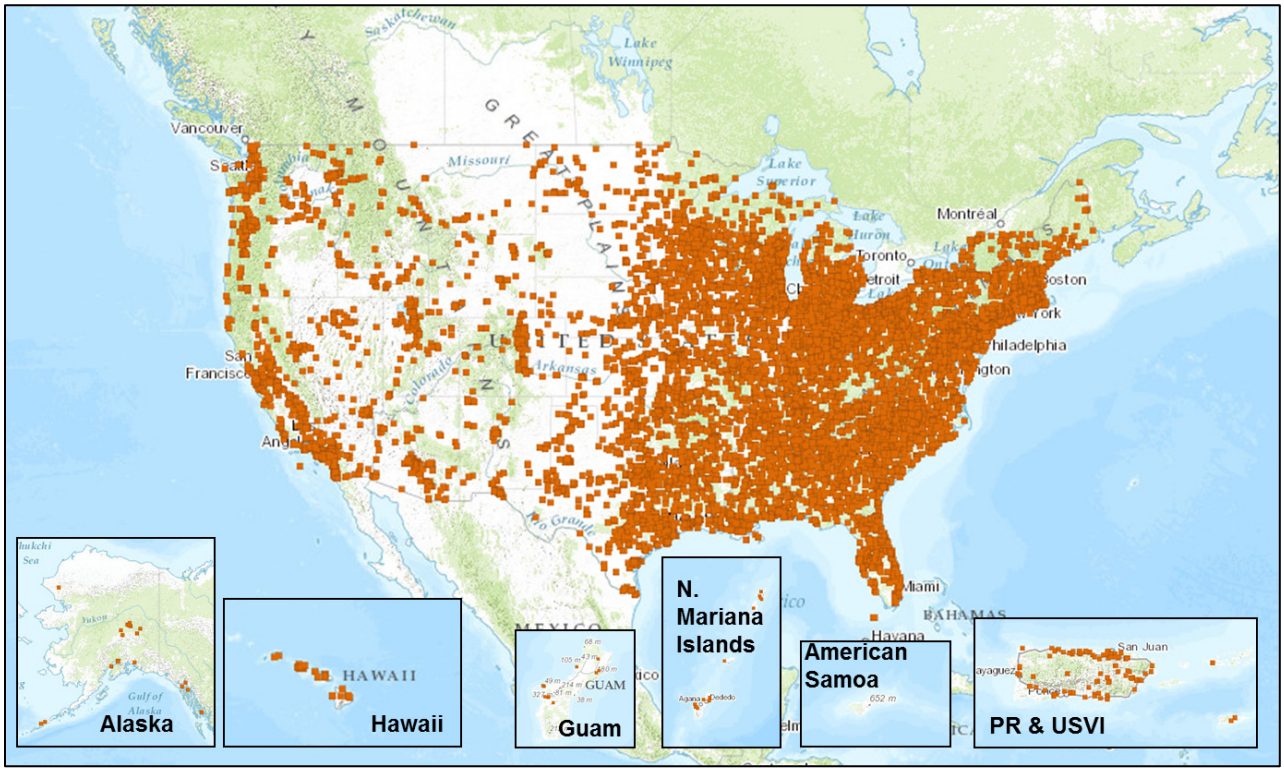
2014 TRI National Analysis: Introduction

Industries and businesses in the United States use tens of thousands of chemicals to make the products we depend on, such as pharmaceuticals, computers, paints, clothing, and automobiles. Although the majority of toxic chemicals are managed by industrial facilities to minimize releases of chemicals into the environment, releases do still occur.

It is your right to know what toxic chemicals are being used in your community, how they are managed, whether they are being released into the environment, the quantities of these releases, and whether such quantities are increasing or decreasing over time. The Toxics Release Inventory (TRI) is an EPA program that tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. This information is submitted by thousands of U.S. facilities on over 650 chemicals and chemical categories under the Emergency Planning and Community Right-to-Know Act (EPCRA) and the Pollution Prevention Act (PPA).

Map of TRI Facilities



This map shows facilities that reported to EPA's TRI Program for 2014. These facilities are primarily from industry sectors involved in manufacturing, metal mining, electric power generation, and hazardous waste treatment; have ten or more employees; and manufacture, process, or otherwise use TRI chemicals in quantities that trigger reporting. Federal facilities are also required to report to the TRI Program, most recently by Executive Order 13693.

For more information about facilities in your community that report to the TRI Program, visit the **Where You Live** section of the National Analysis.

Exploring Demographic Information within the 2014 TRI National Analysis

Almost 59 million people live within one mile of at least one of the many facilities that reported to the TRI Program for 2014. As part of the TRI National Analysis, EPA has developed a Story Map to provide information on community demographics across the country.

The Story Map includes interactive maps showing facility locations and the demographic patterns of the communities around them, particularly the percentage of the population living below the poverty line and the population of minority status, based on U.S. Census data. You can search for your own community to learn more about the facilities that are located in your neighborhood and report to the TRI Program.

See EPA's story map about who lives near TRI facilities.

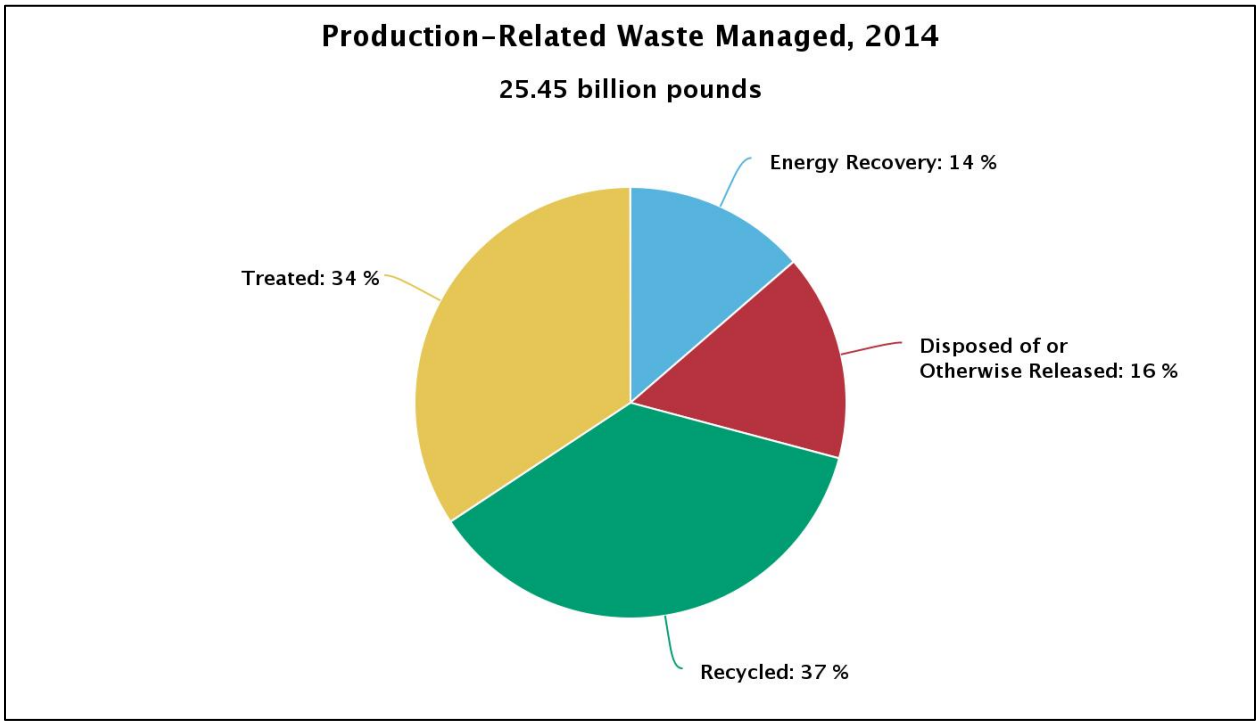
TRI Summary for 2014

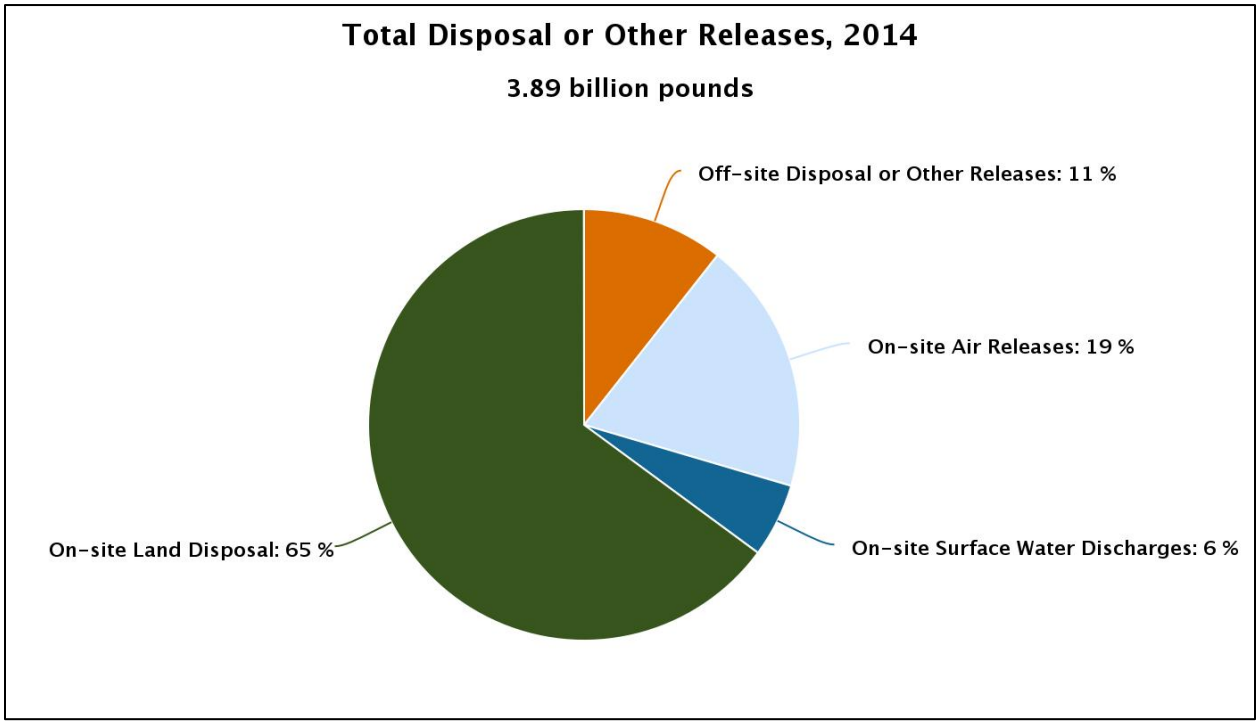
The TRI National Analysis is developed on an annual basis, and the 2014 TRI National Analysis is EPA's summary and interpretation of TRI data reported for activities at facilities during 2014. It offers a starting point for understanding how the environment and communities may be affected by toxic chemicals, and is presented as a snapshot of the data at one point in time. Any TRI reporting forms submitted to EPA after the July 1, 2015, reporting deadline may not be processed in time to be included in the National Analysis. The most recent data available are accessible from the TRI Data and Tools webpage.

Users of TRI data should be aware that the TRI database includes information on the quantities of many toxic chemicals that are released or otherwise managed as waste by industrial facilities, but it does not contain such information on all toxic chemicals or all industry sectors of the U.S. economy. Additionally, covered facilities report the quantities of chemicals to TRI using their best-available data. Each year, EPA conducts an extensive data quality investigation before publishing the National Analysis. During the data quality review, potential errors are identified and investigated to help ensure the most accurate and useful information possible in the National Analysis and TRI database.

Quick Facts for 2014	
Number of TRI Facilities	**21,783**
Production-Related Waste Managed	**25.45 billion lb**
Recycled	9.30 billion lb
Energy Recovery	3.48 billion lb
Treated	8.73 billion lb
Disposed of or Otherwise Released	3.95 billion lb
Total Disposal or Other Releases	**3.89 billion lb**
On-site	**3.49 billion lb**
Air	0.74 billion lb
Water	0.22 billion lb
Land	2.53 billion lb
Off-site	**0.41 billion lb**

Note: Numbers do not sum exactly due to rounding.


Production-Related Waste Managed, 2014
25.45 billion pounds
Energy Recovery: 14 %
Disposed of or Otherwise Released: 16 %
Recycled: 37 %
Treated: 34 %


Total Disposal or Other Releases, 2014
3.89 billion pounds
Off-site Disposal or Other Releases: 11 %
On-site Air Releases: 19 %
On-site Surface Water Discharges: 6 %
On-site Land Disposal: 65 %

In 2014:

- 21,783 facilities reported to the TRI Program.
- Facilities reported managing 25.45 billion pounds of toxic chemicals in production-related wastes. This is the quantity of toxic chemicals in waste that is recycled, burned for energy recovery, treated, disposed of or otherwise released. In other words, it encompasses the toxic chemicals in waste generated in the processes and operations of the facilities that reported.
    - Of this total, 21.50 billion pounds were recycled, burned for energy recovery, or treated, and 3.95 billion pounds were disposed of or otherwise released to the environment, as shown in the Production-Related Waste Managed pie chart.
- Facilities also reported total on- and off-site disposal or other releases of 3.89 billion pounds of toxic chemicals. As shown in the Disposal or Other Releases pie chart, most were disposed of on-site to land (including landfills, other land disposal, and underground injection).

Note that two metrics shown in the Quick Facts box related to disposal or other releases are similar (3.95 and 3.89 billion pounds), but total disposal or other releases is slightly lower. The reason total disposal or other releases is lower is that it removes "double counting" that occurs when a TRI facility transfers waste to another TRI facility. For example, when TRI 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 value. The production-related waste value in TRI, however, considers **all** of the instances where the 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 transfer off-site and the on-site disposal.

A current list of the chemicals reportable to the TRI Program is available on the TRI chemicals webpage. The list of chemicals has changed over the years; as a result, trend graphs in the TRI National Analysis include only those chemicals that were reportable for the entire time period presented so that the year-to-year data are comparable. Results which focus only on the year 2014 include all chemicals reportable in 2014 and may be slightly different from results in trend analyses that include 2014 and previous years.

Additional information is presented in the following chapters of the TRI National Analysis:

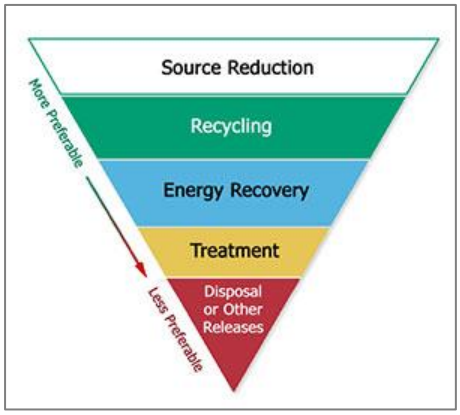
- **Waste Management and Pollution Prevention** presents trends on recycling, energy recovery, treatment, and releases of toxic chemicals and the types of pollution prevention activities that facilities have implemented.
- **Releases of Chemicals** presents trends in releases of toxic chemicals to air, water, and land of toxic chemicals, including a focus on selected chemicals of concern.
- **Industry Sectors** highlights toxic chemical waste management trends for four industry sectors.

- **Where You Live** presents analyses of the quantities of TRI chemicals specific to: state, city, county, zip code, metropolitan area or micropolitan area, and by Large Aquatic Ecosystems (LAEs) such as the Chesapeake Bay, as well as information about facilities in Indian Country.
- **TRI and Beyond** combines TRI data with other EPA data, such as greenhouse gas emissions, providing a more complete picture of national trends in chemical use, management, and releases of the chemicals, and overall environmental performance by facilities.

To conduct your own analysis of TRI data, use one of EPA's TRI data access and analysis tools available to the public from the TRI Data and Tools webpage.

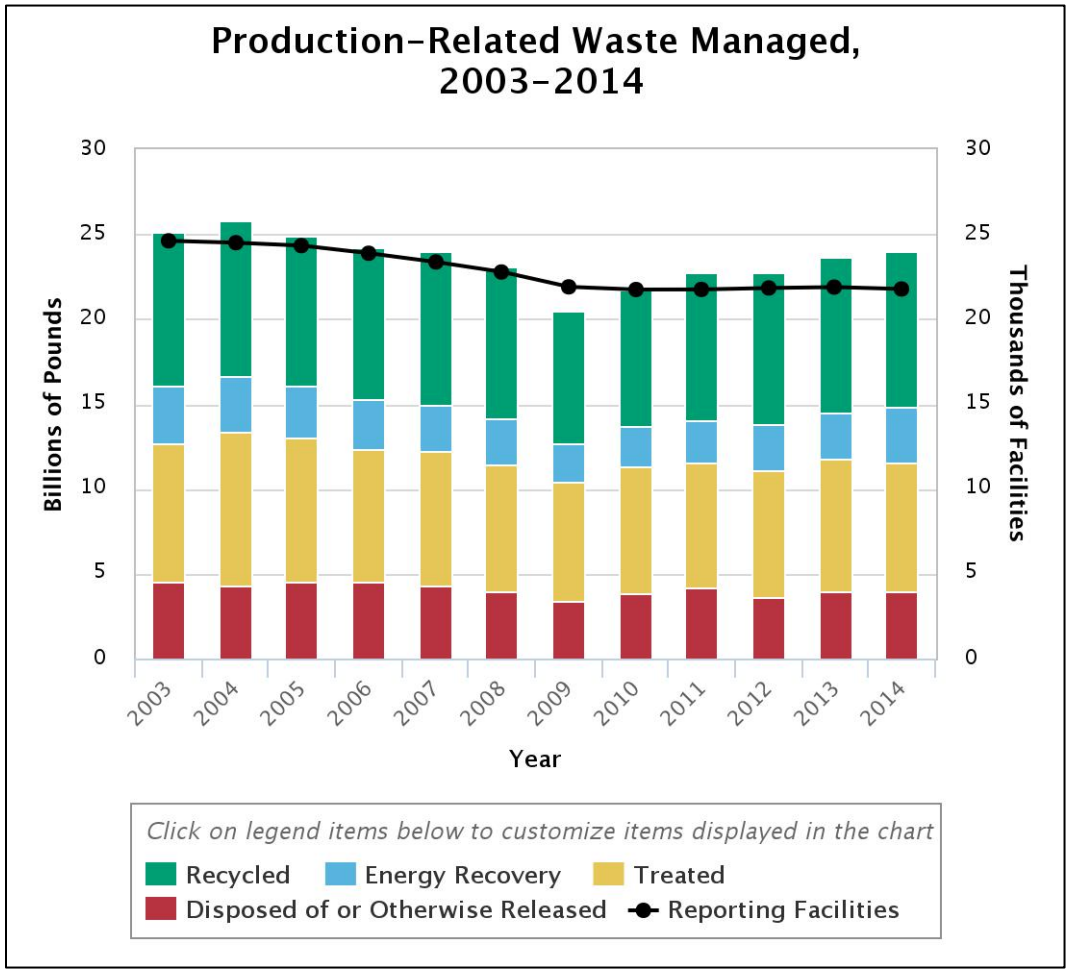
Pollution Prevention and Waste Management

The Toxics Release Inventory (TRI) collects information from facilities on the quantities of toxic chemicals they recycle, combust for energy recovery, treat for destruction, and dispose of or otherwise release on- and off-site. These quantities, in aggregate, are collectively referred to as the quantity of production-related waste managed.



Looking at production-related waste managed over time helps track progress in reducing waste generation and moving toward preferred waste management practices. EPA encourages facilities to first eliminate waste at its source. For waste that is generated, the preferred management method is recycling, followed by burning for energy recovery, treating, and, as a last resort, disposing of or otherwise releasing the waste into the environment. These waste management priorities are illustrated in the waste management hierarchy established by the Pollution Prevention Act (PPA) of 1990. The goal is that, when possible, facilities will shift over time from disposal or other releases toward the preferred techniques in the waste management hierarchy. For the graphs depicting TRI trends over time, 2003 is used as the base year because it is the earliest year in which the reporting requirements are nearly consistent with the current reporting year.

Waste Management Trends

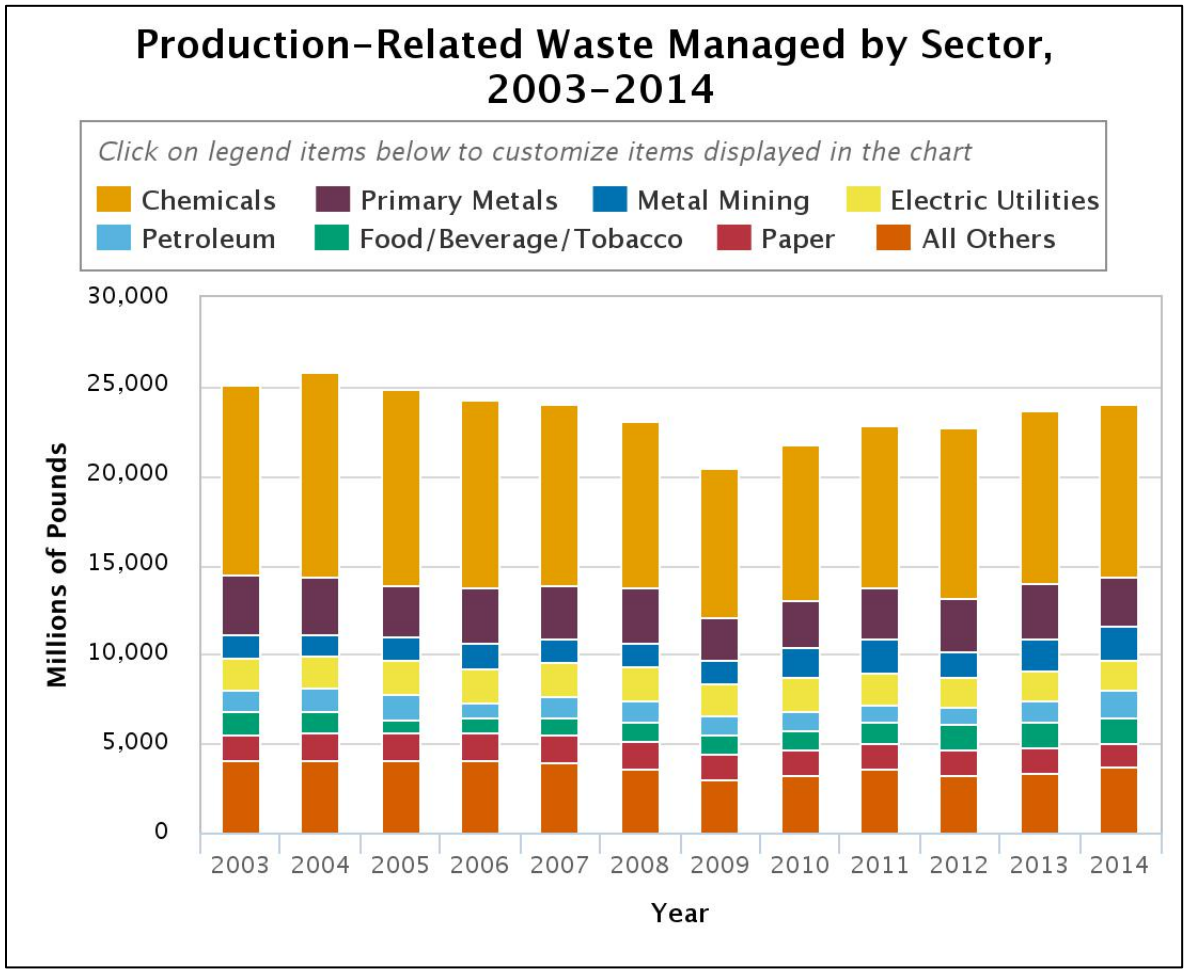


From 2003 to 2014:

- Production-related waste managed by TRI facilities declined by 4% (1.09 billion pounds).
- Disposal and other releases decreased by 661 million pounds (-14%).
- Treatment decreased by 538 million pounds (-7%).
- Energy recovery and recycling held steady with each method changing by less than 2%.
- The number of facilities that report to the TRI Program declined by 12% since 2003, although the count has remained steady at about 21,800 facilities since 2010.
- Since 2009, production-related waste managed has generally been increasing as the U.S. economy has improved.
- Quantities of waste managed in 2014 are similar to what they were in 2007, with little overall change within any waste management method.

Waste Management by Industry Sector

Trend in waste managed by industry sector



This figure shows the seven industry sectors with the most waste managed reported for 2014.

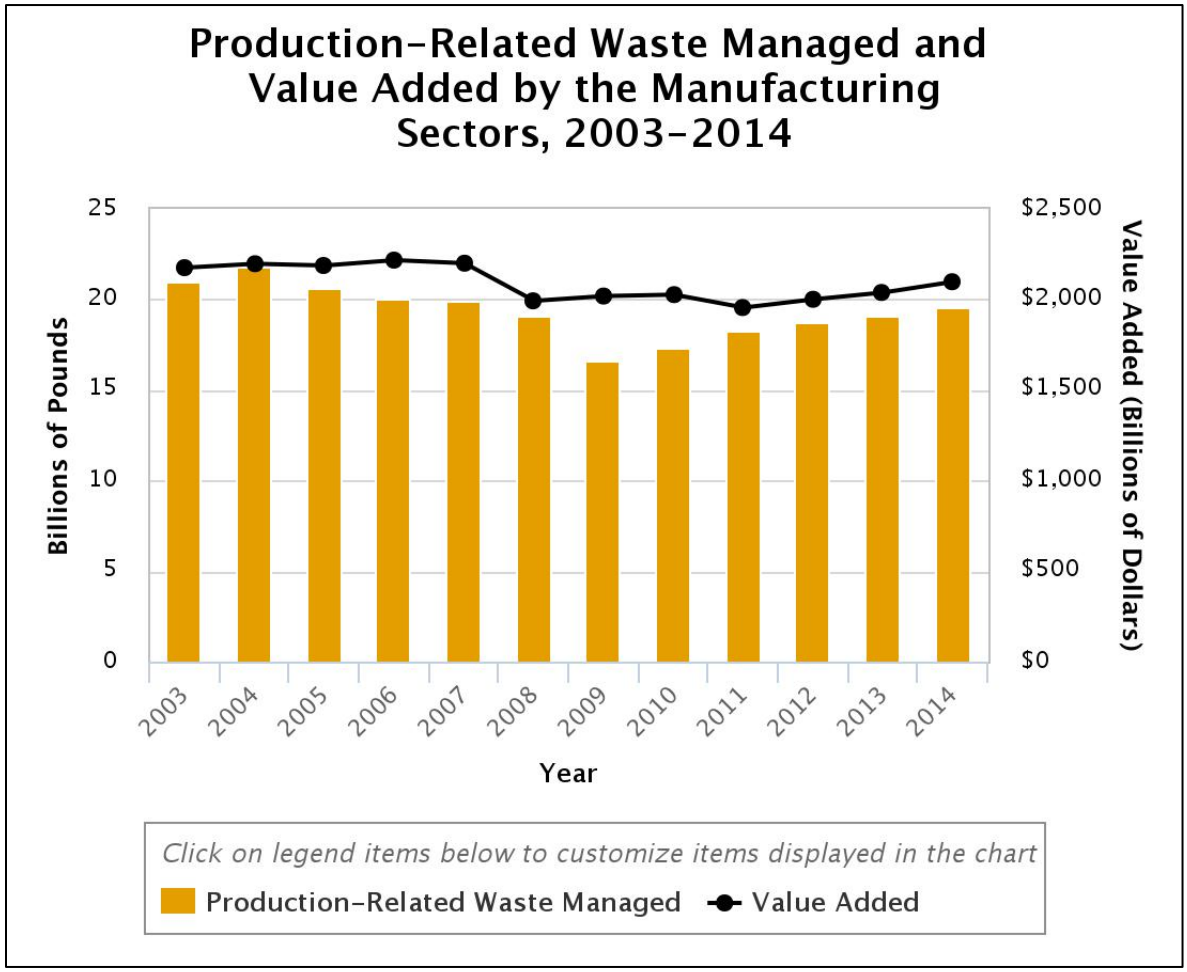
From 2003 to 2014:

- The contribution of each of the top sectors to production-related waste managed has remained relatively constant since 2003.
- Of the seven sectors illustrated above, three increased their quantity of waste managed: metal mining, petroleum, and food/beverages/tobacco.
- Generated waste in some industries fluctuates considerably from year to year, due to changes in production or other factors (e.g., quantities reported by metal mining facilities can change significantly based on changes in the composition of waste rock).

From 2013 to 2014:

- Sectors with the greatest reported increases in overall waste quantities since 2013 are:
  - Petroleum, which increased by 333 million pounds (+28%)
  - Fabricated metals, which increased by 243 million pounds (+40%)
  - Cement, which increased by 165 million pounds (+52%)

Economic and Waste Management Trend for Manufacturing



It is important to consider the influence the economy has on production and production-related waste generation. This figure presents the total pounds in production-related waste managed as reported by the manufacturing sectors each year from 2003-2014 and the manufacturing sector's "value added" (as shown by the solid black line). "Value added" information is obtained from the Bureau of Economic Analysis and is used here as a proxy for production within the manufacturing sectors. "Value added" measures the contribution of manufacturing to the nation's Gross Domestic Product (GDP), which represents the total value of goods and services produced annually in the United States.

In 2014:

- While not all of the facilities that report to the TRI Program are in the manufacturing sector, most (88%) are. The manufacturing sector includes sectors such as chemical manufacturing, metals processing, and pulp and paper manufacturing, but excludes mining, electric utilities, and waste management facilities.
- TRI manufacturing facilities accounted for 81% of the reported production-related waste quantities managed.

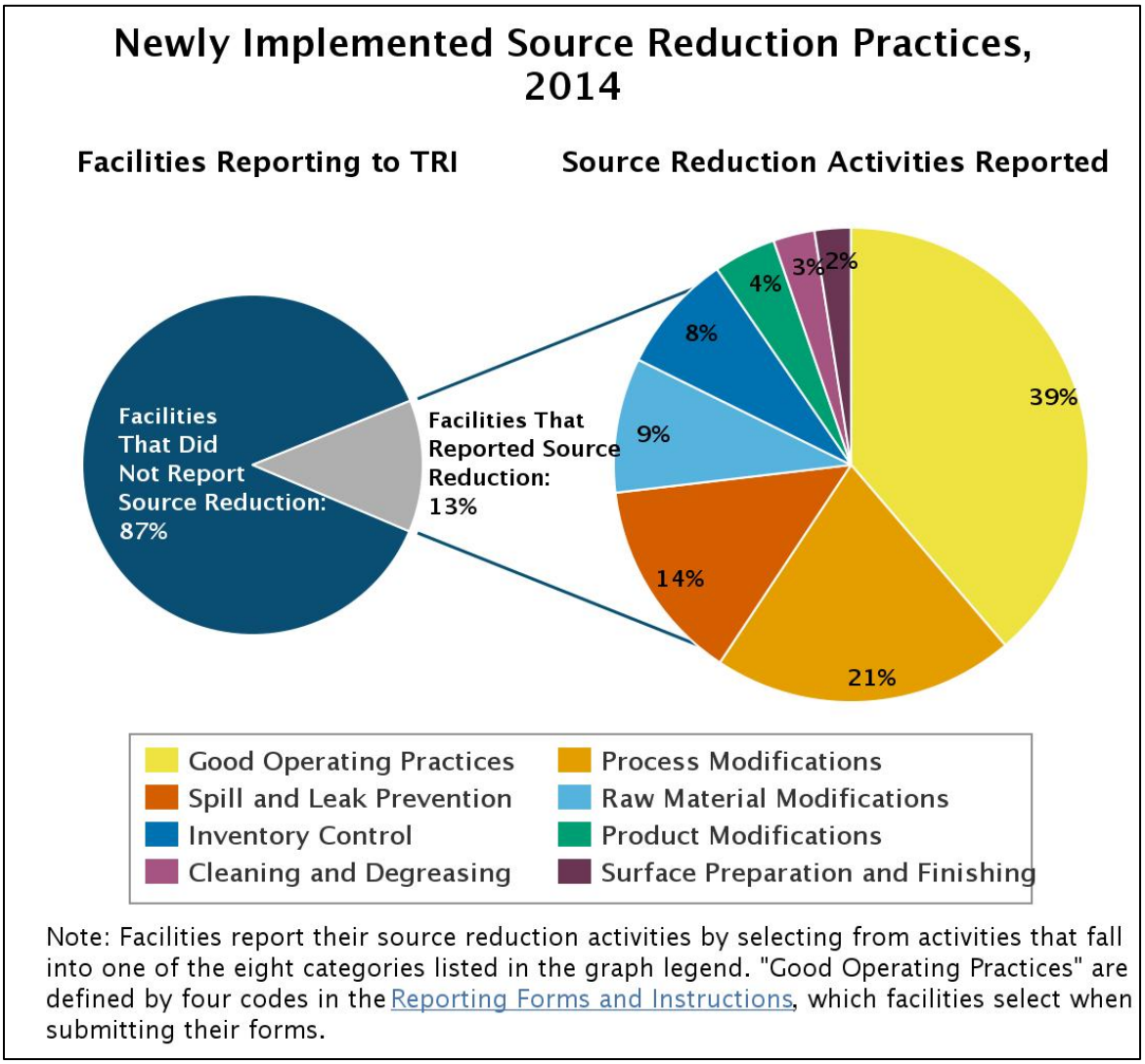
From 2003 to 2014:

- Value added by the manufacturing sectors (adjusted for inflation) decreased by 4%.
- Since waste is decreasing at a rate not proportional to changes in production, as shown in the graph, factors other than production may be contributing to the reductions in production-related waste managed.
    - Other factors such as source reduction and pollution prevention (P2) practices that may have influenced the quantities of production-related waste managed are discussed in the **Source Reduction/Pollution Prevention** section.

More information on production trends for individual sectors, including the electric utility and metal mining sectors, which are not included in the manufacturing sectors, can be found in the **industry sector profiles**.

