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THE STATE OF GARBAGE IN AMERICA

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Latest national data on MSW management -28.5% recycled and composted, 7.4% combusted in WTE plants and 64.1% landfilled.

Phil Simmons, Nora Goldstein, Scott M. Kaufman, Nickolas J. Themelis and James Thompson, Jr.



A joint study by BioCycle and the Earth Engineering Center of Columbia University

[Map: Regional rates of landfilling, recycling and waste to energy](#)
[Table 3: Reported MSW generated , estimated MSW generated....](#)

BioCycle is pleased to produce the State of Garbage in America Report, providing a picture on how municipal solid waste (MSW) is handled throughout the United States. For this 15th nationwide survey, which began in 1989, BioCycle continued its collaboration with Columbia University's Earth Engineering Center (EEC), relying on the methodology developed through the collaboration and initially used in the 2004 State of Garbage survey. The 2006 State of Garbage in America (SOG) survey conducted over the fall/winter of 2005 and 2006 collected and reports on calendar year 2004 data provided by individual states (where available).

Prior to 2004, BioCycle had requested estimates of the amount of waste generated and disposed in each state. Recycling rates, as a percent of the total municipal solid waste stream (MSW) were also requested, filling out the picture of waste management techniques for each state and the nation.

The new methodology launched in 2004 requested tons of materials for each of the major categories of MSW management - tons recycled (including tons composted), tons combusted at waste-to-energy (WTE) facilities (includes MSW combusted without energy recovery - less than 1% of total MSW combusted), and tons landfilled. These categories were added together to provide an estimate of the total MSW stream for each state and the nation. The tonnages also were used to calculate state and national recycling rates. By adopting a tonnage-based approach, it was felt that a truer picture of municipal waste management was obtained.

The information in this article is the culmination of the second BioCycle/EEC collaboration, conducted by the authors of this report using 2004 data. The national picture of the State of Garbage in America is: Of an estimated total of 388 million tons of MSW generated, 28.5 percent is recycled and composted, 7.4 percent is combusted in waste-to- energy plants and 64.1 percent is landfilled. The invaluable contributions of the state solid waste and recycling officials providing data (see sidebar) are most appreciated.

ORIGINAL METHODS

The 2004 State of Garbage in America survey report, published in the January 2004 issue of BioCycle, utilized MSW management data from calendar year (CY) 2002 as

reported by individual states. The fundamental approach to the 2004 and 2006 State of Garbage In America surveys was to request all data in actual tonnages. In prior surveys, BioCycle asked states to provide the annual tons of MSW generated and a percent breakdown of tons recycled, composted, combusted, and landfilled. The tonnages of MSW recycled, combusted and landfilled were calculated using the percentage breakdowns and MSW generation tons for each state. Those tonnages (based on weighted averages) were used to calculate the national rates for recycling, combustion and landfilling (see years 1988-2000 in Table 1).

The old approach worked for several reasons: a) It was used every year, so the year-to-year data could be compared to show trends; b) The waste-to-energy (WTE) and landfill data provided by the states typically included fairly accurate tonnages because of permit requirements for WTE facilities and landfills; and c) Tonnage data were supplied by a few states and allowed for some state-to-state comparisons.

The primary disadvantage of the "old" approach was that even though we requested data on municipal solid waste (i.e., only the residential and commercial/institutional streams), most states only had aggregate tons for solid waste, which may include construction and demolition debris (C&D); industrial waste, biosolids, etc. The same was true of the recycling percentages, (e.g., some states include construction and demolition debris recycled, which technically is not municipal solid waste). This reality made it difficult to get an accurate reading as to how much MSW was being recycled, combusted or landfilled.

TONNAGE ONLY METHODOLOGY

To address that situation, we decided to move to a more objective, numbers-based analysis of solid waste management in the U.S. In the 2004 State of Garbage in America survey, therefore, all data were requested in actual tonnages. For instance, instead of asking states what percent of the total MSW generated was landfilled, the survey questionnaire asked for the tons landfilled in each category listed (e.g., residential, commercial, industrial, C&D; , organics, tires). If such a breakdown was not available, we asked for total tons landfilled. The same was done with recycling data: Instead of asking for a recycling rate, we requested specific tonnages recycled, broken down by categories (e.g., glass, metal, paper).

