



NM Recycling Coalition

Adding 5,000 Jobs to New Mexico's Economy

**A Plan to Increase Jobs Using Recycling-Based
Pay As You Throw and Economic Development**

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Keep New Mexico Beautiful, Inc.

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Executive Summary

The analysis contained in this study was conducted to demonstrate the untapped job potential of New Mexico's recycling industry. The report details job opportunities that could be available through the recycling and reuse industry; it also identifies strategic solutions such as Pay As You Throw (PAYT), which can increase recycling and maintain the steady stream of feedstock materials needed to grow the New Mexico recycling industry.

In 2011, New Mexico recycled approximately 407,290 tons of material, which is approximately 20.6% of the state's overall municipal solid waste (MSW) generation. In 2010, the national U.S. recycling rate was 34%, while some states with more aggressive programs had passed the 50% mark. This study estimates job creation based on three different levels: meeting the current U.S. recycling rate (34%), achieving a 50% recycling rate and achieving a 75% recycling rate. The study also demonstrates that through a statewide residential PAYT program, 2,096 new direct local jobs and a total of 5,356 new local jobs overall (direct, indirect and induced) would be added to New Mexico's economy. The state would realize an estimated savings of \$12.5 million in avoided disposal costs and 973,795 tons of Metric Tons of Carbon Equivalent equaling 178,351 cars off the road.

The following highlights summarize this study's findings:

- Based on the current in-state recycling industry job breakdown, this report estimates that approximately 63% of overall direct job increases will stay local with 52% of total jobs (direct, indirect and induced).
- In 2011, there were an estimated 6,746 direct, indirect and induced jobs, of which 3,526 (48%) were local. (See Section 1.4 for definitions).
- Increasing New Mexico's recycling rate to the national average of 34% would create 9,318 new direct, indirect and induced jobs from the collection, processing, manufacturing and reuse sectors, of which 4,871 jobs would remain local.
- According to the Institute for Local Self Reliance, sorting and processing recyclables provides 10 times more jobs than there would be if these materials were thrown away.
- *Collection sector* jobs are both private and municipal and will remain local as diversion increases. New Mexico is home to 502 jobs directly related to the collection sector through its 15 curbside recycling programs and hundreds of drop-off collection sites.
- *Processing sector* jobs are a mix of local and regional. Many materials are collected and sent out of state for processing. There are currently an estimated 467 jobs associated with processing; they are located at 27 identified compost facilities, two material recovery facilities and numerous other processors. Through New Mexico's expansion of hub-and-spoke systems (6 new and 5 improved small-scale baling and presorted material programs in 2012), and the two new material recovery facilities opening in 2013, the state is implementing the infrastructure needed to retain more processing jobs as the recycling stream increases.
- The *manufacturing sector* has the greatest potential for additional direct, indirect and induced job growth because manufacturers are reliant on local resources to maintain

their businesses (everything from legal, accounting and marketing to repairs and new parts).

- There are currently 309 jobs in New Mexico in the recycling manufacturing sector. The state has a manufacturer of each major commodity sector (paper/cardboard, glass, metal, and plastic). In-state jobs represent approximately 29% of the total estimated direct manufacturing jobs associated with New Mexico's current recycling efforts. The other 71% of New Mexico's diverted materials are supporting manufacturing and related job growth in other states, Mexico and China.
- The *reuse sector* is even more job intensive than recycling. It is a knowledge-based industry, with a premium placed on accurate sorting and pricing, and good inventory management.

There are two proven MSW reduction strategies, Pay As You Throw (PAYT) and Waste Bans, and if implemented they could have a positive impact on local job growth.

- According to the United States Environmental Protection Agency, PAYT is the single most effective way to reduce waste and at the same time creates an instant supply of recyclable materials. **Most PAYT options can be implemented quickly and can adapt to the current design and collection structure with minimal additional cost.**
 - If New Mexico municipalities implemented PAYT, the overall MSW (residential and commercial) material landfilled would decrease by 23.5% from 1,668,000 to 1,275,000 tons.

If New Mexico implemented residential and commercial PAYT rate incentives, and achieved a 50% diversion rate, 5,555 new direct jobs, of which 3,515 are local and 17,358 new total jobs (direct, indirect and induced), of which 9,074 are local would be created.

- Waste bans are also an effective way to increase recycling. There are three waste material categories that, if banned, would create *primarily local direct jobs* throughout the supply chain of collection, processing, manufacturing and reuse: electronics, glass and organics (food and yard waste). Nearly half of U.S. states have enacted legislation to ban yard waste from landfills, creating U.S. yard waste diversion of 57% compared to New Mexico at 29%. A waste ban on organic material (yard and food) would create 774 new direct jobs from yard waste and 805 new direct jobs from food waste diversion.

Changing the way New Mexico values waste will create enormous economic opportunity for the state and its residents. Proactive policies and programs that encourage recycling and reuse will ignite downstream investment in recycling manufacturing from the private sector and promote job growth for the state, financial savings for the residents and a healthier environment for everyone.

