coat parts. [Click to view facility details in the TRI P2 Search Tool]
- A motor vehicle parts manufacturer adjusted the air pressure on paint regulators to reduce paint usage, which resulted in a reduction in ethylbenzene waste. [Click to view facility details in the TRI P2 Search Tool].

You can <u>learn more about pollution prevention opportunities in this sector by using the TRI P2</u> <u>Search Tool</u>. Facilities interested in exploring pollution prevention opportunities at their site can contact their <u>Regional P2 Coordinator</u> to arrange a free onsite P2 assessment.



Chemical Manufacturing

This section examines how TRI chemical wastes are managed in the chemical manufacturing sector (defined as facilities reporting their primary NAICS code as 325).



This map shows the locations of the chemical manufacturing facilities that reported to TRI for 2020, sized by their relative releases. Click on a facility for details on its TRI reporting.





Chemical Manufacturing Facilities Reporting to TRI, 2020 View Larger Map

For 2020, more facilities reported to TRI from the chemical manufacturing sector than any other industry sector (3,411; 16% of facilities that reported for 2020). This sector reported 56% of all waste managed reported to TRI, more than any other sector.

This large and diverse sector includes facilities producing basic chemicals and those that manufacture products through further processing of chemicals. The chart below shows the number of facilities by chemical manufacturing subsectors that reported to TRI for 2020.





Note: Percentages do not sum to 100% due to rounding.

Operations in the chemical manufacturing sector include:

- Basic chemicals facilities produce chemicals by basic processes, such as thermal cracking and distillation. Products include petrochemicals, industrial gases, synthetic dyes and pigments, and many other organic and inorganic chemicals.
- Coatings and adhesives facilities mix pigments, solvents, and binders into architectural and industrial paints; manufacture paint products such as paint removers and thinners; and manufacture adhesives, glues, and caulking compounds.
- Resins and synthetic rubber facilities manufacture resins, plastic materials, synthetic rubber, and fibers and filaments.



Chemical Manufacturing Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by the chemical manufacturing sector. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Quantities of production-related waste managed by the chemical manufacturing sector increased by 79%, while the sector's value added (represented by the black line as reported by the <u>Bureau of Economic Analysis, Value Added by Industry</u>) increased by 1%.
 - Trends in waste <u>recycled</u> by chemical manufacturers are driven by a few facilities. For example, the large increase in chemical waste recycled starting in 2014 compared to previous years was primarily due to increased quantities of recycling reported by chemical manufacturers, with an increase in the quantity of



cumene recycled by one facility and dichloromethane (methylene chloride) recycled by two other facilities.

• Quantities of TRI chemicals treated, released, or combusted for energy recovery decreased, while the quantities of TRI chemicals recycled increased.

From 2019 to 2020:

- Production-related waste managed at chemical manufacturing facilities decreased by 1.1 billion pounds (-7%), driven by a reduction in quantities recycled by two facilities in the sector.
- In 2020, 3% of this sector's waste was released into the environment, while the rest was managed through treatment, energy recovery, and recycling.



Chemical Manufacturing Releases Trend

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities in the chemical manufacturing sector.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases reported by facilities in the chemical manufacturing sector decreased by 2%.
- The proportion of off-site releases increased during this time, while on-site land disposal and on-site water releases now make up a smaller fraction of total releases. Proportions of on-site air releases remained the same.

From 2019 to 2020:

- Releases decreased by 21 million pounds (-4%). This trend is driven by large decreases in land disposal at numerous facilities.
- For 2020, the basic chemicals manufacturing subsector accounted for 51% of chemical manufacturing releases. This subsector includes facilities manufacturing products such as organic and inorganic chemicals, industrial gases, and petrochemicals.





Source Reduction in the Chemical Manufacturing Sector:

Although the chemical manufacturing sector has consistently managed the most productionrelated waste of any TRI-covered sector, 263 facilities (8% of facilities) in this sector initiated source reduction activities in 2020. The most common types of source reduction activities were Good Operating Practices and Process Modifications. For example:

- An in-vitro diagnostic substance manufacturer purchased new equipment to allow for larger batch sizes, reducing dichloromethane waste. [Click to view facility details in the TRI P2 Search Tool]
- A polish and other sanitation goods manufacturing facility replaced a dry blender which resulted in more efficient washouts and generation of less wastewater that contains formaldehyde. [Click to view facility details in the TRI P2 Search Tool]
- Several chemical manufacturing facilities reported source reduction activities that
 resulted in reducing both TRI chemical wastes and greenhouse gas emissions. For
 example, one facility replaced boilers to eliminate the use of coal as a fuel for on-site
 steam generation and reduce releases of dioxin and dioxin-like compounds as well as
 greenhouse gasses [Click to view facility details in the TRI P2 Search Tool]. Another
 facility was able to use styrene/ethylbenzene waste as an alternative fuel source,



reducing the amount of natural gas utilized for the heater [Click to view facility details in the TRI P2 Search Tool].

Additional Resources

- To find more examples of chemical manufacturers' source reduction activities and the source reduction barriers they reported, visit <u>TRI's P2 Search Tool.</u>
- <u>EPA's Smart Sectors Program</u> is partnering with chemical manufacturing trade associations to develop sensible approaches to industrial operations that better protect the environment and public health.
- For more information on how this and other industry sectors can choose safer chemicals, visit EPA's <u>Safer Choice Program</u>.
- EPA supports the adoption of <u>Green Chemistry</u> practices that reduce the environmental impacts from this sector, including reductions in the use of toxic chemicals, water, and electricity.
- Facilities interested in exploring P2 opportunities or getting technical assistance can contact their regional P2 coordinator. <u>Find the P2 coordinators for your state and region</u>.



Greenhouse Gas Reporting in the Chemical Manufacturing Sector

While many chemical releases are reported to the TRI, the TRI Program does not cover all chemicals released by industry. Notably, most greenhouse gas (GHG) emissions are not reported to the TRI. Greenhouse gas emissions increase the concentration of these gases in the atmosphere, which alter the amount of heat trapped by the Earth's atmosphere and contribute to climate change. These elevated concentrations and their effect on climate are reasonably anticipated to endanger the public health and welfare of current and future generations.

EPA's Greenhouse Gas Reporting Program (GHGRP) tracks facility-level emissions from the largest U.S. sources of GHGs. The chart below shows GHG emissions reported to the GHGRP by facilities in the chemical manufacturing sector from 2011 to 2020.





- Note that while TRI typically collects chemical release data in units of pounds, the GHGRP collects GHG emissions data in units of metric tons of carbon dioxide equivalents (MTCO₂e). This chart shows GHG emissions in MTCO₂e.
- The chemical manufacturing sector reported emissions of over 184 million MTCO₂e for 2020, a 2% increase since 2011.
- For 2020, 3,411 facilities in this sector reported to the TRI and 453 facilities in the sector reported to the GHGRP. Some facilities report to only one of these programs due to different applicability

What are carbon dioxide equivalents (CO₂e)?

Different GHGs can have different effects on the Earth's warming; Global Warming Potential (GWP) values allow for comparisons of the global warming impacts of different gases. MTCO₂e is a weighted measurement that considers the tonnes of the gases and their associated global warming potentials.

requirements and reporting thresholds; while most facilities in this sector that report to the TRI Program do not report to the GHGRP, most of the facilities in this sector that report to the GHGRP also report to TRI.

Additional Resources

- To view and explore the data reported to EPA on GHG emissions, see the <u>Facility Level</u> <u>Information on GreenHouse gases Tool (FLIGHT)</u>.
- EPA's <u>Understanding Global Warming Potentials</u> webpage provides further information on GWPs, how they are used, and how they different by GHG.
- For more details on the chemical manufacturing sector's GHG emissions, visit <u>GHGRP</u> <u>Chemicals</u>.



Cement Manufacturing

This section examines how TRI chemical wastes are managed within the cement manufacturing sector (defined as facilities reporting their primary NAICS code as 327310).



Although relatively few facilities in the cement manufacturing sector report to TRI, the operations of these facilities result in substantial quantities of TRI waste managed and released, as well as being a notable contributor to the country's greenhouse gas emissions. The cement manufacturing sector is unique among TRI sectors because of its high volume of waste combusted for energy recovery. Cement manufacturers often use waste from other facilities, such as spent solvents, as fuel to produce heat needed for the manufacture of cement.

This map shows the locations of the cement manufacturing facilities that reported to TRI for 2020, sized by their relative releases. Click on a facility for details on its TRI reporting.







Cement Manufacturing Facilities Reporting to TRI, 2020 View Larger Map

For 2020, 113 facilities in the cement manufacturing sector reported to TRI. Cement manufacturing is an energy-intensive process in which limestone and other ingredients are heated in a kiln. To maintain the high temperatures required to produce cement, facilities use a variety of fuels, including chemical wastes. This sector manages a greater portion of its chemical waste by burning it for energy recovery than any other TRI-covered sector.



Cement Manufacturing Waste Management Trend

The following graph shows the 10-year trend in quantities of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by facilities in the cement manufacturing sector. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Quantities of production-related waste managed by the cement manufacturing sector have fluctuated since 2011, while production (represented by the black line as reported by the <u>U.S. Geological Survey</u>) increased by 31%.
- More than 92% of this sector's waste is managed through energy recovery; this is a higher proportion of waste managed through energy recovery than any other sector. Since 2011, quantities of TRI chemical waste managed through recycling and disposal or other releases decreased, while quantities of waste managed through energy recovery and treatment increased.