In order to maximize the opportunity for direct comparisons (state by state and nationally), the next step was to calculate the MSW-only portion of total solid waste generated, recycled, combusted and landfilled. That was accomplished by including only MSW stream tonnages. With landfilling, for example, that included the residential and commercial waste streams, organics, tires and "other." It did not include C&D; , industrial and agricultural waste.

MSW that crossed state lines was attributed to the state of origin; imported waste was excluded from state MSW totals while exported waste was included. Recyclables included tons reported for glass, steel, aluminum, other metals, paper, plastic, tires, organics, wood and "other." C&D; materials and industrial wastes (e.g., automobile scrap) were not included. The estimated tonnage of MSW generated in a state consisted of the sum of tons recycled and composted, combusted in WTE facilities, and landfilled.

A primary goal of the survey methodology was to standardize the waste streams from each state so that when the rates for each state are compared, the same categories of materials in the MSW stream are included. With some exceptions as described below, all percentages/rates reported in the 2006 State of Garbage survey (of 2004 data) are calculated from tonnage numbers provided by the states. Obviously, the better the information reported by each individual state, the more accurate the results. We believe that what is reported in these pages provides a fairly reasonable picture of the 2004 national MSW stream.

The first question on the 2006 survey questionnaire asked states to provide the total tons of MSW generated in 2004 (or for the most recent year that data were available).

The resulting national total (509 million tons) is in line with the generation tonnages reported in BioCycle State of Garbage In America reports starting with 1989 (see Table 1) and prior to our collaboration in 2003-2004. States were asked to indicate all categories of waste included in that total solid waste generation number (Table 2). Boxes to check off included residential, commercial, C&D; , industrial, agricultural, imported waste, tires and other (states were asked to specify what was included in "other").

In some cases, states reported a total MSW generation that was different than the calculated estimated MSW generated - the sum total of the tons reported for material landfilled, combusted, and recycled, all adjusted to include only MSW. Two major reasons for this difference became evident, dependent upon individual states: In the case of states with a higher reported generation, non-MSW material, such as C&D; waste, agricultural, or industrial waste, and/or MSW imported into the state was typically included in the reported generation rate.

In those cases where states reported less MSW generated than the estimate calculated

(sum of MSW-only recycled, combusted and landfilled tons), the states typically either did not account for exported MSW, or they did not include tons recycled and composted into their MSW generation figure.

CHALLENGES AND DATA GAPS

Challenges faced by the State of Garbage team were essentially the same as those faced in earlier State of Garbage surveys and in other studies that attempt to measure the national MSW stream. As has been found in previous years, each of the states has its own method for collecting statewide MSW management information. In general, the in-state landfilled and combusted tonnages were reported with near certainty owing to the fact that landfills and WTE facilities are generally permitted facilities with regulatory reporting requirements. Recycling and yard trimmings composting facilities, on the other hand, are not necessarily required to report throughput. Therefore, some states reported estimates of their recycled or composted tons based on historical data or waste composition studies, while some did not report these categories at all. Exported MSW presented another challenge for a handful of states that either did not track or report exported waste or were unsure as to how much non-MSW was exported along with MSW. How did the 2006 State of Garbage survey team fill in the data gaps? The first step was to contact the states to confirm that the recycling and composting, WTE and landfilling data compiled from the completed surveys were interpreted correctly. These data confirmations included the calculations used by the State of Garbage team to produce a recycling rate. The confirmation process was very helpful and allowed states to review, and adjust as appropriate, how the State of Garbage survey process categorized their reported data into MSW and non-MSW and how it applied the adjusted data in the recycling rate calculations. In some cases, the data confirmation process also elicited data for items left blank on the initial survey responses. Finally, several states offered constructive criticism about the State of Garbage methodology, mostly concerning the survey's focus on an MSW definition that did not include recycled tonnage for such materials as C&D, auto scrap, and others that states include in calculating their recycling rates.

