OVERVIEW In 2004, the Sector Strategies Program released its first *Performance Report* examining key trends influencing the environmental footprints of twelve sectors and identifying opportunities for improvements. The multi-year data upon which the first report was based came from a variety of public and private sector sources in order to provide the most comprehensive and accurate picture possible of each sector's environmental performance.

The report described each sector's performance in a number of areas, such as:

- Conserving water;
- Improving water quality;
- Increasing energy efficiency;
- Managing and minimizing toxics;
- Managing and minimizing waste; and
- Reducing air emissions.

In the 2006 report, EPA has updated the information on each sector's performance, providing data from the last decade (1994–2003) with an emphasis on performance trends since 2000. In addition, EPA continues to expand both the number of data sources used and the depth of analysis presented. For example, this report includes a new discussion of the toxicity of pollutant releases in each of the sectors.

METHODOLOGY Similar to the 2004 report, the 2006 update provides current sector-specific information based upon a two-part methodology:

- Defining each sector based upon standard classification codes or pre-determined facility lists; and
- Collecting data and presenting "normalized" data trends.

Definition of Sectors For this report, sectors are defined either by standard classification codes, such as the North American Industry Classification System (NAICS) or the U.S. Standard Industrial Classification (SIC) system, or by pre-determined facility lists, such as trade association membership rosters. The endnotes for each chapter clarify how each sector was defined when accessing each data source.

Normalization of Data This report makes frequent use of normalized data when presenting trends over time. As noted in the *Glossary*, "normalizing" means adjusting the actual annual release numbers to account for changes in sector production or output over the same time period. For example, if emissions show a steady decline over time, this could be caused by declining production in the sector, rather than any real improvement in environmental performance. Without accounting for changes in production, the graph would show a downward trend. After adjusting for the declining production, the graph would look more flat.

The factor used to normalize data varies across the sectors but is clearly identified on each chart. Most charts, for example, use sales dollars, while others use productivity measures, such as tons of product.

As an example, many of the charts in this report track progress from 1994 through 2003. On these charts, EPA adjusted sales data for inflation using 1994 dollars as the base year, or similarly adjusted productivity data against the 1994 starting quantity. The formula for this adjustment is shown below:

$$\text{Measures for Year 'A'} \quad \times \quad \frac{\text{1994 Normalized Data (\$/production/shipment)}}{\text{Year 'A' Normalizing Data (\$/production/shipment)}}$$

KEY DATA SOURCES As noted above, the data upon which this report is based come from a variety of public and private sector sources, including EPA's Toxics Release Inventory (TRI) and National Emissions Inventory (NEI). One enhancement in the 2006 report is the utilization of EPA's Risk-Screening Environmental Indicators (RSEI) model, which enables EPA to take into account the relative toxicity of each chemical reported as released to the environment in TRI.

In addition, the 2006 report draws upon other federal data, such as EPA's *National Biennial RCRA Hazardous Waste Report* and the U.S. Department of Energy's (DOE) Manufacturing Energy Consumption Survey (MECS). Industry reporting of some of these data is required by law, while other data come from information submitted voluntarily.

Many sectors also collect their own data to track environmental performance over time. More detailed information on the federal data sources, as well as descriptions of these industry data sources, can be found in *Appendix B*.

The following summaries highlight key points regarding the primary data sources used throughout the report, including TRI, *National Biennial RCRA Hazardous Waste Report*, NEI, and MECS.

Toxics Release Inventory One of the report's key data sources is TRI, a publicly available database that contains information on the release and management of nearly 650 chemicals and chemical categories by facilities that use, process, or manufacture these chemicals at annual levels above reporting thresholds. In TRI terminology, releases include discharges to air, water, and land (including landfills), while management includes a variety of techniques, such as treatment, energy recovery, or recycling.

Although not all sectors and/or facilities are subject to TRI reporting requirements, aggregate TRI data indicate trends in the management and minimization of waste by reporting sectors. Where data are available, this report describes TRI data for each sector from 1994 through 2003 (the most current data available at the time of this report's publication).

In addition, this report includes a discussion of the toxicity of each sector's releases to air and water. Although all TRI chemicals are hazardous, their toxicity – the inherent ability of a chemical to cause harm – varies greatly. Using EPA's RSEI model, EPA can calculate a toxicity-weighted score for each sector's air and water releases, which reflects both the quantity and toxicity of the chemicals released.