- US cement production increased by 3% from 2018 to 2020, but production-related waste managed decreased by 15% during the same period.
 - Facilities in this sector frequently combust wastes from other facilities to make use of the wastes' heating value. This is considered preferable to disposing of that waste. Decreased waste management in this sector may be due operational changes, such as replacing fuel containing TRI-reportable chemicals with other fuels that contain lower levels of TRI chemicals.

From 2019 to 2020:

 Total production-related waste managed at cement manufacturing facilities increased by 19 million pounds (6%), driven by increases in energy recovery and treatment.
 Meanwhile, cement production levels increased by 1%.



Cement Manufacturing Releases Trend

The following graph shows the annual quantities of TRI chemicals released by facilities in the cement manufacturing industry.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Since 2011, TRI chemical releases by the cement manufacturing sector have fluctuated, with an overall decrease of 548,000 pounds (-9%).
 - Air releases decreased by 571,000 pounds (-12%). On-site land disposal decreased by 92,000 pounds (10%) and off-site disposal increased by 90,000 pounds (31%). Releases to water made up less than 1% of the sector's releases.
 - Releases increased between 2011 and 2015 but have decreased by 27% since 2015, driven by several facilities that reported large reductions in air releases.



From 2019 to 2020:

- Releases decreased by 172,000 pounds (3%).
- In 2020, releases to air accounted for 78% of all releases reported by the cement manufacturing sector.

Source Reduction in the Cement Manufacturing Sector:

Since 2011, 15 facilities have reported source reduction activities, including a facility that switched to a new clay material which contained less mercury. [Click to view facility details in the TRI P2 Search Tool]. To find other examples of the sector's source reduction activities and the source reduction barriers they face, visit <u>TRI's P2 Search Tool</u>.

Additional Resources

- <u>EPA's Smart Sectors Program</u> is partnering with cement and concrete manufacturing trade associations to develop sensible approaches to industrial operations that better protect the environment and public health.
- See the <u>USGS Cement Statistics and Information webpage</u> for annual reports on the worldwide supply of and demand for cement.



Greenhouse Gas Reporting in the Cement Manufacturing Sector:

While many chemical releases are reported to the TRI, the TRI Program does not cover all chemicals released by industry. Notably, most greenhouse gas (GHG) emissions are not reported to the TRI. Greenhouse gas emissions increase the concentration of these gases in the atmosphere, which alter the amount of heat trapped by the Earth's atmosphere and contribute to climate change. These elevated concentrations and their effect on climate are reasonably anticipated to endanger the public health and welfare of current and future generations.

EPA's Greenhouse Gas Reporting Program (GHGRP) tracks facility-level emissions from the largest U.S. sources of GHGs. The chart below shows GHG emissions reported to the GHGRP by facilities in the cement manufacturing sector from 2011 to 2020.





- Note that while TRI typically collects chemical release quantities in units of pounds, the GHGRP collects GHG emissions data expressed in units of metric tons of carbon dioxide equivalents (MTCO₂e). This chart shows GHG releases in MTCO₂e.
- The cement manufacturing sector reported emissions of over 66 million MTCO₂e for 2020, an increase of 20% since 2011.
- Although 113 facilities in this sector reported to the TRI for 2020, 92 reported to the GHGRP under the cement production sector in 2020. Some facilities report to only one of these two programs due to different regulatory requirements between the programs.

What are carbon dioxide equivalents (CO₂e)?

Different GHGs can have different effects on the Earth's warming; Global Warming Potential (GWP) values allow for comparisons of the global warming impacts of different gases. MTCO₂e is a weighted measurement that considers the tonnes of the gases and their associated global warming potentials.

Additional Resources

- To view and explore the data reported to EPA on GHG emissions, see the <u>Facility Level</u> <u>Information on GreenHouse gases Tool (FLIGHT)</u>
- EPA's <u>Understanding Global Warming Potentials</u> webpage provides further information on GWPs, how they are used, and how they different by GHG.
- For more details on the cement manufacturing sector's GHG emissions, visit <u>GHGRP</u> <u>Minerals</u>.



Metal Mining

This section examines how TRI chemical wastes are managed by facilities in the metal mining sector (defined as facilities reporting their primary NAICS code as 2122).



Although the number of metal mines reporting to TRI makes up only a small portion of the total number of facilities that report to TRI, the sector accounted for 45% of all releases reported to TRI for 2020.

This map shows the locations of the metal mining facilities that reported to TRI for 2020, sized by their relative releases. Click on a facility for details on its TRI reporting.

Note: Mines are shown on this map based on their longitude/latitude, which may be miles from the city identified on the mine's TRI reporting forms. Mines can qualify their location relative to the city by noting the distance in the street address data field of their TRI reporting forms.





Metal Mines Reporting to TRI, 2020 <u>View Larger Map</u>

For 2020, 86 metal mining facilities reported to the TRI. They tend to be in western states where most of the copper, silver, and gold mining occurs; however, zinc and lead mining tend to occur in Missouri and Tennessee. U.S. mining operations generate metals that are used in a



wide range of products, including automobiles, electric and industrial equipment, jewelry, and decorative objects. The extraction and processing of these minerals generate large amounts of on-site land disposal, primarily of metalbearing rock (called ore) and waste rock. To learn more about metal mining operations and their TRI reporting, <u>explore the interactive metal mining diagram</u>.



Metal Mining Waste Management Trend

The following graph shows the annual quantities of TRI chemical waste managed by the metal mining industry from 2011 to 2020, mainly in the form of on-site land disposal. The nature of metal mining operations limits the feasibility of other methods of waste management. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- The quantity of waste managed by the metal mining sector fluctuated year to year and does not closely follow the sector's production (as reported in the <u>United States</u> <u>Geological Survey</u>).
- One factor commonly cited by facilities as a contributor to the changes in quantities of waste managed is the chemical composition of the extracted ore, which can vary substantially from year to year. In some cases, small changes in the ore's composition can impact whether TRI chemicals in ore qualify for a concentration-based TRI reporting exemption in one year but not in the next year or vice versa.



From 2019 to 2020:

- The quantity of TRI chemical waste managed by this sector decreased by 126 million pounds (-8%).
- During 2020, 95% of the metal mining sector's production-related waste generated was disposed of or otherwise released. Most of this waste consisted of metals, which were primarily disposed of to land on site at the mine.



Metal Mining Releases Trend

The following graph shows the 10-year trend in quantities of TRI chemicals released by the metal mining industry, primarily through on-site land disposal.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- More than 99% of the metal mining sector's releases of TRI chemicals were on site and to land. Quantities of on-site land disposal by metal mines have fluctuated from year to year.
 - Optionally, facilities can indicate whether reported land releases represent disposal of waste rock. For 2020, at least 44% of the on-site land disposal of TRI chemicals at metal mines was in the form of waste rock.
- The quantity of TRI chemicals released alone is not an indicator of health risks posed by the chemicals, as described in the <u>Hazard and Potential Risk of TRI Chemicals</u> section.
 For more information, see the TRI document, <u>Factors to Consider When Using Toxics</u> <u>Release Inventory Data</u>.



In 2020:

 Among the sectors reporting to TRI, the metal mining sector reported the largest quantity of waste disposed of or otherwise released, accounting for 45% of total TRI releases and 70% of on-site land disposal for all industries.

Source Reduction in the Metal Mining Sector:

Unlike manufacturing, the nature of mining—the necessary movement and disposal of large volumes of rock to access the target ore—does not lend itself to source reduction. To find examples of metal mining source reduction activities and the source reduction barriers mining facilities face, visit the <u>TRI P2 Search Tool</u>.

<u>EPA's Smart Sectors Program</u> is partnering with the mining sector to develop sensible approaches to better protect the environment and public health.



Electric Utilities

This section examines how TRI chemical wastes are managed in the electric utilities sector (defined as facilities reporting their primary NAICS code as 2211).



This map shows the locations of the electric utilities that reported to TRI for 2020, sized by their relative releases. Click on a facility for details on its TRI reporting.




Electric Utilities Reporting to TRI, 2020

View Larger Map

For 2020, 408 electricity generating facilities reported to TRI. Facilities in the sector use different fuels to produce electricity, but only those that combust coal or oil to generate electricity for distribution in commerce are subject to TRI reporting requirements.



Electric Utilities Waste Management Trend

The following graph shows the 10-year trend in quantities of TRI chemical waste that electric utility facilities managed, primarily through treatment or release. For more details on quantities released, toggle to the "Releases only" graph.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Quantities of waste managed decreased by 888 million pounds (-50%) since 2011, driven by reduced releases.
- Net electricity generation by electric utilities from coal and oil fuels decreased by 55% (as reported by the <u>U.S. Department of Energy's Energy Information Administration</u>). Note that only facilities that combust coal or oil to generate electricity are covered under TRI reporting requirements.
 - Data from the Energy Information Administration indicate that the mix of energy sources for U.S. electricity generation has changed over time. Natural gas and renewable energy sources account for an increasing share of U.S. electricity generation, while coal-fired electricity generation has declined. Use of oil for



electric power generation continues to contribute a small percentage of total U.S. electricity generation.

In 2020:

- Nearly three-quarters of the sector's production-related waste generated was treated, while approximately one-quarter was released to the environment.
 - This contrasts with 2011, when over one-third of the waste from this sector was released into the environment. This trend is due in part to increased installation of air pollution control devices that destroy TRI-reportable chemicals.