The State of Garbage team has held fast to its methodology, however, in order to provide a data set worthy of "apples to apples" comparisons regarding the MSW portion of the total solid waste stream. Further discussion of the state comments is provided at the end of this article, and a second article comparing methods for measuring the national solid waste stream will be published in BioCycle in the near future.

The data confirmation process is believed to have had a positive effect on the accuracy of the survey. It also highlighted the fact that different methods of waste stream tracking are used by different states. The data confirmation process also can help explain differences noted between the 2004 and 2006 surveys. For instance, in past surveys, New York was the top exporter of waste in the nation. In the 2006 State of Garbage report, New York is third on the list as the focus on "true" MSW resulted in the state's adjustment to exclude over 2 million tons of exported non-MSW from New York's MSW stream.

Data gaps were also filled in, or "back calculated," through the use of historic State of Garbage recycling rates applied to the known tonnage disposed from 2004. By plugging in the known data to the following equation (i.e., using the reported tons combusted and landfilled and the 2002 recycling rate), an estimated "tons recycled" could be calculated for use in the 2006 survey:

$$\text{(Recycled Tons1)} \div (\text{Disposed Tons2} + \text{Recycled Tons}) = \text{Recycling Rate}$$

(1Includes MSW recycled and composted; 2Includes MSW landfilled and combusted)

In addition, historical percent recycled and percent composted figures also were applied to the total amount recycled to estimate the recycled and composted tons, where appropriate. These methods were used to calculate recycled and/or composted tons for Florida (composted tons), Georgia (both), Idaho (both), Indiana (both), Kentucky (composted tons), Missouri (composted tons), Mississippi (recycled tons), Nebraska (composted tons), South Dakota (composted tons), and West Virginia (both). In one sense, filling the gaps in this manner was a return to the "old" methodology, however, this method was based on recycling rates that had clearly excluded non-MSW, an important distinction in the "new" methodology.

In those cases where no data were available (i.e., Alaska, Alabama, Arkansas, Hawaii, and Louisiana did not respond to the survey and Colorado only reported a total waste figure), data from the Waste Business Journal (WBJ) Directory & Atlas of Non-Hazardous Waste Sites were used to supply information for recycled, composted, combusted and landfilled tons. WBJ researchers collect data primarily by calling individual waste management operations and asking what types and quantities of wastes are accepted, among other inquiries. The data gathered through the direct survey are then compared and cross-checked with data received from relevant state regulatory agencies (e.g., state EPAs, DEQs, DNRs). For those cases where WBJ is unable to obtain material quantities for certain facilities, estimates of throughput are based on averages from

similar types of facilities serving the same market - or if the sample size is small, other, similar markets - as that of the facility with unknown throughput. The State of Garbage team used the WBJ data to fill these gaps because its tonnage-based approach provides consistency with the State of Garbage survey methodology. Finally, California was considered a special case. California submitted combustion and landfilling data, but it did not report recycled or composted tons for either this or the 2004 State of Garbage survey. Considering California's size and its impressive recycling infrastructure, it was obvious that the method selected to estimate the California recycling tons would have a significant effect on the national picture. Because California reports a diversion rate (48% or 30.7 million tons) that includes non-MSW material (e.g., C&D; debris), the State of Garbage team decided to use the Waste Business Journal reported amount of tons recycled (21.8 million or a 39.6% recycling rate). The difference between these estimates translates to a 1.6 percentage point difference in the national recycling rate - 28.5 percent using State of Garbage calculations and 30.1 percent using California's 48 percent diversion rate. Further analysis of these kinds of impacts will be discussed in the follow-up article on the BioCycle/EEC State of Garbage in America methodology.

THE NATIONAL PICTURE

In this second tonnage-based State of Garbage survey, the historical national trends seem to continue. MSW tons increased for each of the three categories of waste management. On a percentage basis, recycling increased slightly from the 2004 to the 2006 BioCycle/EEC report (from 26.7% to 28.5%). MSW combustion decreased slightly (7.7% to 7.4%), as did landfilling (65.6% to 64.1%). Table 3 summarizes the data reported in this section - with percent breakouts for tons recycled/composted, combusted and landfilled. Table 4 provides the "raw" tonnages used to calculate the percentages.

