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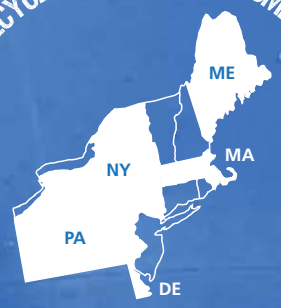
RESOURCE RECYCLING

THE VALUE OF RECYCLING: WHAT THE NUMBERS TELL US



BY TED SIEGLER AND NATALIE STARR

Details are provided of the economic value of recycling in several Northeast states, comparing the industry now to where it was nearly a decade ago.

Recycling has significant environmental benefits, replacing virgin materials with secondary materials, and thus avoiding the mining, transport and processing energy inputs and environmental impacts of using virgin materials. Recycling also provides economic benefits, replacing materials often mined and manufactured outside of the region with those collected and processed within the region. For this reason, the Northeast Recycling Council, Inc. (NERC) contracted with DSM Environmental Services, Inc., and subcontractor MSW Consultants, to research the contribution of recycling and re-use industries to the economy in the sponsoring states of Delaware, Maine, Massachusetts, New York, and Pennsylvania.

This research provides state officials and NERC with an updated ability to communicate the economic value of the recycling and re-use industries in their states, as well as compare results for 2007 (study update) against findings from the original Recycling Economic Information (REI) report published in 2000 (2000 report). The 2000 report was based primarily on U. S. Economic Census data gathered in 1992, updated in some cases to 1997. This study update is based on 2002 Census data, updated in some cases to 2007, thus representing the economic status of the recycling and re-use industries roughly a decade after the 2000 report. While, in most cases, the methodology developed for the 2000 Study by NERC and the U.S. Environmental Protection Agency was followed, several significant changes were made.

First, the direct economic impacts are reported in three categories instead of two. The first category includes all recycling collection and processing activities (labeled "supply side" activities in the 2000 report) and is explicitly categorized and reported as the "recycling industry." The second category, industries that purchase secondary materials from the recycling industry, were labeled

Table 1 | Direct economic impact of recycling, recycling-reliant and re-use and remanufacturing industries

Economic data	DE	MA	ME	NY	PA	All five states	Percent
Establishments							
Recycling industry	73	1,381	1,201	2,392	2,265	7,313	64
Recycling-reliant	18	192	42	251	484	986	9
Re-use/remanufacturing	85	455	191	1,333	1,062	3,126	27
Total	**176**	**2,027**	**1,434**	**3,977**	**3,811**	**11,425**	**100**
Employment							
Recycling industry	632	5,452	2,096	13,485	10,171	31,837	30
Recycling-reliant	545	5,252	1,385	14,063	34,039	55,283	53
Re-use/remanufacturing	708	3,250	1,064	4,859	8,145	18,026	17
Total	**1,885**	**13,953**	**4,545**	**32,408**	**52,355**	**105,146**	**100**
Annual Payroll ($1,000)							
Recycling industry	$17,725	$188,972	$54,741	$502,031	$326,711	$1,090,181	26
Recycling-reliant	$24,356	$233,749	$56,602	$683,150	$1,685,742	$2,683,599	63
Re-use/remanufacturing	$15,074	$76,598	$19,304	$206,618	$159,616	$477,209	11
Total	**$57,156**	**$499,319**	**$130,647**	**$1,391,799**	**$2,172,069**	**$4,250,989**	**100**
Receipts ($1,000)							
Recycling industry	$199,401	$1,279,288	$359,765	$3,820,301	$5,951,010	$11,609,704	33
Recycling-reliant	$93,496	$1,568,764	$352,995	$5,286,317	$14,003,259	$21,304,831	61
Re-use/remanufacturing	$53,939	$327,735	$93,460	$973,010	$617,222	$2,065,366	6
Total	**$346,835**	**$3,175,728**	**$806,220**	**$10,079,628**	**$20,571,490**	**$34,979,902**	**100**

Source: Northeast Recycling Council, DSM Environmental Services, Inc. and MSW Consultants, 2007

"demand side" activities in the 2000 report and reported as part of the "recycling industry," but are now separately reported as "recycling-reliant" industries. This reflects the fact that, for example, a paper mill would commonly be thought of as part of the paper industry, which relies on a mix of recycled and virgin materials. The third category remains the same, "re-use and remanufacturing industries."