Electric Utilities Releases Trend

The following graph shows the annual quantities of TRI chemicals released by electric utilities.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

Releases from the electric utilities sector decreased by 392 million pounds (-63%). This decrease was driven by a 199-million pound (-77%) decrease in air releases and a 166-million pound (-58%) decrease in on-site land disposal. Surface water discharges and off-site disposal also decreased, but to a lesser extent.

From 2019 to 2020:

• Releases by electric utilities decreased by 62 million pounds (-22%), driven by reductions in on-site land disposal of barium compounds and reduced air releases of sulfuric acid and hydrochloric acid.



Source Reduction in the Electric Utilities Sector:

In the electric utilities sector, 7 facilities (2% of the electric utility facilities reporting to TRI) initiated source reduction activities in 2020 to reduce their use of TRI chemicals and creation of wastes containing TRI chemicals. Some facilities reported process improvements to increase their efficiency, which may lead to reduced greenhouse gas emissions as well as reduced TRI chemical wastes.

To find more examples of electric utilities' source reduction activities and the source reduction barriers they face, visit <u>TRI's P2 Search Tool.</u>

<u>EPA's Smart Sectors Program</u> is partnering with this sector to develop sensible approaches to industrial operations that better protect the environment and public health.



2020 TRI National Analysis www.epa.gov/trinationalanalysis/

Greenhouse Gas Reporting in the Electric Utilities Sector

While many chemical releases are reported to the TRI, the TRI Program does not cover all chemicals released by industry. Notably, most greenhouse gas (GHG) emissions are not reported to the TRI. Greenhouse gas emissions increase the concentration of these gases in the atmosphere, which alter the amount of heat trapped by the Earth's atmosphere and contribute to climate change. These elevated concentrations and their effect on climate are reasonably anticipated to endanger the public health and welfare of current and future generations.

EPA's Greenhouse Gas Reporting Program (GHGRP) tracks facility-level emissions from the largest U.S. sources of GHGs. Under the GHGRP, the Power Plants Sector consists predominantly of facilities that produce electricity by combusting fossil fuels, such as coal, oil, and natural gas, or biomass. The sector also includes facilities that produce steam, heated air, or cooled air by combusting fuels. The chart below shows GHG emissions reported to the GHGRP by facilities in the Power Plants sector from 2011 to 2020.



- Note that while TRI typically collects chemical release data in units of pounds, the GHGRP collects GHG emissions expressed in quantities expressed as metric tons of carbon dioxide equivalents (MTCO₂e). This chart shows GHG emissions in MTCO₂e.
- Total reported emissions from the sector were 1,494.9 million MTCO₂e in 2020, which represented nearly 58% of total direct emissions reported to the GHGRP.

What are carbon dioxide equivalents (CO₂e)?

Different GHGs can have different effects on the Earth's warming; Global Warming Potential (GWP) values allow for comparisons of the global warming impacts of different gases. MTCO₂e is a weighted measurement that considers the tonnes of the gases and their associated global warming potentials.

- From 2011 to 2020, GHG emissions from this sector have decreased by 33%. According to data from the U.S. Department of Energy's Energy Information Administration, increased utilization of renewables such as wind and solar and a corresponding decrease in the use of coal from 2011 to 2020 continues to contribute to decreased emissions from this sector across the time series.
- Although 408 facilities in this sector reported to TRI, 1,339 facilities in the Power Plants Sector submitted GHG reports in 2020. Some facilities report to only one of these programs due to different applicability requirements. In particular, TRI covers only electric utilities that combust fuel or oil to generate electricity (i.e., natural gas power plants are not covered by TRI) while the GHGRP covers all power plants that meet the applicability requirements, including natural gas-fueled power plants.

Additional Resources

- To view and explore the data reported to EPA on GHG emissions, see the <u>Facility Level</u> <u>Information on GreenHouse gases Tool (FLIGHT)</u>
- EPA's <u>Understanding Global Warming Potentials</u> webpage provides further information on GWPs, how they are used, and how they different by GHG.
- For more details on the cement manufacturing sector's GHG emissions, visit <u>GHGRP</u> <u>Power Plants</u>.



Federal Facilities

All federal facilities, including facilities operated by the EPA, the Department of Defense, and the Department of the Treasury, are subject to TRI reporting requirements, regardless of the type of operations at the facility (as described by its NAICS code).

This map shows the locations of 458 federal facilities that reported to TRI for 2020, sized by their relative releases. Click on a facility for details on its TRI reporting.



Federal Facilities Reporting to TRI, 2020 View Larger Map



Federal Facilities by Industry

The following chart shows the number of federal facilities reporting to TRI by sector for 2020.



For 2020, 458 federal facilities in 38 different types of operations (based on their 6-digit NAICS codes) reported to TRI. Almost two-thirds of these facilities were in the National Security sector, which includes Department of Defense facilities such as Army and Air Force bases. Since all federal facilities are subject to TRI reporting requirements regardless of industry sector, for some sectors, the TRI database only includes data from federal facilities. Most federal facilities are in such sectors, including military bases; correctional institutions; and police protection, such as training sites for border patrol stations.

As with non-federal facilities, the type of activities occuring at federal facilities determines the amount of chemical waste managed and the management methods used. Some activities occurring at federal facilities are similar to those at non-federal facilities, such as electricity production. In other cases, federal facilities may report waste managed from specialized activities. For example, the federal facilities included under police protection and correctional institutions almost exclusively reported for lead and lead compounds, likely due to the use of lead ammunition on their firing ranges.



Waste Management by Federal Facilities

The following pie chart shows the percentages of TRI chemical waste managed through recycling, energy recovery, treatment, and disposal or other releases by federal government organizations in 2020. For more details on quantities released, toggle to the "Releases only" graph.



- The types of waste reported by federal facilities vary by the type of operation. For example:
 - The Tennessee Valley Authority, a government-owned electric utility, provides power to southeastern states. 85% of its reported waste was hydrochloric and sulfuric acid aerosols, which were mostly treated on site.
 - The Department of the Treasury facilities reporting to TRI are mints for manufacturing currency and, accordingly, they report metals (e.g., copper and nickel) to TRI. Almost all of their metal waste was recycled off site.



Releases by Federal Facilities

The following graph shows the percentages of TRI chemicals released by federal government organizations in 2020.



- Most of the Department of Defense's releases were on-site releases of nitrate compounds to water and on-site land disposal of metals and metal compounds.
- The chemicals released by the Tennessee Valley Authority are similar to the chemicals released by other <u>electric utilities</u> that report to TRI. On-site land disposal of barium compounds and air releases of sulfuric acid make up a large portion of releases from the Tennessee Valley Authority and other electric utilities.

Source Reduction at Federal Facilities:

Federal facilities' operations are diverse and few focus on manufacturing processes. Due to this variety of functions, operations at some federal facilities are better suited to source reduction strategies than others. For the 2020 reporting year, 21 federal facilities (5%) reported implementing source reduction activities.



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Federal facilities have often reported difficulties when trying to reduce their use of lead because it is contained in ammunition used at National Security and Park Service facilities. For 2020, several federal facilities reported using "green" ammuntion in accordance with National Park Service policy to use non-lead ammunition where feasible. To find more examples of federal facilities' source reduction activities and the source reduction barriers they face, visit <u>TRI's P2</u> <u>Search Tool</u> and select industry sectors such as National Security, Correctional Institutions or Police Protection from the dropdown menu under "search criteria."



EPA Regional Profiles

This section of the National Analysis looks at releases and other <u>production-related waste</u> <u>management</u> activities of Toxics Release Inventory (TRI) chemicals at the EPA regional level during 2020. EPA has 10 regional offices, each of which is responsible for multiple states and in some cases, territories and tribes.



EPA regions vary in size, population, and the types of facilities located in each. This results in significant differences between national and regional trends in TRI chemical waste management. For example, certain industrial activities such as <u>metal mining</u> are geographically concentrated and generate large quantities of TRI chemical waste. Release trends in regions with many metal mines often differ greatly from national release trends.

The charts below show how much each EPA region contributed to production-related waste managed and releases.





The relative amounts of production-related waste managed compared to releases in each region is largely explained by the types of industry located in each region. For example:

• Quantities of production-related waste managed in **Regions 3, 4 and 5** were mostly from the chemical manufacturing sector. Each of these regions include one chemical manufacturing facility that reported large quantities of chemicals recycled on site. For example, in Region 3, one facility reported recycling 3.6 billion pounds of cumene. In Region 4, one facility reported recycling almost 2 billion pounds of dichloromethane (methylene chloride).

• **Region 6** had the largest quantity of production-related waste managed, driven by chemical manufacturing facilities treating chemicals on site, such as ethylene, propylene, and hydrochloric acid.

• In **Regions 8, 9 and 10**, metal mines accounted for more releases than any other sector. Metal mines usually report large quantities of on-site land disposals, primarily of TRI chemicals in metal-bearing rock (called ore) and waste rock. This sector also ranks lower than almost all others for quantities of waste managed through treatment, energy recovery, and recycling, resulting in lower quantities of waste managed in regions with more metal mines.

TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the <u>Introduction</u>. For more information see *Factors to Consider When Using Toxics Release Inventory Data*.



Regional Profile for EPA Region 1

This section examines TRI reporting in <u>EPA Region 1</u>. Region 1 includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, and 10 tribes.



927 facilities in the region report to TRI

which is 4% of all TRI facilities

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors



This chart shows the industry sectors with the most TRI-reporting facilities in Region 1.