The 2006 State of Garbage survey (2004 data) shows that the United States continued its increasing trend in MSW generation. Reported annual MSW generation (sum of the tons of MSW reported by the states without any calculation to standardize the reported values) from the states resulted in a 5.5 percent increase over that reported for 2002 - from 483 million tons to 509 million tons. (The national reported MSW generation was determined through a population-based projection of the data from respondent states to the national population of 293 million. This accounts for states not reporting data for the 2006 report.)

The estimated MSW generation - the sum of MSW recycled, combusted and landfilled with each category adjusted to exclude non-MSW - also increased since 2002, by roughly 5.0 percent (from 369 million tons to 388 million tons). On a per capita basis, 2004 and 2002 had similar average estimated MSW generation rates (1.32 tons/person/year for 2004 vs. 1.31 tons for 2002). The estimated MSW per capita generation rates varied from South Dakota's low of 0.7 to Indiana's 2.1 tons/person/year. Based on the reported generation (without adjustment to exclude non-MSW tons), per capita rates were 1.74 for the 2004 population of 293 million and 1.68 for the 2002 population of 288 million (a 1.8 percent population increase).

The national recycling rate also grew along with the total MSW relative to 2002. Of the 388 million tons of MSW generated in 2004, 110 million tons were recycled or composted for a 28.5 percent national recycling rate. Twenty-nine million tons (7.4%) were combusted (the bulk at WTE facilities), and 249 million tons (64.1%) were landfilled. In comparison, the 2004 State of Garbage (2002 data) found that 98.7 million tons (26.7%) were recycled or composted, 28.5 million tons (7.7%) were combusted, and 242 million tons (65.6%) were landfilled. (In the 2001 State of Garbage in America report utilizing the old survey methods, the national rates were 32 percent recycled, 7 percent combusted and 61 percent landfilled.)

On an individual state basis, increases and decreases in each waste management category were as follows:

- o Reported MSW generation: Increased in 19 states, constant in one state, decreased in 18 states (38 states responded to both the 2004 and 2006 surveys).
- o Estimated MSW generation: Increased in 31 states, decreased in 19 states.
- o Recycled Tons: Increased in 36 states, decreased in 14 states.
- o Recycling Rate: Increased in 31 states, decreased in 19 states.
- o WTE and Incinerated Tons: Increased in 23 states, decreased in 14 states (30 states have WTE facilities, 36 states use WTE or incineration as a waste management technique, including those that export MSW for combustion; the WTE facility in Tennessee was closed).
- o Landfilled Tons: Increased in 28 states, decreased in 22 states.

REGIONAL BREAKDOWN

The 2006 survey breakdown on a regional basis (see map on pages 26-27 to identify

states in each region) is as follows. The percentage rates from the 2004 State of Garbage report are in parentheses and are in the order of recycled/composted, WTE, landfilled:

- o New England: Recycled-29%; WTE-35%; Landfilled-36% (27%-34%-39%).
- o Mid-Atlantic: Recycled-33%; WTE-18%; Landfilled-49% (28%-14%-58%). (The large difference in landfilled percent can be explained in part by greater attention to excluding non-MSW from the 2006 calculations.)
- o South: Recycled-22%; WTE-9%; Landfilled-69% (19%-12%-69%)
- o Great Lakes: Recycled-31%; WTE-4%; Landfilled-65% (27%-5%-68%).
- o Midwest: Recycled-22%; WTE-1%; Landfilled-77% (25%- <1%-75%).
- o Rocky Mountain: Recycled-14%; WTE-<1%; Landfilled-86% (9%-1%-90%).
- o West: Recycled 38%; WTE-2%; Landfilled-60% (38%-3%-59%).