Source Reduction/Pollution Prevention

Source Reduction Activities Reported

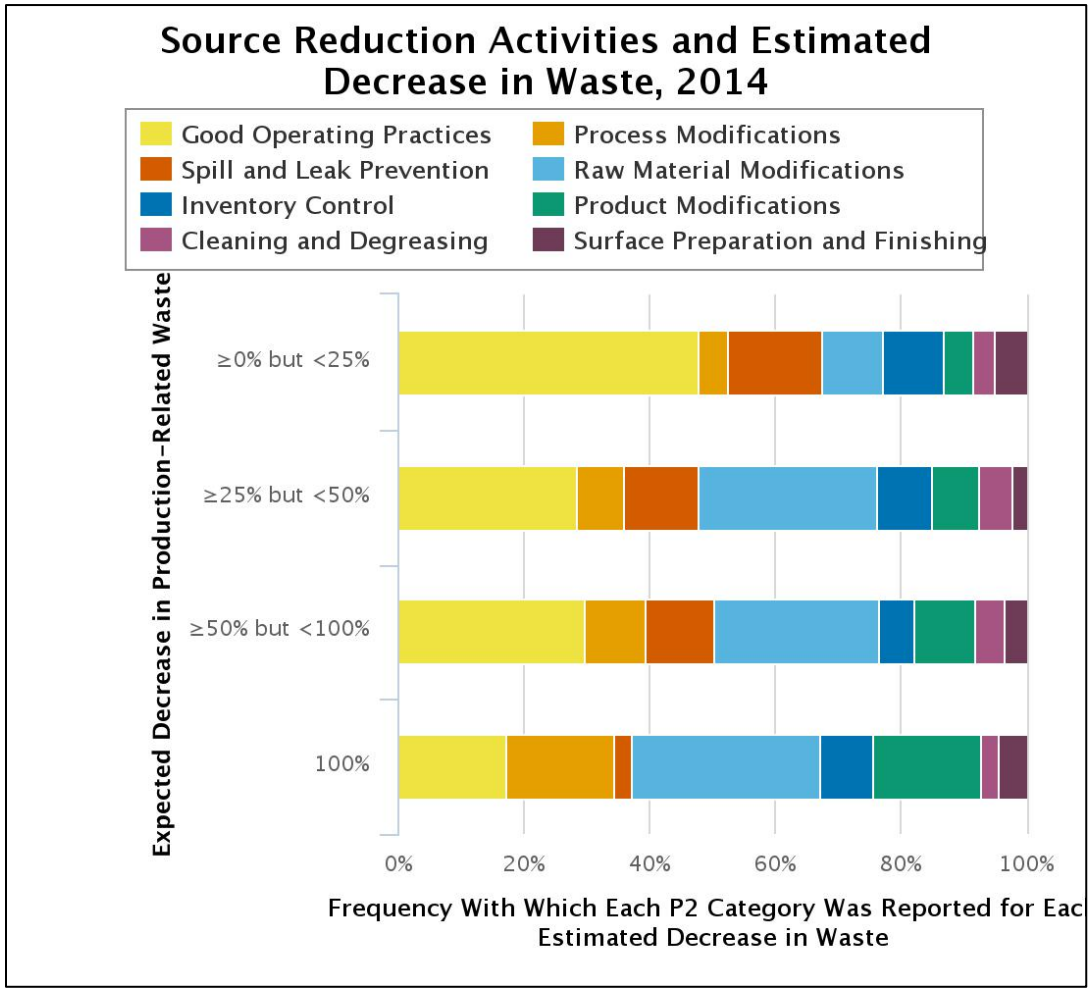


Note: Facilities report their source reduction activities by selecting from activities that fall into one of the eight categories listed in the graph legend. "Good Operating Practices" are defined by four codes in the Reporting Forms and Instructions, which facilities select when submitting their forms.

In 2014:

- 2,732 facilities (13% of all facilities that reported to the TRI Program) reported initiating a total of 8,388 source reduction activities.
- Note that facilities may have ongoing source reduction activities initiated in previous years that are not included in the figure. You can find information on previously implemented source reduction activities by using the TRI P2 Search Tool.

Estimated Release Reduction from Source Reduction



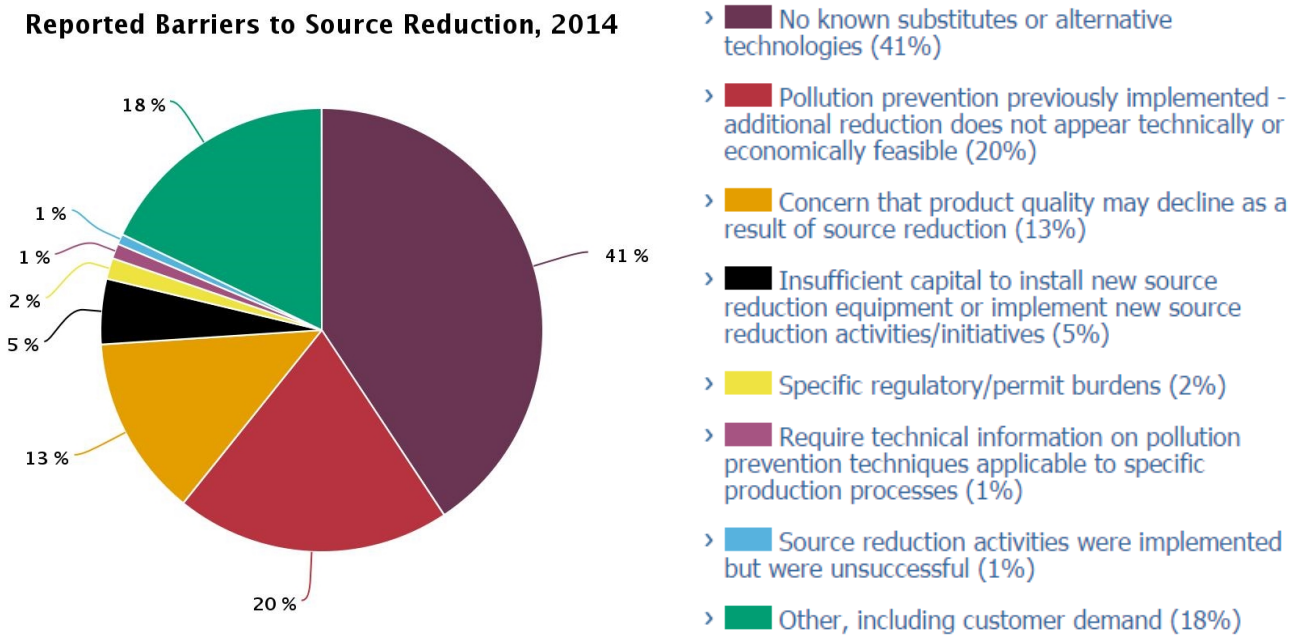
New in Reporting Year 2014, facilities can now provide an estimate of the resulting reduction in the annual amount of the chemical managed as waste (i.e., recycled, treated, used for energy recovery, or released) for each source reduction activity. This figure shows the association between the source reduction activities implemented in 2014 and the estimated annual reductions in chemical waste that facilities expect to achieve in Reporting Year 2015, which varies by activity:

- 30% of the activities reported that were estimated to achieve 100% reduction were Raw Material Modifications (e.g. increasing the purity of raw materials).
- Almost half of the activities expected to achieve less than a 25% reduction were reported as Good Operating Practices.

Barriers to P2

If a facility did not implement new source reduction activities, they can optionally provide information about barriers they faced to source reduction. In 2014, the most common barriers reported were:

- the lack of a substitute or alternative for a chemical or process (41%) and
- previous implementation of source reduction with additional reductions not feasible (20%).



No known substitutes or alternative technologies (41%)
Example: A battery manufacturer produces nickel-cadmium batteries and as a result cannot eliminate nickel compounds from their product. [Facility Details]

Pollution prevention previously implemented - additional reduction does not appear technically or economically feasible (20%)
Example: A fabricated metal manufacturer had previously reformulated their paint booth linings and optimized their paint guns to decrease phenol waste. In order to further reduce waste, the facility would need to replace the paint booth linings entirely, which is a significant economic burden that would require additional permitting. [Facility Details]

Concern that product quality may decline as a result of source reduction (13%)
Example: A steel foundry uses a topping agent that contains aluminum dust, which allows the risers on the casting to stay hot (liquid) long enough to prevent vacuum shrinkage. Using less of the topping agent would negatively impact the casting quality. [Facility Details]

Insufficient capital to install new source reduction equipment or implement new source reduction activities/initiatives (5%)

Example: A firearms manufacturer has looked into an alternative for their cleaning and degreasing operations, but has found the associated costs to be prohibitive. The alternatives would be either expensive fluorinated solvents or aqueous cleaning, which the facility has insufficient capital. [Facility Details]

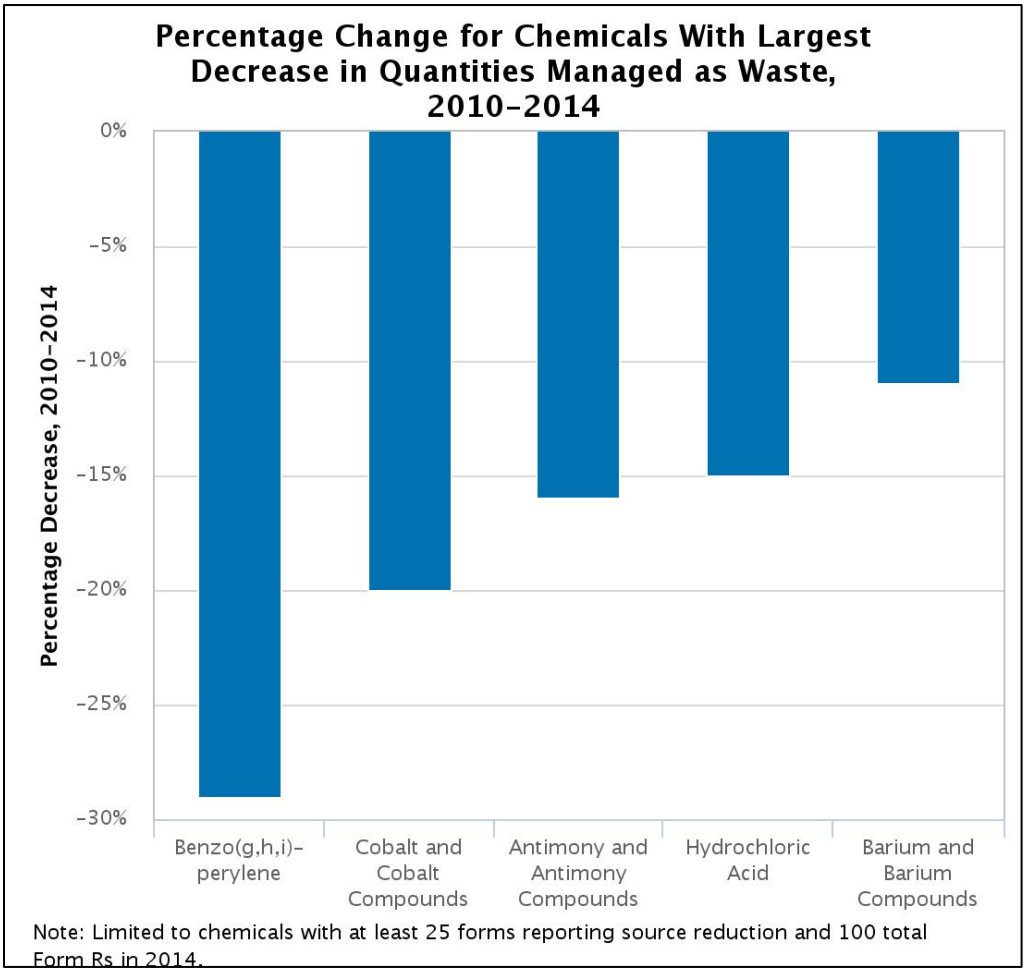
Specific regulatory/permit burdens (2%)
Example: Because of FDA requirements, a pharmaceutical manufacturer is unable to modify their processing methods. [Facility Details]

Require technical information on pollution prevention techniques applicable to specific production processes (1%)
Example: A leather tanning facility is preparing to test a filtering system that would allow recycling of chromium. Although these types of systems have not been effective in the past, the facility continues to investigate the options. [Facility Details]

Source reduction activities were implemented but were unsuccessful (1%)
Example: A dairy facility attempted to substitute citric acid for nitric acid, but citric acid has a high biochemical oxygen demand (BOD) content which overwhelmed the POTW where they transferred their waste. As a result, the POTW requested that the facility switch back to nitric acid for their neutralization operations. [Facility Details]

Other, including customer demand (18%)
Example: An electrical equipment manufacturer has already substituted lead solder with tin solder for their newly produced circuit boards. However, they are required to produce lead soldered boards to support older systems under warranty. [Facility Details]

Chemicals with Greatest Decreases in Waste Managed



Source reduction activities implemented by facilities play a significant role in reducing waste generation, although it's important to note that decreases in reported waste management quantities may be caused by many factors, including changes in production levels or estimation methods.

From 2010 to 2014:

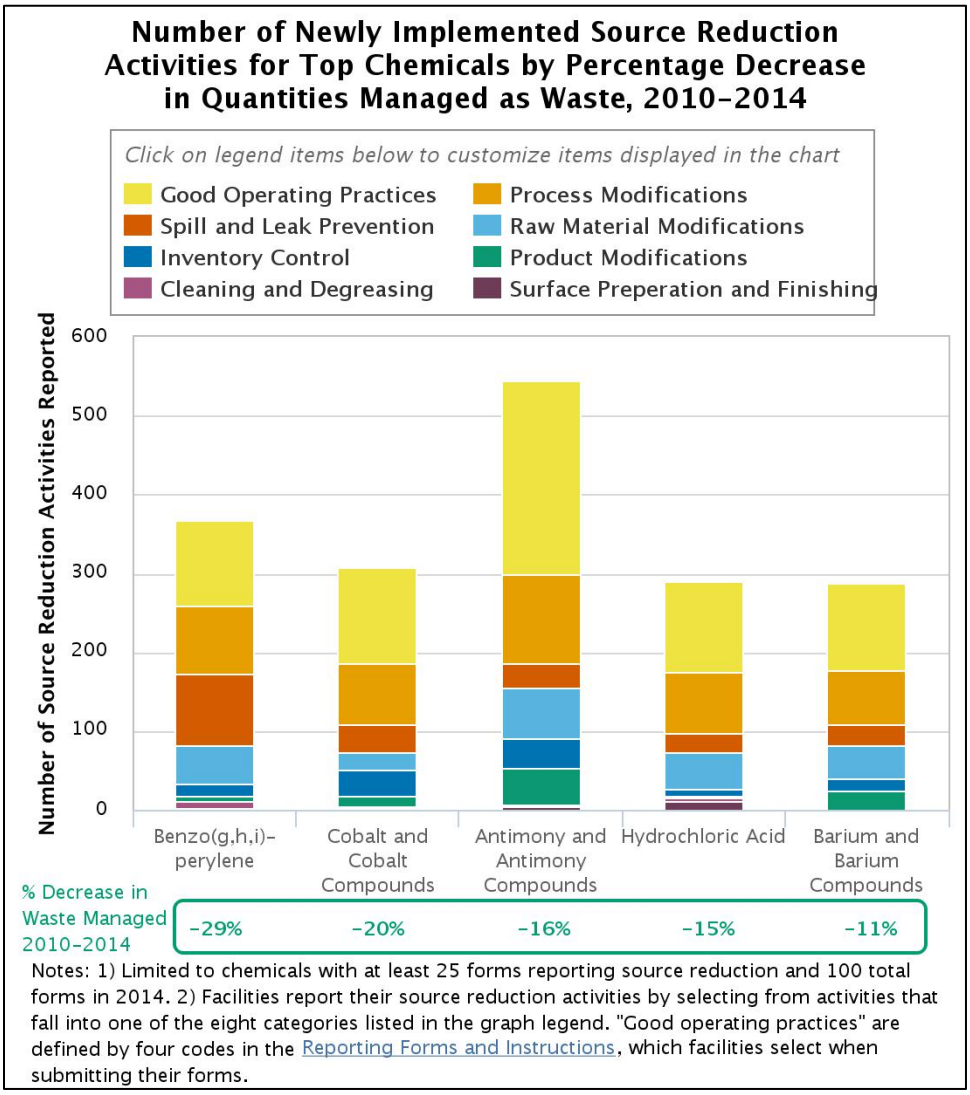
The relationship between source reduction, changes in total waste generation, and chemical releases varies from chemical to chemical. This figure shows the chemicals with the greatest percentage decrease in waste quantities.

- Reducing the generation of total waste through source reduction can also decrease the amount of chemical ultimately released to the environment, as was the case for all of the chemicals shown in the graph with the exception on benzo(g,h,i)perylene.
    - Production-related waste for benzo(g,h,i)perylene decreased by 29% (327 thousand pounds), but releases for this chemical increased by 91 thousand pounds (+143%), driven by releases from one-time events.
- Cobalt (a carcinogen) is managed almost exclusively through recycling at TRI facilities, so source reduction reduces the amount of total chemical waste but does not significantly

decrease chemical releases. While the total quantity of cobalt waste decreased by 20%, releases declined by only 6%.

- Production-related waste of hydrochloric acid decreased by about 15% while releases decreased by 42%, as facilities switched from releasing hydrochloric acid to preferred management methods, such as treatment, and also undertook source reduction activities.

Source Reduction Activities by Chemical



From 2010 to 2014:

- The chemicals with the greatest percentage decrease in production-related waste managed are benzo(g,h,i)perylene, cobalt and cobalt compounds, antimony and antimony compounds, hydrochloric acid, and barium and barium compounds.
- The type of source reduction activity implemented for these chemicals varies depending on their use in industrial operations and the chemical's characteristics. For example, some types of source reduction activities relate to:

- **Spill and leak prevention**, which is commonly reported as a source reduction activity to reduce waste of benzo(g,h,i)perylene, a persistent, bioaccumulative and toxic (PBT) chemical constituent in petroleum products. Common spill and leak prevention activities for this chemical include improving procedures for loading, unloading, and transfer operations at petroleum bulk terminals, and installing overflow alarms or automatic shutoff valves at asphalt product manufacturing facilities.
- **Product modifications**, such as modifying the design or composition of the product, is commonly implemented for antimony or barium compounds, which are incorporated into the product, than for the other chemicals shown.

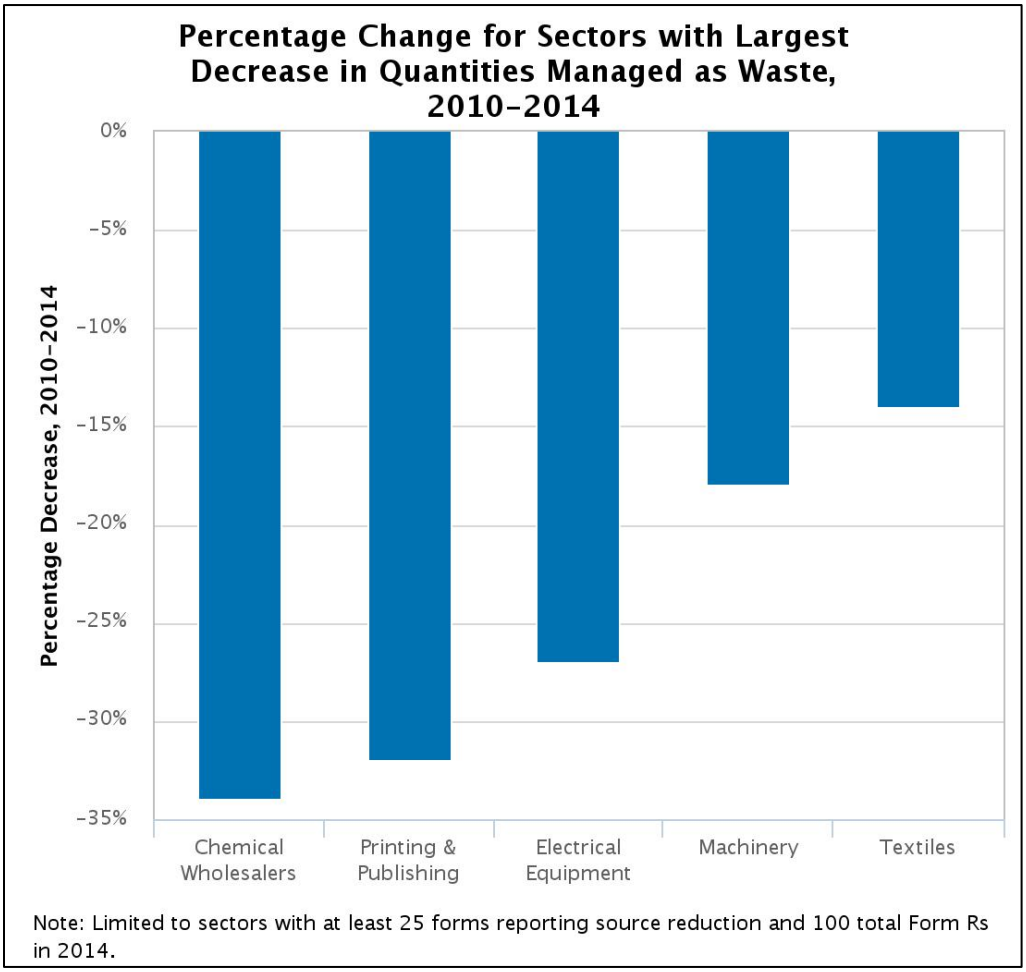
Facilities may also report additional details to the TRI Program about their source reduction, recycling, or pollution control activities.

Examples of additional pollution prevention-related information for 2014:

- **Benzo(g,h,i)perylene**: A medical instrument manufacturer eliminated fuel oil use in an effort to reduce emissions. The change was made in 2014 and resulted in a 10% reduction in benzo(g,h,i)perylene emissions from the previous year. The facility expects they will not have any benzo(g,h,i)perylene emissions in 2015. [Facility Details]
- **Cobalt and Cobalt Compounds**: A metalworking machinery manufacturer initiated a program to reduce scrap generated by decreasing billet size and forming a crack reduction team. [Facility Details]
- **Antimony and Antimony Compounds**: A plastics film manufacturer removed Antimony Trioxide from several products to reduce emissions and decrease costs. [Facility Details]
- **Hydrochloric Acid**: An electric utility installed a selective catalytic reduction system and lime spray dryer halfway through 2014, resulting in a 66% decrease in releases. [Facility Details]
- **Barium and Barium Compounds**: An organic chemical manufacturer changed its processing reactions to improve yield and reduce filtration loss. [Facility Details]

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.

Sectors with Greatest Decreases in Waste Managed



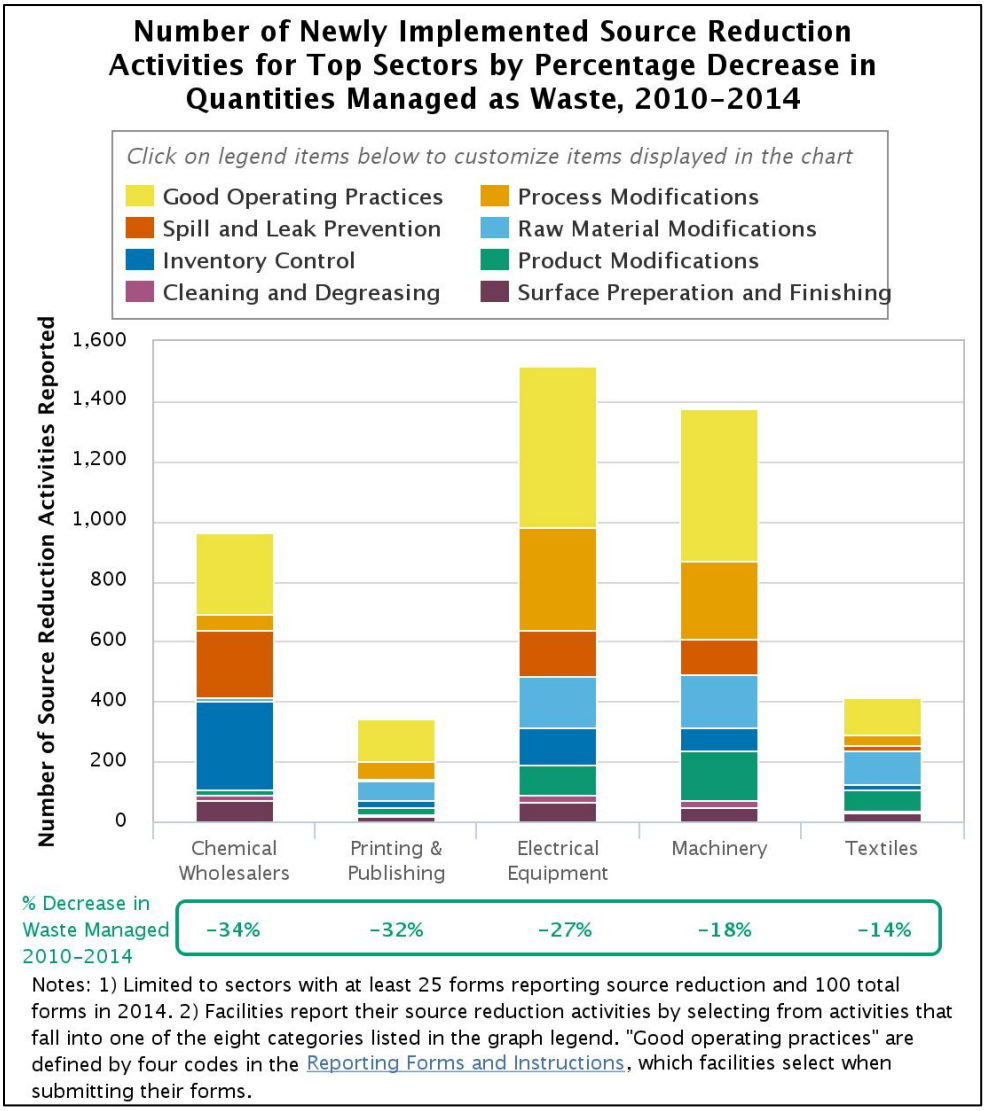
Note: Limited to sectors with at least 25 forms reporting source reduction and 100 total Form Rs in 2014.

From 2010 to 2014:

- The sectors with the greatest percentage decrease in overall waste managed are chemical wholesalers, printing and publishing, electrical equipment, machinery, and textiles.
- With the exception of the machinery sector, releases and other production-related waste managed decreased in the other four sectors, whereas the machinery sector had an increase in releases.
    - Releases for the machinery sector make up a small portion (less than 5%) of production-related waste. The increase in releases was driven primarily by a 241,000 pound increase of disposal to landfills, but during the same time period, the sector decreased total production-related waste by 32 million pounds.

For many sectors, source reduction activities, which reduce or eliminate waste generation at its source, have contributed to substantial decreases in both the amount of waste generated and releases. Source reduction activities reported by these five industries are discussed further in the next figure.

Source Reduction Activities by Sector



From 2010 to 2014:

- The five sectors with the greatest percentage decrease in overall waste managed are chemical wholesalers, printing and publishing, electrical equipment, machinery, and textiles.
- The types of source reduction activities vary significantly by industry, as shown. For example, many chemical wholesalers reported inventory control (e.g., instituting clearinghouses to exchange materials that otherwise would be discarded), while electrical equipment and machinery manufacturers frequently reported modifications to their raw materials and processes, often associated with the elimination of lead solder.

Facilities may also report additional details to the TRI Program about their source reduction, recycling, or pollution control activities.

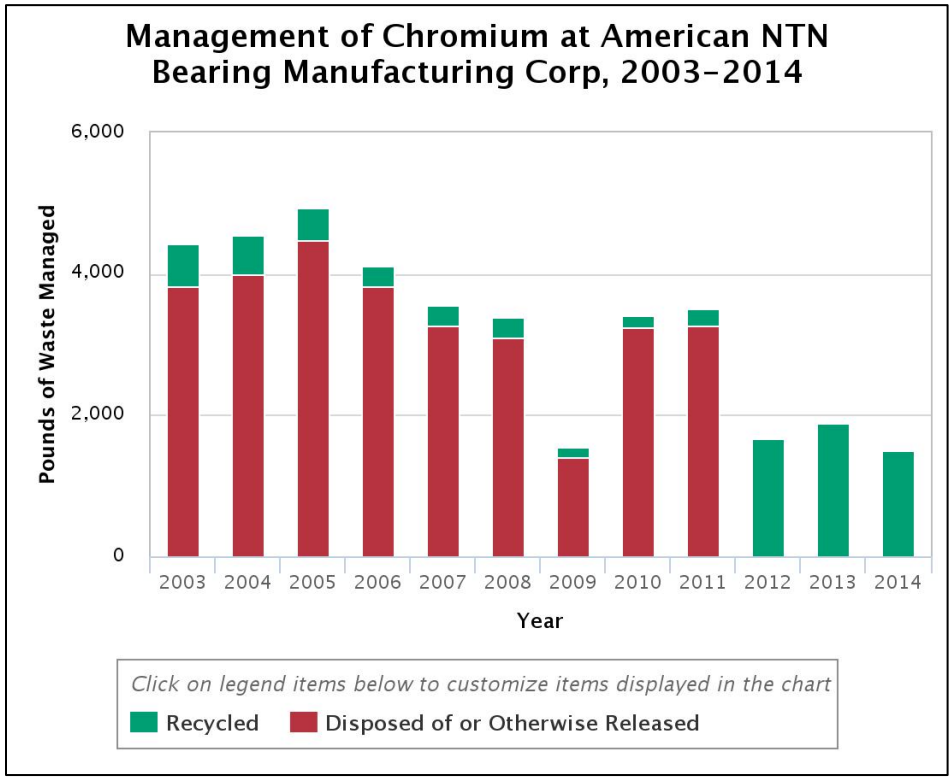
Examples of additional pollution prevention-related information for 2014:

- **Chemical Wholesalers**: A facility changed composition of products in order to reduce or eliminate multiple hazardous chemicals, including methanol. [Facility Details]
- **Printing & Publishing**: A gravure printing facility reduced certain glycol ethers releases by replacing solvent-based digital inks with UV ink technology. [Facility Details]
- **Electrical Equipment**: A facility converted its manufacturing process to use lead-free solders starting in 2013, resulting in an 87% decrease in lead releases in 2014 [Facility Details]
- **Machinery**: An HVAC equipment manufacturer reduced copper scrap releases and overall use by purchasing new tooling for copper bending equipment to improve part quality. [Facility Details]
- **Textiles**: Through an employee recommendation, one facility installed a spill tank to capture zinc liquid material from overflows which decreased releases by 28%. [Facility Details]

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.

Example of a "Zero Releaser"

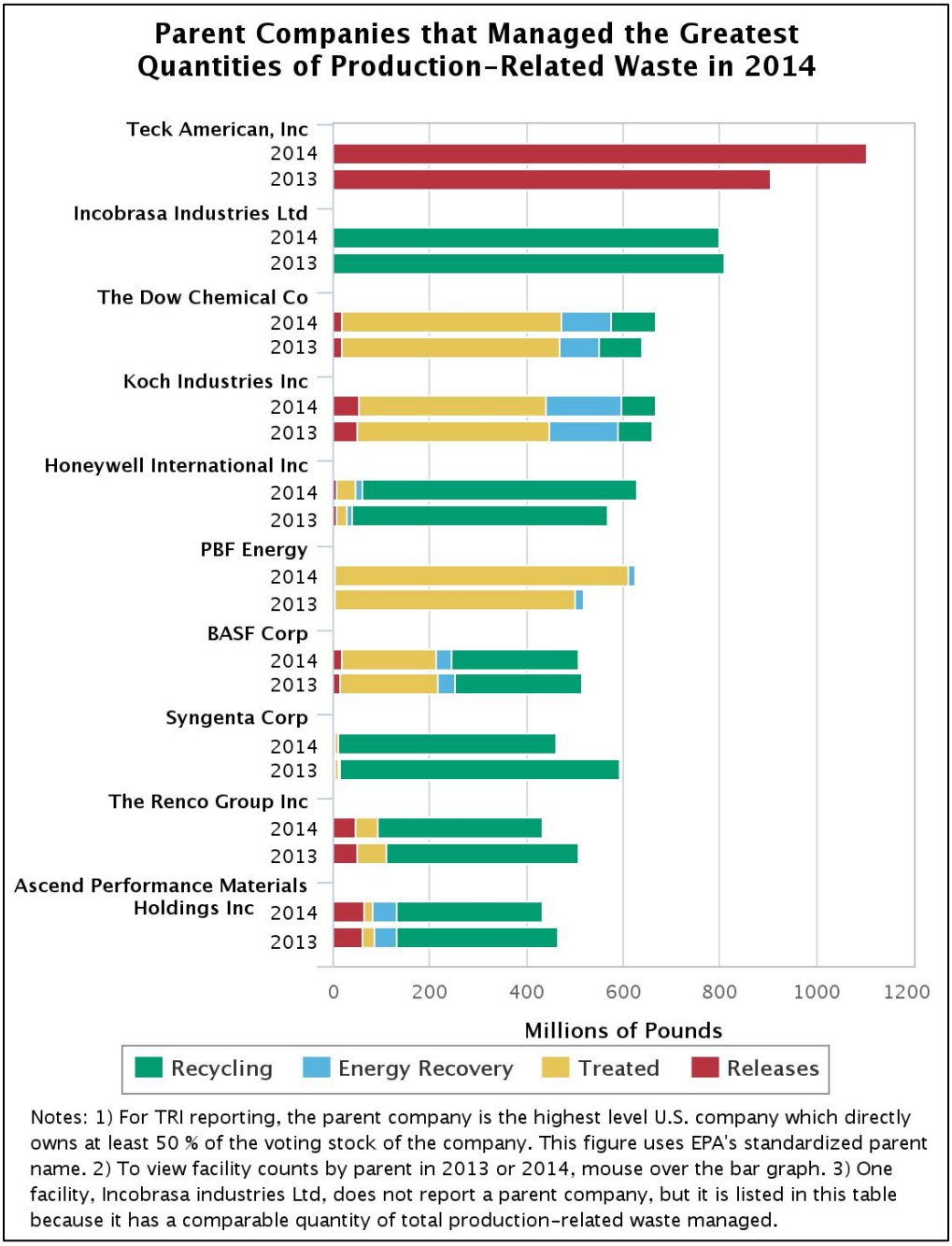
The waste management hierarchy emphasizes the preferred waste management techniques that facilities can utilize to reduce the quantities of toxic chemicals they release or otherwise manage as waste. For example, some facilities may be able to completely eliminate all releases of TRI reportable chemicals while still managing other production-related waste. These "zero releasers" are able to do so by implementing a variety of alternative waste management techniques. An example of a facility that followed the waste management hierarchy and no longer releases certain chemicals is shown below. This example illustrates one of the many ways that facilities can improve current pollution prevention and waste management practices. Find additional examples pertaining to TRI reportable chemicals or sectors by using the TRI P2 Search Tool.



American NTN Bearing Manufacturing Corp. (owned by NTN USA Corp.) manufactures ball and roller bearings. In 2012, they implemented a recycling process for the chips and debris generated as part of the metal grinding process. By 2012, releases of chromium had been reduced to zero and all other chromium waste was recycled.

Waste Management by Parent Company

Parent companies with the most production-related waste managed



Notes: 1) For TRI reporting, the parent company is the highest level U.S. company which directly owns at least 50 % of the voting stock of the company. This figure uses EPA's standardized parent name. 2) To view facility counts by parent in 2013 or 2014, mouse over the bar graph. 3) One facility, Incobrasa Industries Ltd, does not report a parent company, but it is listed in this table because it has a comparable quantity of total production-related waste managed.

Many of the facilities that report to the TRI Program are owned by parent companies that also own other facilities that report to TRI. Facilities that report are asked to provide information on their parent company, if they have one. For TRI reporting purposes the parent companies must be located in the United States.