Note: Percentages do not sum to 100% due to rounding

In 2020:

- 927 facilities in Region 1 reported to TRI, which is slightly fewer than reported for 2019. The sectors with the most facilities were the fabricated metals (i.e., manufacture of metal products) and <u>chemical manufacturing</u> sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 1 were the paper manufacturing, food manufacturing, fabricated metals, and chemical manufacturing sectors. Note that relatively few facilities in the paper manufacturing and food manufacturing sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 1

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 1.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

• Waste managed increased by 45.7 million pounds (21%) in Region 1, driven by increased recycling. Nationally, quantities of waste managed increased by 22%, also driven by increased recycling.

In 2020:

- Facilities in Region 1 managed 267 million pounds of production-related waste, 95% of which was recycled, combusted for energy recovery, or treated. Only 5% was disposed of or otherwise released into the environment in Region 1, compared to 11% nationally.
- Since 2019, quantities of waste managed in the region decreased by 14%, driven by decreases in recycling and treatment.

Source Reduction

In 2020, 8% of facilities in Region 1 (71 facilities) reported implementing new source reduction activities. Source reduction reporting rates were highest in the plastics and rubber products



manufacturing sector. For example, a laminated plastics manufacturer eliminated methanol usage by using a modified resin to manufacture laminates. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 1

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 1.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 1 decreased by 5.9 million pounds (-30%), driven by reduced air releases from paper manufacturing and <u>electric utilities</u>. Nationally, releases decreased by 26%.
- Quantities of chemicals released to air, water, and land decreased, while quantities of chemicals transferred off site for disposal increased.

Regional Highlight

Since 2011, releases in Region 1 have decreased by 30%, driven by reductions in air releases reported by paper manufacturing facilities and electric utilities.

In 2020:

- Facilities in Region 1 reported releasing 14.3 million pounds of TRI chemicals.
- Since 2019, releases in Region 1 decreased by 2.4 million pounds (-14%). On-site releases to air, water, and land, and off-site transfers for disposal all decreased. Nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. Two facilities in Region 1



reported for PFAS; neither facility reported any production-related waste or releases of PFAS.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following pie chart shows each state's contribution to the region's total RSEI Score for 2020.



• The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals



released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 1 facilities with the largest releases, see the <u>Region 1 TRI</u> <u>factsheet</u>.



Regional Profile for EPA Region 2

This section examines TRI reporting in <u>EPA Region 2</u>. Region 2 includes New Jersey, New York, Puerto Rico, US Virgin Islands, and 8 tribes.



which is 5% of all TRI facilities

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors



This chart shows the industry sectors with the most TRI-reporting facilities in Region 2.

Note: Percentages do not sum to 100% due to rounding

In 2020:

- 1,016 facilities in Region 2 reported to TRI, which is slightly fewer than reported for 2019. The sectors with the most facilities were the <u>chemical manufacturing</u> and fabricated metals (i.e., manufacture of metal products) sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 2 were the chemical manufacturing, electric utilities, petroleum products manufacturing, primary metals (including iron and steel manufacturing, and foundries), and hazardous waste management sectors. Note that relatively few facilities in the petroleum products and hazardous waste management sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 2

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 2.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented. Total production-related waste managed reported for 2020 in Region 2 was higher than shown here due to large treatment quantities of hydrogen sulfide, which was not TRI-reportable until 2012.

From 2011 to 2020:

 Production-related waste managed decreased by 159 million pounds (-23%). Quantities of waste treated, combusted for energy recovery, recycled, and disposed of or otherwise released all decreased. Nationally, quantities of waste managed increased by 22%, driven by increased recycling.

In 2020:

- Facilities in Region 2 managed 631 million pounds of production-related waste, 95% of which was recycled, combusted for energy recovery, or treated. Only 5% was disposed of or otherwise released into the environment in Region 2, compared to 11% nationally.
- The 631 million pounds of waste managed includes all chemicals reported for 2020, while for comparability over time, the trend chart excludes chemicals that were added to the TRI list after 2011.



 For Region 2, the difference for 2020 is primarily due to the quantity of hydrogen sulfide treated, which is included in the 631-million-pound total for 2020 but is excluded from the trend chart. TRI reporting of hydrogen sulfide began in 2012.

Source Reduction

In 2020, 6% of facilities in Region 2 (66 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the electrical equipment manufacturing sector. For example, a wiring device manufacturer in Region 2 reduced its use of lead compounds by switching to lead-free solder. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 2

The following graph shows the annual quantities of TRI chemicals released by facilities located in Region 2.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 2 decreased by 8.70 million pounds (-22%), driven by reduced releases from <u>chemical manufacturing</u>, petroleum product manufacturing, and <u>electric utilities</u>. Nationally, releases decreased by 26%.
- Quantities of chemicals released to air and water decreased, while releases to land and off-site transfers for disposal increased.
- The increased releases for 2015 shown in the graph were caused by transfers of several chemicals from a hazardous waste

Regional Highlight

Variability in TRI chemical releases in Region 2 is due to changes in releases from hazardous waste management facilities, where release quantities can vary widely year to year.



management facility in Kearny, New Jersey, to an off-site disposal facility. [Click to view facility details in the TRI P2 Search Tool].

In 2020:

- Facilities in Region 2 reported releasing 31.4 million pounds of TRI chemicals.
- Since 2019, releases decreased by 7.25 million pounds (-19%). Releases to air, water, land and off-site transfers for disposal all decreased. Nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. Four facilities in Region 2 reported for PFAS. Facilities in the region managed 3,781 pounds of PFAS as waste of which 1,825 pounds was released.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following pie chart shows each state's contribution to the region's total RSEI Score for 2020.





 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 2 facilities with the largest releases, see the <u>TRI Region 2 TRI</u> factsheet.



Regional Profile for EPA Region 3

This section examines TRI reporting in <u>EPA Region 3</u>. Region 3 includes Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia, and 7 tribes.



1,850 facilities in the region report to TRI

which is 9% of all TRI facilities

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> Communities section.



Industry Sectors



This chart shows the industry sectors with the most TRI-reporting facilities in Region 3.

Note: Percentages do not sum to 100% due to rounding

In 2020:

- 1,850 facilities in Region 3 reported to TRI, which is slightly fewer than reported for 2019. The sectors with the most facilities were the fabricated metals (i.e., manufacture of metal products) and <u>chemical manufacturing</u> sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 3 were the <u>electric utilities</u>, primary metals (including iron and steel manufacturing, and foundries), hazardous waste management, and petroleum products manufacturing sectors. Note that relatively few facilities in the electric utilities, hazardous waste management, and petroleum products manufacturing sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 3

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 3.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Total waste managed increased by 3.1 billion pounds (134%), driven by one facility that recycled over 3 billion pounds of cumene each year from 2014 to 2020. [Click to view facility details in the TRI P2 Search Tool].
 - Excluding this facility, waste managed in the region decreased by 412 million pounds (-19%).
 - Nationally, quantities of waste managed increased by 22%, driven by increased recycling.

In 2020:

- Facilities in Region 3 managed 5.4 billion pounds of waste, 88% of which was recycled, compared to 54% nationally.
- Since 2019, waste managed decreased by 521 million pounds (-9%), driven by reductions in the quantities of waste treated and recycled.



Source Reduction

In 2020, 6% of facilities in Region 3 (118 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the plastics and rubber products manufacturing sector. For example, a plastics product manufacturer made product modifications that utilized lower styrene level resin systems. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 3

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 3.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 3 decreased by 89 million pounds (-43%), compared to a 26% decrease nationally.
- Quantities of chemicals released into the air and surface waters, and transfers off-site for disposal all decreased. Releases to land increased.

In 2020:

- Facilities in Region 3 reported releasing 120 million pounds of TRI chemicals.
- Since 2019, releases decreased by 4.9 million pounds (-4%), primarily driven by decreased air releases and off-site transfers for disposal, which were somewhat offset by increased releases to water and land. Nationally, releases decreased by 10%.

Regional Highlight

From 2011 to 2020, releases in Region 3 decreased by 89.4 million pounds (-43%). The decrease in total releases was driven by reduced air releases from electric utilities and fewer pounds of off-site transfers for disposal from the primary metals sector.



 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. One facility in Region 3 reported managing 249,812 pounds of PFAS as waste, 630 pounds of which was released.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u> for 2020. The following pie chart shows each state's contribution to the region's total RSEI Score for 2020.





 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the facilities with the largest releases in the region, see the <u>Region 3 TRI</u> <u>factsheet</u>.



Regional Profile for EPA Region 4

This section examines TRI reporting in <u>EPA Region 4</u>. Region 4 includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, and 6 tribes.



4,539 facilities in the region report to TRI

which is 22% of all TRI facilities and includes 2 facilities on tribal lands

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.


Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 4.



Note: Percentages do not sum to 100% due to rounding

- 4,539 facilities in Region 4 reported to TRI, similar to reporting for 2019. The sectors with the most facilities were the <u>chemical manufacturing</u> and nonmetallic mineral products (including <u>cement manufacturing</u>) sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 4 were the chemical manufacturing, paper manufacturing, primary metals (including iron and steel mills), and <u>electric utilities</u> sectors. Note that relatively few facilities in the paper manufacturing and electric utilities sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 4

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 4.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Total production-related waste managed increased by 1.9 billion pounds (49%), driven by one facility that reported recycling over 1.5 billion pounds of dichloromethane (methylene chloride) each year from 2018 through 2020. [Click to view facility details in the TRI P2 Search Tool]. Excluding this facility, waste managed decreased by 55.8 million pounds (-1%), and quantities of waste managed by every method other than recycling (i.e., treatment, energy recovery, and disposal and releases) decreased while recycling increased by 278 million pounds (19%).
 - Nationally, quantities of waste managed increased by 22%, driven by increased recycling.



