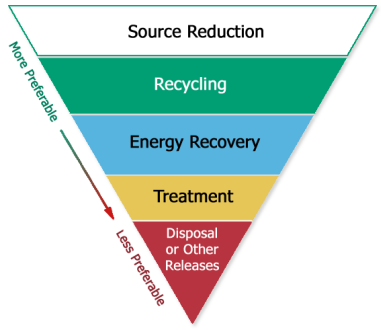
Management of TRI Chemicals

In addition to collecting information on the disposal or other releases of chemicals to the environment, TRI collects information on the quantities of toxic chemicals recycled, combusted for energy recovery, and treated both on- and off-site. This production-related waste includes the total amounts of toxic chemicals in waste managed by facilities, giving a more complete picture of what happens to chemicals at facilities, rather than focusing only on their final deposition.

Looking at production-related waste over time helps track industry progress in reducing waste generation and in moving towards safer waste management methods. For example, EPA encourages facilities to first eliminate waste at its source but, for waste that is generated, the preferred management methods are recycling, followed by burning for energy recovery, treating, and, as a last resort, disposing of or otherwise releasing the waste. The goal is that, when possible, waste management techniques will shift over time from disposal or other releases toward the preferred techniques in the waste management hierarchy. These waste management priorities are illustrated in the waste management hierarchy (Figure 13) established by the Pollution Prevention Act of 1990.

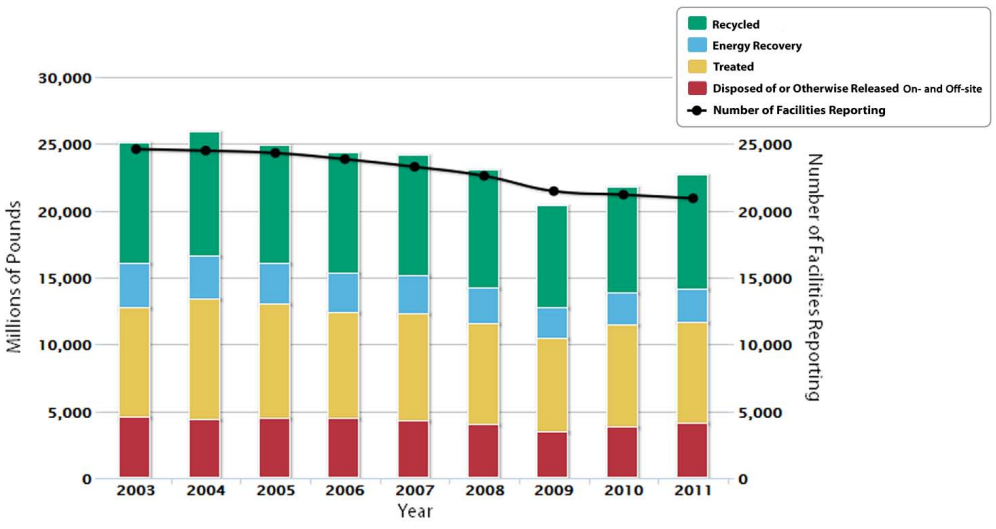
Figure 13. Waste Management Hierarchy



As shown in Figure 14, from 2003 to 2011, total production-related waste managed by TRI facilities declined by 9% (more than 2 billion pounds). However, from 2010 to 2011, the total production-related waste managed increased 4%. The quantities of TRI chemicals in waste that were recycled, combusted for energy recovery, and disposed of or otherwise released increased from 2010 to 2011, while the amount treated decreased:

- recycling increased by 8%
- combustion for energy recovery increased by 2%
- treatment decreased by 1% and
- disposal and other releases increased by 8%.