Introduction

In 2011, the state of New Mexico buried approximately 1,600,000 tons of municipal solid waste in landfills, costing state residents approximately \$51 million in tip fees. Much if not all of this material could have been recovered and moved into the recycling and reuse supply chain. The recovery of this material would save money, save landfill space, save natural resources, decrease greenhouse gas emissions and *create jobs*.

Numerous economic studies demonstrate a direct correlation between recycling and job creation, generating jobs that are usually local. They begin with a resource that is diverse and readily available within each region—trash. Some of the materials that make up trash, such as paper, plastic and aluminum, are commonly known as being recyclable. Other, less-familiar materials such as old furniture, books, pots and pans, clothes, appliances and tires can also be diverted from the waste stream and recycled into new products. As waste management costs, including siting and maintaining landfills and transporting waste, have increased, communities around the globe have started to think of waste as an asset rather than expenditure. These proactive communities have discovered endless opportunities to create new products and local jobs.

Major Corporations Look Toward Zero Waste

In 2007, at the 26th annual National Recycling Coalition Exhibition, the two opening speakers—Dave Steiner, CEO of Waste Management, and Scott Vitters, Sustainable Packaging Director, Coca Cola—stressed the importance of changing the way Americans value waste in an effort to achieve Zero Waste. Steiner defined Zero Waste as collecting and processing waste materials for reutilization. His focus was to make recycling simpler for the consumer, thereby increasing the volume of materials in the recycling stream. Vitters defined Zero Waste more narrowly, arguing that the material packaging of products should be considered valuable raw material for reuse. He defined the current state of sending packaging materials to landfills as a core inefficiency, adding avoidable costs to companies. <http://nasarecycles.nasa.gov/assets/documents/NationalRecyclingCoalition.pdf>

Both men have since led rapid industry change and developed “**out of the box**,” cutting-edge solutions:

- At The Wall Street Journal's September 2012 ECO:nomics conference, Steiner is quoted as saying, “We faced that existential question about five or six years ago. We looked at all the stuff that we take and we put into landfills across the United States. And we said, ‘What would that be worth if we were able to separate it out and sell it for its constituent price?’ Our total revenue right now is about \$13 billion, \$14 billion. If we could take all that garbage you're giving us—in fact, we're charging you to pick it up—and separate it and sell it into the commodity markets, it would be worth about \$10 billion to \$12 billion. We could double our revenue if we sold it for its commodity value.” <http://online.wsj.com/article/SB10001424052702304636404577299693244220740.html>
- In September 2012, Vitters discussed Coca-Cola's plant-based materials and commitment to recycling: “But the journey needs to have a destination. Our destination is Zero Waste.” Coca-Cola's published goals are to recover 50% of its bottles and cans by 2015 and 100% by 2020. “Lots of people are on sustainability journeys,” says Vitters. In 2009 the company opened the world's largest plastic bottle-to-bottle recycling plant in Spartanburg, SC. The plant will produce approximately 100 million pounds of recycled Polyethylene terephthalate [PET] plastic for reuse each year—the equivalent of nearly 2 billion 20-ounce Coca-Cola bottles. These efforts are all focused on helping “close the loop” on packaging use and producing truly sustainable packages for consumers. http://www.greenerpackage.com/bioplastics/destination_zero_waste

From the East Coast to West Coast, the United States is embracing a new recycling lifestyle. States like Massachusetts, whose 2020 solid waste master plan is entitled *A Pathway to Zero Waste*, or Florida and California, with 75% diversion goals by 2025, are establishing a new normal for municipal waste management. These aggressive goals have stimulated the development of more sophisticated recycling technologies, making it possible to separate and recycle materials once thought to be unrecyclable, including Styrofoam and chicken bones. These recycling solutions have created new local jobs. Many states like South Carolina have identified the recycling industry cluster as a critical economic growth sector. According to the South Carolina Department of Commerce (www.recyclinginsc.com), South Carolina has four times as many recycling jobs per capita than Massachusetts and California and the governor recently appointed a team to specifically promote and develop the industry. Wisconsin, Pennsylvania and Maine are also recycling industry job leaders. New Mexico has an opportunity to join these leaders, move past the status quo and think "out of the box."

"In 2012, the Chinese government launched a goal of recycling 70% of the nation's waste stream by 2015, in hopes of transforming the world's second-largest economy into one that is sustainable." (Resource Recycling, 11/11/11).

There has been little emphasis on the economic development aspect of recycling within the state of New Mexico except to acknowledge that recycling creates jobs. The state's population density, large geographic area and low landfill tip rates have created both cost and logistical barriers to expanding New Mexico's recycling collection infrastructure. Are the benefits of job creation from increased recycling enough to overcome these roadblocks? If increased recycling has been shown to stimulate job growth, then exactly how many jobs and what type of jobs would be created? The purpose of this study is to:

- Identify the number of existing New Mexico jobs related to recycling
- Evaluate potential job growth through different recycling sectors (collection, processing, manufacturing and reuse)
- Demonstrate specific jobs through waste diversion opportunities
- Inform regional landfill managers and economic development managers about waste reduction strategies that will ensure a steady stream of diverted materials to stimulate the local reuse and recycling sector

It's widely understood that there are energy and natural resource savings associated with recycling. As the costs associated with waste continue to rise, officials are becoming increasingly aware that there is also a direct financial benefit to avoiding disposal and increasing recycling. This study will demonstrate that there is also a tremendous economic benefit to recycling and reuse industry growth.