- Facilities in Region 4 managed 6.03 billion pounds of production-related waste, 93% of which was recycled, combusted for energy recovery, or treated. Only 7% was disposed of or otherwise released into the environment, compared to 11% nationally.
- Since 2019, quantities of waste managed increased by 5%, largely driven by increased recycling.

Source Reduction

In 2020, 6% of facilities in Region 4 (250 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the transportation equipment manufacturing sector. For example, a truck trailer manufacturer in Region 4 produced less manganese-containing waste by auditing raw material sizes to reduce the amount of scrap metal produced. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 4

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 4.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 4 decreased by 152 million pounds (-26%). Nationally, the decrease in releases was also 26%.
- Quantities of chemicals released to air, water, and land all decreased, with the largest reduction in releases to air. The quantity of chemicals transferred off site for disposal increased.

- Facilities in Region 4 reported releasing 433 million pounds of TRI chemicals.
- Since 2019, releases decreased by 31.2 million pounds (-7%), driven by decreased releases to land and air. Nationally, releases decreased by 10%.



 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl</u> <u>substances (PFAS)</u> to TRI. Three facilities in Region 4 reported for PFAS. Facilities in the region managed 121,229 pounds of PFAS as waste of which 4,145 pounds was released.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



Regional Highlight

Since 2011, on-site releases to air in Region 4 decreased by 43%. The largest decrease was reported by <u>electric</u> <u>utilities</u>, which have reported decreased air releases almost every year since 2011. Decreased air releases in this sector are due to fewer facilities required to report to TRI and reduced releases of hydrochloric acid.

To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following pie chart shows each state's contribution to the region's total RSEI Score for 2020.





Note: Percentages do not sum to 100% due to rounding

 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 4 facilities with the largest releases, see the <u>Region 4 TRI</u> <u>factsheet</u>.



Regional Profile for EPA Region 5

This section examines TRI reporting in <u>EPA Region 5</u>. Region 5 includes Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin, and 35 tribes.



5,245 facilities in the region report to TRI

which is 25% of all TRI facilities and includes 5 facilities on tribal lands

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 5.



Note: Percentages do not sum to 100% due to rounding

- 5,245 facilities in Region 5 reported to TRI, slightly fewer than reported for 2019. The sectors with the most facilities were the fabricated metals (i.e., manufacture of metal products) and <u>chemical manufacturing</u> sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 5 were the primary metals (including iron and steel manufacturing and foundries), <u>electric utilities</u>, chemical manufacturing, food manufacturing, and hazardous waste management sectors. Note that relatively few facilities in the electric utilities and hazardous waste management sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 5

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 5.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

• Total production-related waste managed increased by 1.01 billion pounds (23%), driven by one plastics manufacturing facility that reported recycling more than a billion pounds of waste, mostly dichloromethane (methylene chloride), annually from 2013 to 2020, and one food manufacturer that reported a 600-million-pound increase in *n*-hexane recycling from 2011 to 2020. Excluding these facilities, waste managed decreased by 660 million pounds (-18%).

- Facilities in Region 5 managed 5.50 billion pounds of production-related waste, 66% of which was managed through recycling, compared to 54% nationally.
- Since 2019, quantities of waste managed in the region decreased by 7%. Quantities of waste managed by all methods (i.e., recycling, energy recovery, treatment, and disposal or other release) all decreased.



Source Reduction

In 2020, 6% of facilities in Region 5 (307 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were highest in the computers and electronic products manufacturing sector. For example, a printed circuit assembly manufacturer purchased and installed a new wave soldering machine which reduced the amount of lead waste generated. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 5

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 5.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 5 decreased by 186 million pounds (-33%), driven by reduced releases from electric utilities and the primary metals sector. Nationally, releases decreased by 26%.
- Releases to air, water, land, and transferred off site for disposal all decreased.



In 2020:

- Facilities in Region 5 reported releasing 374 million pounds of TRI chemicals.
- Since 2019, releases decreased by 90.7 million pounds (-20%). Decreases occurred across many sectors, with the largest decreases in the primary metals, <u>electric utilities</u>, and hazardous waste management sectors. Releases decreased to all environmental media. Nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances</u> (PFAS) to TRI. 10 facilities in Region 5 reported for PFAS. Facilities in

Regional Highlight

From 2019 to 2020, total releases in Region 5 decreased by 90.7 million pounds. The decrease was driven by decreased quantities transferred off site for disposal by facilities in the primary metals and hazardous waste sectors and reduced on-site land releases by electric utilities.

the region managed 31,057 pounds of PFAS as waste of which 1,808 pounds was released.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



Note: Percentages do not sum to 100% due to rounding

To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following pie chart shows each state's contribution to the region's total RSEI Score for 2020.





 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 5 facilities with the largest releases, see the <u>Region 5 TRI</u> <u>factsheet</u>.



Regional Profile for EPA Region 6

This section examines TRI reporting in <u>EPA Region 6</u>. Region 6 includes Arkansas, Louisiana, New Mexico, Oklahoma, Texas, and 66 tribes.



2,865 facilities in the region report to TRI

which is 14% of all TRI facilities and includes 6 facilities on tribal lands

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors



This chart shows the industry sectors with the most TRI-reporting facilities in Region 6.

Note: Percentages do not sum to 100% due to rounding

- 2,865 facilities in Region 6 reported to TRI, slightly fewer than reported for 2019. The sectors with the most facilities were the <u>chemical manufacturing</u> and nonmetallic mineral products (including <u>cement manufacturing</u>) sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 6 were the chemical manufacturing, paper manufacturing, petroleum products manufacturing, and <u>electric utilities</u> sectors. Note that relatively few facilities in the paper manufacturing and electric utilities sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 6

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 6.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

• Total production-related waste managed decreased by 216 million pounds (-3%), driven by reduced recycling and treatment.

In 2020:

- Facilities in Region 6 managed 6.72 billion pounds of production-related waste, 44% of which was treated and 28% of which was recycled. Nationally, 25% of waste was managed through treatment and 54% was recycled.
- Since 2019, quantities of waste managed decreased by 16%, primarily driven by decreased quantities of waste recycled and treated.

Source Reduction

In 2020, 5% of facilities in Region 6 (154 facilities) reported implementing new source reduction activities. As one example, a specialty chemical manufacturer formulated a new line of formaldehyde-free resins to meet industry's evolving regulatory and environmental demands. [Click to view facility details in the TRI P2 Search Tool].



Releases Trend Region 6

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 6.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 6 decreased by 74.0 million pounds (-16%), compared to a 26% decrease nationally.
- Quantities of chemicals released to air, land, and off-site transfers for disposal decreased, while quantities of chemicals released to water increased.

Regional Highlight

Since 2019, releases in Region 6 decreased by 23.3 million pounds, driven by reductions in the chemical manufacturing, electric utilities, and petroleum product manufacturing sectors.

- Facilities in Region 6 reported releasing 390 million pounds of TRI chemicals.
- Since 2019, releases decreased by 23.3 million pounds (-6%). Releases to air, land, water, and off-site transfers for disposal all decreased. Nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. Seven facilities in Region 6 reported for PFAS. Facilities in the region managed 382,628 pounds of PFAS as waste of which 3,951 pounds was released.



Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



Note: Percentages do not sum to 100% due to rounding

To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



• The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals



released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on Region 6 facilities with the largest releases, see the Region 6 TRI factsheet.



Regional Profile for EPA Region 7

This section examines TRI reporting in <u>EPA Region 7</u>. Region 7 includes Iowa, Kansas, Missouri, Nebraska, and 9 tribes.



1,506 facilities in the region report to TRI

which is 7% of all TRI facilities

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 7.



Note: Percentages do not sum to 100% due to rounding.

- 1,506 facilities in Region 7 reported to TRI, similar to reporting for 2019. The sectors with the most facilities were the <u>chemical manufacturing</u> and food manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sectors that reported the largest TRI releases in Region 7 were the food manufacturing, <u>metal</u> <u>mining</u>, chemical manufacturing, and <u>electric utilities</u> sectors. Note that relatively few facilities in the electric utilities and metal mining sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 7

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 7.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

• Total production-related waste managed decreased by 16.8 million pounds (-2%). Quantities of waste recycled, treated, and disposed of or otherwise released all decreased, while quantities of waste combusted for energy recovery increased.

- Facilities in Region 7 managed 980 million pounds of production-related waste, 87% of which was recycled, combusted for energy recovery, or treated. 13% was disposed of or otherwise released into the environment, compared to 11% nationally.
- Since 2019, quantities of waste managed decreased by 4%, driven by decreased quantities of waste recycled and treated.



Source Reduction

In 2020, 5% of facilities in Region 7 (70 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the food product manufacturing sector. For example, a pet food manufacturer changed ingredients and reformulated products to reduce the use of zinc. [Click to view facility details in the TRI P2 Search Tool].



Releases Trend Region 7

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 7.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 7 decreased by 35.7 million pounds (-21%). This decrease was driven by reduced releases from the <u>electric utilities</u>, <u>metal mining</u>, and primary metals sectors. Nationally, releases decreased by 26%.
- Quantities of chemicals released to air, water, and land decreased while quantities transferred off site for disposal increased.

Regional Highlight

Releases in Region 7 decreased from 2019 to 2020 primarily due to reduced land releases from electric utilities.

In 2020:

• Facilities in Region 7 reported releasing 132 million pounds of TRI chemicals.