IMPORTS/EXPORTS

Finally, in terms of the big picture, significant tonnages of solid waste continue to cross state borders (Table 5). As in previous years, Pennsylvania leads in the MSW importing category, receiving 10.6 million tons of solid waste in 2004 (the bulk of which was landfilled). Michigan is second with 6.0 million tons, Virginia is third with 5.9 million tons and Ohio is fourth with 3.2 million tons imported. As with Pennsylvania, almost all waste imported is landfilled in the states doing the importing. Illinois, which was second in imported waste in 2002, ranks fifth in terms of waste imports (2.2 million in 2004). On the export side, Maryland ranks highest with 2.6 million tons exported in 2004. New Jersey is in second place, with 2.5 million tons. Third place is held by New York with 2.2 million tons, and in fourth place is Missouri with 2.17 million tons. Other states with over 1 million tons of exports include Massachusetts (1.4 million), North Carolina (1.05 million tons), and Washington (1.5 million tons). Most of the tonnages exported were landfilled in the receiving states. We surmise that the emphasis on MSW only in our survey follow-ups in 2006 resulted in states excluding non-MSW more thoroughly than in previous years. This would account in part for unexpected ranking changes among the exporting states from 2002 to 2004. For instance, New York reported 5.4 million tons of exported waste in the last survey and was the top waste exporting state. In the initial 2006 survey, New York reported 4.4 million tons of exported waste, but this number was adjusted to 2.2 million tons when the request for including only MSW exported was emphasized.

THE RECYCLING SCENE

The amount of MSW recycled increased from 2002 to 2004 (99 million to 110 million tons) as did the recycling rate (26.7% to 28.5%). This number includes organic materials composted and/or mulched.

As shown in Table 3, several states had recycling rates of roughly 40 percent and above, including California (39.6%), Iowa (39.6%), Minnesota (43.2%), and Oregon (45.8%), all of which had similar recycling rates in 2002 (40.2, 41.7, 45.6, and 48.8 percent, respectively). New York (43.0 vs. 29.8%), Washington (40.5 vs. 34.1%), and Tennessee (42.2 vs. 26.4%) all had significant increases in their recycling rates over 2002. Several states also had decreases in their recycling rates of greater than 10 percentage points relative to 2002, including Maine (34.5 vs. 49.0%), Arkansas (19.7 vs. 36.3%), and Delaware (10.4 vs. 20.4%).

The large swings in percent recycling raise questions, of course, for those who think critically about waste management issues. Does the swing represent reality? This issue will be investigated in greater depth in a future article, but there could be several partial explanations, as follows: 1) The swing in recycling rates is, in fact, real. Actual tonnages recycled or disposed have been known to shift significantly from year to year, and there have been two full years between the State of Garbage surveys. For instance, in its annual solid waste management reports, Virginia showed increases in MSW disposed of 8.6 percent and 7.1 percent in 2003 and 2004. In 2002, the MSW disposed decreased by 7.5 percent; 2) Follow-up correspondence with states for the 2006 State of Garbage survey emphasized tracking MSW only in all waste management categories. This emphasis was not put forward as strongly in previous surveys; and 3) Outside of the State of Garbage surveys, many states may have strengthened their internal reporting methodologies resulting in different rates.

Table 6 highlights the contribution of organics to the overall recycling rate. Forty-six of the 50 states reported tonnage data for "recycled" (composted or mulched) organics (including yard trimmings and food residuals) and/or wood (non-C&D;). (Data for Alabama, Alaska, Arkansas, Hawaii and Louisiana were obtained from Waste Business Journal.) The last column of Table 6 calculates the percentage that organics represent in the MSW recycling rate. Based on data from those states, organics (including wood) contributed an average of 18.5 percent of all materials recycled. This is down from the 28 percent reported two years ago (2002 data). Uncertainty surrounds the reason for the

large drop. Is it due to greater recycling of nonorganics? Is the difference due to organics reporting issues, perhaps the differential inclusion/exclusion of non-MSW wood? Many states commented that composting operations are not required to report throughput, making data collection difficult and variable.

Table 7 includes recycled tonnages (by material type) reported by the states. Only 26 states provided this type of breakdown.

CURBSIDE COLLECTION PROGRAMS

Since the State of Garbage In America survey began in 1989, BioCycle has tracked the number of residential curbside collection programs in the U.S. In 1988, there were 1,042 curbside collection programs. That number quickly doubled within two years, and grew rapidly thereafter. A total of 9,709 programs were reported in the 2001 survey.