This figure shows the parent companies whose facilities reported the greatest quantities of production-related waste for 2014. These parent companies vary in size and in the sectors in which

they operate. The number of facilities owned by these companies that reported to the TRI Program for 2014 ranges from 1 to 130.

The parent companies' TRI-reporting facilities operate in the following sectors:

- Metal mining: Teck American
- Soybean processing: Incobrasa
- Multiple sectors, e.g. pulp and paper, petroleum refining, and chemicals: Koch Industries
- Chemical manufacturing: Dow Chemical, Syngenta, Honeywell International, BASF, and Ascend Performance Materials
- Petroleum refining: PBF Energy
- Metal smelting: The Renco Group

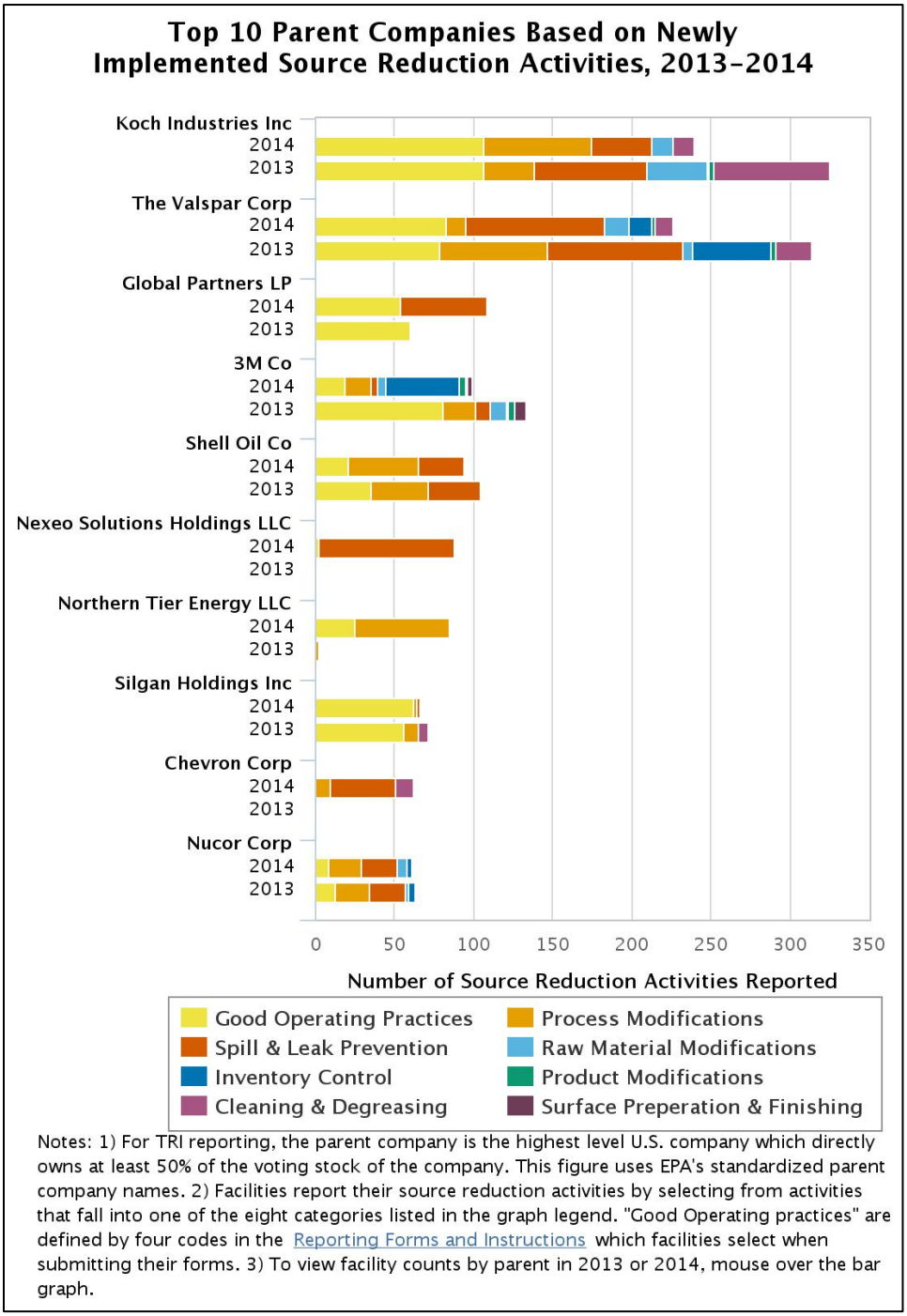
Most of these top parent companies reported implementing one or more new source reduction activities in 2014. Some of these companies also reported additional (optional) information to TRI about their pollution prevention or waste management activities.

Examples of additional pollution prevention-related information for 2014:

- A Syngenta facility that manufactures pesticides eliminated use of more than 200,000 pounds/year of naphthalene by purchasing a solvent that does not contain the chemical. (Raw Material Modification) [Facility Details]
- A BASF organic chemical manufacturing plant changed a manufacturing process from high temperature, high pressure to an ambient temperature reaction, which reduced VOC emissions that included acrylonitrile by over 99%. (Process Modification) [Facility Details]

To conduct a similar type of parent company comparison for a given sector, chemical, or geographic location, use the TRI P2 Search Tool.

Source Reduction Activities by Parent Company



Notes: 1) For TRI reporting, the parent company is the highest level U.S. company which directly owns at least 50% of the voting stock of the company. This figure uses EPA's standardized parent company names. 2) Facilities report their source reduction activities by selecting from activities that fall into one of the eight categories listed in the graph legend. "Good Operating practices" are defined by four codes in the Reporting Forms and Instructions which facilities select when submitting their forms. 3) To view facility counts by parent in 2013 or 2014, mouse over the bar graph.

The parent companies that implemented the most source reduction activities in 2014 are shown in the graph.

The parent companies' facilities that reported to the TRI Program primarily operate in the following industries:

- Multiple sectors, e.g. pulp and paper, petroleum refining, and chemicals: Koch Industries

- Chemical manufacturing sector: Valspar and 3M
- Petroleum refining: Northern Tier Energy
- Bulk petroleum industry (store and distribute crude petroleum and petroleum products): Global Partners
- Multiple petroleum-related sectors, e.g. petroleum refining, bulk petroleum, chemicals: Shell Oil and Chevron
- Chemical wholesaler: Nexeo Solutions
- Metal containers: Silgan Holdings
- Steel manufacturing: Nucor

Good operating practices, such as improving maintenance scheduling and installation of quality monitoring systems, are the most commonly reported source reduction activities for these top parent companies. Spill and leak prevention and process modifications are also commonly reported.

Some of these parent companies submitted additional text to EPA with their TRI reports describing their pollution prevention or waste management activities.

Examples of additional pollution prevention-related information for 2014:

- A Nucor facility worked with a vendor to purchase higher purity steel in response to customer demand for steel with lower residual copper. (Raw Material Modification) [Facility Details]
- By implementing new adiponitrile (ADN) process technology, a Koch Industries chemical manufacturing facility improved yield and reduced the amount of hydrogen cyanide required for processing. (Process Modification) [Facility Details]
- Through an employee recommendation, a 3M plastics manufacturer decreased its use of several solvents, including certain glycol ethers, by sequencing changeovers to reduce the amount of cleanings needed. (Good Operating Practices) [Facility Details]

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

Releases of Chemicals

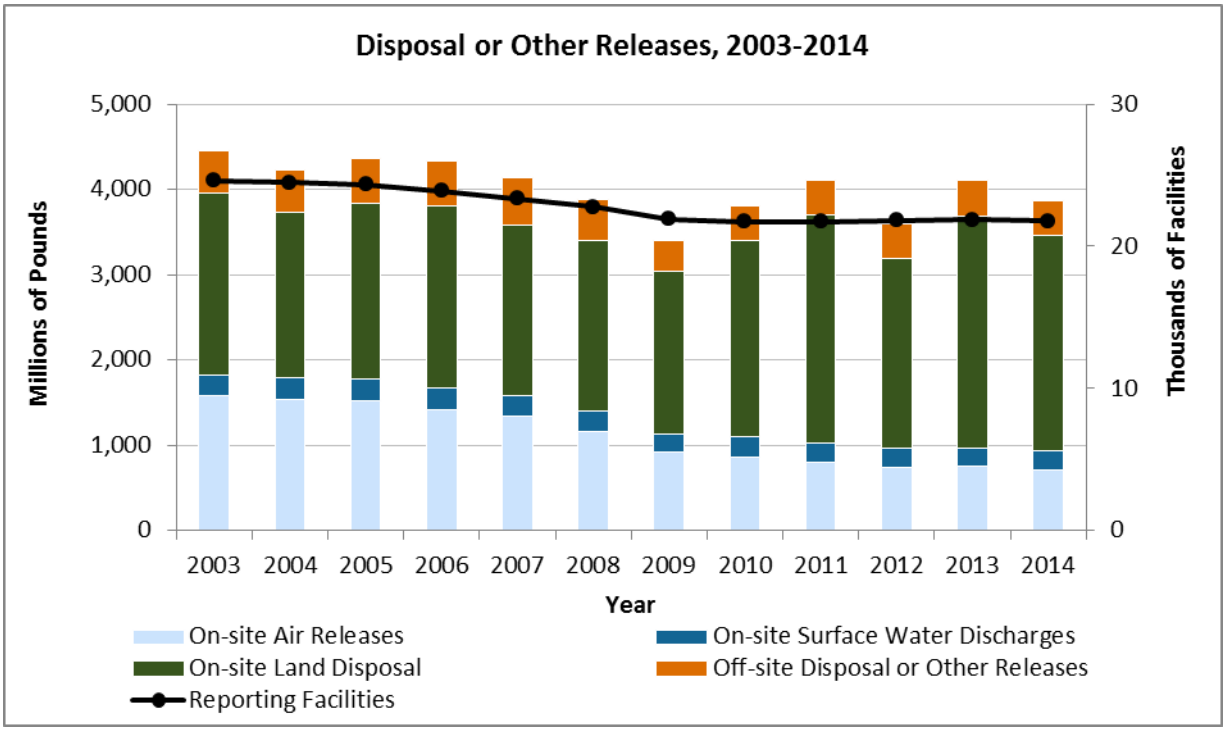
Disposal or other releases of Toxics Release Inventory (TRI) chemicals into the environment occur in several ways. Chemicals may be disposed of at a facility or be released to the air, water, or land. Facilities may also ship waste containing chemicals to an off-site location for disposal.

Evaluating releases of TRI chemicals can help identify potential concerns and gain a better understanding of potential risks that may be posed by the releases. This evaluation can also help identify priorities and opportunities for government and communities to work with industry to reduce toxic chemical releases and potential associated risks.

Many factors can affect trends in releases at facilities, including production rates, management practices, the composition of raw materials, and the installation of control technologies. Note that most disposal or other release practices are subject to a variety of regulatory requirements designed to limit environmental harm. To learn more about what EPA is doing to help limit the release of harmful chemicals to the environment, see EPA's laws and regulations webpage.

What is a release?
In TRI, a "release" of a chemical generally refers to a chemical that is emitted to the air, discharged to water, or placed in some type of land disposal unit.

Trend in total releases



From 2003 to 2014:

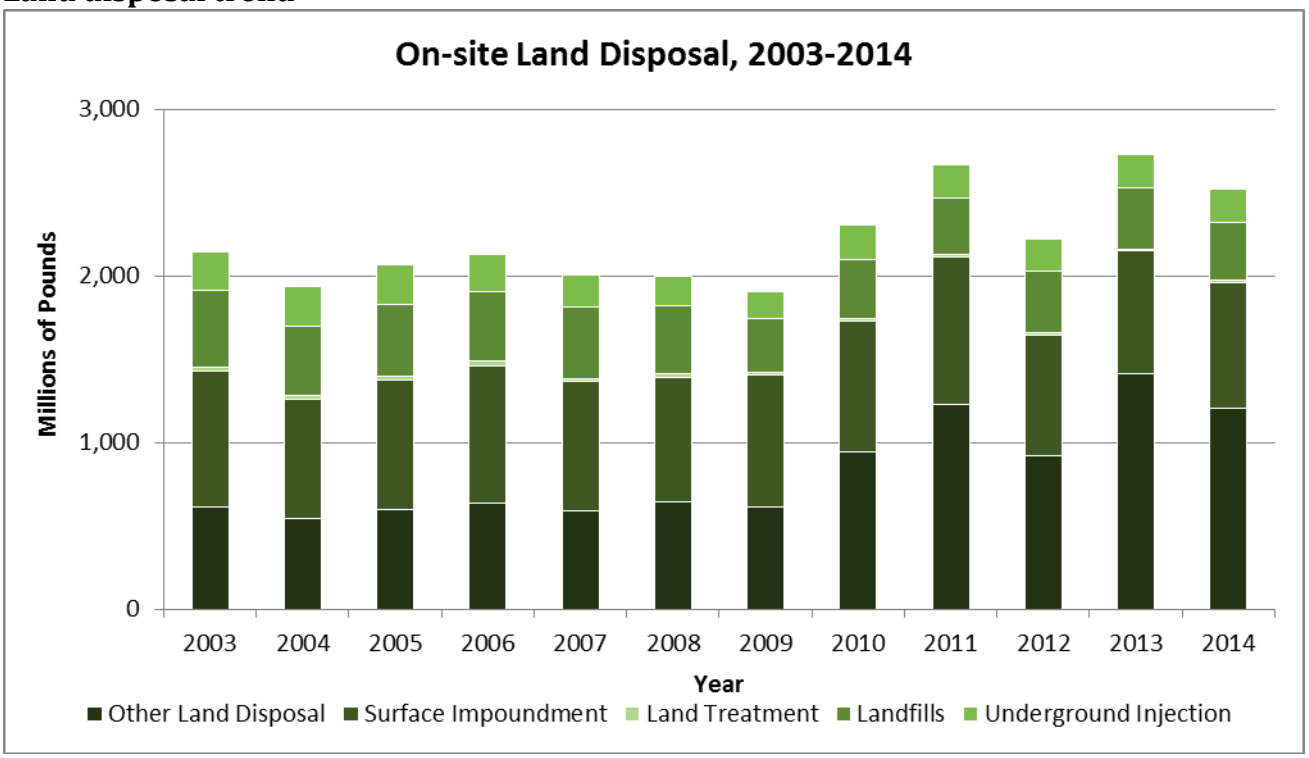
- Total disposal or other releases of TRI chemicals decreased in the long term by 13%.
- The long-term decrease is driven mainly by declining air releases, down 870 million pounds (55%) since 2003. The decrease is driven by electric utilities due to a shift from coal to other fuel sources and the installation of control technologies at coal-fired power plants, which has led to decreases in hazardous air pollutant (HAP) emissions, such as hydrochloric acid.
- Air emissions have also accounted for a declining share of the total releases (down from 36% in 2003 to 19% in 2014) while the portion of releases that are disposed on land has increased (up from 48% in 2003 to 65% in 2014).
- The number of facilities reporting to the TRI Program declined by 12% overall, although the count has remained steady at about 21,800 facilities since 2010.

From 2013 to 2014:

- Total releases decreased by 6% due primarily to decreases in on-site land disposal by the metal mining sector.

Land Disposal

Land disposal trend



From 2003 to 2014:

- On-site land disposal increased from 2.1 to 2.5 billion pounds, an 18% increase.
- Recent fluctuations are primarily due to changes in waste quantities reported to EPA's TRI Program as "other land disposal," which can include chemical waste disposed of in waste piles and spills or leaks.
- "Other land disposal" increased by 98%, while all other types of on-site land disposal decreased. Most of the toxic chemical waste reported as other land disposal is contained in waste rock at metal mines.

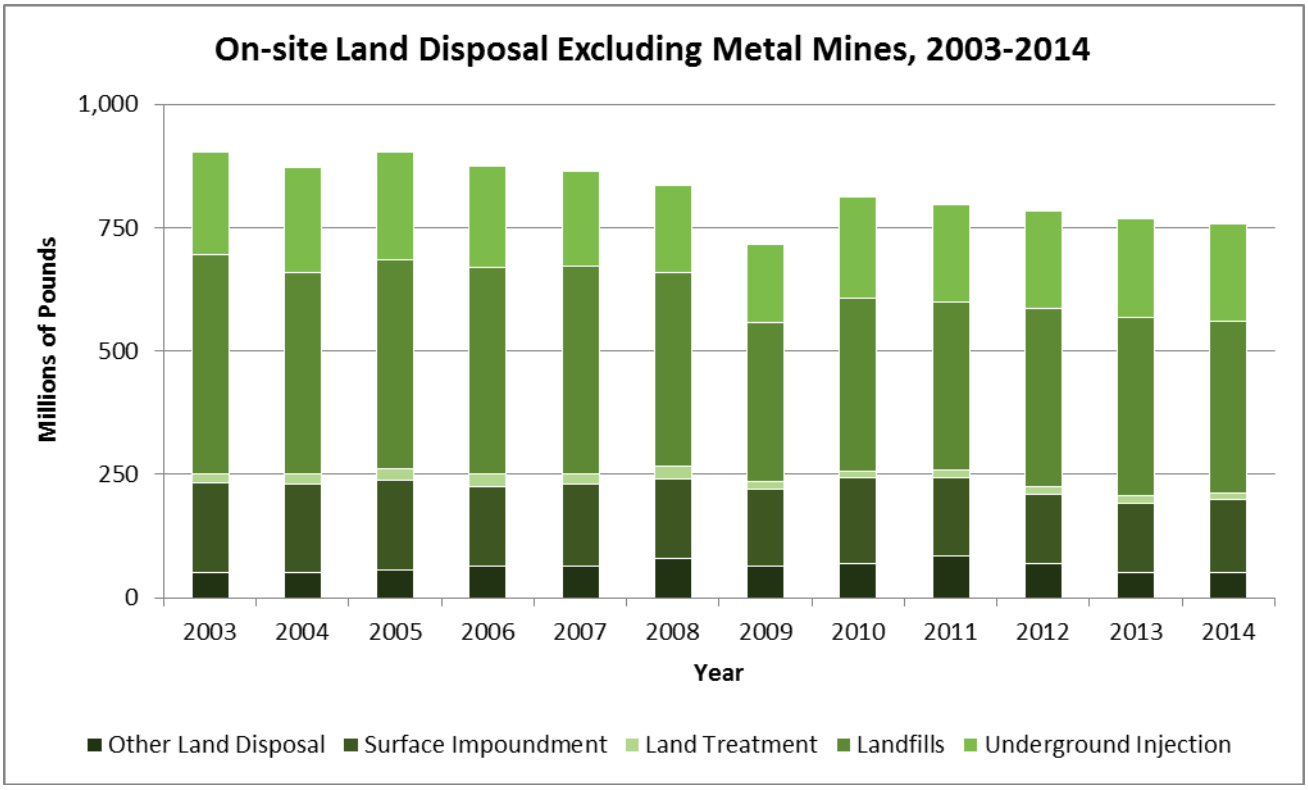
In 2014:

- Land disposal trends are largely driven by the metal mining sector, which accounted for 70% of land disposal quantities. For this reason, the next figure presents on-site land disposal excluding metal mining.

Metal mining facilities typically handle large volumes of material. In this sector, even small changes in the chemical composition of mineral deposits being mined can lead to big changes in the amount of toxic chemicals reported nationally. In recent years mines have cited changes in production of waste rock, changes in the composition of waste rock, and the closure of a heap leach pad as the primary reasons for the reported variability in land disposal of TRI chemicals. Changes in waste rock composition can have an especially pronounced effect on TRI reporting because of a regulatory exemption that applies based on a chemical's concentration in the rock, regardless of total chemical quantities generated.

Federal and state agencies require that waste rock be placed in engineered structures that contain contaminants. Federal and state land management agencies also require that waste rock and tailings piles and heap leach pads be stabilized and re-vegetated to provide for productive post-mining land use.

For more information on waste management by the mining industry, see the Metal Mining section.

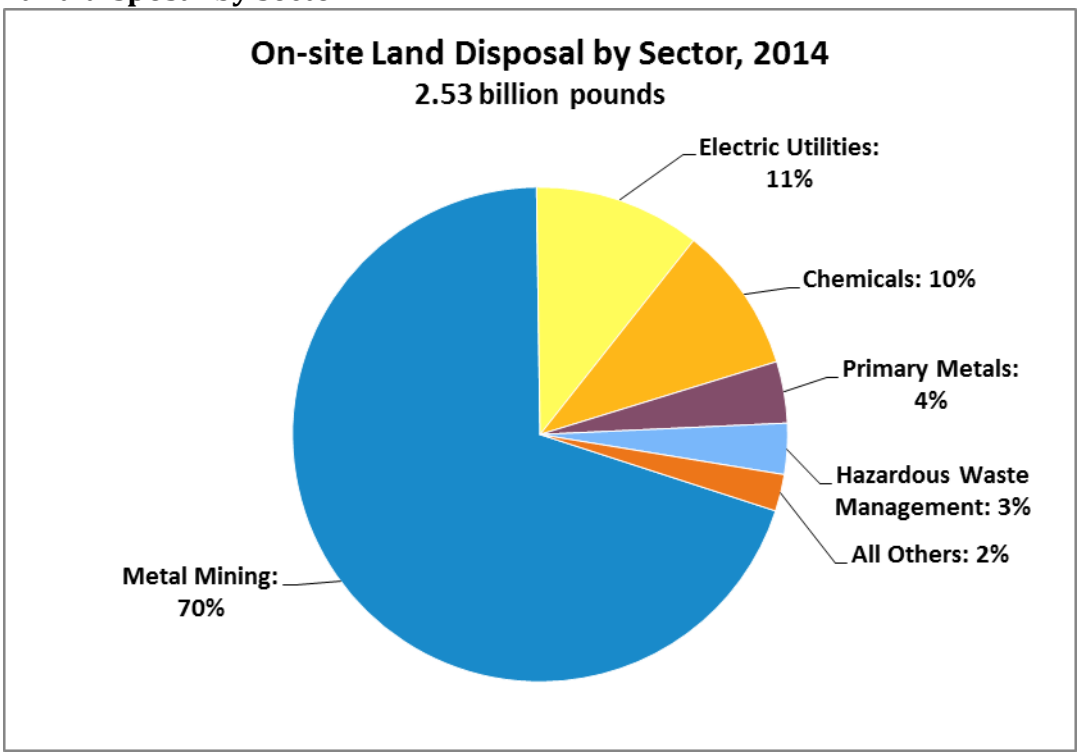


From 2003 to 2014:

- Total on-site land disposal for all industries other than metal mining decreased by 16%.
- Disposal to landfills, which accounts for the greatest percentage of land disposal when metal mining is excluded, decreased by 22%.

While releases to land have decreased in other sectors, releases by metal mining drive overall land disposal trends. See the following section, Land Disposal by Sector, for more information.

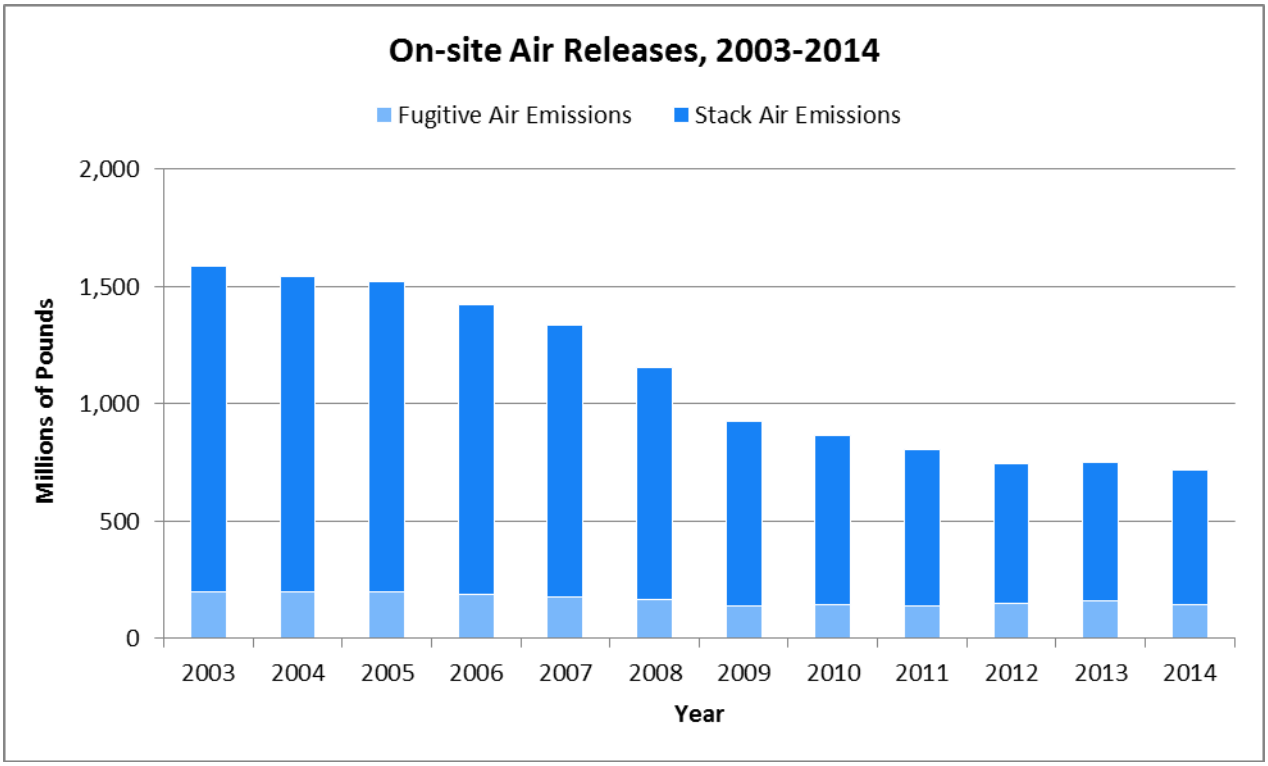
Land disposal by sector



- The metal mining sector accounted for the majority of releases to land in 2014, mostly due to chemicals contained in waste rock.
- The contribution by sector to the quantities of TRI chemicals disposed of on-site to land has not changed considerably in recent years.

Air Releases

Air releases trend



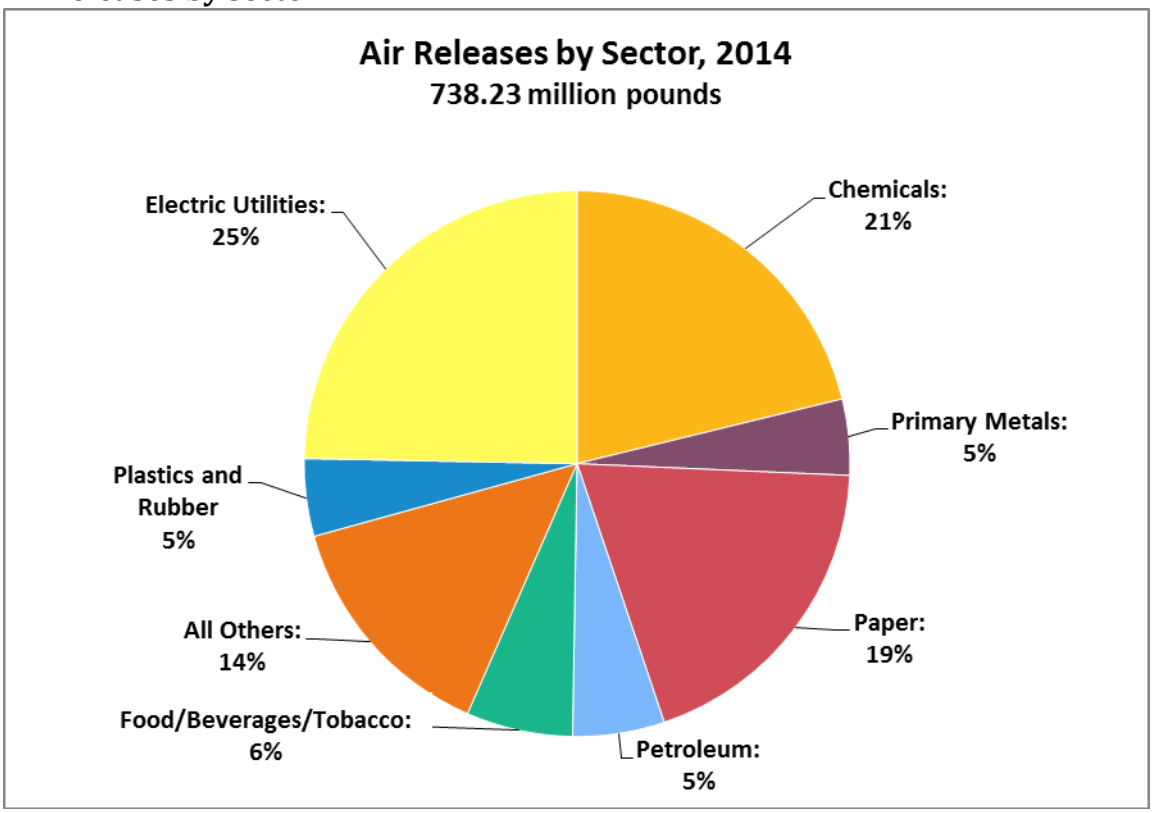
From 2003 to 2014:

- Air releases declined significantly, serving as a primary driver of decreases in total releases.
- Air releases decreased by 870 million pounds (55%). The decrease is driven by electric utilities due to a shift from coal to other fuel sources and the installation of control technologies at coal-fired power plants, which has led to decreases in hazardous air pollutants (HAP) emissions, such as hydrochloric acid, at electric utilities.
- Air releases of OSHA carcinogens also decreased; see the Air Releases of OSHA Carcinogens figure.
- Air releases of other chemicals of special concern, including lead and mercury, also decreased; see the Chemicals of Special Concern section.

In 2014:

- Ammonia, followed by hydrochloric acid, accounted for the greatest quantities of air releases of TRI chemicals.

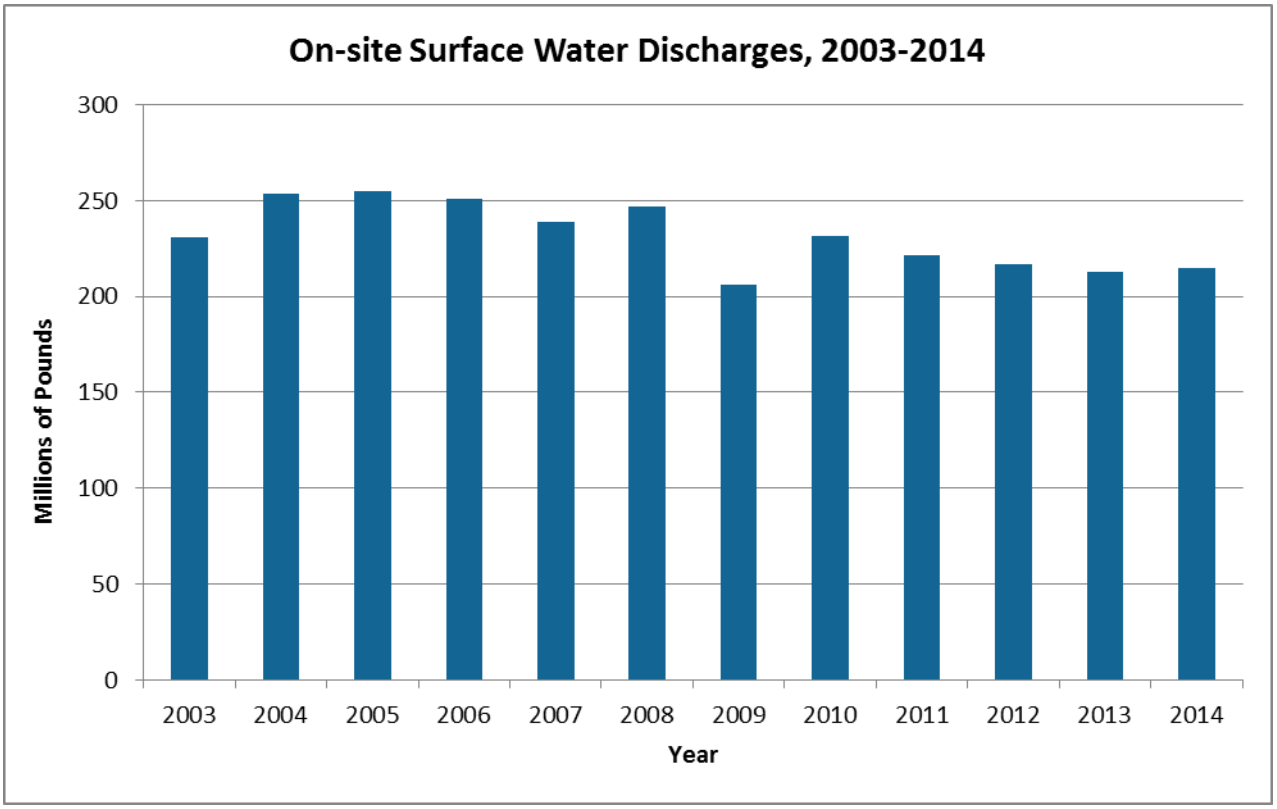
Air releases by sector



- Electric utilities, chemicals, and paper accounted for the greatest releases to air in 2014. Together, these three industries contributed almost two-thirds of total air releases.
- Air releases in these three sectors have decreased since 2013:
  - Chemicals: 22 million pounds (-12%)
  - Electric utilities: 15.9 million pounds (-8%).
  - Paper: 2 million pounds (-1%)

Water Releases

Water releases trend



Facilities are required to report the quantities of TRI chemicals they release to receiving streams or other water bodies.