- Since 2019, releases decreased by 11.5 million pounds (-8%). Releases decreased to all media except water. Nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. Six facilities in Region 7 reported for PFAS. Facilities in the region managed 1,489 pounds of PFAS as waste and released 543 pounds of PFAS.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



Note: Percentages do not sum to 100% due to rounding

To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.





 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 7 facilities with the largest releases, see the <u>Region 7 TRI</u> <u>factsheet</u>.



Regional Profile for EPA Region 8

This section examines TRI reporting in <u>EPA Region 8</u>. Region 8 includes Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 28 tribes.



724 facilities in the region report to TRI

which is 3% of all TRI facilities and includes 2 facilities on tribal lands

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors

This chart shows the industry sectors with the most TRI-reporting facilities in Region 8.



Note: Percentages do not sum to 100% due to rounding.

- 724 facilities in Region 8 reported to TRI, similar to reporting for 2019. The sectors with the most facilities were the nonmetallic mineral products (including <u>cement</u> <u>manufacturing</u>), <u>chemical manufacturing</u>, and food manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the sector that reported the largest TRI releases in Region 8 was the <u>metal mining sector</u>, which accounted for 56% of releases reported in the region. After metal mining, the <u>electric</u> <u>utilities</u>, primary metals (including smelters), and chemical manufacturing sectors reported the largest releases. Note that relatively few facilities in the metal mining and primary metals sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 8

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 8.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

In 2020:

- Facilities in Region 8 managed 917 million pounds of production-related waste, 37% of which was disposed of or otherwise released, compared to 11% nationally. Primary metal manufacturers and metal mines drive the quantity of waste released in Region 8.
- Since 2019, quantities of waste managed in the region decreased by 3%.

From 2011 to 2020:

 Total production-related waste managed increased by 48.4 million pounds (6%). Quantities of waste combusted for energy recovery, treated, and disposed of or otherwise released increased, while quantities recycled decreased. Nationally, quantities of waste managed increased by 22%, driven by increased recycling.

Source Reduction



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In 2020, 5% of facilities in Region 8 (33 facilities) reported implementing new source reduction activities. For example, to reduce xylene waste, a structural metal products manufacturer assigned dedicated day and night shift paint technicians to operate pumps effectively and prevent leaks. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 8

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 8.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 8 have fluctuated since 2011, largely driven by changes in the quantities of metal waste disposed of to land by metal mines. Changes in production volumes and in the chemical composition of the extracted ore can vary substantially from year to year at metal mines, impacting waste quantities reported to TRI. The 2013 spike in land disposal was driven by two metal mines in Utah.
 - Excluding the metal mining sector, releases decreased by 20.4 million pounds (-16%).

Regional Highlight

For 2020, 56% of total disposal or other releases reported in Region 8 were from the metal mining sector, largely driven by one copper mine in Utah [view facility details].



In 2020:

- Facilities in Region 8 reported releasing 335 million pounds of TRI chemicals.
- Since 2019, releases decreased by 28.3 million pounds (-8%), driven by reduced releases to land. Nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. Three facilities in Region 8 reported for PFAS. Facilities in the region managed 3,328 pounds of PFAS as waste of which less than a pound was released.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



Note: Percentages do not sum to 100% due to rounding

To consider the potential health risk from chronic exposure to these releases, EPA uses a riskscreening score from the RSEI model. The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.





Note: Percentages do not sum to 100% due to rounding

 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities, which drive the high release quantities for Utah. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 8 facilities with the largest releases, see the <u>Region 8 TRI</u> <u>factsheet</u>.



Regional Profile for EPA Region 9

This section examines TRI reporting in <u>EPA Region 9</u>. Region 9 includes Arizona, California, Hawaii, Nevada, the Pacific Islands (American Samoa, Guam, and the Northern Mariana Islands), and 148 tribes.



1,606 facilities in the region report to TRI

which is 8% of all TRI facilities and includes 11 facilities on tribal lands

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> <u>Communities section</u>.



Industry Sectors



This chart shows the industry sectors with the most TRI-reporting facilities in Region 9.

Note: Percentages do not sum to 100% due to rounding

- 1,606 facilities in Region 9 reported to TRI, slightly fewer than reported for 2019. The sectors with the most facilities were the nonmetallic mineral products (including <u>cement</u> <u>manufacturing</u>) and <u>chemical manufacturing</u> sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the most TRI releases in Region 9 were from the <u>metal mining</u> sector, which accounted for 86% of the region's releases for 2020. After metal mining, the primary metals (including smelting), hazardous waste management, and petroleum products manufacturing sectors reported the largest releases. Note that relatively few facilities in the metal mining, primary metals, and hazardous waste management sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 9

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities located in Region 9.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

 Total production-related waste managed decreased by 258 million pounds (-22%), driven by decreased recycling by the primary metals sector and decreased quantities disposed of by metal mines.

- Facilities in Region 9 managed 916 million pounds of production-related waste, 61% of which was disposed of or otherwise released, compared to 11% nationally. Metal mines drive the quantity of waste managed in the region, due to large quantities of metalcontaining waste disposed to land; for 2020, metal mines managed 55% of all productionrelated waste managed in the region.
- Since 2019, quantities of production-related waste managed in Region 9 decreased by less than 1%. While the quantities of waste that were recycled, combusted for energy recovery, or treated all decreased, an increase in waste disposed of or otherwise released diminished the overall reduction.


Source Reduction

In 2020, 6% of facilities in Region 9 (91 facilities) reported implementing new source reduction activities. Source reduction reporting rates in the region were among the highest in the fabricated metals sector. For example, a sheet metal products manufacturer enacted a preventative maintenance program to run machines more efficiently and reduce manganese waste. [Click to view facility details in the TRI P2 Search Tool].



Release Trend Region 9

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 9.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 9 have fluctuated since 2011, largely driven by changes in the quantities of metal waste disposed of to land by metal mines. Changes in production volumes and in the chemical composition of the extracted ore can vary substantially from year to year, impacting waste quantities reported to TRI.
- Excluding the metal mining sector, releases in Region 9 decreased by 26.8 million pounds (-25%).

Regional Highlight

43 metal mines in Region 9 reported to TRI for 2020, more than in any other region, accounting for 86% of the region's releases. Most of the mining releases were reported by gold mines in Nevada.

In 2020:

- Facilities in Region 9 released 555 million pounds of TRI chemicals.
- Since 2019, releases increased by 91.9 million pounds (20%), while nationally, releases decreased by 10%.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI. One facility in Region 9



reported managing 20 pounds of PFAS as waste, all of which was released. A second facility in the region reported for a PFAS in error and subsequently withdrew the report.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.





 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities, which drive the high release quantities for Nevada. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 9 facilities with the largest releases, see the <u>TRI Region 9</u> <u>factsheet</u>.



Regional Profile for EPA Region 10

This section examines TRI reporting in <u>EPA Region 10</u>. Region 10 includes Alaska, Idaho, Oregon, Washington, and 271 tribes.



744 facilities in the region report to TRI

which is 4% of all TRI facilities and includes 16 facilities on tribal lands

U.S. EPA TRI, Reporting Year 2020

For state- and tribe-specific TRI data, <u>see the Where You Live section</u> and the <u>Tribal</u> Communities section.



Industry Sectors



This chart shows the industry sectors with the most TRI-reporting facilities in Region 10.

Note: Percentages do not sum to 100% due to rounding.

In 2020:

- 744 facilities in Region 10 reported to TRI, similar to reporting for 2019. The sectors with the most facilities were the nonmetallic mineral products (including <u>cement</u> <u>manufacturing</u>) and wood product manufacturing sectors.
- While the figure shows the sectors with the most TRI facilities in the region, the most TRI releases in Region 10 were from the <u>metal mining</u> sector, which accounted for 92% of the region's releases for 2020. After metal mining, the <u>chemical manufacturing</u>, food manufacturing, and paper manufacturing sectors reported the largest releases. Note that relatively few facilities in the metal mining sector or paper manufacturing sectors reported to TRI in this region and those sectors are included in "All Other Sectors" in the pie chart above.



Waste Management Trend Region 10

The following graph shows the 10-year trend in quantities of TRI chemicals managed as production-related waste by facilities in Region 10.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

• Total production-related waste managed decreased by 457 million pounds (-33%), driven by decreased releases reported by metal mines. Excluding metal mines, waste managed decreased by 26.7 million pounds (-8%).

In 2020:

- Facilities in Region 10 managed 978 million pounds of production-related waste, 72% of which was disposed of or otherwise released, compared to 11% nationally. Metal mines drive the quantity of waste managed in the region, due to large quantities of metalcontaining waste disposed to land; for 2020, metal mines managed 66% of all productionrelated waste managed in the region.
- Since 2019, quantities of production-related waste managed in the region decreased by 22%, driven by decreased disposal quantities from metal mines. Excluding metal mines, waste managed in Region 10 decreased by 48.6 million pounds (-13%).



Source Reduction

In 2020, 4% of facilities in Region 10 (28 facilities) reported implementing new source reduction activities. As one example of source reduction in Region 10, an agricultural chemical manufacturer began using a liquid raw material with fewer impurities which generated less filter cake waste containing zinc. [Click to view facility details in the TRI P2 Search Tool].



Releases Trend Region 10

The following graph shows the 10-year trend in quantities of TRI chemicals released by facilities located in Region 10.



Note: For comparability, trend graphs include only those chemicals that were reportable to TRI for all years presented.