Figure 14. Production-Related Waste Managed, 2003-2011

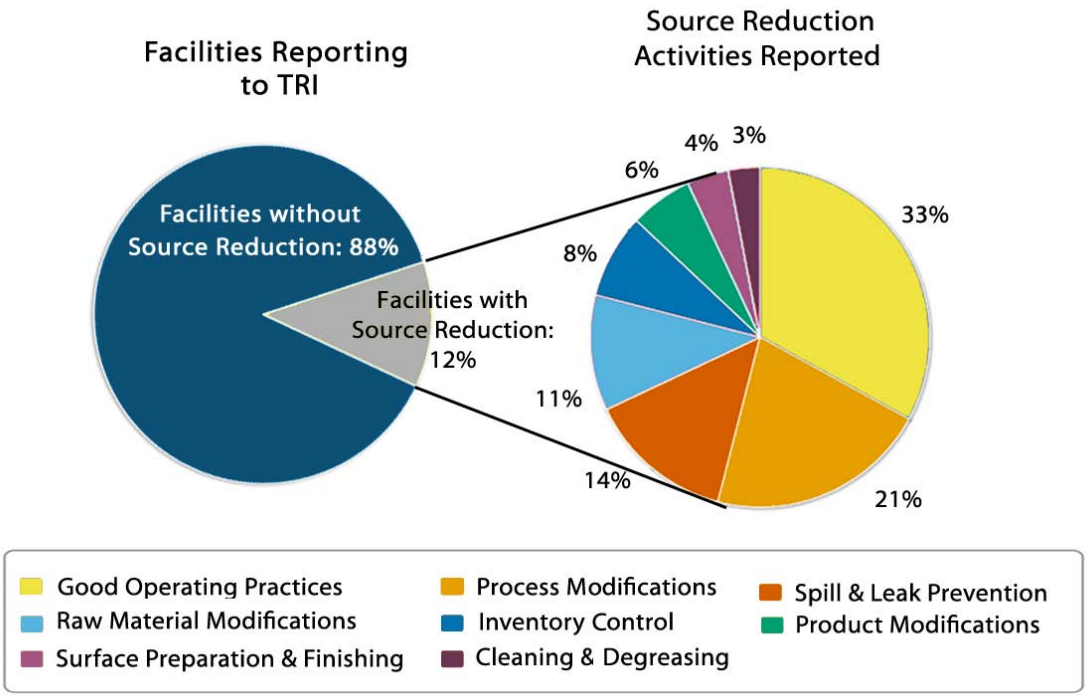


As with disposal or other releases, production-related waste managed can increase or decrease due to factors like changes in operations at facilities that alter the chemicals they use, the adoption of pollution prevention activities, or changes in business activity.

The adoption of pollution prevention activities can help eliminate waste at the source. Progress in implementing these activities can be tracked, in part, through the source reduction practices that are reported to TRI. The term "source reduction" generally refers to any practice that reduces the total quantity of chemical waste generated at the source. TRI facilities report newly implemented* source reduction activities each year. Examples of these include: good operating practices (e.g., improved maintenance scheduling); process modifications (e.g., instituted re-circulation within a process); raw materials modifications (e.g., increased purity of raw materials); and numerous others.

In 2011, a total of 2,509 facilities (12% of all TRI facilities) reported initiating 8,430 source reduction activities. Good operating practices, process modifications, and spill and leak prevention were the types of activities reported most frequently, as shown in Figure 15.

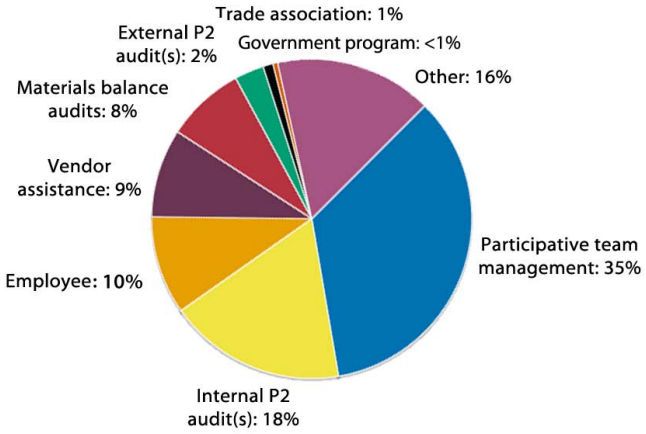
Figure 15. Newly Implemented* Source Reduction Practices, 2011



* Facilities may have ongoing source reduction activities initiated in previous years that are not captured in the graphs in this document. To find data on previously implemented source reduction activities see the TRI Pollution Prevention Website (www.epa.gov/tri/p2).

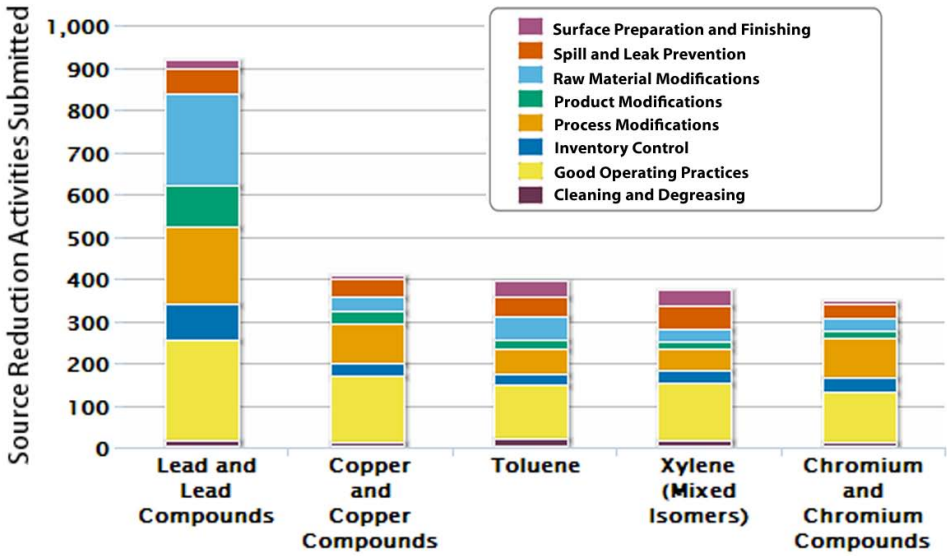
For each of the source reduction activities, facilities also provide information about how they identified the opportunity for source reduction. Facilities most commonly identified these opportunities through participative team management (e.g., team training to identify process improvements) and internal audits (Figure 16).