According to our data, the number of curbside collection programs in the U.S. dropped between 2000 and 2002 to 8,875, and again to 7,689 in 2004. However, only 32 states responded to that question in the 2006 survey (Table 8). There is no way to assess whether national curbside recycling is shrinking in size as well as number, or if program consolidation or other changes in reporting account for the decrease.

Comparing data from the three most recent surveys, however, the following can be noted:

Several states have had significant declines in curbside programs from 2000 to 2004 (data presented as 2000, 2002, 2004). These include Georgia (459, 184, 169), California (546, 396, not reported), Washington (283, 150, 159), Indiana (168, 79, 78), North Carolina (279, 256, 212), West Virginia (51, 51, 20), Kansas (109, 118, 84), and Florida (299, 333, 79).

Significant increases in curbside recycling programs occurred in Ohio (232, 459, 480), Pennsylvania (892, 945, 974), Missouri (177, 216, 211), Maine (34, 40, 84), and Wisconsin (631, 544, 695).

YARD TRIMMINGS COMPOSTING

As in the case with curbside programs, data have been collected on the number of yard trimmings composting sites since the first State of Garbage survey in 1989. According to the first report, there were 651 yard trimmings composting sites in 1988. Due to both rapid growth and better data tracking, that number more than doubled to 1,407 by 1990, and doubled again to 2,981 by 1992. Growth between 1992 and 2000 was more steady, increasing to 3,846 yard trimmings composting sites in the U.S. by 2000.

In 2002, the reported number of yard trimmings composting sites was 3,227, a decrease of 619 from the 2000 data. It is believed the primary reason for the drop was that five states providing numbers for 2000 were not able to do so for CY 2002 (e.g., Minnesota reported 454 in 2000 and Wisconsin reported 140). In the 2006 survey, 38 states provided data on their composting infrastructure for CY 2004 (Table 8), totaling 3,357 reported yard trimmings composting facilities. States with significant yard trimming compost site increases from 2002 to 2004 included Wisconsin (140, 174), Maine (<25, 80), Pennsylvania (>300, 465), and Ohio (534, 586). States with major drops in reported composting facilities include New Hampshire (192, 25), Texas (160, 108), and South Carolina (128, 96).

While California did not provide any yard trimming composting facility data, a survey conducted in 2003-04 for the California Integrated Waste Management Board (CIWMB) identified 117 green waste composting facilities statewide (see "Second Assessment of California's Compost- and Mulch-Producing Infrastructure," CIWMB, May 2004). Adding the CIWMB's data to the national number, the total for CY 2004 is 3,474.

Florida, another of the top three most populous states in the nation, also did not report data on yard trimmings composting sites. The state did, however, note it has 178 mulch-only processing facilities. (Nine states reported data for the question on mulch production (other than "0") for a total of 518 mulch production facilities.)

LANDFILLING AND WASTE-TO-ENERGY STATISTICS

Based on data from 45 states, the total number of landfills in operation in 2004 was 1,654, down from 1,767 in 2002 and 2,142 reported in 2000 (Table 9). The lack of data from the five states that did not respond - Alaska, Alabama, Arkansas, Hawaii and Louisiana - likely accounts for some of our reported decrease of 113 landfills between 2002 and CY 2004. Five states reported significant changes in landfill numbers between 2002 and 2004 (data is presented as 2002, 2004): Maryland (20, 31), Oklahoma (40, 31), Texas (175, 189), Virginia (67, 60), Wisconsin (42, 32), and Florida (100, 54).

Twenty-seven states reported average landfill tipping fees (Table 9), with a low in Oklahoma of \$18/ton and a high of \$98/ton in Vermont. Of the other 25 states, seven reported tipping fees of \$20 to \$29/ton, nine between \$30 and \$39/ton, two between \$40 and \$49/ton, four of \$50 to \$60/ton, and three of \$60 to \$70/ton.