Second, the study update allocates recycling economic activity to only that portion of the recycling-reliant industry that uses recycled materials. For example, if a pulp mill averages 25-percent recycled fiber, then 25 percent of its employment, payroll and gross receipts are allocated to recycling.

Finally, the study update reports both indirect and induced economic impacts. However, they are not summed with the direct economic impacts to calculate the total economic impact of recycling, to avoid double counting. Instead, the indirect and induced impacts are separately reported for each sector for use by the participant states to estimate the impact of a change in economic activity in any one of the sectors reported on in this study update.

The results are in

Twenty-six different business sectors were identified in the 2000 report, and were included again in this study update. The values for each sector were estimated using:

- U.S. Census Bureau data
- Published national and state data (e.g., U.S. Bureau of Labor and U.S. Geological Survey minerals statistics and county business patterns)
- Trade association data
- State and private databases
- Surveys of individual establishments in certain sectors
- Modeling of certain sectors based on the number of establishments, and other characteristics of the industry.

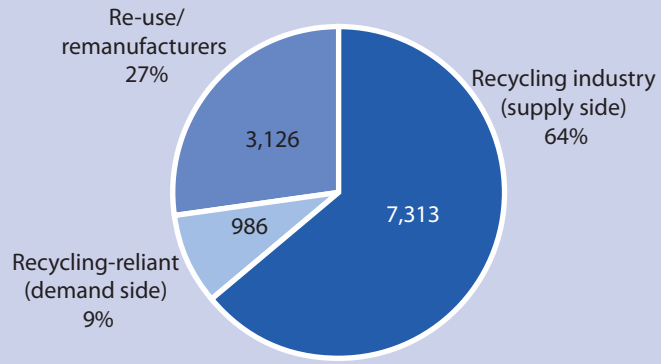
Table 1 summarizes the estimated direct economic impacts of the industry for each of the participating states.

A total of 11,378 establishments are presently involved in recycling, and the use of recycled materials, in the five states. Sixty-four percent were categorized as recycling industries and 27 percent as re-use and remanufacturing industries, while only nine percent were categorized as recycling-reliant industries. This is consistent with the pyramid that one would expect, with many (smaller) collection, processing and wholesaling operations feeding a few larger recycling-reliant industries.

The 11,378 establishments employed an estimated 104,885 people in the five states (Figure 2). Interestingly, employment does not track establishments, with only 30 percent of total jobs in the recycling industries (31,837 jobs), 53 percent of jobs in the recycling-reliant industries (55,283 jobs), and 17 percent (17,765 jobs) in reuse and remanufacturing. This is primarily because of the small number of full-time equivalent employees working at the large number of small composting, drop-off and bottle bill redemption centers.

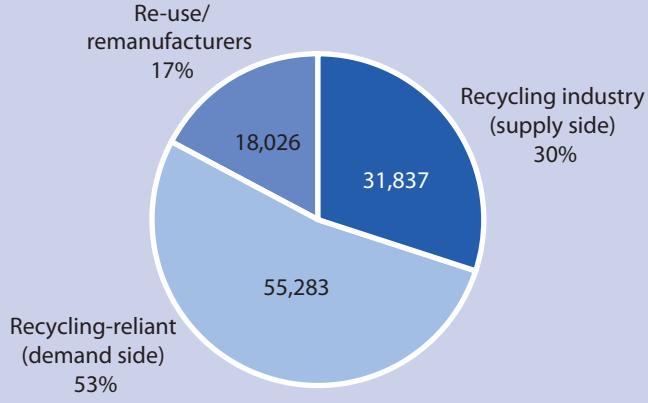
The 104,885 jobs provided approximately $4.2 billion dollars in annual payroll, with payroll roughly paralleling the employment distribution (Figure 3). On average, employee pay was slightly higher in recycling-reliant industries, reflecting higher paying manufacturing jobs. Altogether, a total of $35 billion (rounded) in gross receipts was generated by the recycling, recycling-reliant and re-use and remanufacturing industries. As noted

Figure 1 | Total establishments in participant states



Source: Northeast Recycling Council, DSM Environmental Services, Inc. and MSW Consultants, 2007

Figure 2 | Total employment in participant states



Source: Northeast Recycling Council, DSM Environmental Services, Inc. and MSW Consultants, 2007

in Figure 4, 61 percent of gross receipts were generated by the recycling-reliant industries, with 33 percent generated by the recycling industries. Only six percent of gross receipts were generated by the re-use and remanufacturing industries, which reflects the lower value materials they tend to deal with, but ignores the significant environmental benefits of re-use industries.

