MSW Residential/Commercial Percentage Allocation – Data Availability
U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery
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Background

The contractor was tasked to collect and analyze available data to classify MSW products into residential and commercial fractions similar to the allocations shown in EPA's "Characterization of Municipal Solid Waste in the United States: 1998 Update" Appendix D.

The 1998 allocations were made by EPA's contractor on a "best judgment" basis. The allocations based on information gathered for a 1994 report for Keep American Beautiful, was extensively reviewed by public and private sector experts in municipal solid waste management. The allocation classified MSW generation and did not include an allocation of the MSW discard stream.

This memo presents the contractor's research approach and results of the current research effort compared to the previous work.

Approach

The contractor identified statewide solid waste generation and disposal studies that distinguish between residential and commercial sources. Statewide sampling studies are judged to be most appropriate since city or county level sampling studies are more influenced by local conditions such as climatic variability, population centers, and economic activities. However, due to the lack of available generation studies we included one citywide study within this analysis.

The studies need to provide sufficient detail so waste sources and waste materials and products can be matched as closely as possible between studies. The sampling studies data must also be delineated so residential and commercial (including institutional) MSW can be separated from non-MSW waste products. For example, although construction and demolition debris could be considered part of the commercial waste stream, it is not included in EPA's definition of MSW. Many sampling studies include this waste stream.

There are numerous examples of state sampling studies conducted at the point of disposal that split MSW into the residential and commercial fractions. One challenge of using many of the studies identified was the data were frequently presented as *percent of total* for residential separate from commercial but not as *percent of material or product*. For example, the compositions of the residential and commercial fractions (e.g., 30 percent paper, 10 percent plastic) were shown separately but the allocations of individual materials or products between residential and commercial were not shown (e.g., magazines 45 percent residential and 55 percent commercial). If detailed weight data were provided, the contractor was able to calculate the material and product allocations.

After study selection, data were extracted from study tables and entered into Excel spreadsheets. Data were aligned with EPA's national characterization report materials (e.g., paper, glass, plastic) and product categories (e.g., durable goods, nondurable goods, containers and packaging).

Where identified, studies using EPA's 1998 allocation to fill data gaps were excluded from the detailed analysis. The studies used in the analysis are cited at the end of this memorandum.

Observations

The results of this analysis are shown in a series of five tables.

1. Total MSW Residential/Commercial Allocation
2. MSW Residential/Commercial Discard and Generation Allocation, by Material
3. MSW Residential/Commercial Discard Allocation, All States by Product
4. MSW Residential/Commercial Discard Allocation, by Product
5. MSW Residential/Commercial Generation Allocation, by Product

The overall observation from this analysis is that as the level of detail increases, the range of values increases. In other words, the range of values shown for total MSW (Table 1) was tighter than the range of observations by material (Table 2) which is tighter than the range of observations by product (Tables 3, 4, 5).

The ranges are so wide, in some cases, that the use of the data shown in these tables should be used with caution. The data are insufficient to develop a single residential/commercial allocation data set.

Total MSW Residential/Commercial Allocation

Table 1 shows the residential/commercial allocation of the "bottom line". Of the states shown, discards from the residential sector average 51 percent; commercial sector MSW discards average 49 percent. The ranges are 41-62 percent for residential sector and 38-59 percent for commercial sector MSW.

The bottom portion of Table 1 lists generation study results. On average, residential sector generation is 46 percent and commercial sector generation is 54 percent. The ranges are 39-54 percent for residential sector and 46-61 percent for commercial sector MSW. This compares to EPA's 1998 report estimate of 55-65 percent for residential sector and 35-45 percent for commercial sector MSW. This suggests a complete switch of sector values.

The data shown in Table 1 are more readily available than the detailed data shown in Tables 2 through 5 and could be expanded to include additional states to better define the allocation of total MSW between the residential and commercial sectors.

MSW Residential/Commercial Discard and Generation Allocation, by Material

Table 2 shows statewide allocation results for materials in MSW. The top portion shows discard allocations; the bottom portion shows generation allocations. Rubber & leather and wood exhibit the widest ranges but also have the fewest data points. Yard waste also has wide allocation ranges. This could be due to the accounting methods; yard waste brought to the sampling site by commercial landscapers (from residential yard maintenance) may be counted as commercial in some locations but as residential in others. MSW wood waste includes mostly wood from pallets which should be allocated to the commercial sector. The data in Table 2 suggests that some sampling studies include other sources of wood waste such as scrap lumber included in MSW waste loads.

The material categories where agreement between the discard data are the closest (i.e., tightest ranges) are paper, metals, and plastic. The generation allocation ranges are closest for these same materials plus textiles, food, and other.