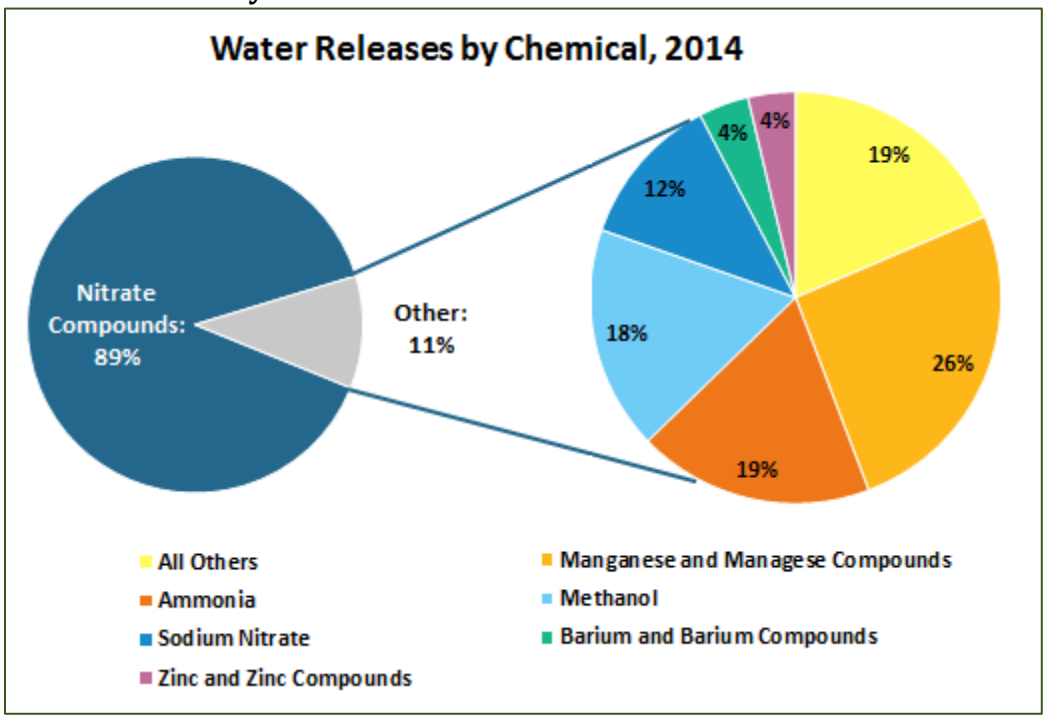
From 2003 to 2014:

- Surface water discharges decreased by 16 million pounds (7%). Most of this decline is due to nitrate compounds, which decreased by 11 million pounds (5%).
- Nitrate compounds are often formed during wastewater treatment processes such as when nitric acid is neutralized, and is the type of TRI chemical most commonly released to water.
- Surface water discharges of other TRI chemicals, many of which are more toxic than nitrate compounds, have been decreasing at a faster rate. Releases to water are discussed further in the next few figures starting with water releases by chemical.

In 2014:

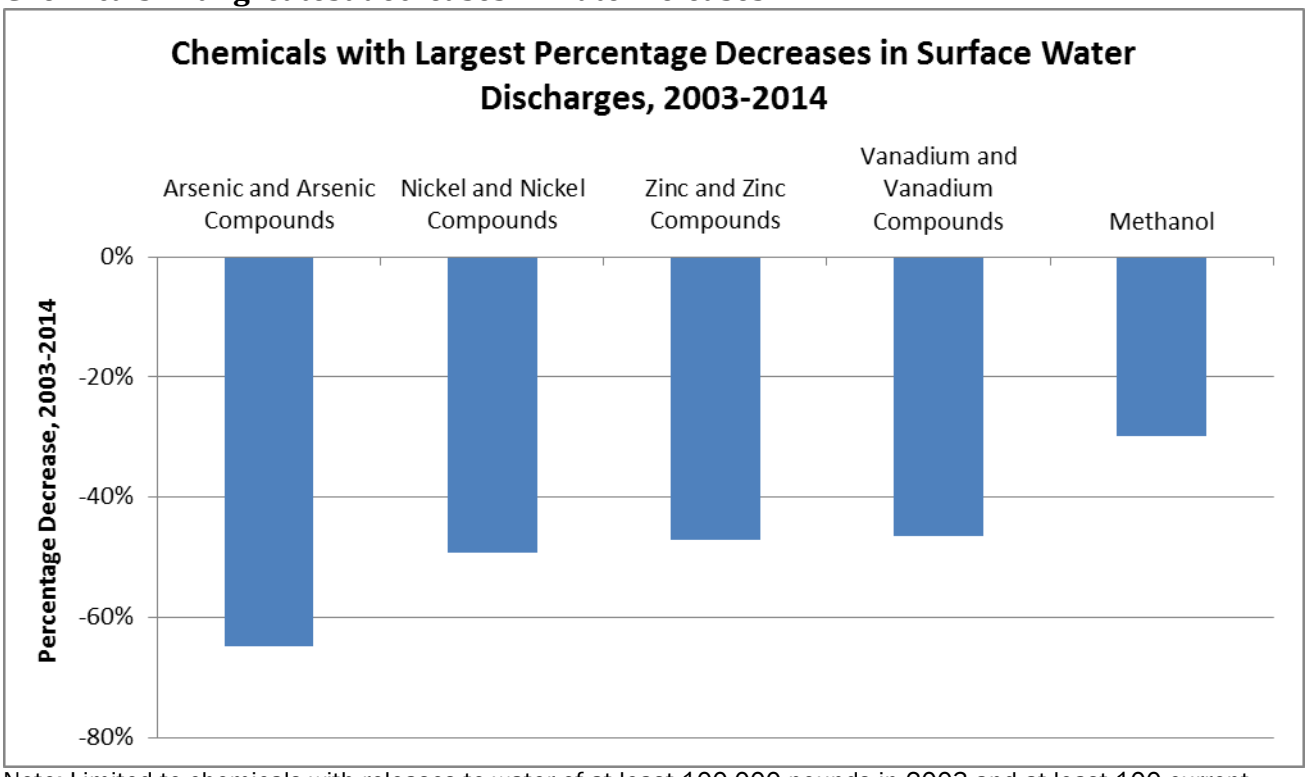
- Nitrate compounds accounted for 89% of all surface water discharges.

Water releases by chemical



- Nitrate compounds accounted for 89% of all water releases in 2014. Nitrate compounds are soluble in water and commonly formed as part of the wastewater treatment process.
- Manganese and its compounds, ammonia and methanol are the next most commonly released TRI chemicals and, combined, account for 7% of all quantities of TRI chemicals released to water.

Chemicals with greatest decreases in water releases



Note: Limited to chemicals with releases to water of at least 100,000 pounds in 2003 and at least 100 current forms with discharges to water.

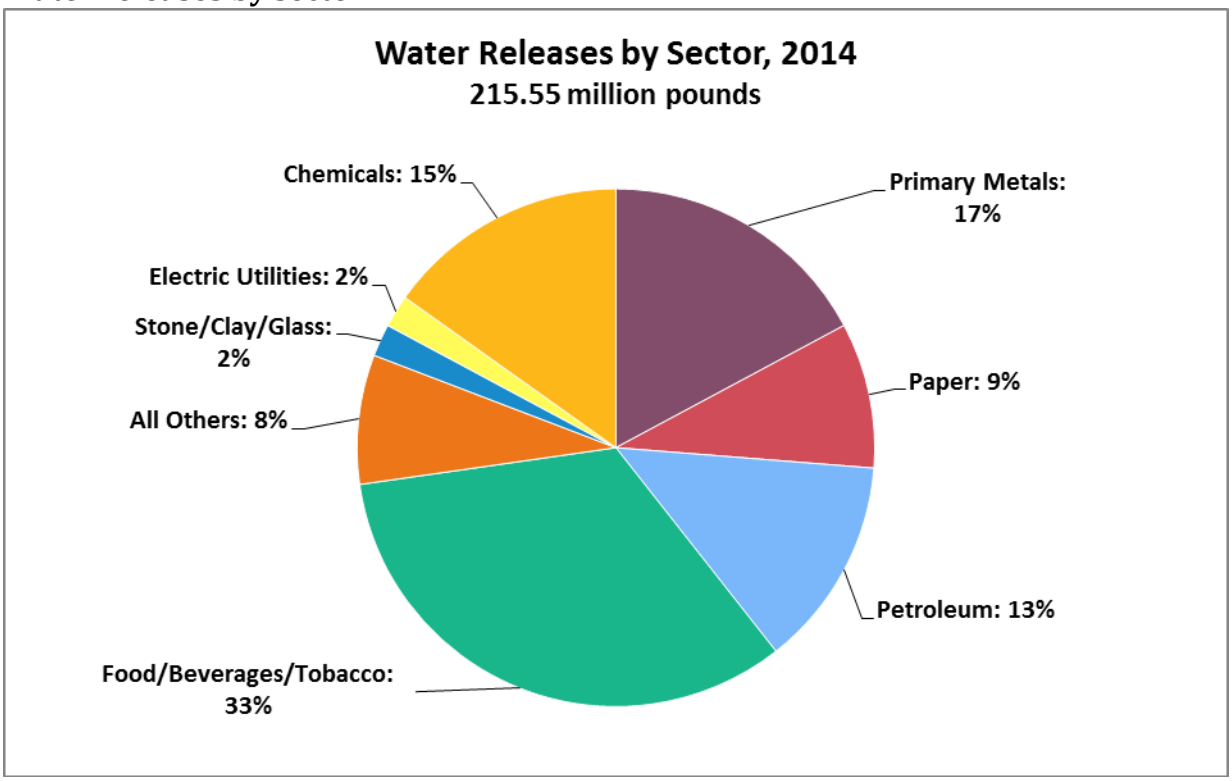
From 2003 to 2014:

- Nitrate compounds discharges decreased by the greatest quantity, decreasing by 11 million pounds (-5%).

In 2014:

- The chemicals with the largest percentage decreases in surface discharges were:
  - Methanol, which is used as a solvent, chemical feedstock, and for other purposes, is discharged primarily by paper manufacturing facilities;
  - Arsenic, nickel, and zinc, and their associated compounds, are metals and are primarily discharged to surface water by electric utilities facilities; and
  - Vanadium and its associated compounds are primarily discharged by metal mining and chemical manufacturing facilities.

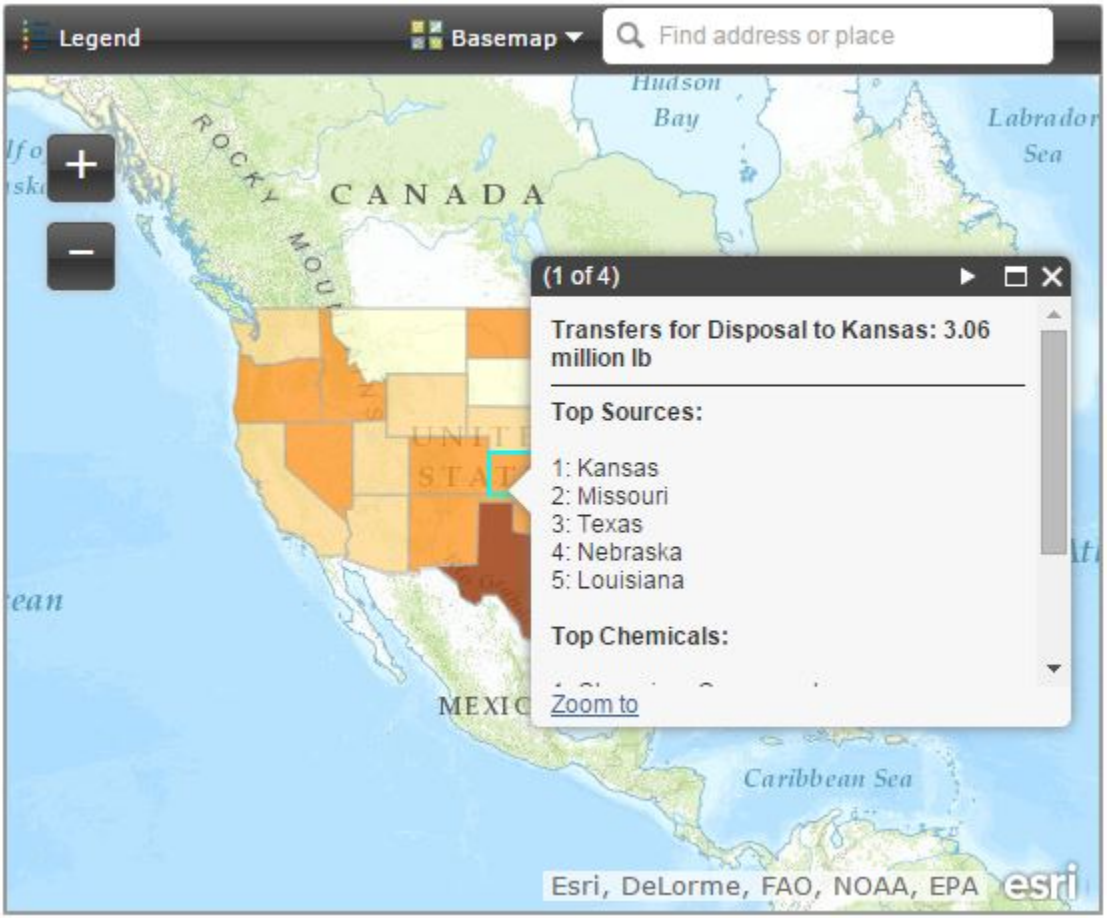
Water releases by sector



- The food, beverages, and tobacco sector accounted for approximately one-third of the quantities of TRI chemicals released to water in 2014, which is similar to their contribution over the past 10 years.
- Nitrate compounds alone accounted for 98% of the quantities of releases of TRI chemicals to water from the food, beverages, and tobacco sector.

Off-site Disposal or Other Releases

Off-site disposal or other releases, by state receiving transfer, 2014



Note: The transfers shown do not include transfers to Publicly Owned Treatment Works (POTWs) and, thus, reflect only a portion of total TRI transfers.

TRI facilities report the quantities of chemicals that they transfer off-site for disposal or further waste management. The levels of shading on the map indicate increasing ranges of chemical quantities transferred, as described in the map legend.

In 2014:

- Nationally, 84% of TRI transfers were of metals and metal compounds.
- Metals transferred: zinc, manganese, barium, chromium, and lead and their compounds were the top five in terms of quantities transferred.
- Non-metals transferred: nitrate compounds, methanol, ammonia, asbestos, and ethylene glycol were the top five in terms of quantities.

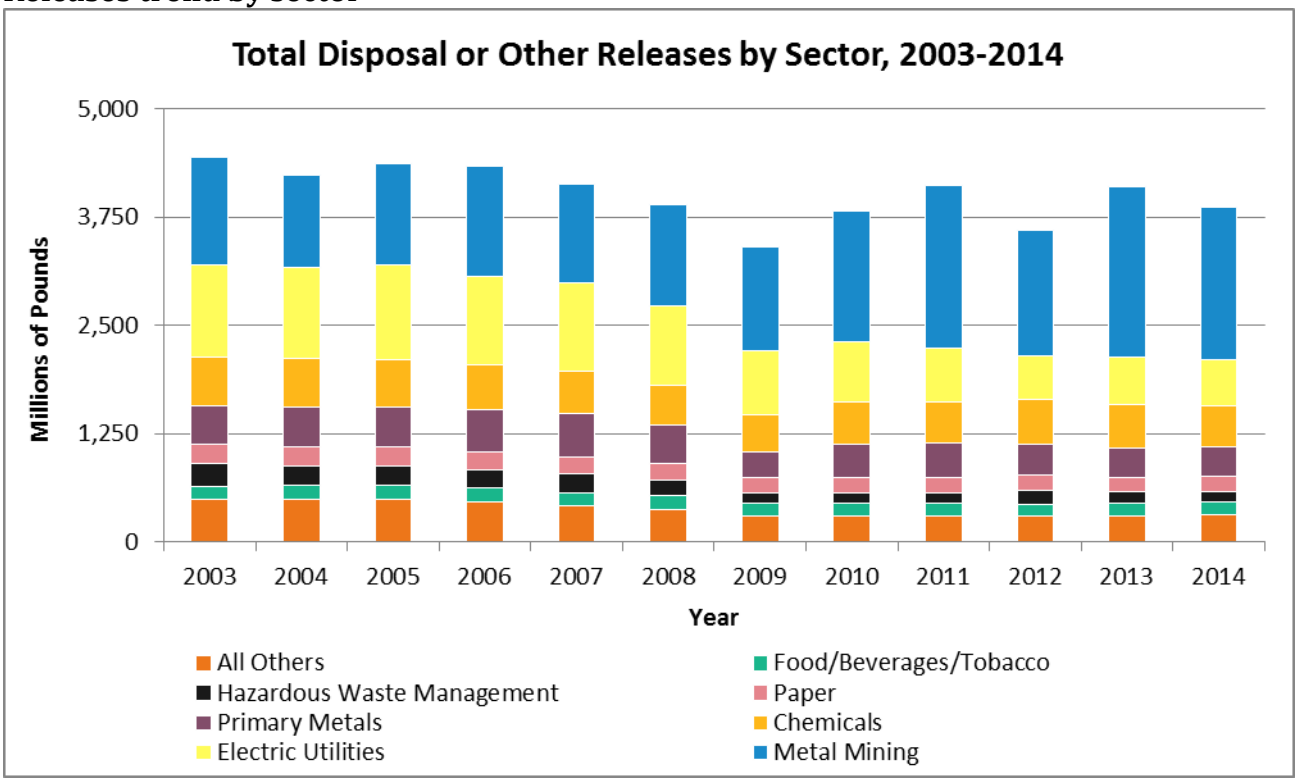
Top States Ranked by Receiving Transfers of TRI Chemicals in 2014

State Ranking	Total Transfers	Metal Transfers	Non-Metal Transfers
1	Indiana	Indiana	Texas
2	Illinois	Illinois	Ohio
3	Michigan	Michigan	Louisiana
4	Texas	Pennsylvania	Indiana
5	Pennsylvania	Ohio	Pennsylvania

- Five states received 48% of the total quantity of TRI chemicals transferred off-site for disposal or other releases.
- 45 of the 50 U.S. states were their own largest sources of transfers for disposal; that is, facilities sent chemical waste for disposal to other sites within their state borders.
- A large number of transfers were from neighboring states (states with directly adjoining borders). Overall, 92% of TRI chemical transfers for disposal came from either within a state or from neighboring states.

Releases by Industry

Releases trend by sector



From 2003 to 2014:

- Total releases from all sectors decreased by 576 million pounds.
- Since 2010, on-site releases to land by metal mining facilities have fluctuated significantly. Metal mines have cited changes in production and changes in the composition of waste rock as the primary reasons for this variability.

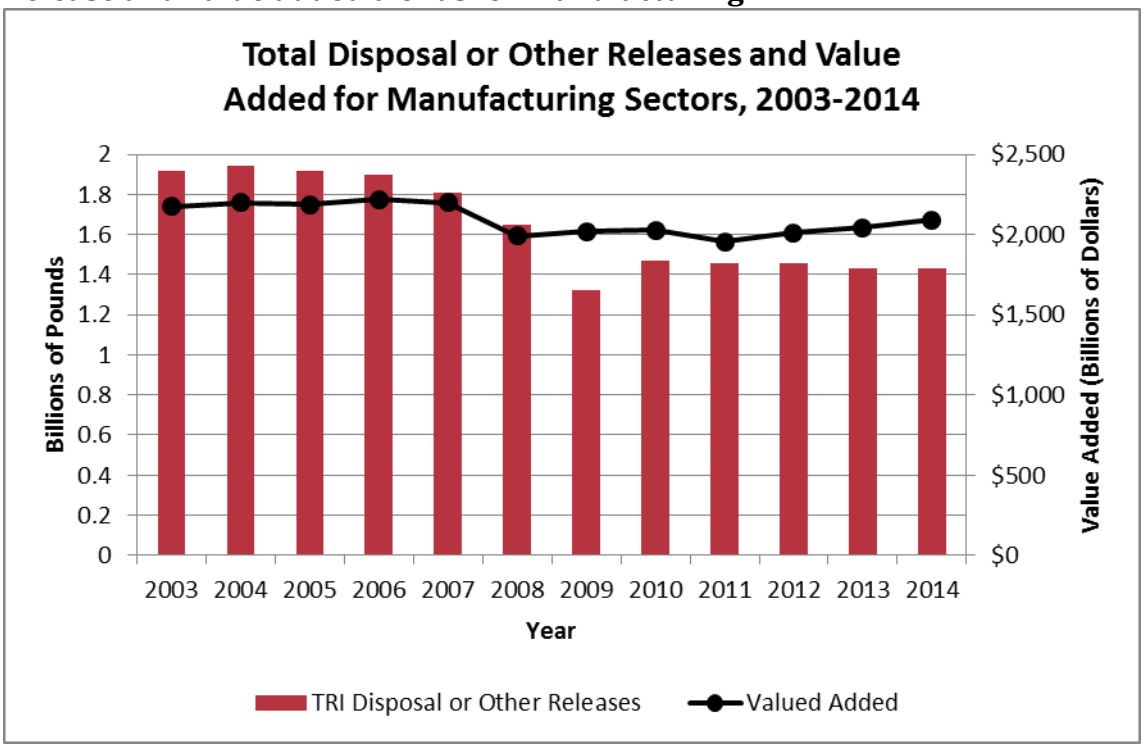
From 2013 to 2014:

- Decreases in the past year are driven by three sectors:
  - Metal mining decreased by 195 million pounds (-10%)
  - Chemical manufacturing decreased by 29 million pounds (-5%)
  - Electric utilities decreased by 18 million pounds (-3%)

The industry sectors whose facilities report to the TRI Program vary substantially in size, scope, and business type. As a result, the amounts and types of toxic chemicals generated and managed among industry sectors differ greatly. Within an industrial sector, however, the processes, products, and regulatory requirements can be similar, resulting in similar toxic chemical use, manufacture, and waste generation by facilities therein. Looking at waste management trends within a sector can illuminate emerging issues and reveal opportunities

for better waste management practices. A more detailed analysis of releases and waste management by sector can be found in the industry sector profiles.

Release and value added trends for manufacturing



It is also important to consider the influence that production and the economy have on the manufacture, processing, and use of TRI chemicals and the associated waste management quantities facilities report to the TRI Program. This figure presents the trend in total disposal or other releases by the manufacturing sectors and the trend in the manufacturing sectors' value added (as shown by the solid line). This figure illustrates how changes in the production at facilities may influence the quantities of toxic chemicals these facilities release to the environment. "Value added" is obtained from the Bureau of Economic Analysis is used as a proxy for production levels in the manufacturing sectors. Value added measures the contribution of manufacturing to the nation's Gross Domestic Product (GDP), which represents the total value of goods and services produced annually in the United States. The manufacturing sectors include most facilities (88% in 2014), including chemical manufacturers, metals processing, and pulp and paper manufacturing. Excluded facilities include mines, electric utilities, and waste management facilities.

From 2003 to 2014, total disposal or other releases by the manufacturing sectors decreased by 26%, while value added by the manufacturing sectors (adjusted for inflation) decreased by only 4%. This suggests that other factors besides production may be contributing to declining releases. Possible other factors include installation of new pollution control measures and the implementation of source reduction activities. Given that the number of facilities reporting to the TRI Program has declined since 2003, it is also possible

that outsourcing of manufacturing activities overseas has contributed to the overall decrease in total disposal and other releases.

More information on production trends for individual sectors, including additional non-manufacturing sectors, can be found in the industry sector profiles.

Chemicals of Special Concern

In this chapter, we take a closer look at some TRI chemicals that are of special concern: 1) persistent, bioaccumulative, and toxic (PBT) chemicals; and 2) known or suspected human carcinogens.

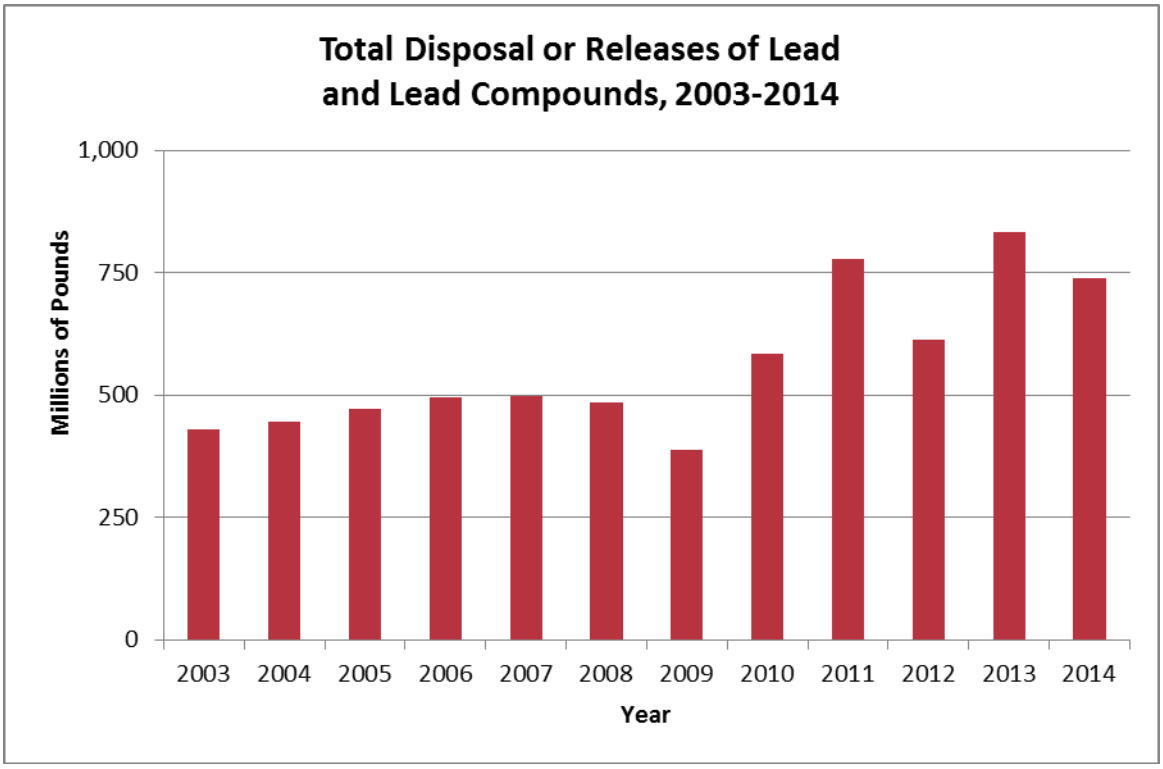
Chemicals designated as PBTs are not only toxic, but also remain in the environment for a long time where they tend to build up (bioaccumulate) in the tissue of organisms throughout the food web. These organisms serve as food sources for other organisms that are sensitive to the toxicities the chemicals cause.

Reporting requirements for TRI's 16 PBT chemicals and 4 chemical categories are more stringent than for other TRI chemicals. See TRI's PBT webpage for the full list of PBTs.

Use these links or the dropdown menu above to find out more about specific PBTs: lead and lead compounds; mercury and mercury compounds; and dioxin and dioxin-like compounds.

There are also about 180 chemicals included on the TRI chemical list that are known or suspected human carcinogens, which EPA refers to as Occupational Safety & Health Administration (OSHA) carcinogens. These chemicals also have different reporting requirements. A full list of these chemicals can be found on the TRI basis of OSHA carcinogens webpage. Select a graphic from the dropdown menu above to see how the volume of OSHA carcinogens released to air have changed over time.

Lead releases trend



From 2003 to 2014:

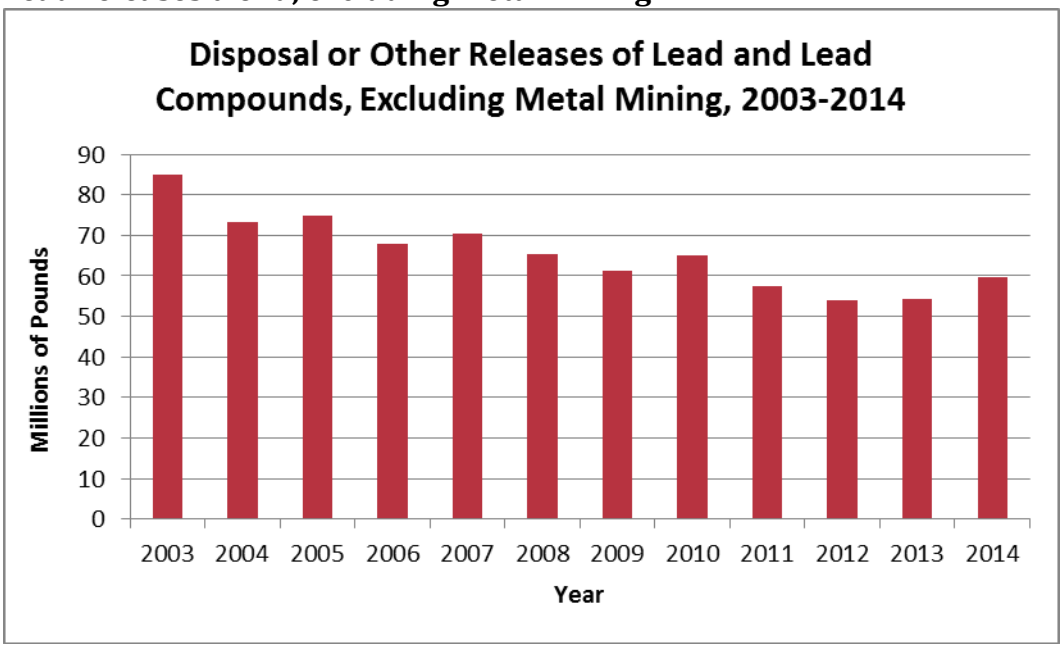
- Total releases of lead and lead compounds rose and fell between 2003 and 2014, with an overall increase of 72%.
- Total releases especially fluctuated between 2010 and 2013. The metal mining sector accounts for most of the disposal of lead and lead compounds, driving the overall trend. For example, metal mines reported 91% of total lead releases in 2014.

From 2013 to 2014:

- Total releases of lead and lead compounds decreased by 11% (92 million pounds).

The next figure shows disposal or other releases of lead and lead compounds excluding metal mining.

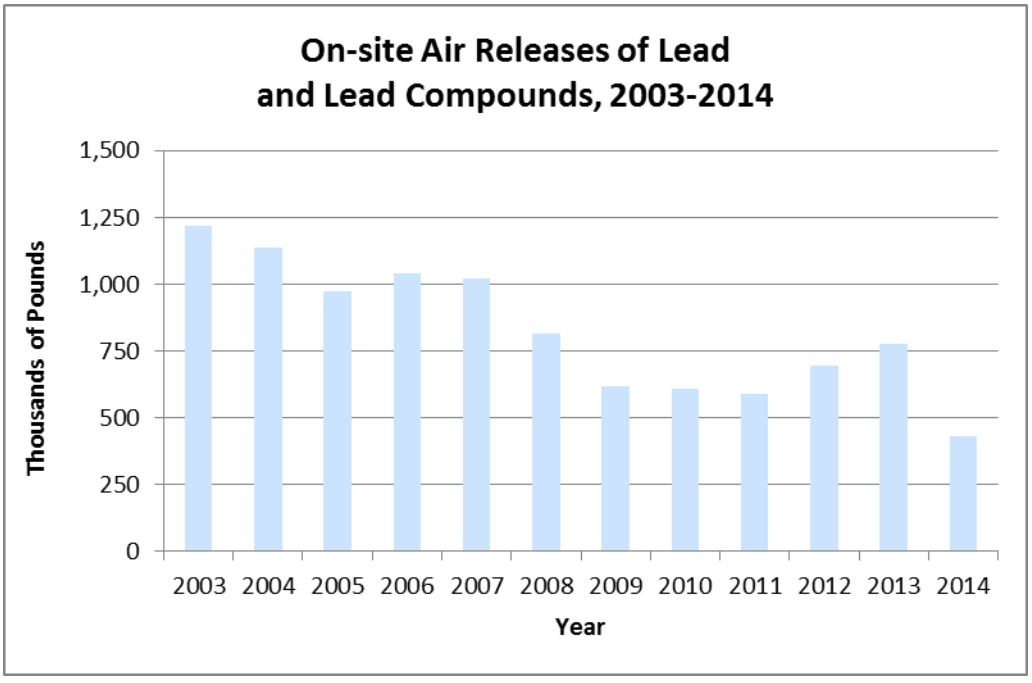
Lead releases trend, excluding metal mining



From 2003 to 2014:

- Metal mining accounts for the majority of releases of lead and lead compounds.
- Other sectors decreased releases of lead by 25 million pounds (30%). The primary metal, hazardous waste, and electric utilities sectors have driven these declines.

Lead air releases



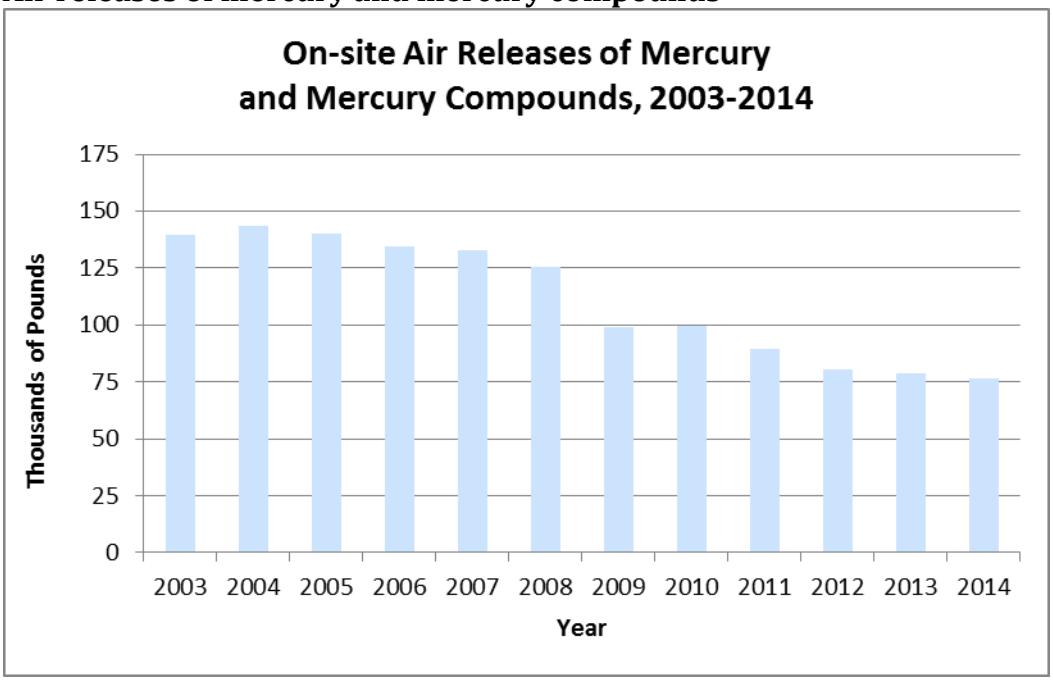
From 2003 to 2014:

- Air releases of lead and lead compounds decreased by 65%. Electric utilities and metal mines have driven this decrease.
- The sector with the greatest quantity of emissions of lead and lead compounds to air is the primary metals sector, which includes iron and steel manufacturers and smelting operations.

From 2013 to 2014:

- Air releases of lead and lead compounds decreased by 45% due to a large decrease in air releases at a lead smelter.

Air releases of mercury and mercury compounds



From 2003 to 2014:

- Releases of mercury and mercury compounds to air decreased by 45%.
- Electric utilities are also driving the decline in mercury air emissions, with a 51% reduction. Reasons for this include a shift from coal combustion to combustion of other fuel sources and installation of control technologies at coal-fired power plants.