Comparison with 2000 report

One of the study goals was to assess the change in recycling economic activity over the past decade. There was speculation that increased exports of recyclables, combined with closure of manufacturing plants in the Northeast, would have negative economic impacts on the recycling industry, despite efforts to support recycling demand made by participant states.

Unfortunately, it is difficult to draw direct comparisons between the two studies for three primary reasons:

- Materials values have changed significantly. The year that materials' prices were based on for the 2000 report is not known, but in 2007 (the year used for material prices for this study update), prices were at an historic high
- There were significant changes in the methodology between the two reports
- Business classifications used in the Census reports were changed between the two studies, making it impossible to do direct time-series comparisons for some sectors.

Given these caveats, some general comparisons can be made.

Impact of export. While some states worried that the increase in export of secondary materials, and the U.S. decline in manufacturing, would adversely impact recycling-reliant industries, a general observation is that recycling-reliant industries have not shrunk significantly. This is due, in part, to the resurgence in steel production over the past decade. Conversely, the number of regional mills using recycled paper shrunk from 118 to 68 over the same time period. This is a direct result of older mills closing in the Northeast, with production shifting to newer mills in the Southeast and in other countries – especially in Asia – where newer mills have the capacity to process more highly-contaminated feedstock. If the new domestic demand had been met through increased manufacturing capacity in the Northeast, there would have been greater growth than actually occurred.

Jobs. Like many other sectors of the economy, the number of jobs reported is about one-half of that reported in the 2000 report; this is despite the fact that jobs involving the collection of recyclables have increased over those noted in the 2000 report, due both to the methodology used in this update and increased numbers of collection programs. While it's plausible that some job loss is due to increased mechanization and productivity, it is likely that the largest single factor (other than the impact of export) affecting the numbers reported in this study is the change in methodology, which allocates employment based on the percent of secondary material used in the recycling-reliant industries, rather than a reflection of actual job loss.

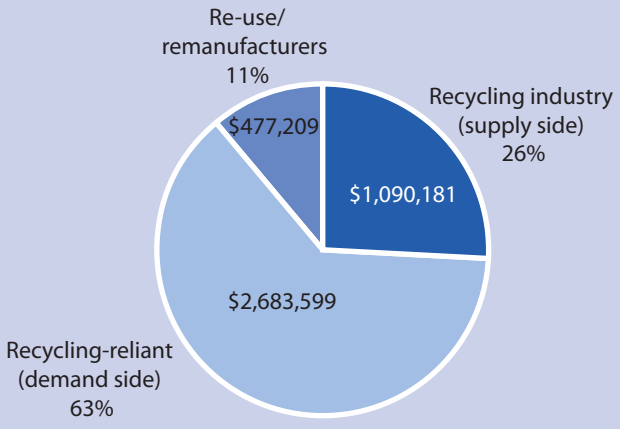
Municipal and private collection. In general, for both municipal and private collection programs, employment and payroll are up significantly. This is probably due to a combination of new investment in recycling collection programs, as well as a more aggressive attempt to quantify collection costs and revenues.

Organics. As with recyclables collection, organics management is up across the board. Investments by state and local governments, significant investments made by the private sector and driven by yard waste bans, and increased demand for compost and mulch, are likely the cause of these increases.

Materials recovery facilities. In general, this area has remained relatively stable. While there has been some growth, it's not significant, except for in New York. Authors of the study update relied on a purchased database believed to be accurate for the region, and cannot explain the apparent growth in MRFs in New York State, when comparing the study update to the 2000 report.