RSEI results are calculated by multiplying the pounds of air or water releases by a toxicity weight specific to the chemical and media of release. The toxicity weights for chemicals increase as the toxicological potential to cause chronic human health effects increases. The resulting toxicity-weighted results provide an alternative perspective to the typical pounds-based results found in other reports.

As shown in the example on the next page, when pounds are simply summed, Facility A's total TRI air releases, being nearly double that of Facility B, would seem to be of greater concern. However, when additional information about each released chemical's toxicity is factored into the equation using the RSEI model, a different picture emerges. Applying the RSEI model, Facility B's releases, when weighted for toxicity, surpass the similarly weighted releases from Facility A due to the greater presence of mercury, which is much more toxic than methanol.

Note, however, that toxicity weighting of a chemical is *not* the same as identifying the risk potentially posed by a release of the chemical. "Risk" in that context would rely on additional information, such as the fate and transport of the chemical in

the environment after it is released, the pathway of human exposure, and the number of people exposed. These and other important details concerning the RSEI model are discussed in depth in *Appendix B*.
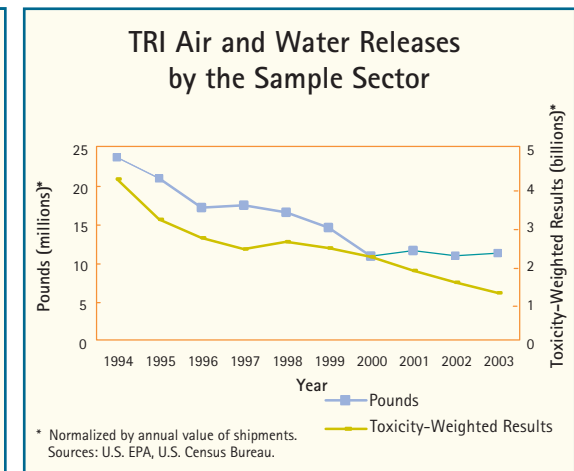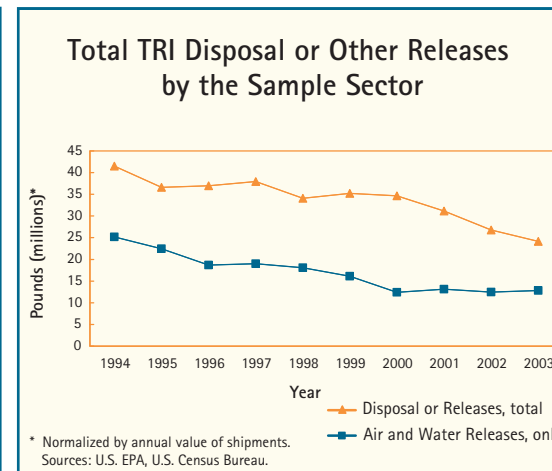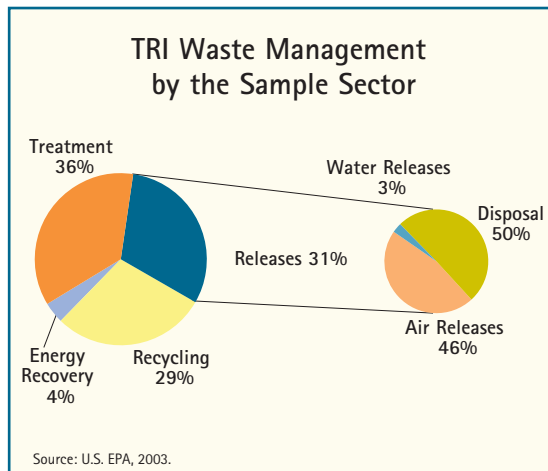
Reported TRI Air Releases (lbs.)

	Methanol	Mercury	Total
Facility A	40,000	10	40,010
Facility B	20,000	40	20,040

Toxicity–Weighted TRI Air Releases

	Methanol (lbs.)	Toxicity Weight	Toxicity–Weighted Result	Mercury (lbs.)	Toxicity Weight	Toxicity–Weighted Result	Total: Both Chemicals
Facility A	40,000	0.45	18,000	10	6,000	60,000	78,000
Facility B	20,000	0.45	9,000	40	6,000	240,000	249,000

As shown in the set of examples below, the TRI data discussion in each sector chapter begins with a series of three related charts that provide a progressively focused look at the sector's TRI releases and waste management activities.