MSW Residential/Commercial Discard Allocation, by Product

Due to the large number of data points when comparing allocation of MSW products, the state-by-state discard data are summarized in Table 3. The detailed state-by-state discard data are shown in Table 4. Some of the widest ranges are observed in the durable goods portion of Table 3. Similar to yard waste discussed above, this is likely due to accounting methods. For example, major appliances originate from residential sources but are mostly managed by the commercial sector. Whether these products are considered residential or commercial will vary by state.

The products where discard data ranges exhibit the most agreement are small appliances, trash bags, diapers, and HDPE bottles.

MSW Residential/Commercial Generation Allocation, by Product

Table 5 shows allocation of MSW generation by products. The two studies are compared side-by side with EPA's 1998 study estimates. Due to the lack of available generation studies, no trends could be identified from the limited data. For some products, the two sampling studies agree fairly well to each other but not the U.S. data (e.g., plastic bottles and containers); for other products one sampling study agrees with the U.S. data and the other one does not agree (e.g., newspapers). Office-type papers and clothing and footwear agree fairly well across all three studies.

Table 1. Total MSW Residential/Commercial Allocation

Discards	**Residential %**	**Commercial %**
California	40	60
Connecticut	58	42
Illinois	51	49
Iowa	53	47
New York	54	46
Oregon	62	38
Washington	50	50
Wisconsin	41	59
Average	*51*	*49*
Range	*41-62*	*38-59*
Generation	**Residential %**	**Commercial %**
Florida	47	53
Illinois	52	48
Chicago, Illinois	39	61
Iowa	43	57
Massachusetts	41	59
New York	54	46
Average	*46*	*54*
Range	*39-54*	*46-61*
U.S. Range	*55-65*	*35-45*

U.S. EPA "Characterization of Municipal Solid Waste in the United States: 1998 Update"

Table 2. MSW Residential/Commercial Discard and Generation Allocation, by Material

Materials	Paper & Paperboard		Glass		Metals		Plastics		Rubber & Leather	
Location	**Residential**	**Commercial**	**Residential**	**Commercial**	**Residential**	**Commercial**	**Residential**	**Commercial**	**Residential**	**Commercial**
Discards	%	%	%	%	%	%	%	%	%	%
California	35	65	54	46	33	67	31	69	6	94
Connecticut	54	46	62	38	55	45	49	51		
Illinois	44	56	64	36	51	49	50	50	35	65
Iowa	41	59	65	35	51	49	44	56	35	65
New York	56	44	52	48	56	44	54	46	57	43
Oregon	49	51	73	27	55	45	55	45	70	30
Tennessee	44	66	51	49	48	52	56	44		
Washington	48	52	34	66	55	45	47	53	72	28
Wisconsin	35	65	24	76	54	46	34	66	1	99
Average	*45*	*56*	*53*	*47*	*51*	*49*	*47*	*53*	*39*	*61*
Range	*35-56*	*44-65*	*24-73*	*27-76*	*33-56*	*44-67*	*31-56*	*44-69*	*1-72*	*28-99*
Generation										
New York	53	47	56	44	56	44	55	45	59	41
Illinois	40	60	65	35	57	43	60	40	5	95
Iowa	31	69	33	67	33	67	42	58		
Chicago	30	70	47	53	32	68	41	59	39	61
Average	*39*	*62*	*50*	*50*	*45*	*56*	*50*	*51*	*34*	*66*
Range	*30-53*	*47-70*	*33-65*	*35-67*	*32-56*	*43-68*	*41-60*	*40-59*	*5-59*	*41-95*

Table 2. MSW Residential/Commercial Discard and Generation Allocation, by Material (continued)

Materials	Textiles		Wood		Food		Yard Waste		Other	
Location	**Residential**	**Commercial**	**Residential**	**Commercial**	**Residential**	**Commercial**	**Residential**	**Commercial**	**Residential**	**Commercial**
Discards	%	%	%	%	%	%	%	%	%	%
California	61	39			50	50	45	55	26	74
Connecticut	74	26			57	43	78	22	54	46
Illinois	57	43	7	93	53	47	53	47	59	41
Iowa	69	31			80	20	51	49	60	40
New York	54	46	46	54	48	52	63	37	50	50
Oregon	63	37	19	81	67	33	79	21	64	36
Tennessee	49	51			65	35	52	48	50	50
Washington	65	35			46	54	90	10	50	50
Wisconsin	38	62	9	91	51	49	60	40	50	50
Average	*59*	*41*	*20*	*80*	*57*	*43*	*63*	*37*	*51*	*49*
Range	*38-74*	*26-62*	*7-46*	*54-93*	*46-80*	*20-54*	*45-90*	*10-55*	*26-64*	*36-74*
Generation										
New York	65	35	41	59	46	54	66	34	51	49
Illinois	56	44	8	92	50	50	54	46	49	51
Iowa			41	59	51	49	80	20	60	40
Chicago	49	51	2	98	40	60	53	47	58	42
Average	*57*	*43*	*23*	*77*	*47*	*53*	*63*	*37*	*55*	*46*
Range	*49-65*	*35-51*	*2-41*	*59-98*	*40-51*	*49-60*	*53-80*	*20-47*	*49-60*	*40-51*