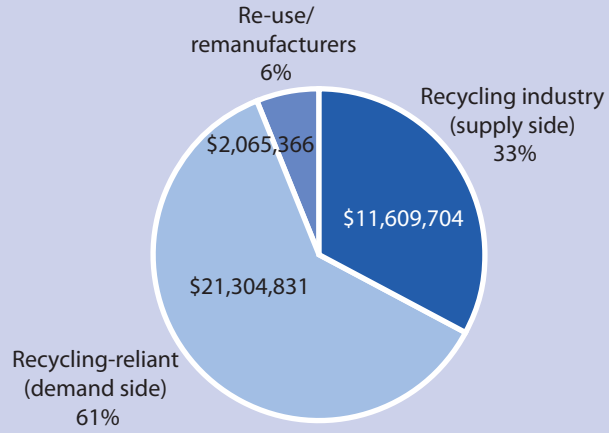
Plastics manufacturing. The significant decline in economic activity reported in this sector is also due to a change in methodology, not to a decline in the amount of post-consumer recycled (PCR) resin actually used. The use of PCR resin has likely increased over the past decade as more manufacturers source recycled resin (especially as virgin resin

Figure 3 | Total annual payroll in participant states



Source: Northeast Recycling Council, DSM Environmental Services, Inc. and MSW Consultants, 2007

Figure 4 | Gross receipts in the five participant states



Source: Northeast Recycling Council, DSM Environmental Services, Inc. and MSW Consultants, 2007

prices increased).

Pavement mix producers. There are large increases over the previous study, probably due to better data combined with the increased use of recycled asphalt (RAP) over the last decade. Increases in both acceptance by highway engineers, and in the percentage of RAP in new asphalt paving allowable under highway specifications, have contributed to additional use of RAP.

Steel mills. The number of establishments has held steady in New York and Pennsylvania over the past 10 years, with employment down but payroll up slightly. In fact, gross receipts are way up due to significantly higher commodity prices. These higher steel prices mask the change in methodology, which would otherwise have reported significantly reduced gross receipts because of the change in methodology, which allocates economic activity based on the percent of scrap consumed.

Re-use and remanufacturing. Changes to the economic census reduced this sector significantly due to the removal of pawn shops from this sector. In addition, many materials exchanges are in essence "virtual" exchanges, existing electronically only. Moreover, many re-use activities are affiliated with other social service organizations, and were not counted unless the re-use activity involved the exchange of dollars. However, even a significant increase in the number of establishments would not impact total economic activity appreciably because of low wages and gross receipts associated with the majority of these industries.

Recommendations for future studies

The original *Recycling Economic Information* study conducted for NERC (Roy F. Weston, 1994) used value added, instead of gross receipts, to report on the contribution of the recycling industry. We recommend a return to value-added calculations for future studies. While the use of value-added calculations for recycling-reliant industries would reduce the reported economic benefit of recycling, it would allow the recycling industry to be compared against other industries (and the U.S. economy) as a percent of gross domestic product. More importantly, it would allow future comparisons of the recycling industry that are not masked by large changes in commodity values, because such values would already be incorporated into the input price for the recycling reliant industries.

Second, all report updates should be conducted in sync with the most recent release of Economic Census data, as both the 2000 report and this study update were forced to use dated Economic Census data because the most recent census data were not available. The Economic Census is conducted in the second and seventh year of each decade, but is typically not released for two years after the survey year, making the REI study years of '04-'05 or '09-'10 more ideal time periods to capitalize on recent census data.

Thirdly, because of the wide variations in commodity prices, it's critical that future studies be explicit about reporting the year in which the materials values are reported.

Finally, statewide databases must be maintained, as the lack of quality databases of recycling industries and, in some cases, recycling-reliant industries, can stymie any survey effort. The ability of states to maintain and update databases on all recycling, recycling-reliant and re-use/remanufacturing industries would make an economic study, and updates, easier, and cheaper, to carry out.

In conjunction with the maintenance of these statewide databases, participating states could also push to have legislation introduced, which requires that brokers, processors and recycling-reliant industries report annually on quantities of recyclables handled by material type. By establishing such a reporting requirement, which is already used in a number of other states, it would improve the overall accuracy of the Recycling Economic Information studies, as well as benefit state recycling rate calculations and the charting of the flow of materials in each state. RR

Ted Siegler and Natalie Starr are principals of DSM Environmental Services, Inc. They can be contacted at (802) 674-2840 or ted@dsmenvironmental.com and natalie@dsmenvironmental.com.

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