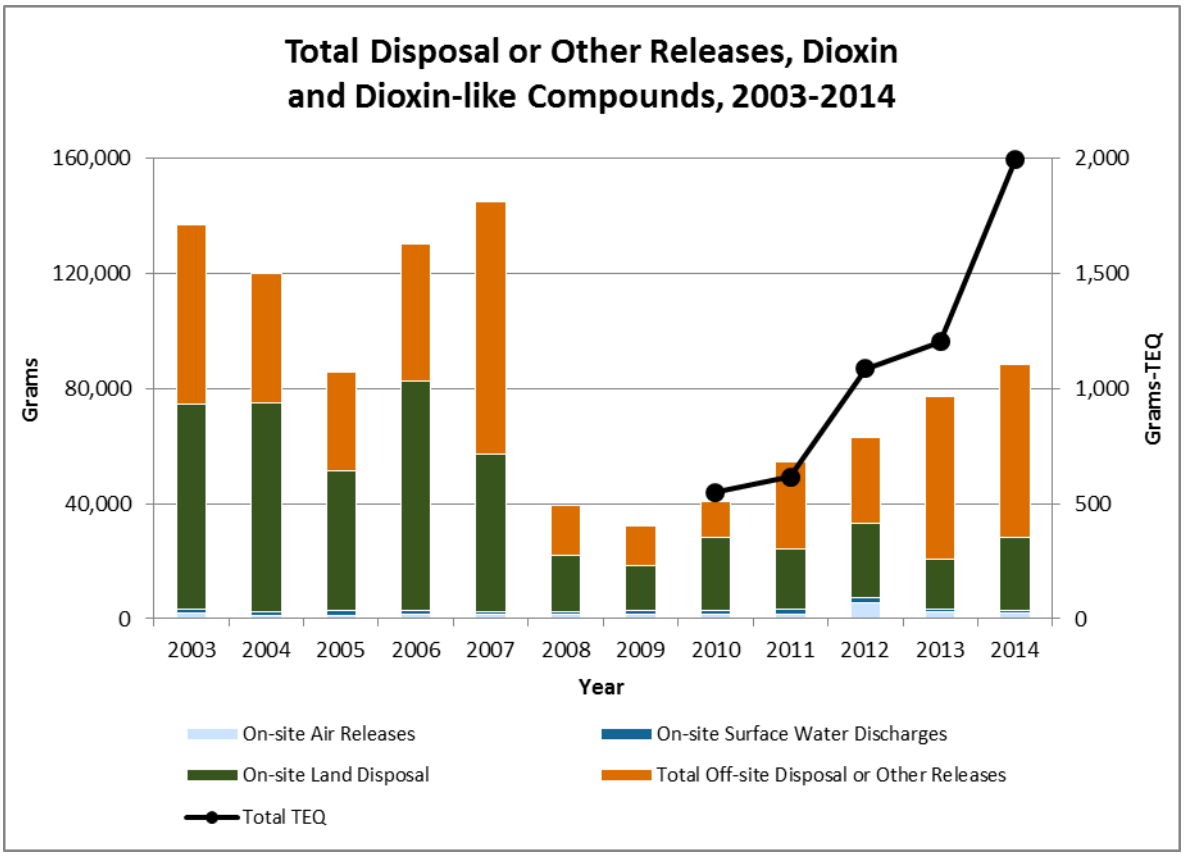
In 2014:

- Electric utilities, which include coal- and oil-fired power plants, accounted for 57% of the emissions of mercury and mercury compounds to air reported to the TRI Program.

Dioxin releases trend

Dioxin and dioxin-like compounds (dioxins) are PBTs characterized by EPA as probable human carcinogens. Dioxins are the unintentional byproducts of combustion and several industrial chemical processes. EPA requires facilities to report up to 17 types of dioxin (or congeners). Congener information was first collected in 2010.

While as a chemical class dioxin congeners cause the same toxic effects, they differ widely in their potencies in causing these effects. The mix of dioxins from one source can have a very different level of toxicity than the same total amount, but different mix, from another source. These varying potencies can be taken into account using Toxic Equivalency Factors (TEFs), which are based on each congener's toxic potency. EPA multiplies the total grams of each congener reported by facilities by the associated TEF to obtain a toxicity weight, and sums all congeners for a total of grams in toxicity equivalents (grams-TEQ). Analyzing dioxins in grams-TEQ is useful when comparing disposal or other release quantities of dioxin from different sources or different time periods, where the mix of congeners may vary.



From 2003 to 2014:

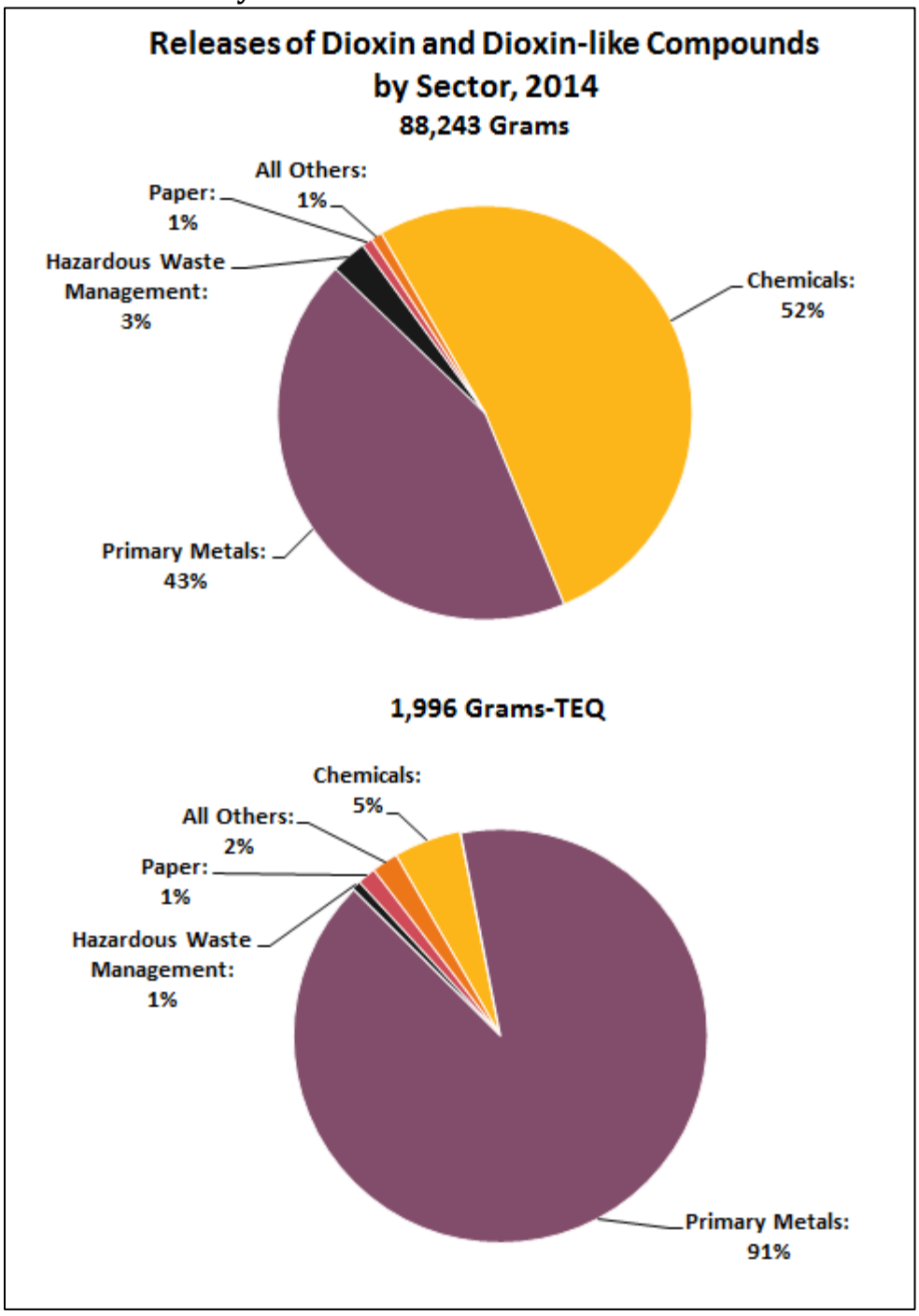
- Releases of dioxins decreased by 35%.

- Since 2010, grams-TEQ increased by 264%, while dioxin grams released increased by 118%.
  - This suggests that releases of the more toxic congeners have increased at a faster rate than releases of dioxins overall, causing grams-TEQ of dioxins to increase at a higher rate than overall grams.

From 2003 to 2014:

- Releases of dioxins increased 14%, largely due to an increase in dioxins reported by one smelting facility.
- In 2014, most (68%) of the quantity released was disposed of off-site.

Dioxin releases by sector

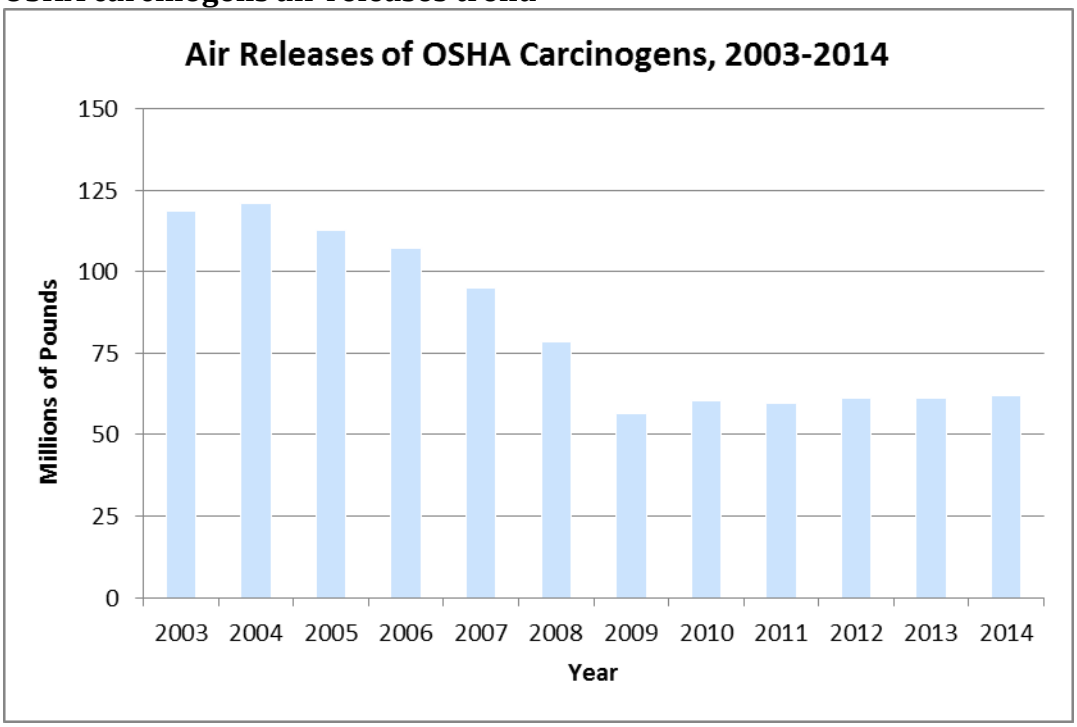


- This figure shows the releases of dioxins in grams and grams-TEQ. EPA multiplies the total grams of each congener (i.e., each type of dioxin) reported by its associated Toxic Equivalency Factor to obtain a toxicity weight, and sums all of the congeners for a total in grams-TEQ. Analyzing dioxins in grams-TEQ is useful when comparing disposal or other

release quantities of dioxin where the mix of the congeners may vary. Various industry sectors may dispose of or otherwise release very different mixes of dioxin congeners.

- In 2014, four industry sectors accounted for most of the grams and grams-TEQ of dioxins released.
- The chemical manufacturing industry accounted for 52% and the primary metals sector for 43% of the total grams of dioxins released.
- However, when TEFs are applied, the primary metals sector accounted for 91% and the chemical manufacturing sector for just 5% of the total grams-TEQ released.

OSHA carcinogens air releases trend



Among the chemicals that are reportable to the TRI Program, there are about 180 known or suspected carcinogens, which EPA refers to as OSHA carcinogens.

From 2003 to 2014:

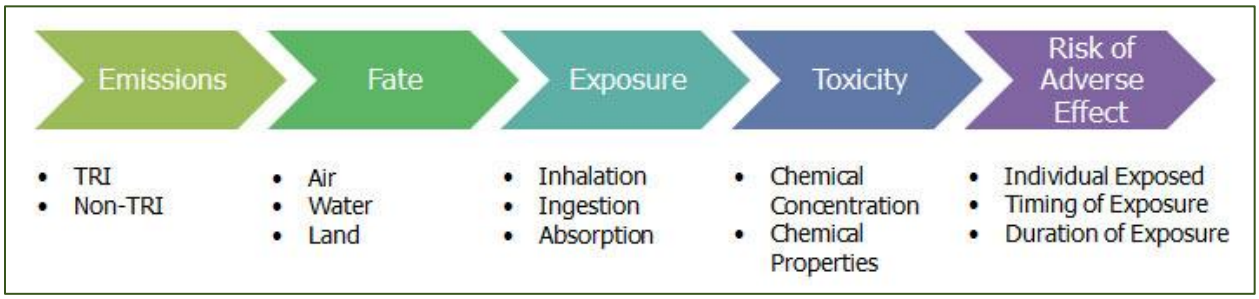
- Air releases of these carcinogens decreased by 48%.
- The long-term decreases in air releases of OSHA carcinogens were driven mainly by decreases in emissions of styrene from the plastics and rubber and transportation equipment industries.

Hazard and Risk of TRI Chemicals

Among other information, TRI provides data about environmental releases of toxic chemicals from industrial facilities throughout the United States, measured in pounds. Pounds of releases, however, is not an indicator of any health risks posed by the chemicals. Although TRI data generally cannot indicate to what extent individuals have been exposed to toxic chemicals, TRI can be used as a starting point to evaluate exposure and the potential risks TRI chemicals pose to human health and the environment.

The human health risks resulting from exposure to toxic chemicals are determined by many factors, as shown in the figure below. TRI contains some of this information, including what chemicals are released from industrial facilities; the amount of each chemical released; and the amounts released to air, water, and land.

Overview of Factors That Influence Risk



It is important to keep in mind that while TRI often includes information on a large portion of the toxic chemicals used by industry, it does not cover all facilities, all toxic chemicals, or all sources of TRI chemicals in communities. For example, potential sources of chemical exposure that are not covered by TRI include exhaust from cars and trucks, chemicals in consumer products, and chemical residues in food and water.

Helpful Concepts

The *hazard* of a toxic chemical is its ability to cause an increased incidence of adverse health effects (e.g., cancer, birth defects). *Toxicity* is a way to measure the hazard of a chemical.

The *risk* of a toxic chemical is the chance of adverse health effects occurring as a result of exposure to the chemical. Risk is a function of hazard and exposure.

To provide information on the potential hazard and risk posed by disposal or other releases of TRI chemicals, the TRI Program uses EPA's publicly available Risk-Screening Environmental Indicators (RSEI) model, a screening-level model that uses simplifying assumptions to fill data gaps and reduce the complexity of calculations in order to quickly evaluate large amounts of data. RSEI includes TRI data for on-site releases to air and water, transfers to Publicly Owned Treatment Works (POTWs), and transfers for off-site incineration. RSEI does not currently model other release pathways, such as land disposal.

RSEI produces hazard estimates and unitless risk "scores," which represent relative chronic human health risk. Each type of result can be compared to other results of the same type.

- 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.
- RSEI **risk** scores are estimated of potential human risk based on pathway-specific modeling of chemical concentrations at specific points in the environment, like in the air around a facility or in the water downstream from a facility.

Note that the RSEI model should be used for screening-level activities such as trend analyses that compare relative risk from year to year, or ranking and prioritization of chemicals or industry sectors for strategic planning. RSEI does not provide a formal risk assessment, which typically requires site-specific information, more refined exposure information, and detailed population distributions.

RSEI: Risk-Screening Environmental Indicators

RSEI results consider more than just chemical quantities released.

- RSEI *hazard* results also consider:
  - Toxicity of the chemical
- RSEI scores also consider:
  - Location of releases
  - Toxicity of the chemical
  - Fate and transport
  - Human exposure pathways

Top chemicals released§ in 2014, ranked in order by…

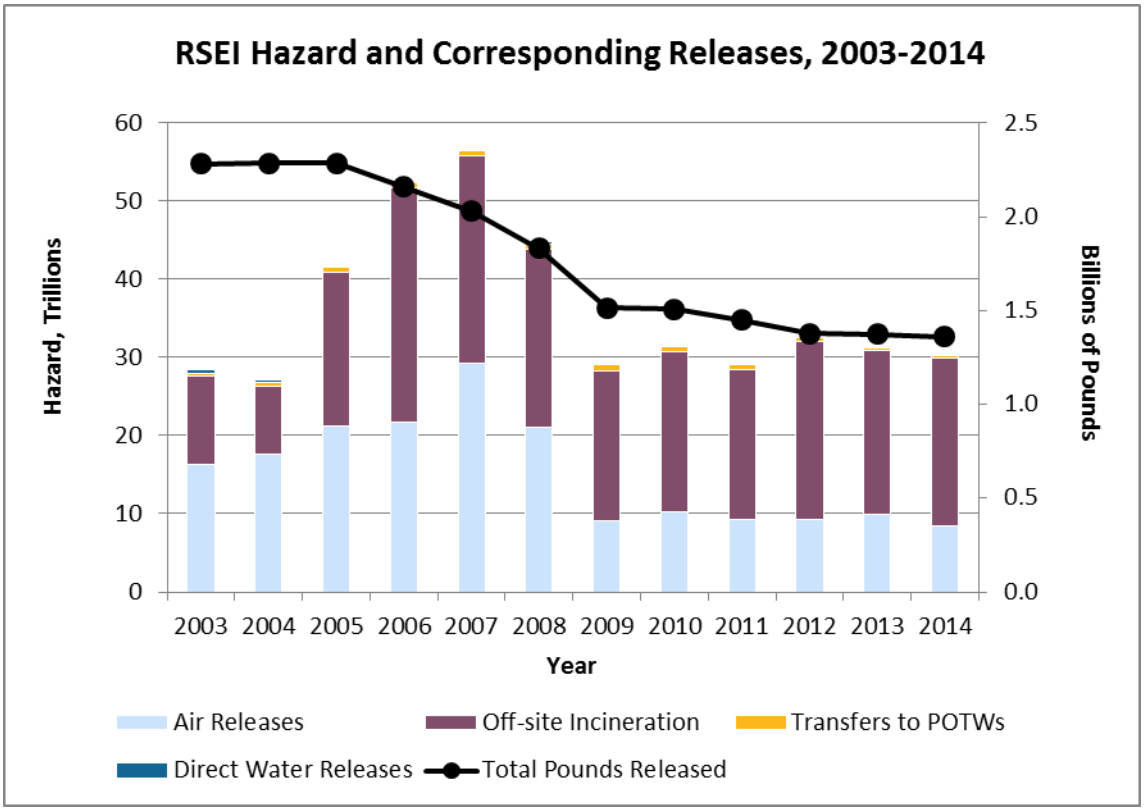
Pounds released	RSEI Hazard (toxicity*pounds)	RSEI Score (estimated dose*toxicity*exposed population)
1. Nitrate compounds	1. Diaminotoluene (mixed isomers)	1. Chromium and compounds
2. Methanol	2. Chromium and compounds	2. Cobalt and compounds
3. Ammonia	3. Hydrazine	3. Nickel and compounds
4. Hydrochloric acid	4. Polycyclic aromatic compounds	4. Polycyclic aromatic compounds
5. Sulfuric acid	5. Arsenic and compounds	5. Arsenic and compounds

Why are the rankings different?

- The top five chemicals by **pounds** are released in large amounts and are comparatively less toxic than the top chemicals by hazard or score. None of them are known carcinogens - cancer effects usually drive RSEI hazard and RSEI scores.
- The top five chemicals by **RSEI hazard** have very high toxicity weights and all of them are carcinogens. The rank for diaminotoluene (mixed isomers) is driven by large transfers to incineration.
- For a chemical to have a high **RSEI score**, it must be either very toxic, have a large number of people potentially exposed, or have potential for very high exposures (or some combination).
- Diaminotoluene is the top chemical by **RSEI hazard**, but it is not in the top five by **RSEI score** because almost all of the diaminotoluene transferred to incineration is destroyed during the incineration process, resulting in little human exposure.

§This includes chemicals released on-site to air and water by TRI facilities, or transferred and released off-site to air and water by POTWs and incinerators.
Note: RSEI is commonly used to quickly screen and highlight situations that may potentially lead to chronic human health risks. More information about the model can be accessed at the RSEI webpage.

Hazard trend

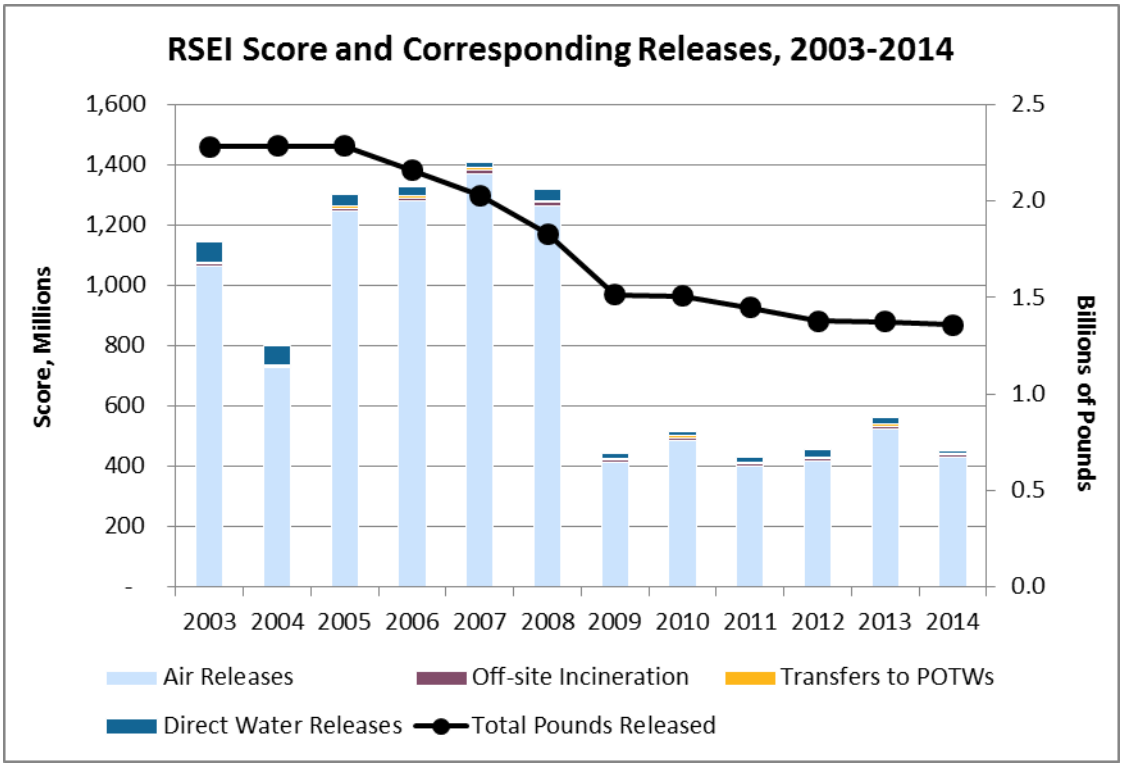


RSEI hazard estimates consider the amounts of chemicals released on-site to air and water by TRI facilities, or transferred off-site to POTWs or incinerators, and the toxicity of the chemicals.

From 2003 to 2014:

- The increase in the hazard estimate from 2004 to 2007 is driven mainly by an increase in off-site transfers of diaminotoluene for incineration and increased chromium releases to air.
- The overall RSEI hazard estimate increased by 7%, while corresponding pounds released decreased by 40%. This suggests that in recent years TRI reporters may be releasing chemicals that have relatively higher toxicities.

Risk trend



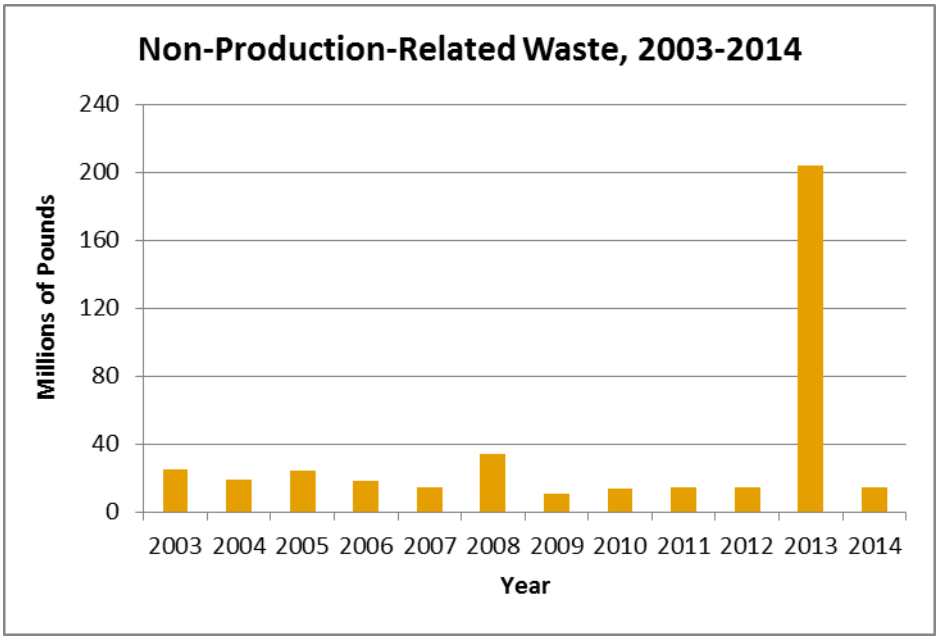
RSEI risk "scores" represent relative chronic human health risk and can be compared to RSEI-generated scores from other years. RSEI scores are different from RSEI hazard estimates because they also consider the location of the release, its fate and transport through the environment, and the route and extent of potential human exposure.

From 2003 to 2014:

- The RSEI score decreased by 60%, while the corresponding pounds released over the same time period decreased by 40%. These results suggest that the RSEI score is going down because of reduced exposure modeled in RSEI, which may be a result of where the chemical waste is released or how it is being released, such as a shift in the release media. Taking into account the RSEI hazard trend, the results are not due to reduced toxicity.
- The large fluctuation in RSEI score between 2004 and 2009 was driven by a large increase and subsequent decrease in chromium releases from three facilities.

Non-Production-Related Waste

Non-production-related waste refers to quantities of TRI chemicals disposed of or released, or transferred off-site, as the result of one-time events, rather than due to standard production activities. These events may include remedial actions, such as decommissioning a heap leach pad, catastrophic events, 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 not as part of its production-related waste managed, which may account for discrepancies between the two figures.



- Non-production-related waste from all facilities was below 35 million pounds in all years but 2013.
  - In 2013, a mining facility reported a one-time only release of 193 million pounds due to decommissioning a heap leach pad. The facility reported zero releases in 2014.
- In 2014, TRI facilities reported 15 million pounds of one-time releases:
  - 26% (3.7 million pounds) was reported from the federal cleanup of an old nuclear weapons production site, 98% of which was lead.
  - Other quantities reported included 633,365 pounds of nitric acid from a chemical manufacturing facility.

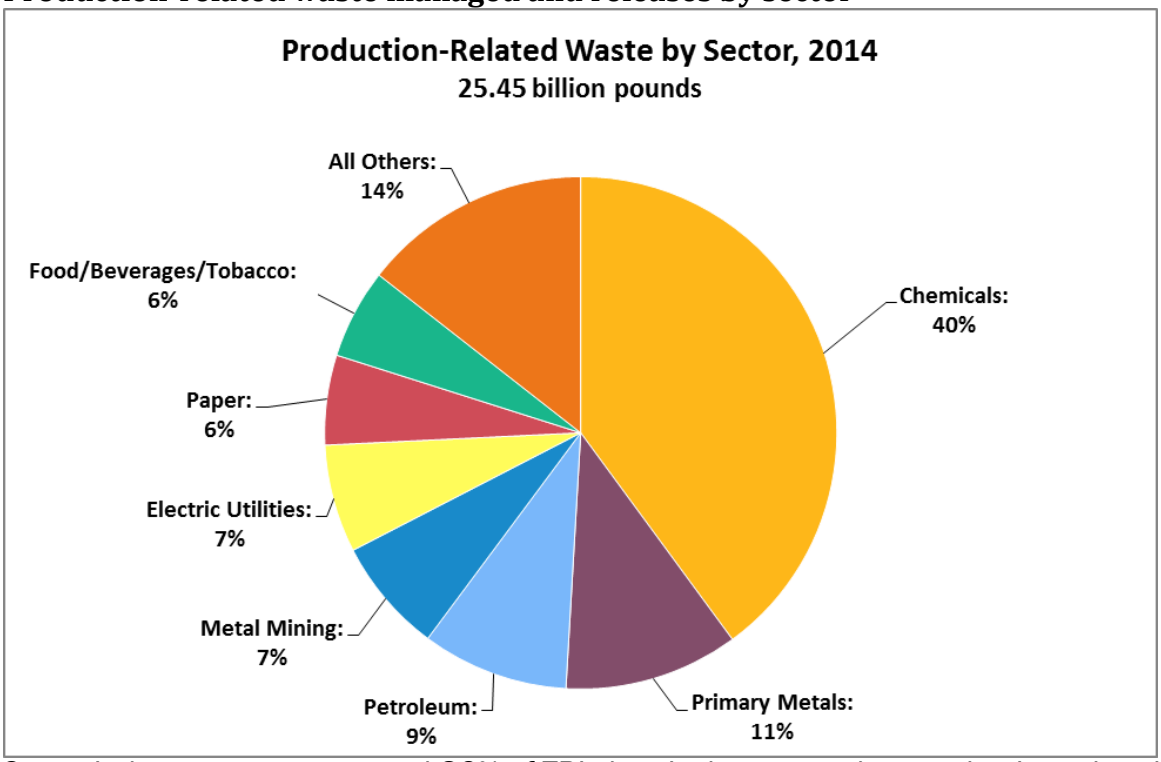
Industry Sectors

Comparing Industry Sectors

This chapter examines which sectors contribute the most to production-related waste managed and total disposal or other releases in 2014, and highlights several industry sectors to show trends occurring over time within each. It also includes a discussion about the trends among federal facilities, which report to the Toxics Release Inventory (TRI) regardless of industry sector. For analysis purposes, the TRI program has combined 3- and 4-digit North American Industry Classification System (NAICS) codes to create 27 distinct industry sector categories.

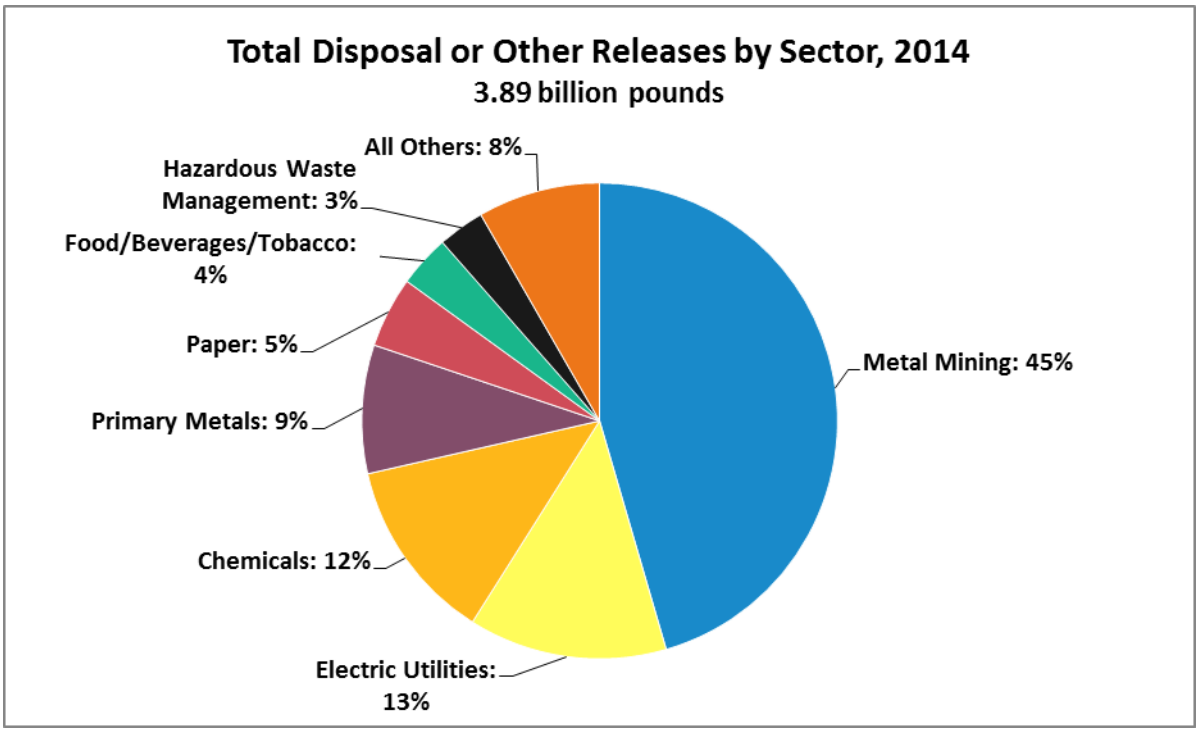
The industry sectors that are subject to TRI reporting requirements vary substantially in size, scope, composition, and business type. As a result, the amounts and types of chemicals used, generated, and managed by the facilities within a given industry sector often differ greatly from those of facilities in other sectors. For facilities within the same industry sector, however, the processes, products, and regulatory requirements are often similar, resulting in similar manufacture, processing, or other use of toxic chemical use and waste generation. Looking at waste management trends within a sector can identify emerging issues, highlight progress made in environmental performance, and reveal opportunities for better waste management practices.