Figure 16. Methods to Identify Newly Implemented Source Reduction Activities, 2011



In 2011, newly implemented source reduction activities were most frequently reported for the chemicals shown in Figure 17. The figure also shows the distribution of types of source reduction activities initiated for these chemicals. The type of source reduction implemented varies depending on a chemical's use in industrial operations and the chemical's characteristics. It should be noted that these five chemicals are among the most commonly reported TRI chemicals by number of reports.

Figure 17. Newly Implemented Source Reduction Activites for Top 5 Chemicals, 2011
for Chemicals with the Most Source Reduction Activities Reported



Facilities may also report additional information to EPA on their source reduction, recycling, or pollution control activities. For the top chemicals with source reduction reporting, examples of additional information reported are shown in Table 1 with the sector of the facility that submitted each example indicated in brackets.

Table 1: Selected Source Reduction Activity Descriptions, by Chemical (2011) (from Section 8.11 of the Form R)

Chemical	Source Reduction Activity Descriptions
Lead and Lead Compounds	• During reporting year 2011 an alternative product surface finishing line was implemented as an alternative to the lead process. The new process was installed for a customer that desired the surface finish. The new process is not limited to only that customer. Several customers have utilized the lead-free process and we expect continued growth of this process. [Computers/Electronic Products sector] • Our agency/institution has implemented an aggressive environmental management system (EMS) program based on the ISO 14001 standard. We are moving to purchase "lead" free ammunition (green ammunition) and instituted better tracking procedures/operational controls that add accuracy in regard to our release calculations. [Federal Facility] • Changed frequency of solder plating bath replacement from once every 18 months, to once every 24 months. [Computers/Electronic Products sector]
Copper and Copper Compounds	• A filter system was added to a process that generated copper fines. The fines had the opportunity to dissolve and reach the wastewater ion exchange system. The filter system was installed to remove the copper fines at the source. Filter system was designed during new equipment design review. Reuse of rinsewater containing copper fines was implemented to conserve water with a side benefit of less copper discharge. [Computers/Electronic Products sector] • When ordering copper wire and designing units, we had previously ordered and cut 10% longer pieces than necessary to allow for error. Reducing the extra amount from 10% to 7% will save a bit on excess material. [Electrical Equipment sector] • The site has implemented a 'zero leak' policy. Shift supervisor make rounds every 4 hours to look for signs of leaks or releases. Any leak or release is stopped and work orders are written to make repairs. [Chemicals sector]
Toluene	• Used toluene for cleaning parts. At the suggestion of an employee, a water based green cleaner has been used to replace the toluene. The future use of toluene has been eliminated. Used a local vendor to identify an adequate water based cleaner to replace the toluene. [Fabricated Metal Products sector] • We are retrofitting our sand mills one-by-one to be fully enclosed, preventing evaporative loss during milling, and saving time and solvent during cleaning. Internal EHS reviews determined that yields will improve and the work environment would be cleaner if we could prevent the loss of volatile components. For a given batch using solvent carrier, we expect 0.75% to 1.5% of the solvent used will be eliminated as fugitive/stack emissions. There were many ways to update or upgrade the mills including full replacement and assorted methods to capture and control emissions. Working with the vendor, total enclosure was selected as the most efficient method for reducing emissions. [Chemicals sector] • Preventive maintenance scheduling and records will be transitioned to digital documentation, to make that data more easily accessed, and to further be able to quantify quality record keeping. Increased use of inventory and production control systems through digitization will further benefit closer accounting of on-hand stocks. Corporate planning to increase cooperation between production facilities. [Textiles sector]
Xylene (mixed isomers)	• Implementing kanban inventory control systems that should help reduce inventory. New equipment and procedures that will help reduce waste. [Furniture sector] • Finished coatings product that contained xylene has been eliminated and replaced with a low VOC product. This elimination has resulted in a significant reduction of the use of a xylene containing raw material. [Chemicals sector] • Installed blowdown lines to capture all cleaning materials and paint related products throughout facility; Process improvements made with process engineer/maintenance manager. [Chemicals sector]
Chromium and Chromium Compounds	• Installed a new piece of equipment (Salvagnini punching / shearing system) to better utilize the raw material resulting in less waste. [Machinery sector] • [The facility] continues to reduce hex chrome contained in primers. This year a new primer was introduced containing half the chromium the previous primer contained. The long range plan is to reduce all chromium contained in the primary primer used on aircraft parts and assemblies to 0. [Transportation Equipment sector] • Trials underway with trivalent vs hex chromate conversion coating for corrosion resistance on zinc plated copper parts used in electrical applications. [Fabricated Metal Products sector]