Table 3. MSW Residential/Commercial Discard Allocation, All States

	Residential Range %		Commercial Range %	
Durable Goods				
Major Appliances	0	99	1	100
Small Appliances	46	56	44	54
Furniture & Furnishings	3	81	19	97
Carpets & Rugs	12	71	29	88
Rubber Tires	1	72	28	99
Batteries, Lead-Acid	0	100	0	100
Selected Consumer Electronics	45	77	23	55
Bulky Items*	49	66	34	51
Other Miscellaneous Durables	26	49	51	74
Nondurable Goods				
Newspapers/Mechanical Papers	34	75	25	66
Magazines	43	71	29	57
Office-Type Papers	25	47	53	75
Trash Bags	31	48	52	69
Disposable Diapers	58	79	21	42
Other Nonpackaging Paper	39	73	27	61
Clothing & Footwear	38	82	18	62
Textiles*	49	78	22	51
Containers & Packaging				
Glass Packaging	24	77	23	76
Steel Packaging	50	80	20	50
Aluminum Packaging	50	75	25	50
Paper & Paperboard Packaging	20	56	44	80
Corrugated Boxes	18	52	48	82
Plastics Packaging	34	73	27	66
PET Bottles and Jars	48	77	23	52
HDPE Natural Bottles	49	66	34	51
Other Containers	41	74	26	59
Bags & Sacks and Wraps	31	72	28	69
Other Plastics Packaging	10	71	29	90
Wood Packaging	7	46	54	93
Other Wastes				
Food Wastes	46	73	27	54
Yard Wastes	45	90	10	55
Miscellaneous Inorganic Wastes	48	66	34	52

Table 4. MSW Residential/Commercial Discard Allocation, by Product

	California		Conencticut		Illinois		Iowa		Massachusetts	
	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial
Product	%	%	%	%	%	%	%	%	%	%
Durable Goods										
Major Appliances	0	100	73	27	0	100			11	89
Small Appliances										
Furniture & Furnishings	22	78								
Carpets & Rugs	25	75	64	36	66	34			71	29
Rubber Tires	6	94			35	65	35	65	44	56
Batteries, Lead-Acid			15	85	83	17			0	100
Selected Consumer Electronics	52	48	53	47	52	48			77	23
Bulky Items*			49	51	66	34			62	38
Other Miscellaneous Durables	29	71	49	51						
Nondurable Goods										
Newspapers/Mechanical Papers	58	42	60	40	63	37	66	34	58	42
Magazines	55	45	57	43	71	29	51	49	64	36
Office-Type Papers	34	66	35	65	47	53	25	75	29	71
Trash Bags	31	69	32	68			48	52		
Disposable Diapers							79	21	75	26
Other Nonpackaging Paper	39	61	41	59	53	47	60	40	47	53
Clothing & Footwear							64	36		
Textiles*	61	39	64	36	74	26	53	48	69	31
Containers & Packaging										
Glass Packaging	58	42	58	42	62	38	64	36	65	36
Steel Packaging			50	50	65	35	64	36	53	47
Aluminum Packaging			56	44	50	50	62	39	75	25
Paper & Paperboard Packaging			20	80	46	54	30	70	41	59
Corrugated Boxes	18	82	19	82	46	54	24	74	22	78
Plastics Packaging			38	62	51	49	50	50	44	56
PET Bottles and Jars	54	46	54	46	48	52	55	45	53	47
HDPE Natural Bottles	51	49	52	49	57	43	54	46	56	44
Other Containers	47	53	47	53	42	58	54	46	41	59
Bags & Sacks and Wraps	31	69	34	66	61	39	40	60	55	45
Other Plastics Packaging							57	43	43	57
Wood Packaging					7	93				
Other Wastes										
Food Wastes	50	50	50	50	57	43	53	47	51	49
Yard Wastes	45	55	50	50	78	22	53	47	80	20
Miscellaneous Inorganic Wastes							55	45	48	52