Production-related waste managed and releases by sector



Seven industry sectors reported 86% of TRI chemicals managed as production-related waste in 2014. A majority (60%) of TRI chemicals managed as production-related waste originated

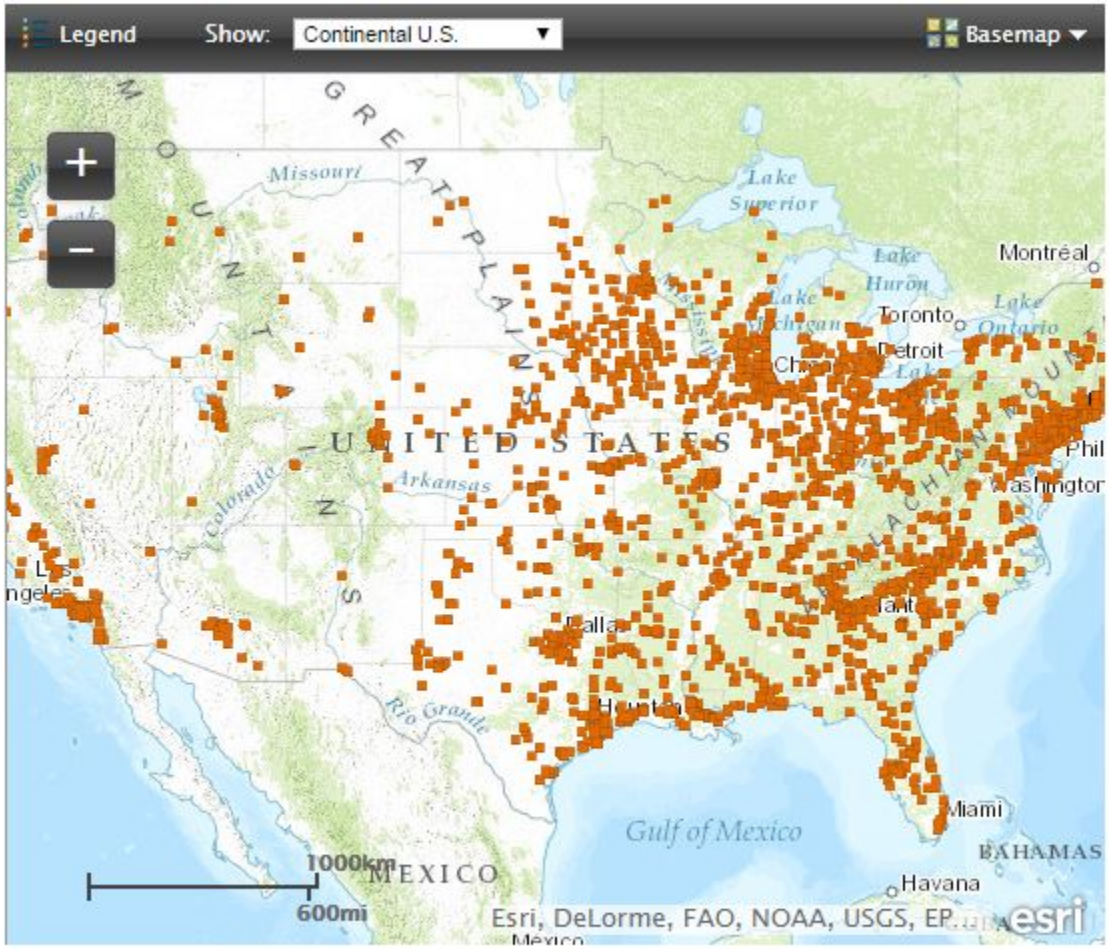
from three sectors: chemical manufacturing (40%), primary metals (11%), and petroleum products manufacturing, primarily from petroleum refineries (9%).



This pie chart shows that 92% of TRI chemicals disposed of or otherwise released originated from seven of the 27 TRI industry sectors. More than two-thirds originated from just three industry sectors: metal mining (45%), electric utilities (13%), and chemical manufacturing (12%). The chemical manufacturing sector is in the top three for both production-related waste managed and total releases.

- For more details on how the amounts and proportions of TRI chemicals managed and released have changed over time, see the production-related waste managed by industry trend graph and the releases by industry trend graph.
- For more information on sectors with significant decreases in waste managed and releases in recent years, see the industry sectors with largest percentage decrease in waste managed graph and the types of source reduction activities graph.
- For more information on the influence that production and the economy have on waste managed and releases, see the production-related waste managed and value added by the manufacturing sectors graph and the total releases and value added by the manufacturing sectors graph.

Chemical Manufacturing



Chemical Manufacturing Facilities that Reported to the TRI Program for 2014

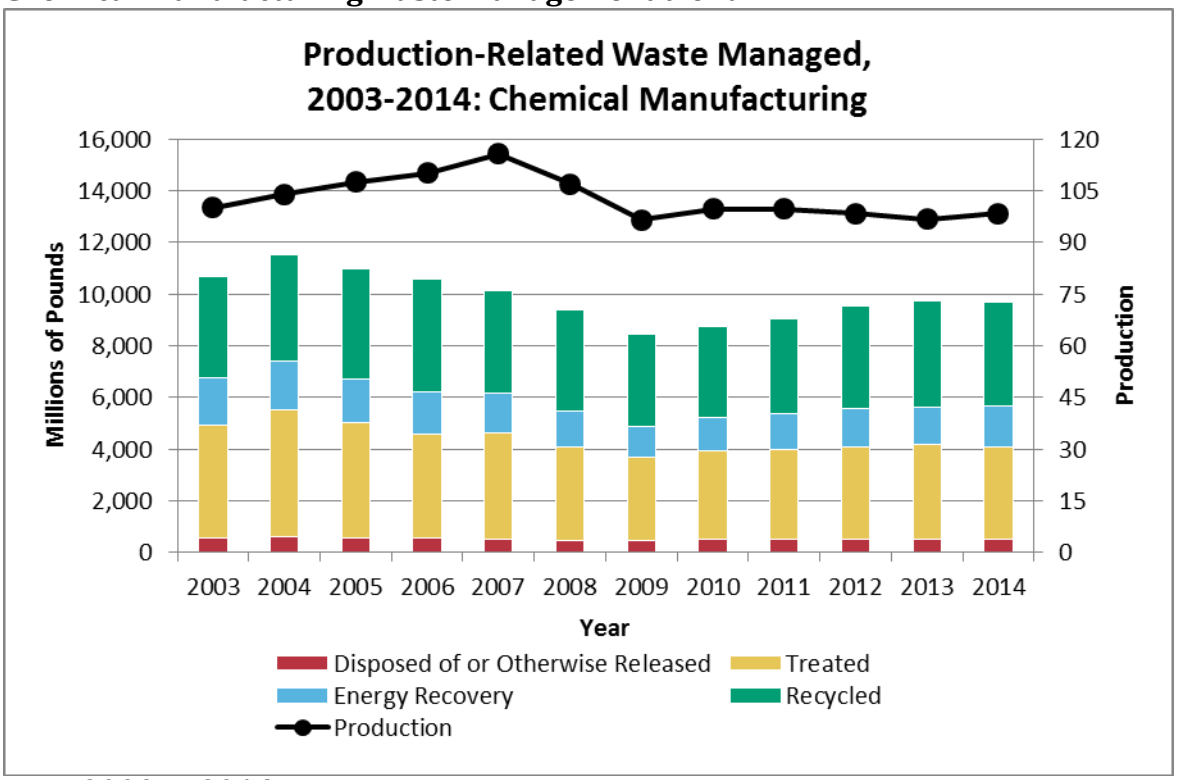
View Larger Map

Chemical manufacturers produce a variety of important products, including basic chemicals, products used by other manufacturers (such as synthetic fibers, plastics, and pigments), pesticides, pharmaceuticals, paints, and cosmetics, to name a few. In 2014, the chemical manufacturing sector had the most facilities (3,460) report to the TRI Program and also reported the largest portion of production-related waste managed (40% of all reported production-related waste).

Quick Facts for 2014: Chemical Manufacturing	
Number of TRI Facilities	**3,460**
Facilities Reporting Newly Implemented Source Reduction Activities in 2014	584
Production-Related Waste Managed	**10,157.7 million lb**
Recycled	4,068.6 million lb
Energy Recovery	1,745.9 million lb
Treated	3,845.7 million lb
Disposed of or Otherwise Released	497.5 million lb
Total Disposal or Other Releases	**494.6 million lb**
On-site	**431.8 million lb**
Air	156.4 million lb
Water	32.9 million lb
Land	242.5 million lb
Off-site	**62.8 million lb**

Note: Numbers may not sum exactly due to rounding.

Chemical manufacturing waste management trend



From 2003 to 2014:

- Production-related waste managed by the chemical manufacturing sector decreased by 9%, while production (represented by the black line as reported by the Federal Reserve Board Industrial Production Index) fluctuated but changed little overall.
- Quantities of waste released, treated, or used in energy recovery have decreased, while the quantity of waste recycled has increased.

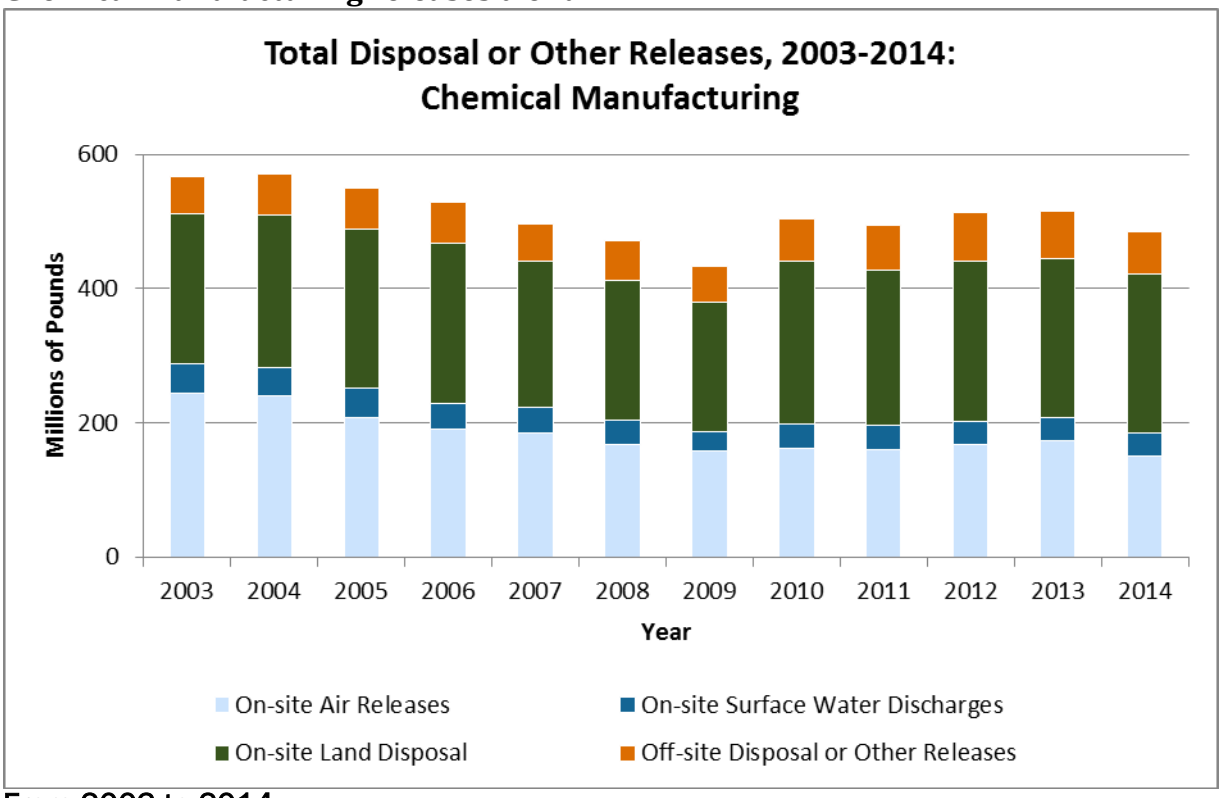
From 2013 to 2014:

- Production-related waste managed decreased by 86.0 million pounds (1%).
- In 2014, 5% of the sector's waste was released, while the rest was managed through treatment, energy recovery, and recycling.

Source Reduction in the Chemical Manufacturing Sector

Although this has consistently been the sector with the most production-related waste managed, 17% of facilities in the sector initiated source reduction activities in 2014 to reduce their toxic chemical use and waste generation. The most commonly reported category of source reduction activities for the sector was good operating practices. For example, one facility reduced the amount of formaldehyde waste managed by using a materials balance audit to determine how many drums of formaldehyde it could recycle and use again. Other common source reduction activities in the chemical manufacturing sector include process modifications and spill and leak prevention. TRI's Pollution Prevention Search Tool can help you learn more about pollution prevention opportunities in this sector.

Chemical manufacturing releases trend



From 2003 to 2014:

- Total releases by the chemical manufacturing sector decreased by 14%. This is primarily due to a reduction in air emissions.
- Water releases have also declined since 2003, while on-site releases to land and off-site disposal have increased.

From 2013 to 2014:

- Total releases decreased by 29 million pounds (6%).

For more information on how facilities in this sector and other sectors can choose safer chemicals, visit EPA's Safer Choice Program pages for Alternatives Assessments and the Safer Chemical Ingredients List.

Metal Mining

Metal Mining Facilities that Reported to the TRI Program for 2014

View Larger Map

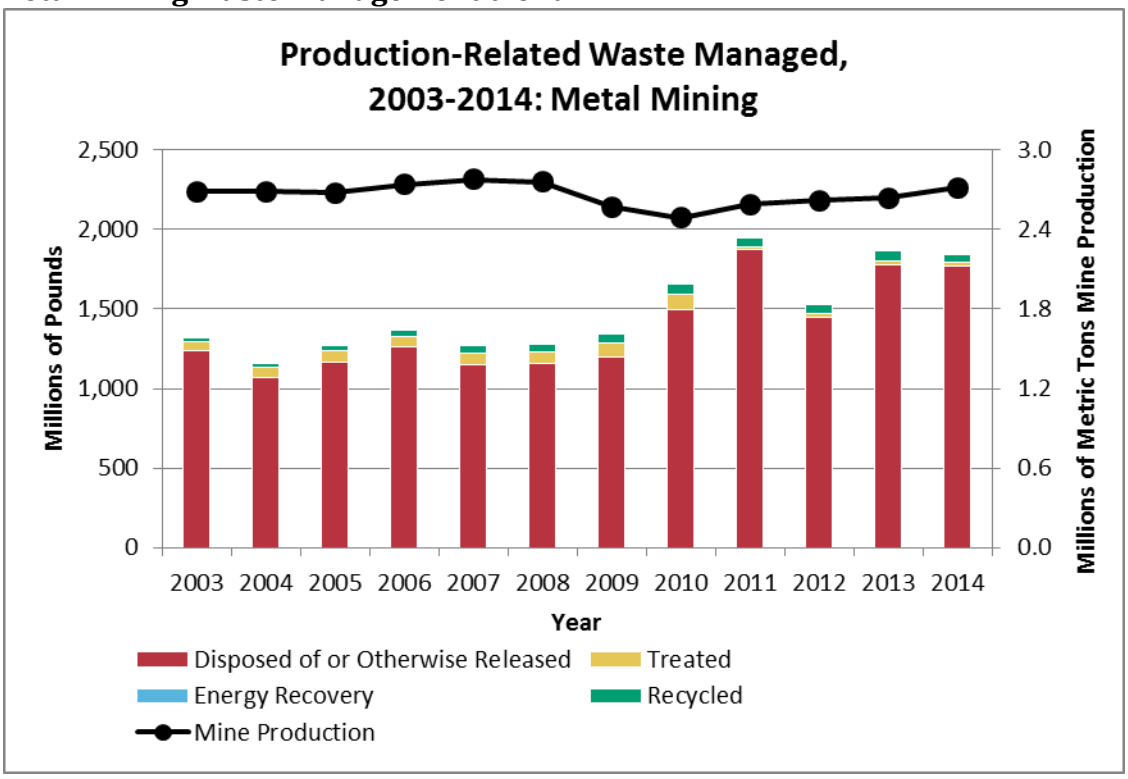
The portion of the metal mining sector subject to TRI reporting includes facilities mining copper, lead, zinc, silver, gold, and several other metals. In 2014, 89 metal mining facilities reported to the TRI Program. They tend to be in western states where most of the copper, silver, and gold mining occurs; however, zinc and lead mining tend to occur in Missouri, Tennessee, and Alaska. Metals generated from U.S. mining operations are used in a wide range of products, including automobiles and electrical and industrial equipment.
The extraction and beneficiation of these minerals generate large amounts of waste.

Quick Facts for 2014: Metal Mining

Number of TRI Facilities	**89**
Facilities Reporting Newly Implemented Source Reduction Activities in 2014	9
Production-Related Waste Managed	**1,842.7 million lb**
Recycled	48.5 million lb
Energy Recovery	5 lb
Treated	23.0 million lb
Disposed of or Otherwise Released	1,771.3 million lb
Total Disposal or Other Releases	**1,771.7 million lb**
On-site	**1,768.4 million lb**
Air	2.9 million lb
Water	1.7 million lb
Land	1,763.7 million lb
Off-site	**3.3 million lb**

Note: Numbers may not sum exactly due to rounding.

Metal mining waste management trend



From 2003 to 2014:

- While metal mining production (as reported in the U.S. Geological Survey Mineral Commodities Surveys) has remained relatively steady, the quantity of waste managed has fluctuated.
    - One factor other than production frequently cited by facilities as a contributor to the changes in quantities of waste managed is the composition of the extracted ore and waste rock, which can vary substantially from year to year. In some cases, small changes in the waste's composition can impact whether chemicals in waste rock qualify for a concentration-based exemption from TRI reporting in one year, but not qualify for the exemption the next year or vice versa.

In 2014:

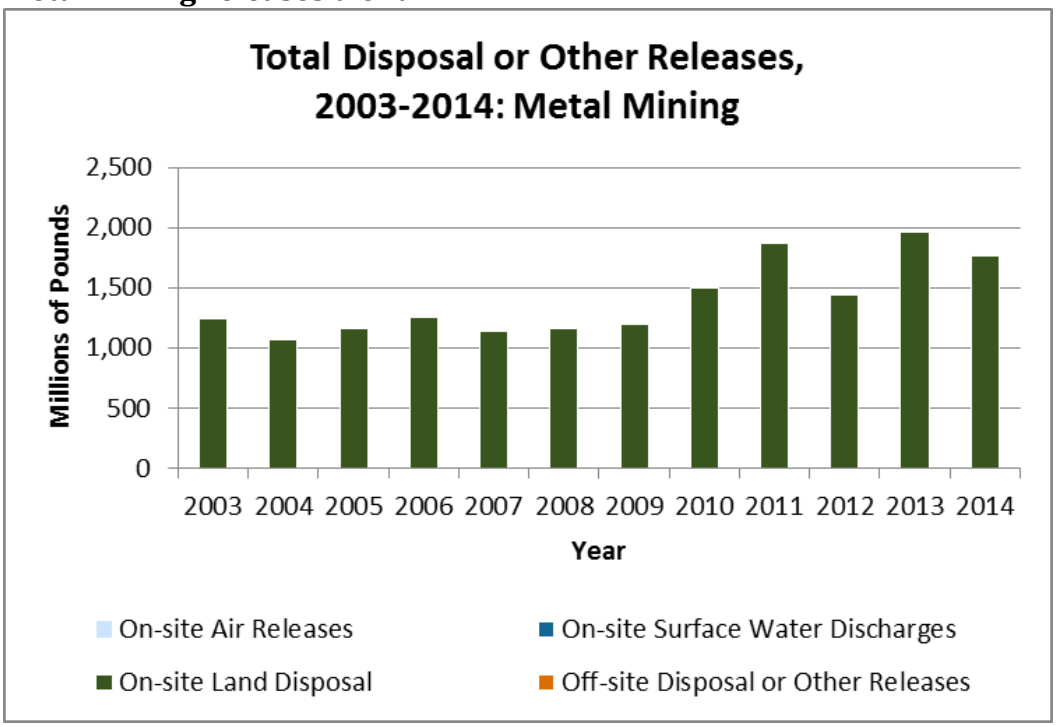
- 96% of the metal mining sector's production-related waste managed is disposed of or otherwise released.

Source Reduction in the Metal Mining Sector

Nine of the 89 facilities initiated source reduction activities in 2014 to reduce their toxic chemical use and waste generation. Toxic chemical quantities reported by this sector are not especially amenable to source reduction, because they primarily reflect the natural composition of the ore and waste rock. The most commonly reported source reduction activity was good operating practices, which includes activities such as improving

maintenance scheduling, record keeping, or procedures. TRI's Pollution Prevention Search Tool can help you learn more about pollution prevention opportunities in this sector.

Metal mining releases trend



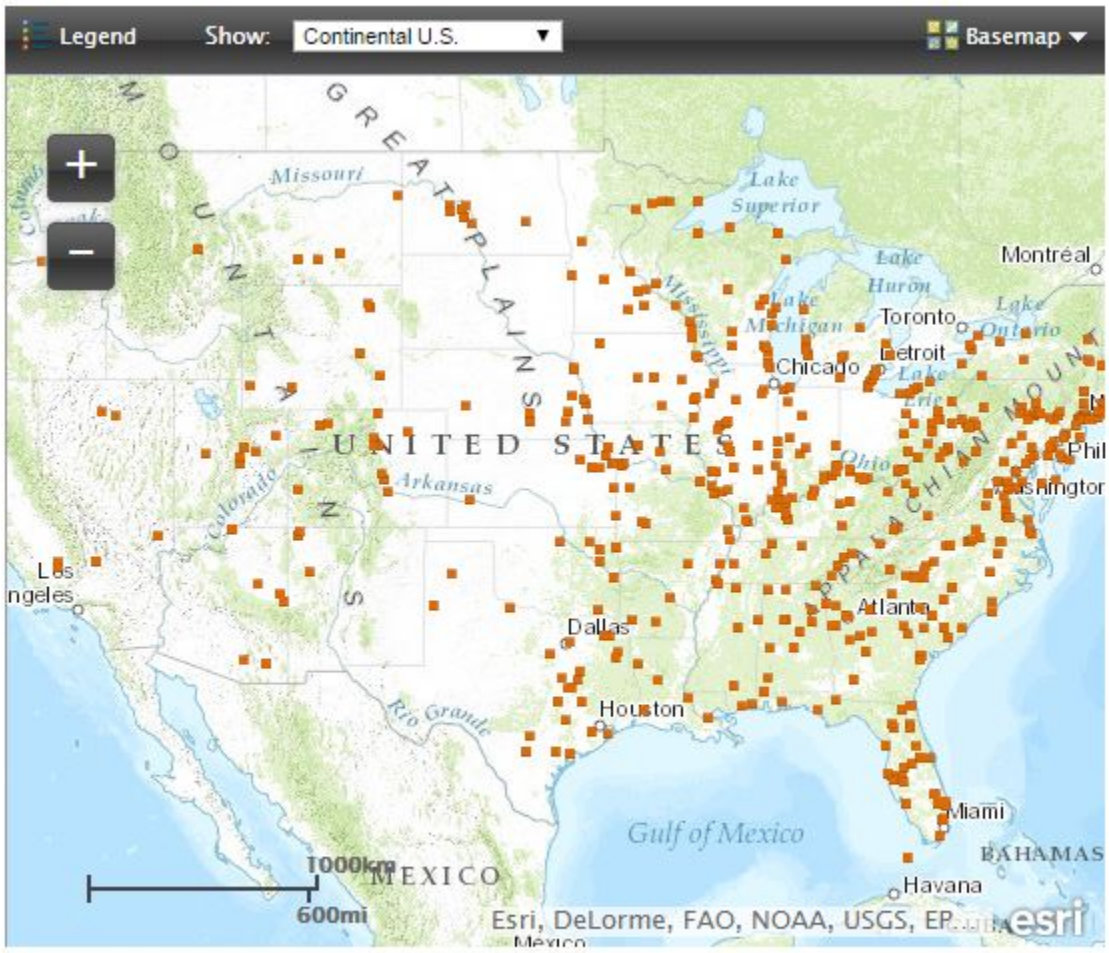
From 2003 to 2014:

- More than 99% of the metal mining sector's releases were in the form of on-site land disposal. On-site land disposal by metal mines has fluctuated in recent years, increasing significantly in 2013 and then decreasing in 2014.
- Several mining facilities have reported that changes in production and changes in the chemical composition of the deposit being mined are the primary cause of these fluctuations in the amount of chemicals reported.
- Metal mining facilities typically handle large volumes of material, and even a small change in the chemical composition of the deposit being mined can lead to big changes in the amount of toxic chemicals reported nationally.

In 2014:

- The metal mining sector reported the largest quantity of total disposal or other releases, accounting for 45% of the releases for all industries. It also represents almost three quarters (70%) of the on-site land disposal for all sectors.

Electric Utilities



Electric Utilities that Reported to the TRI Program for 2014

View Larger Map

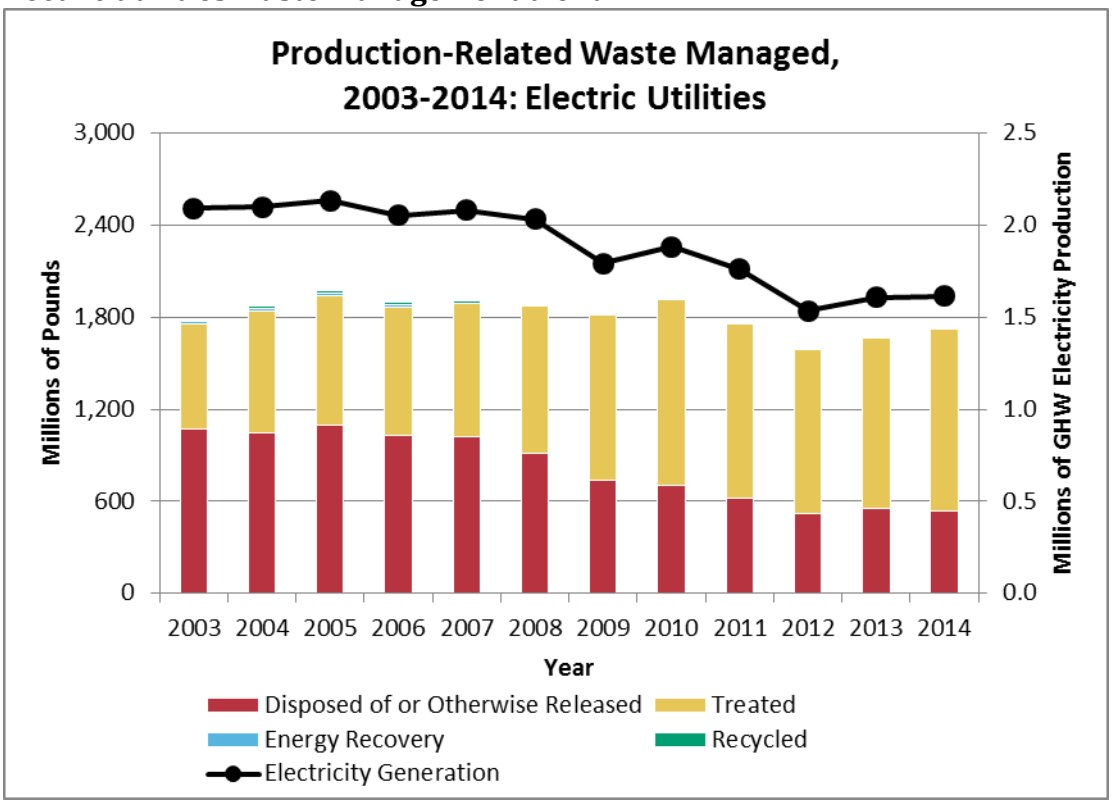
The electric utilities sector consists of establishments primarily engaged in generating, transmitting, and distributing electric power. Electricity-generating facilities combust or otherwise use a variety of substances to generate electricity; however, only the combustion of coal or oil to generate power for distribution in commerce is covered under TRI reporting requirements. In 2014, 573 electric generating facilities reported to the TRI Program.

Quick Facts for 2014: Electric Utilities

Number of TRI Facilities	**573**
Facilities Reporting Newly Implemented Source Reduction Activities in 2014	22
Production-Related Waste Managed	**1,733.4 million lb**
Recycled	7.6 million lb
Energy Recovery	462 thousand lb
Treated	1,191.3 million lb
Disposed of or Otherwise Released	534.0 million lb
Total Disposal or Other Releases	**534.7 million lb**
On-site	**461.3 million lb**
Air	182.3 million lb
Water	4.2 million lb
Land	274.8 million lb
Off-site	**73.4 million lb**

Note: Numbers may not sum exactly due to rounding.

Electric utilities waste management trend



From 2003-2014:

- Production-related waste managed has decreased by 49.9 million pounds (3%).
- Net electricity generation (in terms of electricity generated using coal and oil fuels as reported by the U.S. Department of Energy's Energy Information Administration), has decreased by 23%. The recent production decrease is driven by the industry's transition to natural gas, and only combustion of coal or oil to produce power is covered under TRI reporting requirements.
- The releases per gigawatt-hour (GWh) produced have dramatically decreased, offset by an increase in quantities treated per GWh produced.

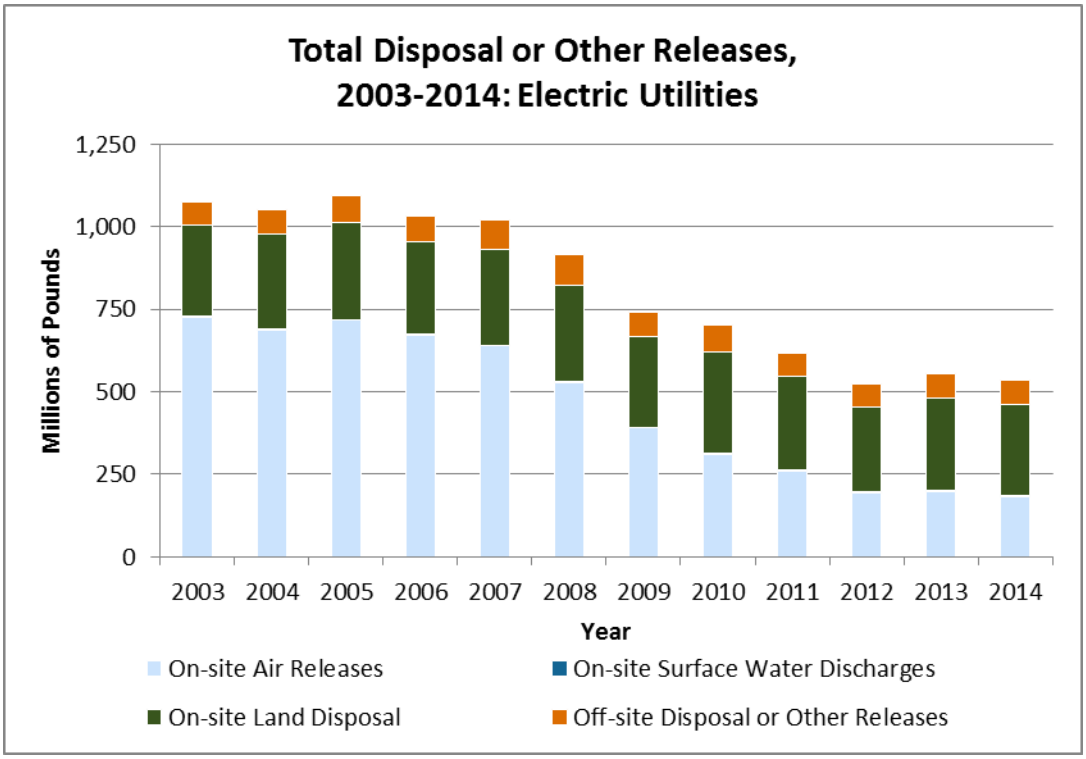
In 2014:

- Approximately two-thirds of production-related waste managed was treated, while approximately one-third was released.
    - This is in contrast to 2003, when the opposite occurred – almost two-thirds of the waste was released, and over one-third was treated. This trend is in large part due to an increase in the number of scrubbers at electric utilities that treat (or destroy) acid gases that would otherwise be released on-site to air.

Source Reduction in the Electric Utilities Sector

Only 4% of facilities initiated source reduction activities in 2014 to reduce their toxic chemical use and waste generation (note: adding a scrubber would not be considered a source reduction activity because it controls waste rather than prevents the generation of waste). The most frequently reported type of source reduction activities for this sector was process modifications, which include activities such as modifying equipment, layout, or piping. TRI's Pollution Prevention Search Tool can help you learn more about pollution prevention opportunities in this sector.

Electric utilities releases trend



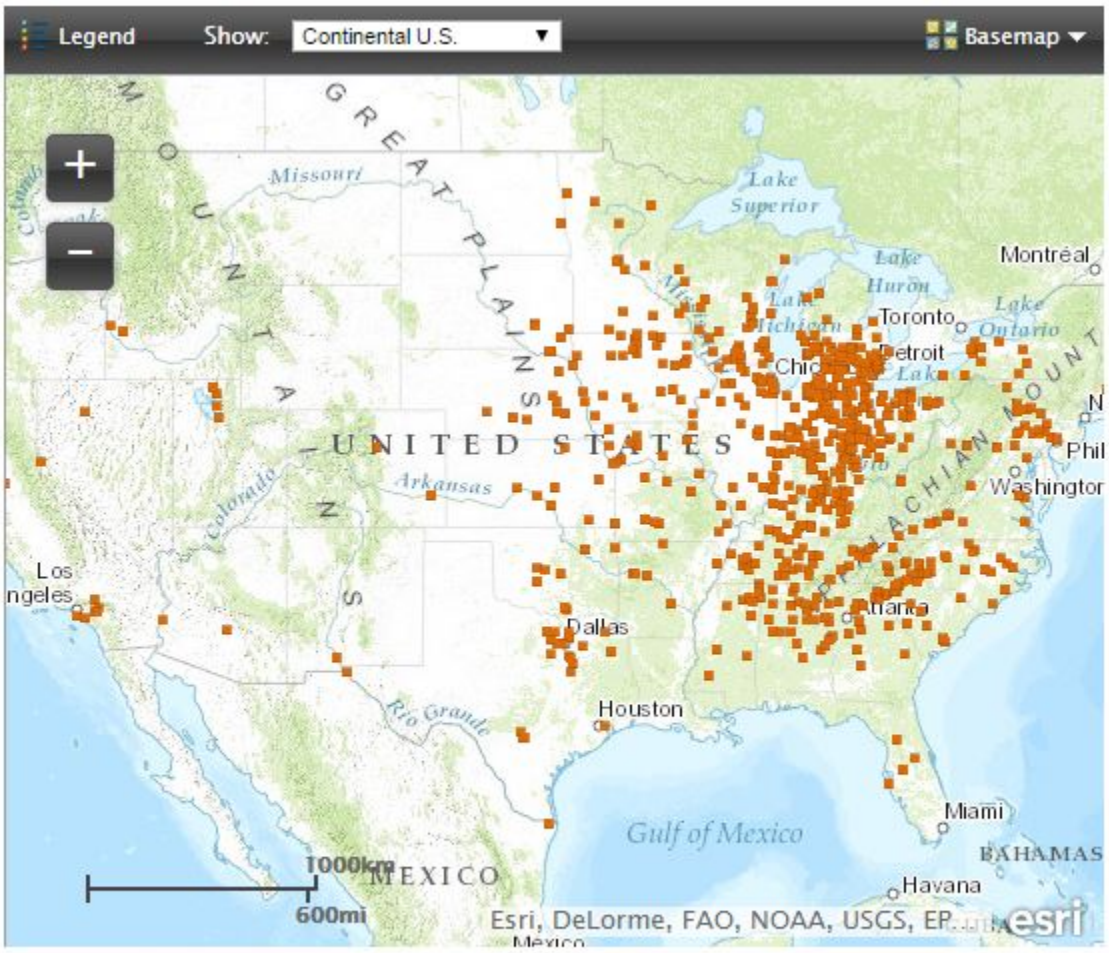
From 2003 to 2014:

- Releases from the electric utilities sector decreased by 50%. This decrease is driven by a 75% decrease in on-site air releases, whereas on-site land disposal and off-site disposal or other releases remained relatively constant over this time period

From 2013 to 2014:

- Releases by electric utilities decreased by 3% (18 million pounds). This decrease was primarily driven by a decrease in on-site air releases.
- This sector reported the second-greatest total disposal or other releases of any industry sector for 2014, including the greatest on-site air emissions, which represented 25% of air emissions from all industries.