- The first chart, *TRI Waste Management by the Sample Sector*, breaks down how the sector managed all of the wastes it reported to TRI in 2003. The first, larger pie chart shows percentages for releases (including disposal), treatment, energy recovery, and recycling. A second, smaller, pie chart provides additional details on the "releases" slice of the large pie chart, showing the percentages released to air, released to water, and disposed (considered a "release" to land, in TRI terminology).

- The second chart, *Total TRI Disposal or Other Releases by the Sample Sector*, expands on the smaller pie chart by examining trends from 1994 to 2003. The top line on the chart tracks total releases (including disposal), while the bottom line details releases only to air and water. Note that these data are always normalized (in this example by annual value of shipments).

- The third chart, *TRI Air and Water Releases by the Sample Sector*, compares the total pounds of the sector's releases to air and water (the bottom line from the previous chart) to the toxicity–weighted results for those releases. Note that the scale for the pounds line is located on the left side of the chart, while the scale for the toxicity–weighted line is located on the right side of the chart. These data are always normalized.

TRI Waste Management by the Sample Sector

Treatment 36%
Water Releases 3%
Releases 31%
Disposal 50%
Air Releases 46%
Energy Recovery 4%
Recycling 29%

Source: U.S. EPA, 2003.

Total TRI Disposal or Other Releases by the Sample Sector

Pounds (millions)*

- Disposal or Releases, total
- Air and Water Releases, only

* Normalized by annual value of shipments.
Sources: U.S. EPA, U.S. Census Bureau.

TRI Air and Water Releases by the Sample Sector

Pounds (millions)*
Toxicity–Weighted Results (billions)*

- Pounds
- Toxicity–Weighted Results

* Normalized by annual value of shipments.
Sources: U.S. EPA, U.S. Census Bureau.

To take the analysis one step further, the report also includes a table entitled *Top TRI Chemicals Based on Toxicity-Weighted Results* that identifies the chemicals released to air and water that accounted for 90% of the sector's total toxicity-weighted results in 2003. This table identifies the most significant opportunities for a sector to reduce the toxicity of its releases through source reduction or chemical substitution.

National Biennial RCRA Hazardous Waste Report

EPA collects information every other year on the generation, management, and final disposition of hazardous waste from large quantity generators – that is, facilities that meet minimum thresholds for reporting, such as those that generate 1,000 kilograms or more of hazardous waste per month, or 1 kilogram or more of acutely hazardous waste per month – and from facilities that treat, store, or dispose of hazardous waste. Data are reported by facilities in even-numbered years for hazardous waste activities of the previous year. The information received is stored in the Resource Conservation and Recovery Act Information System (RCRAInfo) and compiled in the *National Biennial RCRA Hazardous Waste Report*.

Most of the facilities in the sectors presented in this report do not meet reporting thresholds, and, thus, are not required to file a biennial report. Therefore, the hazardous waste generation and management practices of the reporting facilities in each sector may not be representative of the sector as a whole. However, where data are available, this report typically presents the following figures for 2003:

- Number of reporting facilities;
- Amount of hazardous waste generated;
- Percentage of total hazardous waste generated nationally accounted for by the sector;
- Predominant types of hazardous wastes generated;
- Sources of hazardous wastes generated; and
- Methods used to manage hazardous wastes.

Definitional changes in the data system in 2001 prevent EPA from including comparisons of hazardous waste data with earlier years in this report.

National Emissions Inventory

National Emissions Inventory NEI contains EPA's emission estimates of the six criteria air pollutants – carbon monoxide, ammonia, nitrogen oxides, sulfur dioxide, particulate matter, and volatile organic compounds. The inventory is based upon inputs submitted to EPA once every three years by numerous state and local air agencies, tribes, and industry, as well as data from TRI and other sources. Gaps in data for the years between submissions are filled with emissions estimates modeled using sources such as sector-level economic data.

Manufacturing Energy Consumption Survey

Manufacturing Energy Consumption Survey DOE's statistical agency, the Energy Information Administration, collects data on the energy consumption of U.S. manufacturers every four years by mailing questionnaires to a statistically valid sample of firms. The responses are then extrapolated to represent the full universe of manufacturers and presented in MECS. Where data are available, this report presents the quantity and types of fuel consumed by each sector.