The states also were asked to provide the amount of total landfill capacity remaining measured in total tons or cubic yards. Twenty-nine responses were tallied across these two categories, ranging from lows of 150,000 cubic yards in Connecticut to 986 million cubic yards in Illinois and from 2.3 million tons in Massachusetts to 1.1 billion tons in Texas.

Thirty-nine states also responded to a qualitative, yes/no question about whether landfill capacity was being added. Thirty reported "yes" and nine reported "no."

Table 9 also includes data on waste-to-energy plants in the U.S. Prior to BioCycle's collaboration with EEC, State of Garbage in America surveys did not specifically ask states for data on waste-to-energy combustion, but instead only asked about incineration (which may or may not include energy recovery). There were 107 WTE facilities reported for CY 2002, in comparison to the 132 WTE/incineration plants reported for 2000. In 2004, 101 WTE facilities were reported in 29 states, including two facilities that burn tires or MSW with coal, and not including eight incinerators that do not recover energy (109 total facilities that burn MSW - other sources report between 89 and 102 WTE facilities nationwide). Thirty-six states reported the use of WTE or incineration as a means of waste management, six of which did not report WTE facilities in-state - Kansas combusts roughly 4,000 tons of tires in cement kilns, Rhode Island and Vermont export MSW to WTE facilities but do not have WTE capacity in state, and Arkansas, Louisiana, and Colorado did not report WTE facility numbers. Connecticut, New York, and Minnesota, all states with WTE facilities, also reported exported MSW going to WTE facilities. Tipping fees at waste-to-energy plants, based on 15 respondents, ranged from \$40/ton in North Carolina with one facility to \$98/ton in Washington with three WTE plants.


Table 10 provides data on C&D; landfills and MSW transfer stations. In 2004, a total of 1,571 C&D; landfills were reported (38 respondents), compared with 1,931 reported in 2002 and 1,825 reported for 2000. The total number of MSW transfer stations reported for 2004 was 3,744 (40 respondents). In 2002, 3,895 were reported and 3,970 were reported for 2000.

Table 11 show materials that are banned from MSW landfills in various states. For example, 21 states have bans on the landfill disposal of leaves, grass clippings and/or all yard trimmings. Few states have added additional materials to their list of banned items over the years. Massachusetts is one that has; in early 2006 asphalt pavement, brick, concrete, metal and wood in the C&D; stream were banned from disposal. The state's 2000 solid waste Master Plan includes a ban on disposal of commercial organic feedstocks, e.g., from supermarkets and food service establishments. A date that it will become effective was not specified.

METHODS BEHIND THE METHODOLOGY

The State of Garbage team is extremely grateful to the state representatives across the U.S. who helped by providing data, feedback, time, and effort in support of the 2006 State of Garbage In America survey. The accompanying sidebar acknowledges these individuals by name. Some of our e-mail exchanges with state officials highlighted the challenges of developing a standardized waste stream characterization for all 50 states - not to mention difficulties that states encounter as they attempt to collect standard waste stream data from numerous towns, cities, and counties. The comments and observations from several states (Table 12) provide a flavor of some of these discussions. Many of the comments are constructive critiques of the State of Garbage methodology, and, although anecdotal in nature and not formally requested as part of the survey, provide insight into the varied nature of waste stream data collection by different states.

Most of the comments suggest that recycled construction and demolition debris (C&D;) and other recycled materials that do not fall into the U.S. EPA definition of MSW should be included in the calculation of the State of Garbage recycling rate. (The EPA definition includes paper and paperboard, yard trimmings, food scraps, plastics, metals, glass, wood, rubber, leather and textiles, household batteries, etc.) Others allude to the difficulty of tracking data, the variable quality of data from different reporting units, and the use of estimates, as opposed to actual hard data, to develop MSW generation and recycling rates. Finally, a philosophical controversy seems to exist as well, involving the definitions of solid waste and the reference points used to track the success of recycling efforts (e.g., landfill diversion vs. recycling rates; EPA MSW vs. state-defined MSW). For our part, the State of Garbage team has applied a methodology to characterize the EPA defined MSW portion of the total solid waste stream. BioCycle will be publishing follow-up articles to the April 2006 State of Garbage report to compare its methodology with other techniques for characterizing the national waste stream. m



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