Automotive Manufacturing



Automotive Manufacturing Facilities that Reported to the TRI Program for 2014

View Larger Map

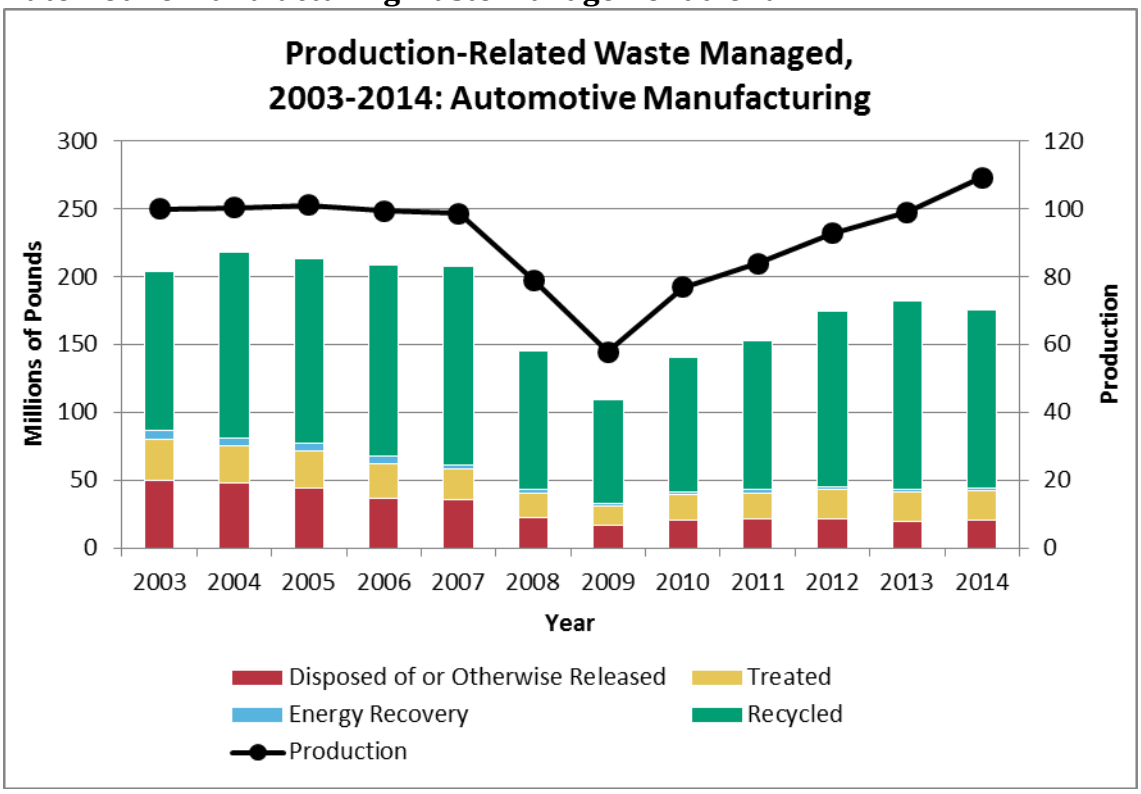
The automotive manufacturing sector includes facilities that assemble automobiles, light trucks, and utility vehicles to produce finished vehicles, as well as facilities that manufacture automotive vehicle parts and bodies. It includes the NAICS codes 3361, 3362, and 3363, which are a subset of the Transportation Equipment industry sector category. Compared to the other industry sectors profiled, this sector is small in terms of the quantities of chemicals released or managed as waste. However, given the attention on the automotive sector's production levels in recent years, the sector is included as one of the Industry Sector Profiles.

Quick Facts for 2014: Automotive Manufacturing

Number of TRI Facilities	**810**
Facilities Reporting Newly Implemented Source Reduction Activities in 2014	124
Production-Related Waste Managed	**175.8 million lb**
Recycled	131.1 million lb
Energy Recovery	2.1 million lb
Treated	22.0 million lb
Disposed of or Otherwise Released	20.7 million lb
Total Disposal or Other Releases	**19.9 million lb**
On-site	**14.9 million lb**
Air	14.8 million lb
Water	13 thousand lb
Land	134 thousand lb
Off-site	**5.0 million lb**

Note: Numbers may not sum exactly due to rounding.

Automotive manufacturing waste management trend



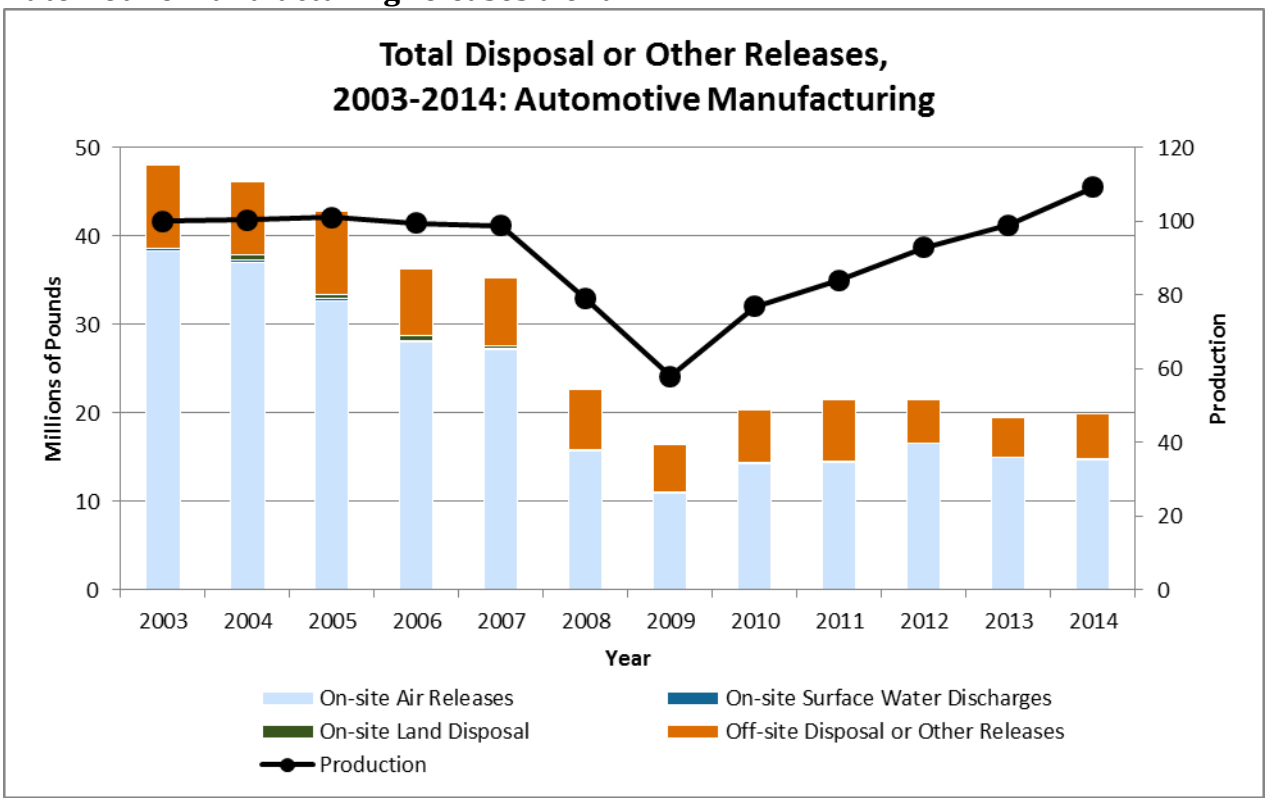
From 2003 to 2014:

- Automotive manufacturing production (as reported by the Federal Reserve Board Industrial Production Index) dropped by 41% from 2007 to 2009, and has since increased to a level in 2014 that exceeds 2003 production.
- The sector's production-related waste followed a trend similar to production, but still remains below 2003 levels. Overall, production-related waste decreased by 14% from 2003 to 2014 while production increased by 9%, indicating that waste per vehicle decreased over this time period.
- The proportion of managed waste that is recycled has increased from 2003, when 57% of total production-related waste was recycled, to 2014 when 75% was recycled.
- During the same time period, quantities disposed or otherwise released declined from 24% of total production-related waste in 2003 to 12% in 2014.

Source Reduction in the Automotive Manufacturing Sector

Fifteen percent of facilities reported having initiated practices to reduce their toxic chemical use and waste generation through source reduction activities implemented in 2014. The most frequently reported source reduction activities for the sector were good operating practices and process modifications. For example, one facility incorporated closed molding systems to reduce releases of methyl methacrylate. TRI's Pollution Prevention Search Tool can help you learn more about pollution prevention opportunities in this sector.

Automotive manufacturing releases trend



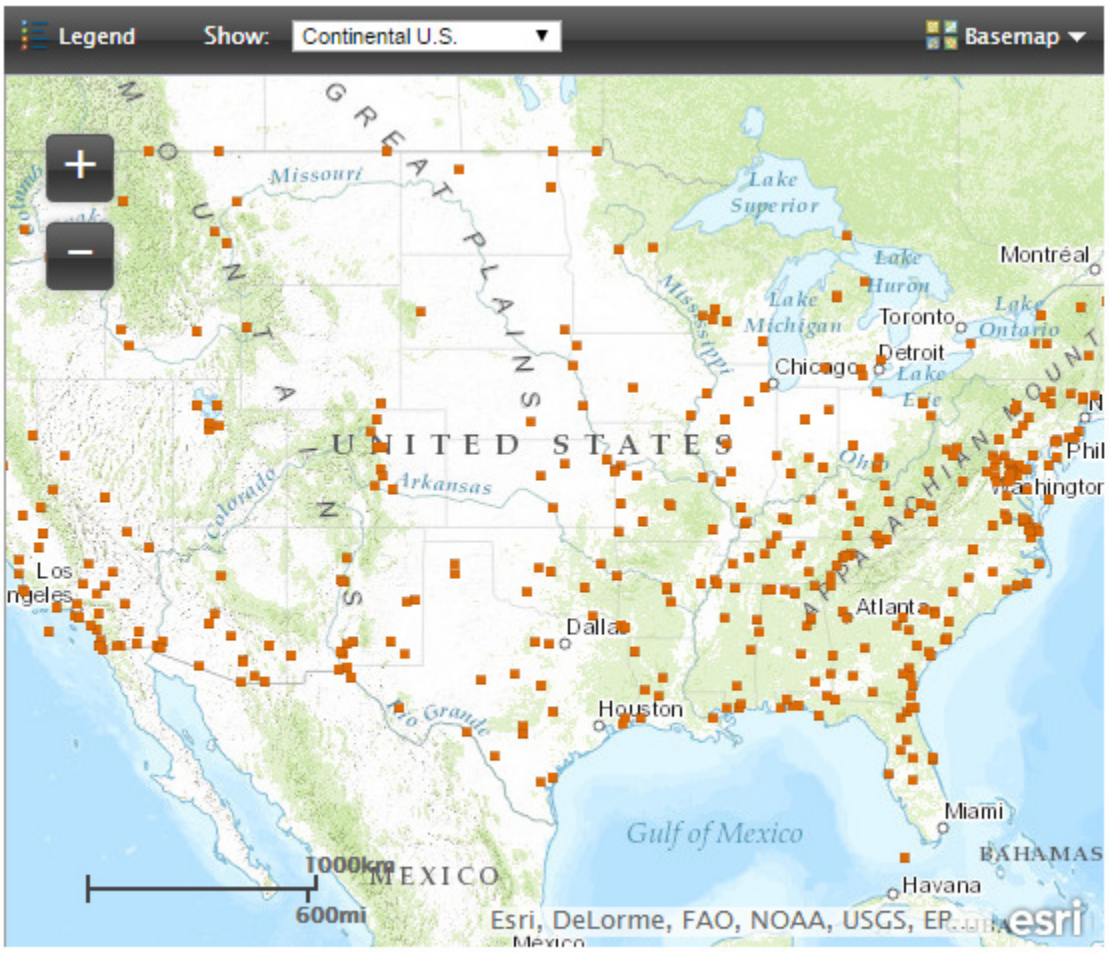
From 2003 to 2014:

- The sector's total disposal or other releases decreased by 58%, driven by a 24-million-pound reduction in on-site air releases. This is in contrast to the 9% increase in production since 2003.
- Notably, since 2009, releases have remained relatively stable while production has almost doubled.

In 2014:

- The automotive manufacturing sector's disposal or other release quantities are dominated by on-site air releases (74%), with the remaining releases largely reported as off-site disposal or other releases.

Federal Facilities



Federal Facilities that Reported to the TRI Program for 2014

View Larger Map

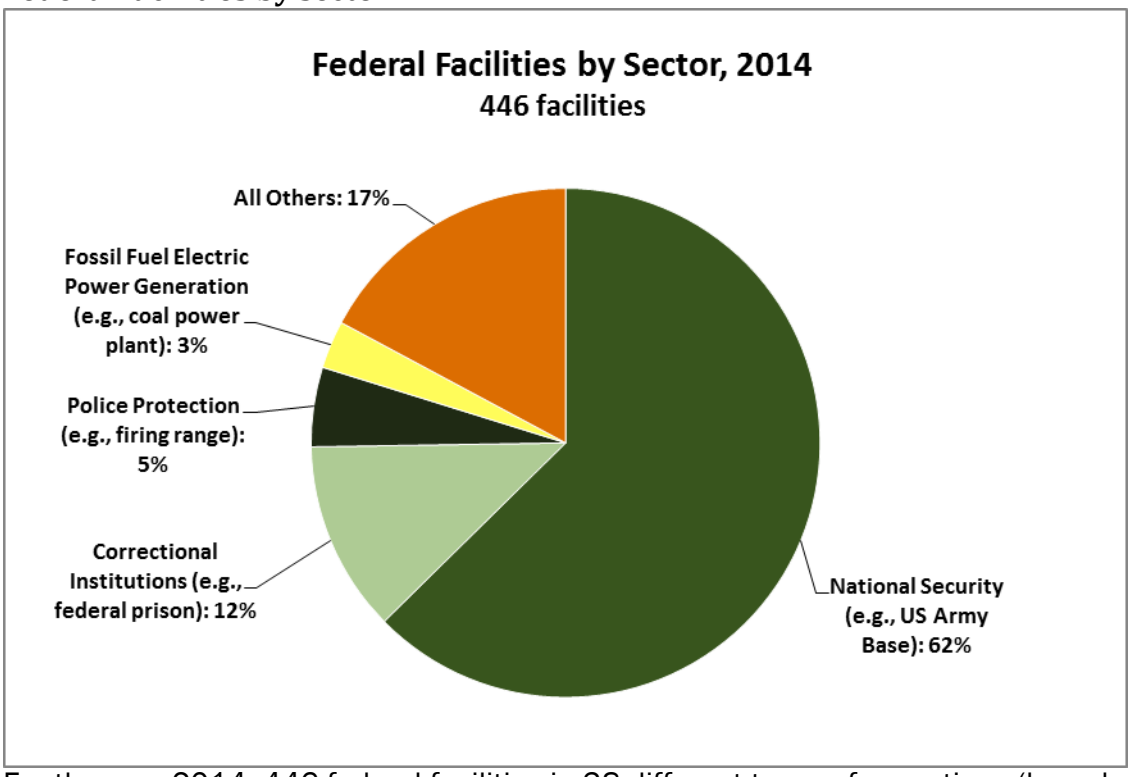
In 1993, President Clinton signed Executive Order 12756, "Federal Compliance with Right-to-Know Law and Pollution Prevention Requirements." This order established toxic chemical release reporting by all federal facilities that meet TRI threshold reporting criteria regardless of the type of operations at the facility, as described by their NAICS code. These actions were recently affirmed in March 2015 by President Obama through Executive Order 13693, "Planning for Federal Sustainability in the Next Decade." Due to these requirements, federal facilities are subject to the TRI reporting requirements.

Quick Facts for 2014: Federal Facilities

Number of TRI Facilities	**446**
Facilities Reporting Newly Implemented Source Reduction Activities in 2014	28
Production-Related Waste Managed	**199.4 million lb**
Recycled	53.3 million lb
Energy Recovery	2.7 million lb
Treated	90.2 million lb
Disposed of or Otherwise Released	53.2 million lb
Total Disposal or Other Releases	**57.3 million lb**
On-site	**53.6 million lb**
Air	13.7 million lb
Water	12.1 million lb
Land	27.8 million lb
Off-site	**3.7 million lb**

Note: Numbers may not sum exactly due to rounding.

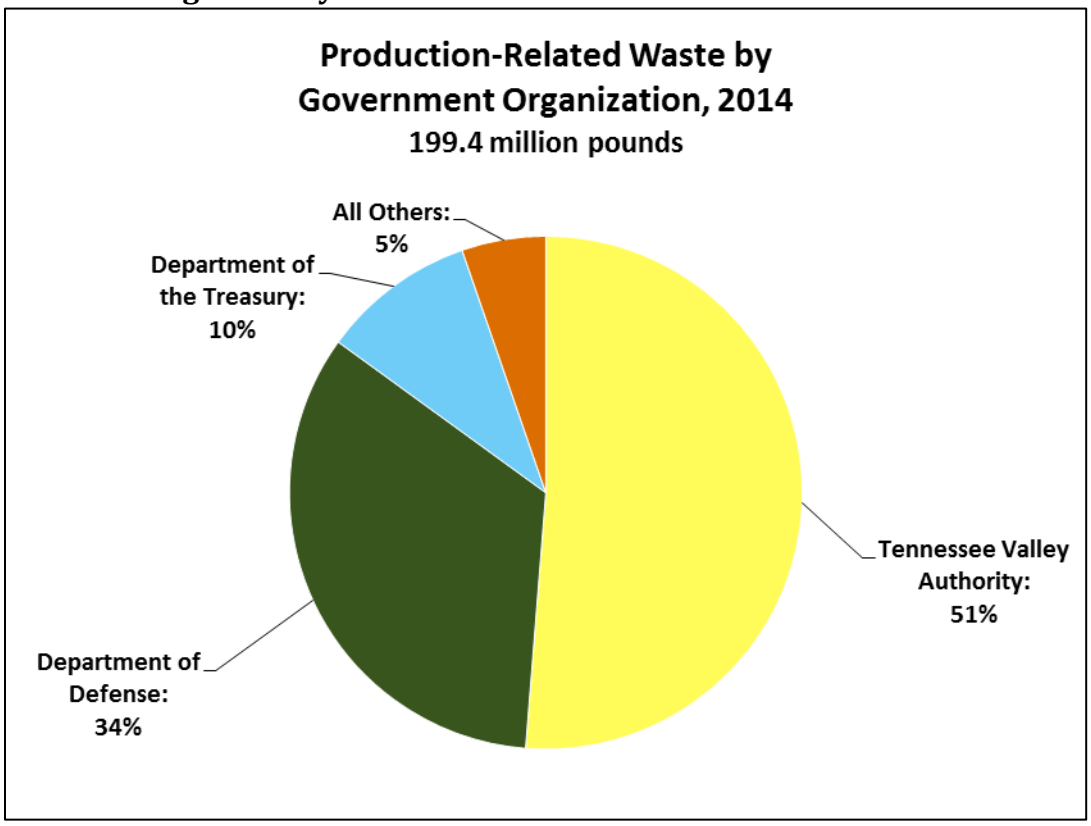
Federal facilities by sector



For the year 2014, 446 federal facilities in 38 different types of operations (based on their 6-digit NAICS codes) reported to the TRI Program. 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. While all federal facilities are subject to TRI reporting requirements regardless of their industry sector classification, for some industry sectors the TRI database only contains information from federal facilities. In fact, more than three-quarters of federal facilities are in just three sectors: National Security, such as military bases (62%); Correctional Institutions (12%); and Police Protection, such as training sites for Border Patrol stations (5%). No non-federal facilities in these three sectors have reported to the TRI Program.

As with non-federal facilities, activities at federal facilities drive the types and quantities of releases reported. Some of the activities at federal facilities that are captured by TRI reporting are similar to those at non-federal facilities, such as hazardous waste treatment. In other cases, federal facilities may report due to a more specialized activity not usually performed by non-federal facilities. For example, all of the federal facilities included under Police Protection and Correctional Institutions only reported for lead and lead compounds, likely due to the use of lead-containing ammunition on firing ranges at these facilities.

Waste management by federal facilities



This figure shows that 95% of the TRI chemicals managed as production-related waste at federal facilities in 2014 was reported by: the Tennessee Valley Authority (51%), the Department of Defense (34%), and the Department of the Treasury (10%). All other government organizations comprised 5% of the production-related waste managed and reported by federal facilities.

The types of waste reported by federal facilities vary by the type of operation. For example, the Tennessee Valley Authority (TVA) is a government-owned electric utility that provides power to southeastern States. Out of the 18 TVA facilities that reported to the TRI Program for 2014, virtually all of the production-related waste comes from the fossil fuel plants that report in the Fossil Fuel Electric Power Generation sector. Similarly, out of the six Department of the Treasury facilities that reported, most are mints for manufacturing currency and, accordingly, report in the Metal Stamping sector NAICS classification.

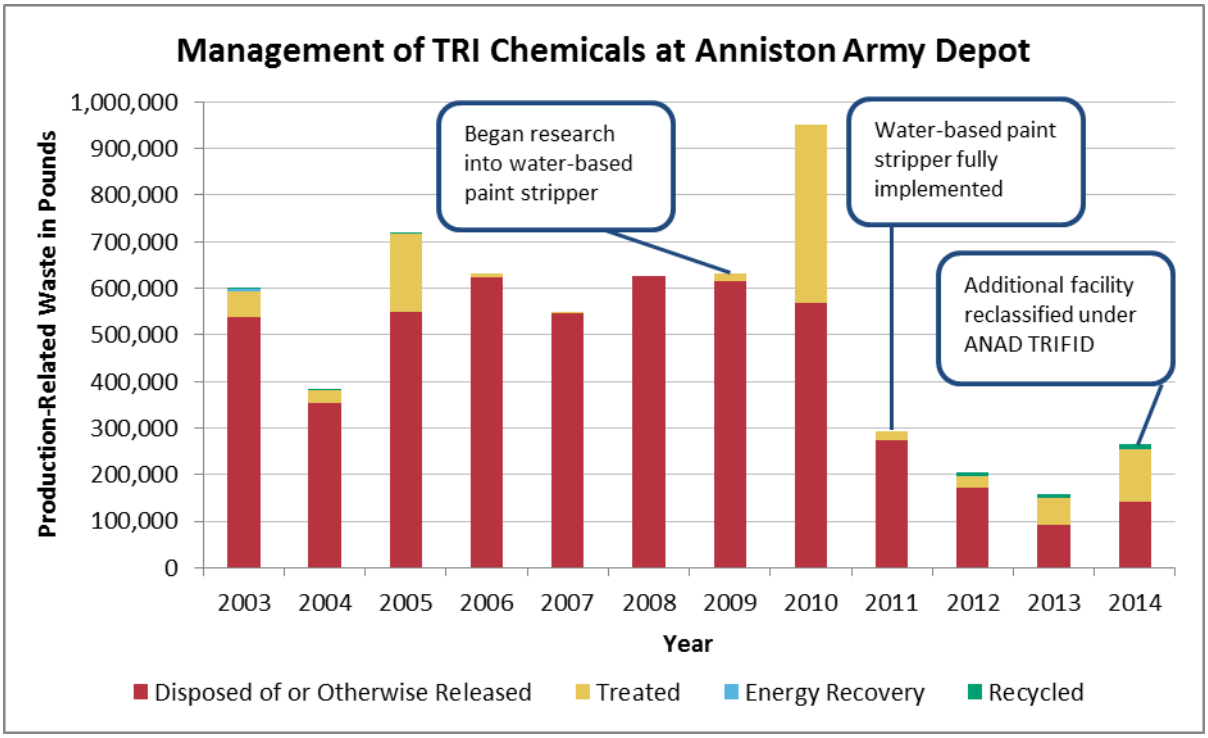
Case study: federal facility source reduction

Since federal facilities are subject to TRI reporting regardless of their industry sector classification, their operations are diverse and few focus on manufacturing processes. With their unique operations, some federal facilities may face challenges in implementing source reduction strategies to reduce chemical waste. For the 2014 reporting year, 28 federal facilities (6%) reported implementing source reduction activities.

Facilities that do not implement source reduction activities may elect to indicate the types of barriers to source reduction they encountered. For federal facilities, most of the facilities that indicate barriers to implementing source reduction are national security or correctional institutions that report on lead or copper. For example, several facilities in the National Security sector indicated that they reported on lead because it is contained in the ammunition used on site and they have not been able to identify ammunition that does not contain lead. However, other federal facilities have been able to implement some source reduction activities.

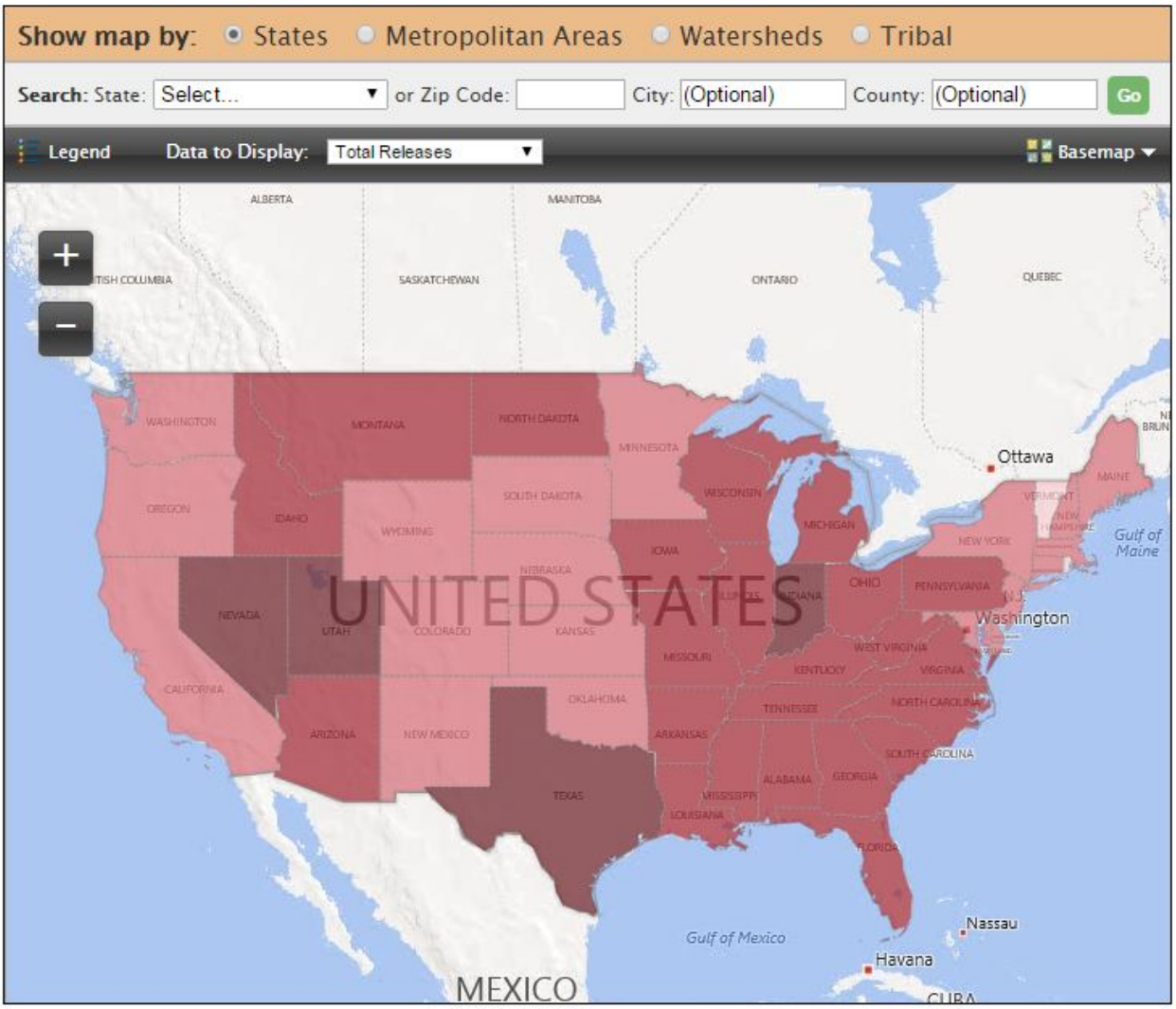
Source Reduction Example: Reducing TRI Releases at Anniston Army Depot

Anniston Army Depot (ANAD) is a U.S. Army maintenance center and munitions storage site in northeast Alabama. ANAD previously used a paint stripping solvent that contained approximately 75% dichloromethane, 20% formic acid, and 5% aromatics. ANAD began research in 2009 to find a replacement paint stripper that was water-based and would reduce the total volume of Hazardous Air Pollutants (HAPs) emitted by the facility. The new paint stripper selected by ANAD is free of dichloromethane and formic acid. ANAD also implemented ultrasonic cleaning solutions and equipment as a replacement to trichloroethylene used in degreasing operations. As shown in the figure below, ANAD has reduced TRI reportable chemical wastes significantly since they began implementing these initiatives. Note that for the 2014 reporting year, the releases from a separate facility were reclassified to be included under ANAD's release inventory, which likely explains the slight increase in total production-related waste managed.



Where You Live

Note: It may take a moment for the map to load.



View Larger Map, **Click on any one of the locations on the map to see detailed information.**

This chapter of the National Analysis looks at toxic chemical disposal or other releases that occurred at various geographic levels throughout the United States. The map default display is of total releases by state. The different shades of colors on the map indicate increasing ranges of releases based on which data is selected to display, as described in the map legend.

To view summary Toxics Release Inventory (TRI) data, select search parameters within the top two rows or query the map directly. Note that searching for city or zip code level information is possible only by specifying the search parameters.

The map displays data for states, counties, metropolitan areas, watersheds and tribes.

New this year: In addition to viewing the maps based on air, water, land and total releases, you can now also view the maps based on "RSEI Risk-Screening Scores." RSEI risk-screening scores are estimates of potential human risk generated by EPA's publicly available Risk-Screening Environmental Indicators (RSEI) model. These unitless scores represent relative chronic human health risk and allow you to compare RSEI scores across locations. RSEI scores consider more than just chemical quantities released; they also account for:

- Location of releases
- Toxicity of the chemical
- Fate and transport
- Human exposure pathway

For more on RSEI, see the Hazard and Risk of TRI Chemicals section.

States

States include all U.S. territories for a total of 56 states/territories. Of the 56 states and territories, all except American Samoa have facilities that reported releases to the TRI Program for the 2014 reporting year. The states with the greatest number of facilities that reported are Texas, Ohio and California, which together accounted for 20% of total reporting facilities in 2014. Selecting a state on the map will provide a pop-up with:

- a state level summary of TRI data
- a link to the state level TRI fact sheet
- an option to zoom to the counties within the state.

When zoomed to the state's map of counties, you may click to retrieve county-level summaries of TRI data and link to a county-level TRI fact sheet.

Metropolitan Areas

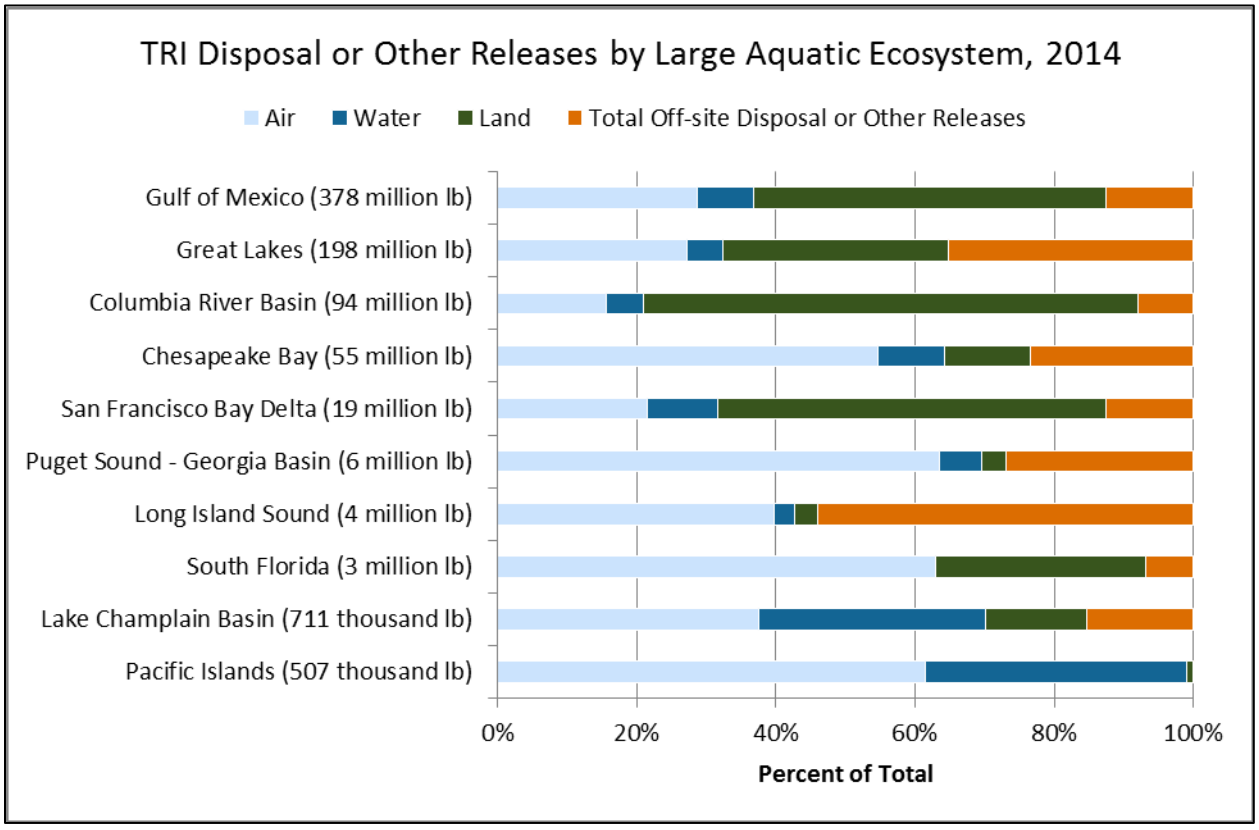
More than 80% of the country's population and many of the individual facilities that report to the TRI Program are located in urban areas. This map option shows all metropolitan and micropolitan statistical areas (metro and micro areas) in the United States as defined by the Office of Management and Budget (OMB) within which TRI-reported releases occurred in 2014. Metro and micro areas consist of one or more socially and economically integrated adjacent counties, cities, or towns. Click any of these areas on the map for an analysis of the TRI data specific to each.