From 2011 to 2020:

- Releases in Region 10 have fluctuated since 2011, largely driven by changes in the quantities of waste disposed of to land by metal mines. Changes in production volumes and in the chemical composition of the extracted ore can vary substantially from year to year, impacting waste quantities reported to TRI.
 - Excluding the metal mining sector, releases decreased by 19.3 million pounds (-25%).

Regional Highlight

TRI chemical releases in Region 10 are dominated by one metal mine. For 2020, the Red Dog mine in Alaska reported 78% of the region's releases [View facility details].

In 2020:



- Facilities in Region 10 reported releasing 701 million pounds of TRI chemicals.
- Since 2019, releases decreased by 230 million pounds (-25%), compared to a 10% decrease nationally. The decrease in Region 10 releases was driven by the metal mining sector.
 - Excluding metal mining, releases decreased by 6.9 million pounds (-10%) since 2019.
- 2020 was the first year facilities reported their releases and waste management practices for certain <u>per- and polyfluoroalkyl substances (PFAS)</u> to TRI.

Releases by State

The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.



To consider the potential health risk from chronic exposure to these releases, EPA uses a <u>risk-screening score from the RSEI model</u>. The following chart shows each state's contribution to the region's TRI chemical release quantities for 2020.





 The RSEI model accounts for factors such as a chemical's toxicity, its movement in the environment, and population density, in addition to the pounds of TRI chemicals released. RSEI models releases to the air and water but does not model land disposal quantities, which drive the high release quantities for Alaska. These factors can lead to significant differences between a state's contribution to regional releases and its contribution to the regional RSEI Score.

For information on the Region 10 facilities with the largest releases, see the <u>Region 10 TRI</u> <u>factsheet</u>.



Where You Live

Use the geographical selections bar above the map to show the releases of Toxics Release Inventory (TRI) chemicals that occurred throughout the United States during 2020. Use the Data to Display dropdown to select the metric to display.



Click on any location on the map to see detailed information.

View Larger Map

In addition to viewing maps based on release quantities, you can also view maps based on riskscreening scores, which are estimates of relative potential risks to human health following exposure to TRI chemicals. These unitless risk-screening scores (RSEI Score) are generated by EPA's <u>Risk-Screening Environmental Indicators (RSEI) model</u> and allow you to compare the relative potential for human health impacts across various locations. For more on RSEI, see the <u>Hazard and Potential Risk of TRI Chemicals</u> section.



TRI Data Considerations

As with any dataset, there are several factors to consider when using the TRI data. Key factors associated with data used in the National Analysis are summarized in the <u>Introduction</u>. For more information see <u>Factors to Consider When Using Toxics Release Inventory Data</u>.



States and Metropolitan Areas

For TRI purposes, "states" includes all U.S. territories. For 2020, facilities located in all 56 states and territories reported to the TRI Program. Texas, Ohio, and California had the most facilities that reported to TRI, and together accounted for 20% of the total number of facilities that reported for 2020.

More than 80% of the U.S. population and many of the industrial and federal facilities that report to the TRI Program are in urban areas. "Metropolitan Statistical Areas" (MSAs) and "micropolitan statistical areas" in the United States are defined by the Office of Management and Budget (OMB) and consist of one or more socially and economically integrated adjacent counties, cities, or towns.





Watersheds

A watershed is the land area that drains to a common waterway. Rivers, lakes, estuaries, wetlands, streams, and oceans are catch basins for the land adjacent to them. Ground water aquifers are replenished by water flowing through the land area above them.

Large aquatic ecosystems comprise multiple small watersheds and water resources within a large geographic area. The Where You Live map displays 10 aquatic ecosystems.

The chart below shows the proportion of TRI chemical releases within each of the aquatic ecosystems that were released to air, water, or land, or transferred for disposal off site. Discharges of any type, including to air or land, can all affect living resources within an aquatic ecosystem. For example, some chemicals can persist in the environment and accumulate in the tissues of fish and other wildlife. A few chemicals can become more concentrated as predators farther up the food chain eat these organisms, which may ultimately cause health problems for wildlife and humans.



The chart below shows TRI chemical releases per square mile for each of the 10 large aquatic ecosystems. Releases per square mile are greatest in the Gulf of Mexico watershed, where



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many chemical manufacturing facilities are located. In fact, almost half of the TRI releases from the chemical manufacturing sector are from these facilities.





Tribal Communities

<u>Under EPA policy</u>, the agency works with federally recognized <u>tribes</u> on a government-togovernment basis to protect the land, air, and water in <u>Indian country</u> and Alaska Native villages and to support tribal assumption of program authority. <u>Facilities located in Indian</u> <u>country that meet TRI reporting requirements must indicate the appropriate three-digit Bureau</u> <u>of Indian Affairs (BIA) tribal code on annual TRI reporting forms</u>. These codes tell the EPA on which tribal land the facility is located.

In 2020, there were 42 facilities located in the Indian country of 19 different federally recognized tribes that reported to TRI. These facilities collectively managed over 16 million pounds of production-related waste, 5.3 million pounds of which was disposed of or otherwise released. Of these releases, 89% were released on site; 87% of these on-site releases were disposal to land from <u>electric utilities</u> and <u>metal mining</u> facilities. These facilities primarily disposed of metal compounds such as lead, barium, and copper compounds. Lead and copper are often present in the mineral ore disposed of by metal mines, and barium is present in coal and oil combusted at electric utilities.

Many more facilities are located on or within a 10-mile radius of Indian country. 1,934 such facilities reported to TRI for 2020, representing 241 different federally recognized tribes. These facilities collectively managed over 980 million pounds of production-related waste, 180 million pounds of which were disposed of or otherwise released. Of the releases reported, 83% were released on site; 69% of these on-site releases were from <u>chemical manufacturing</u>, <u>metal</u> <u>mining</u>, and primary metals manufacturing facilities.

The table below provides more details about various types of releases and other waste management reported by facilities on federally recognized tribal lands.



Quick Facts for 2020: Facilities on Tribal Lands

Measure	Facilities on Tribal Land	Facilities on Tribal Land Facilities on or within 10 miles of tribal land	
Number of Facilities that Reported to TRI	42	1,934	
Number of Tribes with TRI Facilities on Their Lands	19	241	
Production-Related Waste Managed	16.04 million lb	987 million lb	
Recycling	2.85 million lb	301 million lb	
Energy Recovery	2.54 million lb	109 million lb	
Treatment	5.34 million lb	397 million lb	
Disposal or Other Releases	5.32 million lb	180 million lb	
Total Disposal or Other Releases	5.34 million lb	181 million lb	
On-site	4.75 million lb	150 million lb	
Air	0.51 million lb	56.3 million lb	
Water	1,600 lb	13.8 million lb	
Land	4.24 million lb	79.4 million lb	
Off-site	0.59 million lb	31.4 million lb	

In this table, the values for "Disposal or Other Releases" in the production-related waste managed section is lower than the value for "Total Disposal or Other Releases." This is primarily because some facilities reported managing non-production-related waste. Non-production-related waste is not included in production-related waste managed values but is included in the Total Disposal or Other Releases.

The <u>Tribal Communities Dashboard</u> makes it easy to explore information about releases of TRI chemicals from facilities on or near tribal lands. An example of the type of TRI information in the Tribal Communities Dashboard is shown in the interactive chart below. Use the buttons in the top row to filter the data by industry sector, chemical, and/or tribe.



Select an Industry Sector	Select a Chemical	Select a Tribe			
Select charts from th	iis menu 🕶 🛃	Clear Selections			
Total Releases on Tribal Lands, 2020					
Total Releases for 19 Tribes: 5,337,594 lb					
Coeur D'/ Puyallup Tribe of the Puy Ute Indian Tribe of the	Alene Tribe yal 14.02 40.22 Tohono O'odham Natio	Coeur D'Alene Tribe Navajo Nation, Arizon Puyallup Tribe of the P Tohono O'odham Nati Ute Indian Tribe of the Others			
Navajo Nation, Arizona,	New Mexico				

The interactive table below lists the federally recognized tribes that had at least one TRIreporting facility on their lands, along with the total releases reported by facilities and the number of facilities. Click on a column header to change how the table is sorted.



Total Disposal or Other Releases on Tribal Lands by Tribe, 2020

Tribe	Q	Total Releases (Ib)	Number of Facilities	Fact Sheet
Totals		5,337,594	42	
Tohono O'odham Nation of Arizona		2,147,985	1	Link
Navajo Nation, Arizona, New Mexico & Utah		1,207,221	1	Link
Ute Indian Tribe of the Uintah & Ouray Reservation, Uta	ah	890,520	1	Link
Puyallup Tribe of the Puyallup Reservation		749,426	8	Link
Coeur D'Alene Tribe		127,051	2	Link
Confederated Tribes and Bands of the Yakama Nation		98,419	3	Link
The Choctaw Nation of Oklahoma		78,771	4	Link
Eastern Band of Cherokee Indians		27,283	2	Link
Ottawa Tribe of Oklahoma		4,400	1	Link
Saginaw Chippewa Indian Tribe of Michigan		2,731	1	Link
Oneida Nation		1,851	4	Link
Northern Arapaho Tribe of the Wind River Reservation, Wyoming		1,553	1	Link
Salt River Pima-Maricopa Indian Community of the Sal Reservation, Arizona	t River	256	2	Link
Gila River Indian Community of the Gila River Indian Reservation, Arizona		111	6	Link
Tulalip Tribes of Washington		10	1	Link
Nez Perce Tribe		7	1	Link
Fort McDowell Yavapai Nation, Arizona		0	1	Link
Rincon Band of Luiseno Mission Indians of Rincon Reservation, California		0	1	Link
Suquamish Indian Tribe of the Port Madison Reservation	on	0	1	Link

<u>Additional resources for tribes are available on the TRI for Tribal Communities webpage,</u> including more detailed analyses of TRI data, links to other online tools, and contact information for EPA's Tribal Program Managers.