*Product detail not provided

Table 4. MSW Residential/Commercial Discard Allocation, by Product (continued)

	New York		Oregon		Tennessee		Washington		Wisconsin	
	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial
Product	%	%	%	%	%	%	%	%	%	%
Durable Goods										
Major Appliances			38	62			99	1	37	63
Small Appliances			56	44					46	54
Furniture & Furnishings			81	19			3	97	38	62
Carpets & Rugs	54	46	64	36			12	88	49	51
Rubber Tires	57	43	72	28			6	94	1	99
Batteries, Lead-Acid			100	0			0	100	0	100
Selected Consumer Electronics	53	47	47	53	45	55	58	42	75	25
Bulky Items*										
Other Miscellaneous Durables							26	74	31	69
Nondurable Goods										
Newspapers/Mechanical Papers	75	25	42	58	34	66	62	38	61	39
Magazines	68	32	61	39	43	57	59	41	62	38
Office-Type Papers	30	70	30	70	30	70			33	67
Trash Bags							39	61		
Disposable Diapers			65	35	73	27	77	23	58	42
Other Nonpackaging Paper	73	27			39	61	48	52		
Clothing & Footwear			54	46			82	18	38	62
Textiles*	78	22			49	51	65	35		
Containers & Packaging										
Glass Packaging	77	23	53	48	51	49	65	35	24	76
Steel Packaging	80	20	52	48	65	35	57	43	54	46
Aluminum Packaging	66	34	64	36	54	46	56	44	52	48
Paper & Paperboard Packaging	40	60	56	44	44	56	38	62	35	65
Corrugated Boxes	39	61	46	54	52	48			37	52
Plastics Packaging	73	27	58	42	56	44	49	51	34	66
PET Bottles and Jars	77	23	56	44	65	35	64	36	48	52
HDPE Natural Bottles	66	34	61	39			49	51	52	48
Other Containers	74	26	57	43	60	40	63	37	61	39
Bags & Sacks and Wraps	72	28	52	48	49	51	47	53	58	42
Other Plastics Packaging	53	47	58	42	71	29	10	90	32	68
Wood Packaging	46	54	19	81					9	91
Other Wastes										
Food Wastes	73	27	48	52	65	35	46	54	51	49
Yard Wastes	77	23	63	37	52	48	90	10	60	40
Miscellaneous Inorganic Wastes	66	34	53	47	50	50				

*Product detail not provided

Table 5. MSW Residential/Commercial Generation Allocation, by Product

	New York		Chicago		EPA U.S. 1998	
	Residential	Commercial	Residential	Commercial	Residential	Commercial
Product	%	%	%	%	%	%
Durable Goods						
Major Appliances			0	100	10	90
Carpets & Rugs	64	37	30	70	80	20
Rubber Tires	59	41	39	61	5	95
Batteries, Lead-Acid	64	36	97	3	5	95
Selected Consumer Electronics	53	47	44	56		
Bulky Items*			35	65		
Other Miscellaneous Durables	58	42	32	68	80	20
Nondurable Goods						
Newspapers/Mechanical Papers	78	22	46	54	85	15
Books	64	36			80	20
Magazines	57	43	40	60	65	35
Office-Type Papers	19	81	12	88	25	75
Standard Mail	85	15			65	35
Commercial Printing	49	52			65	35
Trash Bags			36	64	95	5
Disposable Diapers	69	31	75	25	90	10
Clothing & Footwear	66	34	59	41	60	40
Textiles*			40	60		
Containers & Packaging						
Glass Packaging	56	44	47	53	80	20
Steel Packaging	69	31	48	52	80	20
Aluminum Packaging	64	36	25	75	80	20
Paper & Paperboard Packaging	53	47	31	69		
Corrugated Boxes	36	64	16	84	10	90
Gable Top/Aseptic Cartons			26	74	50	50
Other Paperboard Packaging	81	19	52	48	50	50
Bags & Sacks	76	24			90	10
Other Paper Packaging	58	42	43	57	70	30
Plastics Packaging	55	45	41	59		
PET Bottles and Jars	58	42	54	46	80	20
HDPE Natural Bottles	63	37	50	50	95	5
Other Containers	56	44	43	57	80	20
Bags & Sacks and Wraps	53	47	42	58	90	10
Other Plastics Packaging	61	39			80	20
Wood Packaging	41	59	2	98	0	100
Other Wastes						
Food Wastes	46	54	40	60	50	50
Yard Wastes	66	34	53	47	90	10
Miscellaneous Inorganic Wastes	52	48	54	46	50	50
Total MSW Generation	*54*	*46*	*39*	*61*	*57*	*43*

*Product detail not provided

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