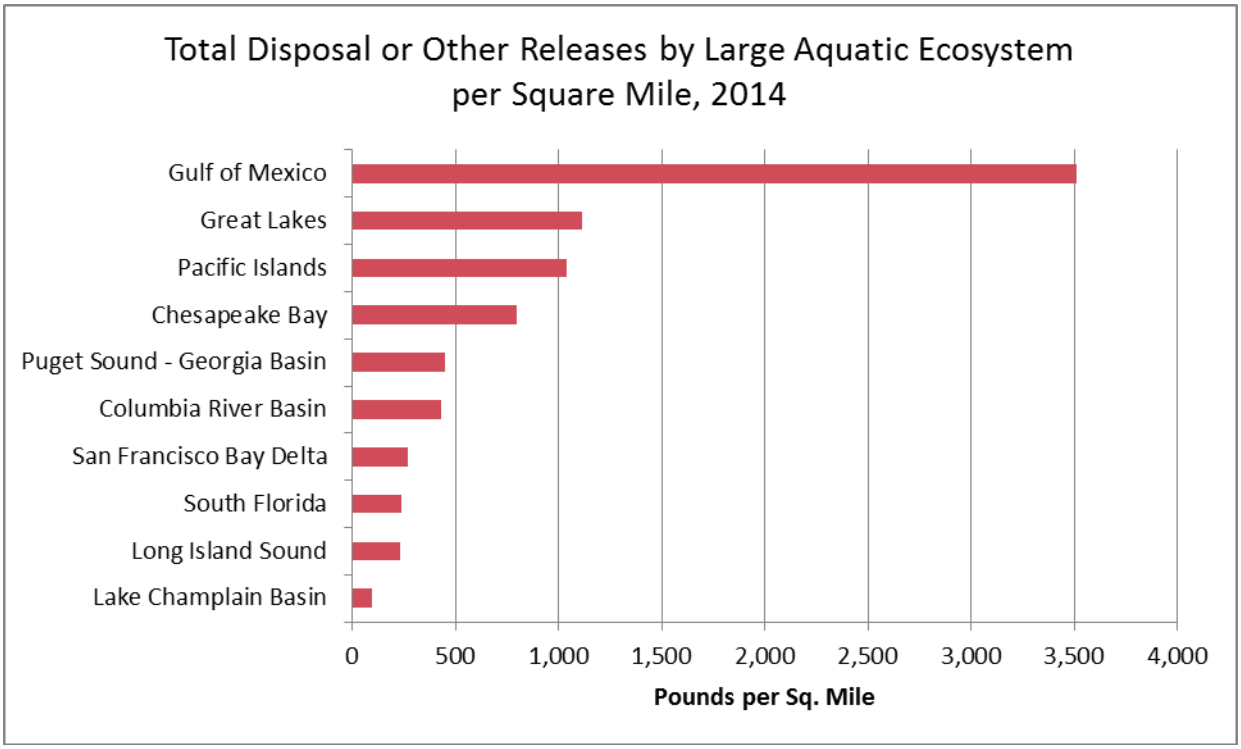
Watersheds

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 based on water flowing down through the land area above them. These important water resources are sensitive to chemicals and other pollutants released within or transferred across their boundaries.

Large aquatic ecosystems (LAEs) comprise multiple small watersheds and water resources within a large geographic area. The Large Aquatic Ecosystems Council was created by the U.S. Environmental Protection Agency in 2008 to focus on protecting and restoring the health of critical aquatic ecosystems. Currently, there are 10 LAEs in this program. Click on any of the 10 LAEs featured on the map to see an analysis of toxic chemical releases in each LAE.

Water pollution, surface runoff, contaminated sediment, discharges of toxic chemicals, and air emissions can affect the environmental quality of the land, water, and living resources within an aquatic ecosystem. Persistent toxic pollutants can be especially problematic in aquatic ecosystems because pollutants can accumulate in sediments and may bioaccumulate in aquatic organisms and the tissues of fish and other wildlife within the food chain to concentrations many times higher than in the water or air, causing environmental health problems for humans and wildlife.





Tribal

Congress has delegated authority to EPA to ensure that environmental programs designed to protect human health and the environment are carried out throughout the United States, including tribal lands. EPA's policy is to work with tribes on a government-to-government basis to protect the land, air, and water in Indian country and to support tribal assumption of program authority.

The map presents 2014 Toxics Release Inventory (TRI) data relating to federally-recognized tribes and Alaska Native Villages (ANVs) as depicted by the U.S. Bureau of Land Management's Alaska State Office. This analysis shows facilities that believe their facility is in Indian country and reported Bureau of Indian Affairs codes to EPA for 2014.

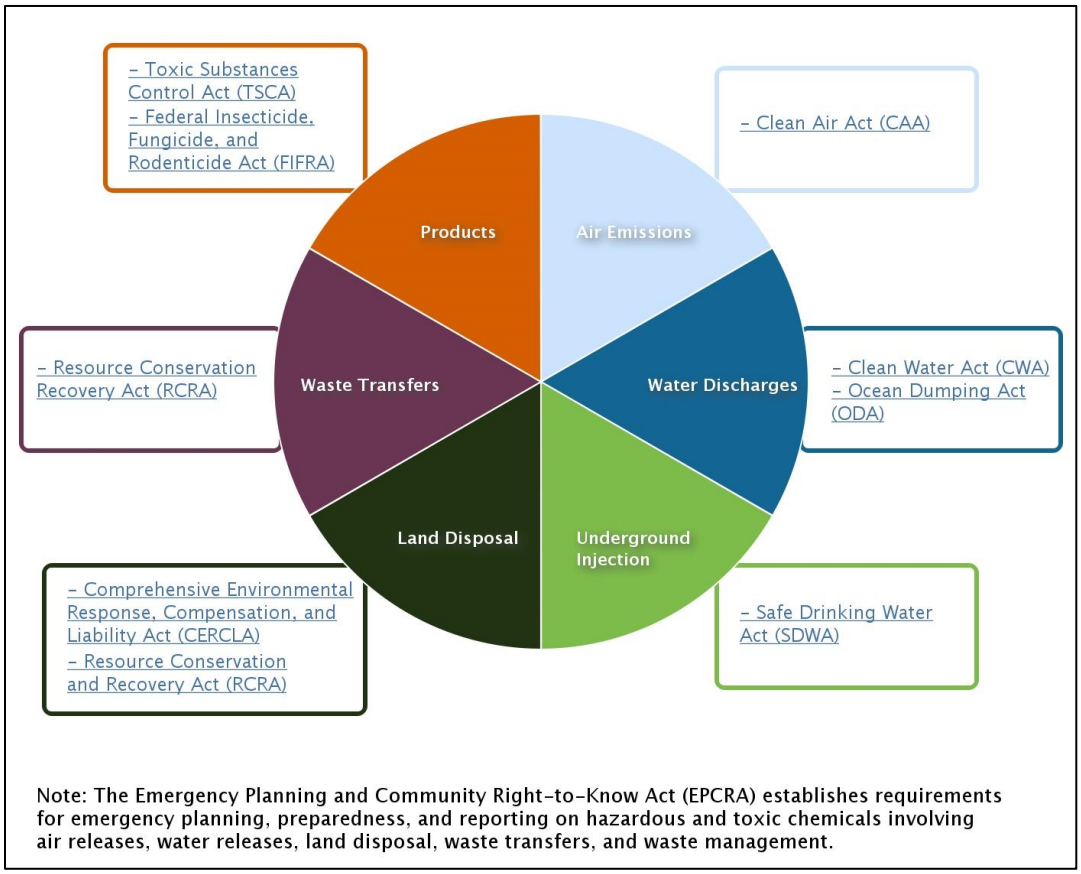
The table below lists the Indian tribes and ANVs that had at least one TRI facility reporting 2014 data, and shows which industry sector and chemicals accounted for the majority of disposal or other releases in each area. Click on the number of facilities for more information about those facilities including chemicals released, quantities released, parent company, and facility contacts.

Indian Tribes and Alaska Native Villages	State(s)	Number of Facilities	Total On-site and Off-site Disposal or Other Releases (lbs)	Primary Industry Sector(s) (% of disposal or other releases)	Primary Chemical(s) (% of disposal or other releases)
Navajo Nation, Arizona, New Mexico and Utah	AZ, NM	2	4,034,126	Electric Utilities (100%)	Barium Compounds (88%)
Tohono O'odham Nation of Arizona	AZ	1	3,484,417	Metal Mining (100%)	Lead Compounds (86%)
Ute Indian Tribe of the Uintah & Ouray Reservation, Utah	UT	1	1,835,290	Electric Utilities (100%)	Barium Compounds (84%)
Puyallup Tribe of the Puyallup Reservation	WA	11	392,317	Hazardous Waste/Solvent Recovery (57%); Petroleum (36%)	Chromium (33%); Ammonia (22%); Nitrate Compounds (11%)
Confederated Tribes and Bands of the Yakama Nation	WA	3	157,408	Plastics and Rubber (100%)	Styrene (81%)
Coeur D'Alene Tribe	ID	2	108,547	Wood Products (100%)	Methanol (74%)
Arapaho Tribe of the Wind River Reservation and Shoshone Tribe of the Wind River Reservation, Wyoming	WY	1	2,777	Chemicals (100%)	Sulfuric Acid (100%)
Saginaw Chippewa Indian Tribe of Michigan	MI	1	2,569	Machinery (100%)	Chromium (62%)
Sissteton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota	SD	1	821	Chemicals (100%)	n-Hexane (100%)
Colorado River Indian Tribes of the Colorado River Indian Reservation, Arizona and California	AZ	1	782	Hazardous Waste/Solvent Recovery (100%)	Hydrochloric acid (96%)
Oneida Tribe of Indians of Wisconsin	WI	4	476	Chemicals (99%)	Methanol (97%)
Gila River Indian Community of the Gila River Indian Reservation, Arizona	AZ	9	448	Primary Metals (100%)	Copper (71%)
Salt River Pima-Maricopa Indian Community of the Salt River Reservation, Arizona	AZ	1	333	Stone/Clay/Glass (100%)	Lead (74%)
Tulalip Tribes of Washington (previously listed as the Tulalip Tribes of the Tulalip Reservation, Washington)	WA	1	225	Primary Metals (100%)	Chromium Compounds (93%)
Cheyenne and Arapaho Tribes, Oklahoma	OK	1	0	Petroleum Bulk Terminals (100%)	NA
Suquamish Indian Tribe of the Port Madison Reservation	WA	1	0	Stone/Clay/Glass (100%)	NA

TRI and Beyond

The Toxics Release Inventory (TRI) is a powerful resource that provides the public with information about how toxic chemicals are managed by industrial facilities in the United States. However, there are many other programs at EPA that collect information about chemicals and our environment.

The next figure is an overview 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 area, TRI covers releases to air, water, and land; waste transfers; and waste management activities. As a result, TRI data are especially valuable, as they can be combined with many other datasets to provide a more complete picture of national trends in chemical use, management and releases.



Note: 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 waste management.

This chapter highlights two thematic areas that combine TRI data with other data sources:

- Climate Change:
  - A comparison of TRI data and EPA's Greenhouse Gas Reporting Program (GHGRP) data collected under the Clean Air Act (CAA)
- Surface Water:
  - An analysis of TRI and EPA's Discharge Monitoring Report (DMR) data collected under the Clean Water Act (CWA)

Comparing TRI and Greenhouse Gas Emissions

Under the authority of the Clean Air Act, EPA's Greenhouse Gas Reporting Program (GHGRP) requires large emitters of greenhouse gases and suppliers of certain products to submit annual greenhouse gas reports to EPA. Emissions of greenhouse gases lead to elevated concentrations of these gases in the atmosphere, which alter the Earth's radiative balance and contribute to climate change. These elevated concentrations are reasonably anticipated to endanger the public health and welfare of current and future generations. The purpose of GHGRP is to collect timely, industry-specific data to help us better understand the source of greenhouse gas emissions and to inform climate policy. Comparing GHGRP data with TRI data about chemical releases from industrial facilities can provide a more complete picture of a facility's environmental performance.

What is CO_2e?

GHG emissions are typically expressed in a common metric so that their impacts can be directly compared as some gases are more potent than others. The international standard practice is to express GHGs in CO_2e.

What chemicals were reported to GHGRP for 2014?

- Carbon dioxide = 91.5% of the $mtCO_2e$ total
- Methane = 7.0%
- Nitrogen Oxide (N_2O) = 0.9%
- Fluorinated Gases (HFCs, PFCs, SF6) = 0.7%

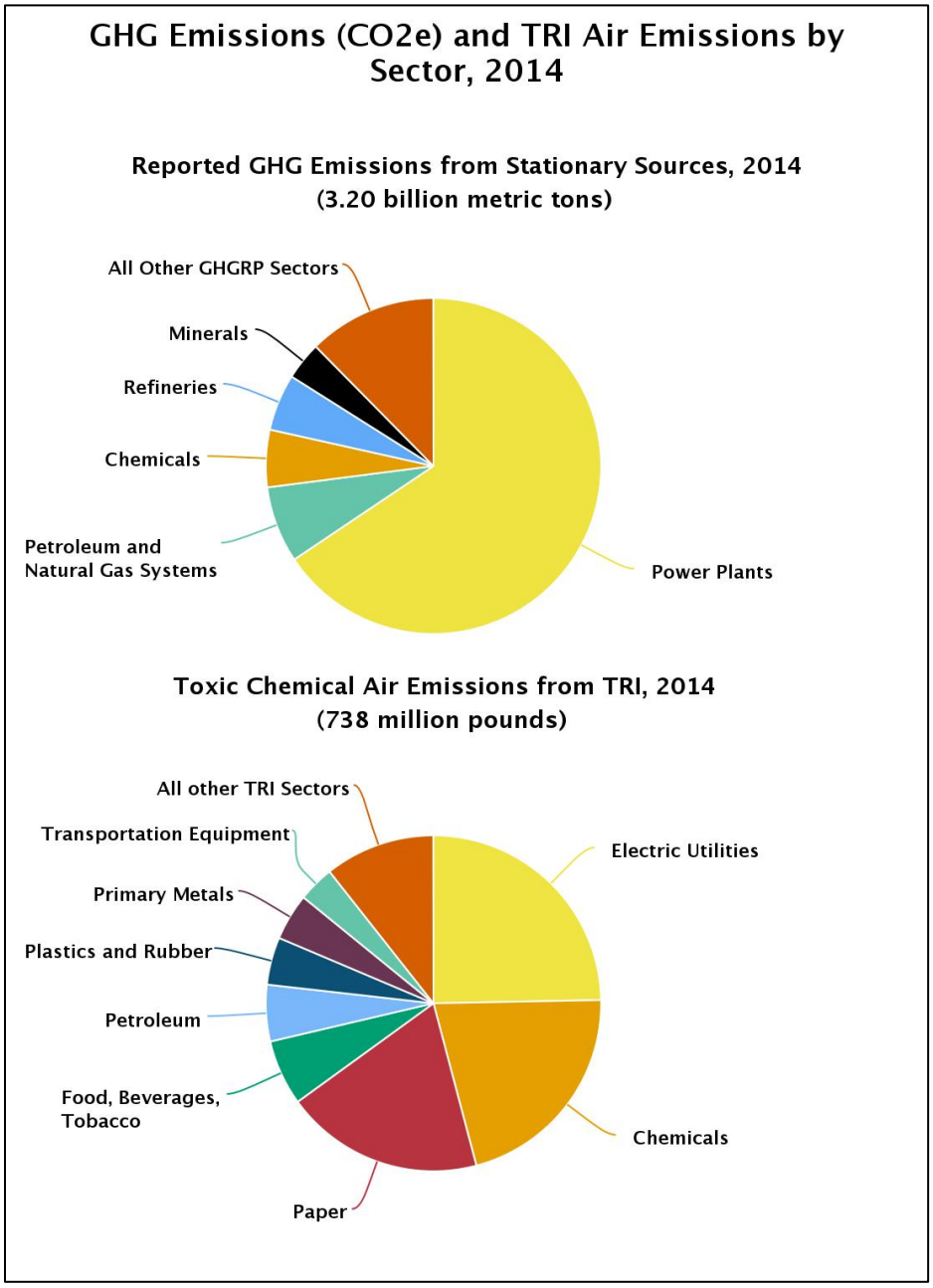
In 2014:

- Over 8,000 facilities reported direct emissions of GHGs to the atmosphere, totaling over 3.20 billion metric tons of carbon dioxide equivalent ($mtCO_2e$).
- This represents about half of the 6.67 billion $mtCO_2e$ that EPA estimated were released in the United States from all human-related sources per the 2013 annual U.S. Greenhouse Gas Inventory. The GHGRP does not require direct emissions reporting from all U.S. sources. For example, the transportation sector and agricultural sources of GHG emissions are not included in the GHGRP.
- The primary greenhouse gas reported to the GHGRP was carbon dioxide (CO_2), which is released during fossil fuel combustion and various industrial processes.

TRI reporting focuses on toxic chemicals and as a result covers different chemicals from GHGRP. Some TRI chemicals are a result of combustion of fuels for energy (as most GHG emissions are), but others are used in and released from additional processes ranging from metal mining to surface cleaning. Analyzing toxic chemical releases reported to TRI and greenhouse gas emissions reported to the GHGRP together creates a more complete picture of emissions at the facility and industrial sector levels.

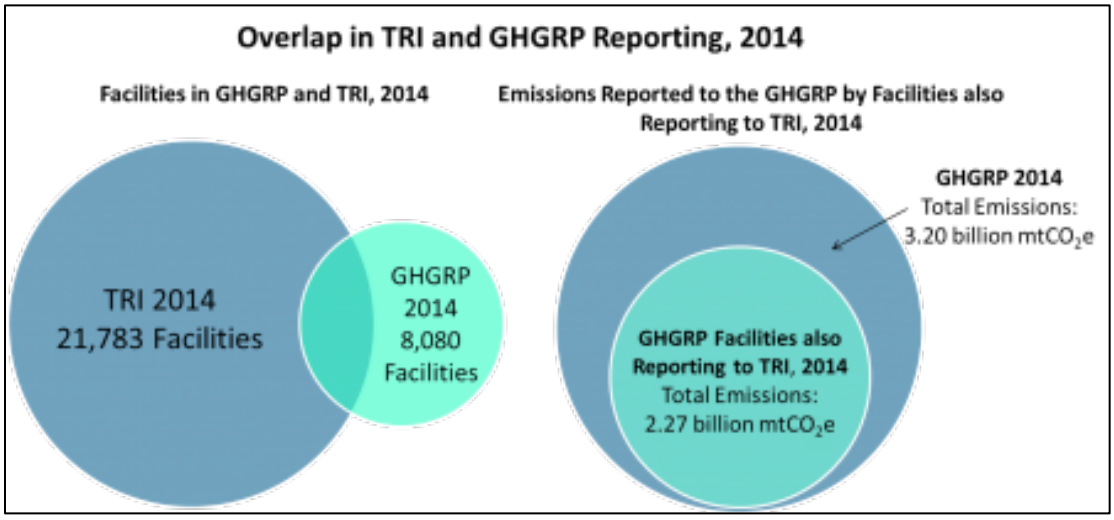
Note that in addition to differences in the chemicals reported to TRI and GHGRP, there are numerous other program differences including reporting thresholds. For TRI, the reporting threshold for most chemicals is 25,000 pounds manufactured or processed, or 10,000 pounds otherwise used per year, whereas for GHGRP, the reporting threshold is based on emissions and is generally 25,000 metric tons of carbon dioxide equivalent per year.

Top Sectors Reporting TRI Air Emissions and GHG CO_2e



- This figure shows the top sectors reporting air emissions to GHGRP and TRI in 2014.
- The top air emitting sectors in TRI are similar, but not identical to, the top emitting sectors covered by the GHGRP.
- While electric utilities are the primary reporters of air emissions to both programs, the chemical manufacturing industry is a bigger contributor to the toxic air emissions reported to the TRI Program than it is to the GHG emissions reported to the GHGRP.

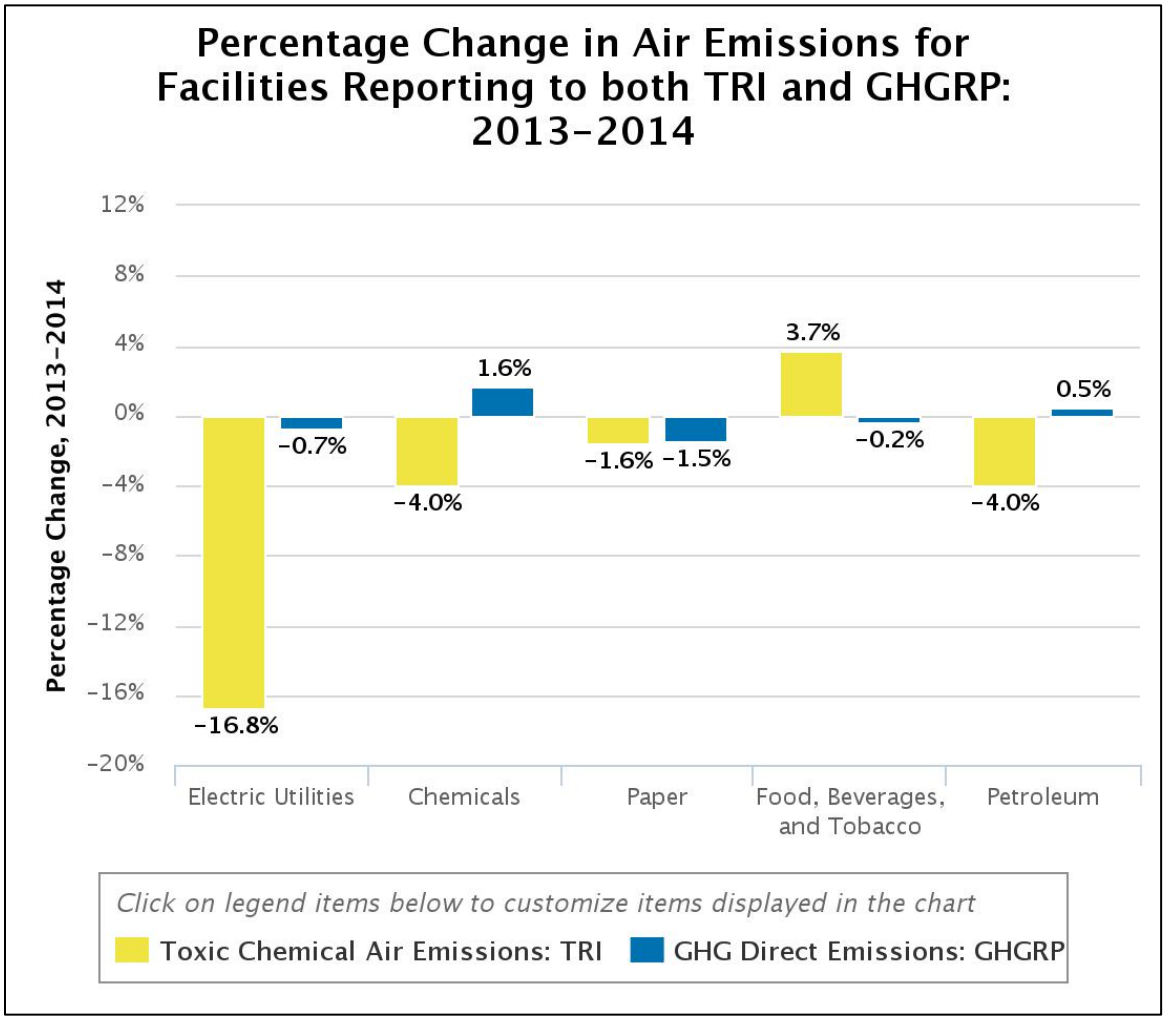
Overlap in TRI and GHGRP Reporting



In 2014:

- Almost one-third of the facilities reporting to the GHGRP also reported to the TRI Program.
- However, this subset of GHGRP reporters accounted for 70% of GHGRP emissions, indicating that the facilities reporting the greatest GHG emissions also trigger TRI requirements for reporting on toxic chemicals.

Percentage Change in TRI and GHG Air Emissions



From 2013 to 2014:

- For the five industry sectors with the greatest TRI-reported air emissions, this figure shows the percentage change in total air emissions for the subset of facilities reporting to both the TRI Program and the GHGRP.
- While based on a consistent subset of facilities, the percentage change in emissions by industry sector varies between the two programs.
- The variations are driven by differences in the types of pollutants reported to the TRI Program and the GHGRP and by the impacts of certain source reduction and pollution control activities. Actions taken by facilities may include:
    - Reduction of fuel consumption, which decreases emissions of both greenhouse gases and toxic chemicals that are byproducts of fuel combustion.
    - Installation of new treatment technology, which may reduce emissions of a specific TRI chemical but not affect greenhouse gas emissions.

Regulating Chemical Releases to Water

Under the Clean Water Act (CWA), facilities are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for all point sources (a pipe, ditch, or channel) used to discharge pollutants into waters of the United States. The NPDES program aims to protect and restore the quality of U.S. rivers, lakes, and coastal waters through pollutant discharge limits. Facilities are required to report compliance with the stipulated permit limits via monthly Discharge Monitoring Reports (DMRs).

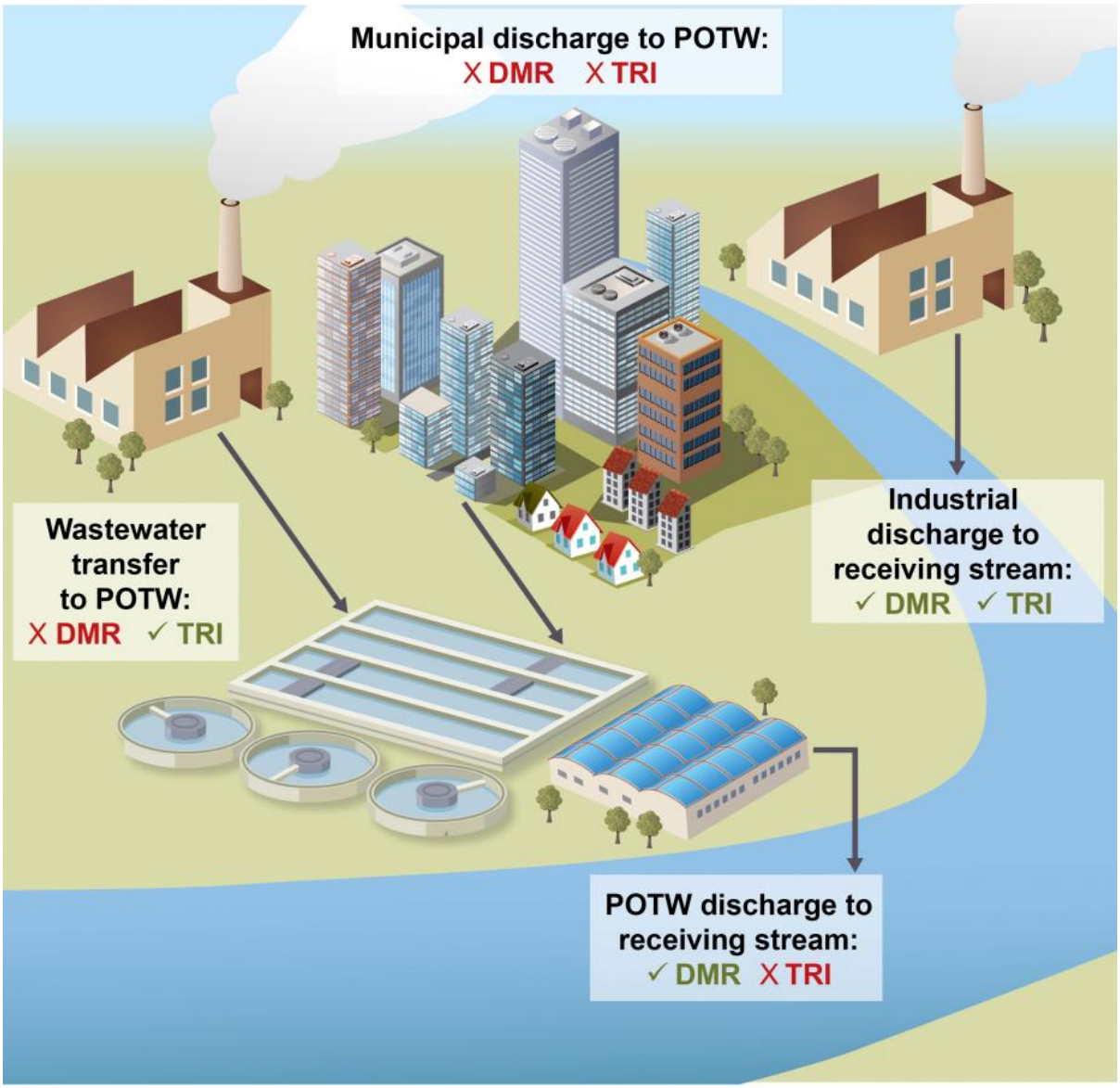
Through the DMRs submitted, the NPDES program collects data for the facility-specific parameters identified in the facility's NPDES permit. The DMR data may include:

- release quantities of specific chemicals;
- water quality measures, such as pH, temperature, and flow rates; and
- conventional parameters such as biochemical oxygen demand and total suspended solids.

Analyzing TRI data about toxic chemical releases to water along with DMR data provides a more comprehensive picture of pollutant discharges to surface water.

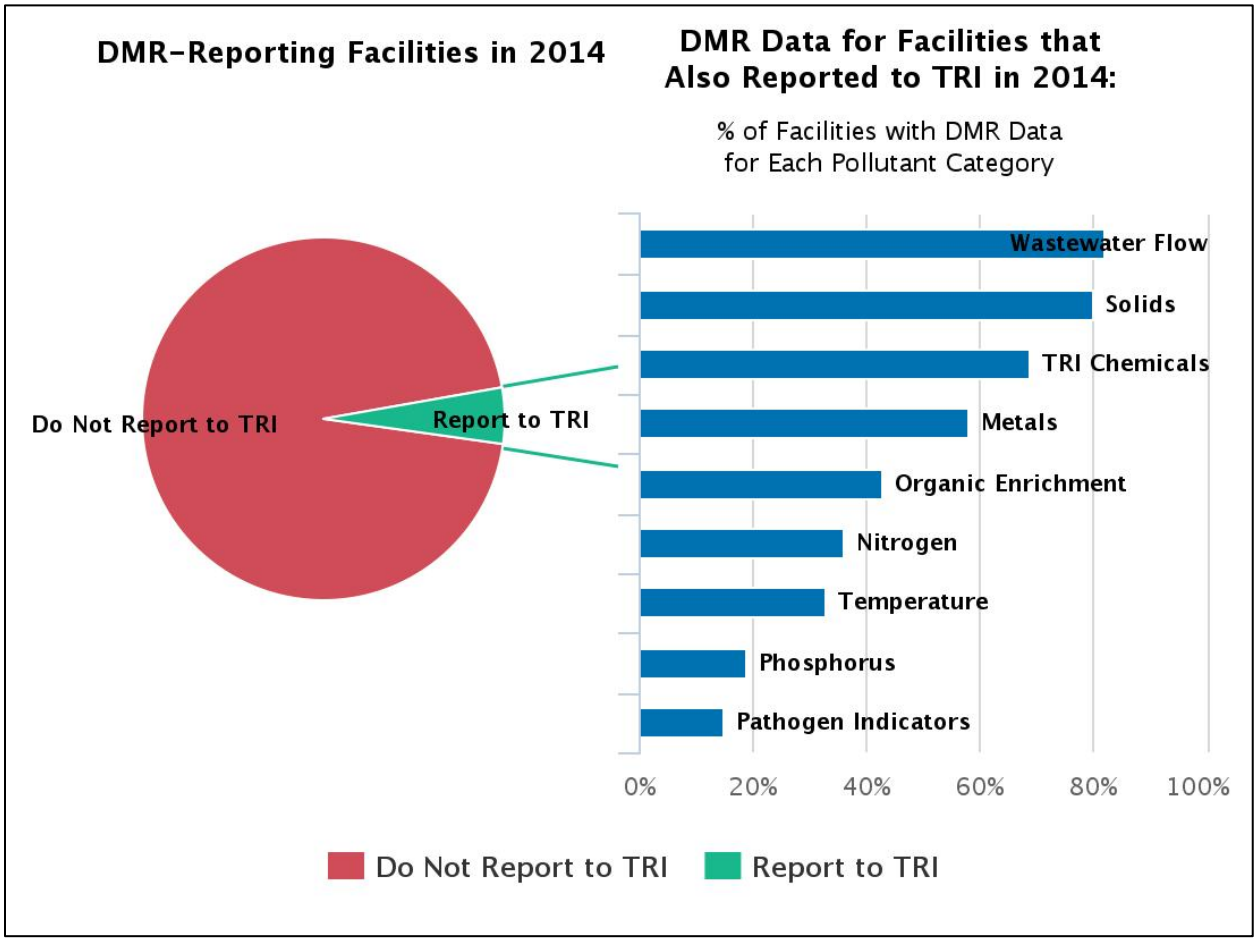
This figure illustrates the types of wastewater streams that the TRI Program and DMR data describe.

Wastewater Stream Types Relevant to DMR and TRI Data



The TRI database includes information on discharges to receiving streams and chemical transfers to Publically Owned Treatment Works (POTWs) from industrial facilities. DMRs include information on discharges to receiving streams by both industrial facilities and POTWs, but do not include transfers from an industrial facility to a POTW. Neither data set captures municipal discharges to POTWs.

DMR Data for Facilities that Report to TRI



While the data collected by the TRI Program and NPDES Program differ in important ways, using both TRI and DMR data provides a more complete understanding of pollutants being discharged into surface waters. As shown in the pie chart, 5% of the facilities that submitted DMRs also reported to the TRI Program. The bar graph focuses on this subset of facilities that report to the TRI Program and submit DMRs. Through their DMRs, these facilities provide information on many other parameters that may impact water quality, such as the temperature, or biochemical or chemical oxygen demand (i.e., organic enrichment) of their water discharges.

There are several considerations to keep in mind when comparing TRI and DMR data:

- **Reporting facilities:** Permitting authorities, such as the states, are not required to report DMR measurements for smaller, non-major, facilities. In addition, facilities may be exempt from reporting to TRI if they are not in a covered industry sector or do not meet the threshold number of employees.
- **Regulated chemicals:** When filing DMRs, facilities only report discharges of pollutants that the NPDES permit requires them to monitor. The specific pollutants for which monitoring requirements are implemented in a facility's NPDES permit are at

the discretion of the permitting authority. Other pollutants may be discharged but are not reported on DMRs. Facilities that report to the TRI Program only report on chemicals on the TRI list, and are not required to report if they do not exceed an activity threshold for reporting.

DMR and TRI data can be explored together using the DMR Pollutant Loading Tool. This tool provides information on which facilities are discharging pollutants to surface water, what pollutants and how much of each they are discharging, and where these discharges occur. Explore the tool to learn more about discharges of pollutants to surface waters in your community. You can also look at nationwide comparisons of DMR and TRI data for Reporting Year 2014 in the TRI and DMR Comparison Dashboard.