TRI and Beyond

The Toxics Release Inventory (TRI) serves as a model for pollutant release and transfer inventories worldwide and how TRI relates to other EPA environmental and chemical management programs and laws.

The TRI is a powerful resource that provides the public with information about how TRI chemical wastes are managed by facilities in the United States. Beyond the TRI, there are many programs at EPA that also collect various types of information about TRI-listed chemicals and other regulated chemicals. The next figure is an overview of some of the laws that EPA implements, and the industrial activities or processes EPA regulates under these laws.

While many programs at EPA focus on one environmental medium, the TRI Program is unique in that it covers all environmental media by tracking chemical releases to air, water, and land, as well as chemical waste transfers. In addition, facilities submit TRI reports annually. As a result, TRI data provide some of the most up-to-date, comprehensive information available and can be used with other datasets to provide a more complete picture of national trends in chemical waste management practices.





The Emergency Planning and Community Right-to-Know Act (EPCRA) establishes requirements for emergency planning, preparedness, and reporting on hazardous and toxic chemicals involving air releases, water releases, land disposal, waste transfers, and the quantities of chemicals on site, the type and location of storage of those chemicals, and their use. The TRI Program was established by EPCRA and covers the reporting of information pertaining to toxic chemicals; see the EPCRA section below for details.

Offices throughout EPA use TRI data to support their respective programmatic missions to protect human health and the environment. These uses include technical analysis for regulation, informing program priorities and projects, providing information to internal and external stakeholders, and many other applications.



TRI Around the World

In 1986, with the enactment of the Emergency Planning and Community Right-to-Know Act (EPCRA), the TRI was established as the first national Pollutant Release and Transfer Register (PRTR) in the world. Since then, environmental agencies in other countries have implemented their own PRTR programs modeled after the TRI Program. Currently, at least 50 countries have fully established PRTRs or have implemented pilot programs, as shown in the map below. More countries are expected to develop PRTRs in the future, particularly in Asia, South America, and Africa.



Source: United Nations Economic Commission for Europe PRTR Global Map

As global PRTR implementation continues to grow, the TRI Program will continue to work with international organizations to:

- Assist in the development of new PRTR programs,
- Promote data standards and core data elements to improve PRTR comparability and harmonization and allow global scale analyses, and
- Showcase the utility of PRTR data for assessing progress towards sustainability.



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International Project Spotlight: Using PRTR Data to Assess Progress toward the U.N. Sustainable Development Goals

Background. The TRI Program collaborates with the Organization for Economic Cooperation and Development (OECD) on PRTR projects, including a project to use global PRTR data to assess progress toward the <u>United Nations' (U.N.) Sustainable</u> <u>Development Goals (SDGs)</u>. These goals are designed to "shift the world on to a sustainable and resilient path" by setting targets



Watch a short video on the recently published report on global PRTRs

that encompass the economic, environmental, and social dimensions of sustainability. As stakeholders act toward achieving the SDGs, the U.N. will measure progress toward the Goals using existing data where possible. One such existing data source for some of the SDGs may be found in countries' PRTR data.

Project Focus. The <u>U.N. SDG Target 12.4</u> **EXIT** was identified as the target most directly relevant to PRTR data and focuses on reducing chemical releases to the environment.

Project Status. <u>OECD recently published the project report</u> **EXIT** based on aggregated data for multiple chemicals from multiple countries to provide insight into progress toward achieving SDG Target 12.4. The figure below from the report shows a comparison of 2008 and 2017 air and water releases of 14 pollutants from manufacturing facilities as reported to the 7 PRTRs analyzed in the project.

Next steps. EPA is working with OECD to define the next steps for building on the work completed to date. The findings may be included in the next update of the <u>U.N. Sustainable</u> <u>Development Goals Report</u> EXIT.





Change in releases of 14 pollutants, 2008 to 2017 (kg)

Note: PRTRs included in the analyses: Australia - National Pollutant Inventory (NPI), Canada - National Pollutant Release Inventory (NPRI), Chile – Registro de Emisiones y Transferencia de Contaminantes (RETC), European Union - European Pollutant Release and Transfer Register (E-PRTR), Japan Pollutant Release and Transfer Register (PRTR), Mexico - Registro de Emisiones y Transferencia de Contaminantes (RETC), United States - Toxics Release Inventory (TRI). Chemicals included in the analyses: 1,2-Dichloroethane, Benzene, Cadmium, Chromium, Di-(2-ethylhexyl) phthalate, Dichloromethane, Ethylbenzene, Mercury, Nickel, Particulate matter, Styrene, Sulfur oxides, Tetrachloroethylene, Trichloroethylene.



Mapping Cross-Border Transfers

Facilities must report on the TRI chemicals in wastes they transfer off site for management. Facilities report how the waste was managed off site and the name and address of the receiving facility.



This interactive map shows states with TRI facilities that shipped waste containing TRI chemicals outside of the US. Click on a state to view sending facility locations in that state and countries receiving waste from facilities in that state. Explore this data in more depth in the full TRI National Analysis Dashboard.



More on EPCRA

The TRI was established by the Emergency Planning and Community Right-to-Know Act (EPCRA) in 1986. The creation of EPCRA was in response to what is widely considered to be the worst industrial chemical disaster in history. Beginning on December 2, 1984, methyl isocyanate gas was accidentally released from a chemical plant in Bhopal, India. Thousands of people died that night and many more were injured. Thousands more died in the following months and years as a result of their exposure, and survivors of the accident continue to suffer with permanent disabilities. Approximately six months after the Bhopal accident, a similar incident occurred at a facility in West Virginia. These two events raised concern about local preparedness for chemical emergencies and the availability of information on toxic chemicals.

EPCRA establishes requirements for federal, state and local governments, Indian tribes, and industry regarding **emergency planning** and **"Community Right-to-Know" reporting** on hazardous and toxic chemicals. These requirements are specified in EPCRA's four major provisions as shown in the figure below. Information collected under EPCRA helps states and communities develop a broad perspective of potential chemical hazards at individual facilities and in surrounding neighborhoods. Section 313 of EPCRA established the Toxics Release Inventory (TRI) which contributes to this broader perspective by making information about the management of toxic chemicals available to the public. This information supports informed decision-making by companies, government agencies, non-governmental organizations, communities, and others.



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TSCA and TRI

TRI data and information contribute to evaluating and ensuring the safety of chemicals under the Toxic Substances Control Act (TSCA). TSCA, as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act, is the nation's primary chemicals management law and it requires EPA to evaluate the safety of chemicals in commerce. Many of the chemicals that EPA selects for evaluation are from the 2014 <u>Update to the TSCA Work Plan</u>, which helps to focus and direct EPA's activities. The Agency is required to conduct a transparent, riskbased evaluation process. TRI data serve as an important source of chemical and environmental information for assessing and managing chemicals under TSCA.

The three stages of <u>EPA's process for evaluating the safety of existing chemicals</u> (shown in graphic below) are prioritization, risk evaluation, and risk management. EPA first **prioritizes** chemicals in commerce through a risk-based screening process **evaluates** those chemicals to determine if they present unreasonable risks, and then if EPA identified unreasonable risk, **manages** the unreasonable risks to protect health and the environment. TRI data may be used for each step in this process.



TRI Data Use in TSCA Chemical Evaluations

Prioritization. Approximately two-thirds of the chemicals identified in the 2014 update of the TSCA Work Plan are also included on the TRI list of chemicals. TRI data can inform EPA's



prioritization of chemicals for risk evaluation because the data are collected annually and include the location of facilities and the quantities of TRI chemicals they released to air, water and land, and transferred to off-site locations. In addition, trend analyses of TRI data can help identify changes over time in the location and quantities of releases, and the types of industrial sectors managing these chemicals.

Risk evaluation. A TSCA risk evaluation of a chemical is a comprehensive evaluation of the risks the chemical poses to health and the environment. EPA evaluates how the chemical is used, which may include manufacturing and import, processing, use, distribution in commerce, and disposal over the chemical's life cycle. During risk evaluation, EPA is required to assess hazards of and exposures to the chemical in the workplace, to the general population and to environmental (e.g., ecological) receptors. TRI and other data are used to support these assessments under TSCA.

Risk Management. If EPA determines that certain uses of a chemical pose an unreasonable risk to health or the environment, EPA will manage the risk through regulatory actions or other risk management options. These regulatory actions and options may include labeling with warnings and instructions for use, recordkeeping or notice requirements, restrictions on certain uses or activities to reduce exposure or environmental releases, or a ban of the chemical entirely. EPA may use TRI data, such as on chemical use and pollution prevention practices, to help inform these risk management decisions.

TSCA Risk Evaluation Update

In 2017, EPA published the scope documents for the initial ten chemicals undergoing risk evaluation under the amended TSCA in which nine of the ten chemicals are TRI-reportable chemicals (except for C.I. Pigment Violet 29).

In 2019, EPA designated 20 high-priority chemicals to undergo risk evaluation. These chemicals will move through the process required by TSCA to evaluate any unreasonable risks they may present to human health or the environment. This marks a major milestone for EPA in its efforts to ensure the safety of existing chemicals in the marketplace through its updated chemical management program. In 2020, EPA published the final scope documents for these 20 chemical substances, of which 13 are TRI-reportable chemicals.