SECTION I. Potential Job Growth by Recycling Categories

1.1 Recycling Industry Overview

Why does waste diversion create many more jobs than landfill, incineration and material extraction? According to the Institute for Local Self Reliance (ILSR), the supply chain that is triggered from diversion through reuse and recycling creates 10 jobs for every job in the waste and material extraction industries. These jobs are diverse and contain varying pay levels. According to the 2008 report *More Jobs, Less Pollution: Growing the Recycling Economy*, there are 666,000 jobs in municipal solid waste (MSW) fields in the United States. Of these jobs, 85% (574,000) are associated with recycling. According to *Resource Recycling Magazine*, the recycling industry is a \$236 billion industry compared to the waste industry, which is less than \$45 billion.

According to the *U.S. Recycling Economics Information Update Study, 2009* by DSM Environmental, the recycling supply chain includes four key sectors:

In 2010, the South Carolina Department of Commerce boasted that the recycling industry sector in the state had grown by more than 12% each year for more than four consecutive years—at a time when most other industry sectors were either showing flat or negative growth.

- **Collection:** The collection process begins when a resident or a business decides to place materials into the recycling stream; they are then collected either curbside from the business or residence or brought to a drop-off location. Curbside recycling is traditionally operated through a municipal or private hauler service but could also be operated by an independent business or a nonprofit. Drop-off facilities are generally offered by municipalities or through a regional public or private landfill. However, nonprofits or businesses can also collect specific materials for recycling or reuse. Increased collection streams can create jobs in both the public and private sectors.
- **Processing:** Processing or sorting and consolidating materials can take place at a municipally owned materials recovery facility (MRF), a private MRF or at a specialized private business collecting specific materials like organic materials used to generate compost.
- **Manufacturing and converting:** Converting involves cleaning and processing recycled materials into a feedstock for manufacturing and is typically performed by a private business. While this is generally done with major commodity materials, some facilities perform specialized conversion processes. For example, Nike uses the converting process to grind used sneakers to generate feedstock materials that can be molded into school gymnasium flooring.

The manufacturing process begins by utilizing a processed or converted material and turning that material back into the same product or into a totally new product. This

could include large commodity materials like PET plastic used to make new PET bottles or used mattress stuffing used to make fire starter.

- **Reuse or remanufacturing:** The term “remanufacturing” includes the process of repair (as in repairing an old dishwasher that can be sold for profit or nonprofit), refurbishment (as in refurbishing an old dresser that can be sold as new) or recovery (as in chlorofluorocarbons that can be captured and reused). Reuse includes the sale or donation of items that can be used again, such as clothing, sofas or bicycles.

1.2 New Mexico Recycling Totals

According to the New Mexico Environment Department (NMED), in 2011, New Mexico recycled approximately 407,290 tons of MSW, which is approximately 20.6% of overall MSW generation in the state. In 2010, the U.S. recycling rate was 34%, with some states exceeding 50% recycling. Table 1 compares the U.S. recycling rates to New Mexico's rates across material categories. The chart was developed using the U.S. Environmental Protection Agency's (US EPA) *2010 Facts and Figures* report and, to account for the lack of a waste characterization study for New Mexico, applies the same category percentages for generation by material type to New Mexico's MSW stream. The chart uses detailed information from US EPA's report to break out subcategory percentages within the five major material categories. This methodology will later be used to determine more specific resource availability within New Mexico's trash. These percentages can also be used by regional planners and landfill managers to determine the tonnage availability through diversion of specific materials. *The recycling rate is determined by dividing the total tonnage recycled by the total tonnage generated (trash and recycling combined) within each category and subcategory.*

The U.S. recycling rate is ahead of New Mexico's in most categories. For example, within the paper category, the corrugated boxes recycling rate in New Mexico is 41.4%, compared to the U.S. rate of 85%; the newspaper recycling rate is 20% in New Mexico, compared to the U.S. rate of 72%; New Mexico's yard waste recycling is 29%, compared to the U.S. rate of 57%. New Mexico falls behind the United States in every category except metal recycling and nondurable plastic goods.

With recent investments and commitments made in both rural and urban areas, New Mexico is poised to reach the overall national recycling rate average. The New Mexico recycling rate has witnessed a steady 16% average annual increase over the previous 5 years. If this trend continues, reaching the national average of 34% could be attained as early as 2015.

Table 1. Recycling Rates by Material Category United States vs. New Mexico

Recycling Percentage by Commodity Stream United States 2011 Compared to New Mexico 2011				
Category	U.S. Recycling Percentage by Commodity Stream	NM Recycling Percentage by Commodity Stream	Total Generation NM (Tons)	Total Recycling NM (Tons)
Paper and Paperboard				
Newspapers	71.6%	20.4%	78,320	15,966
Other Papers	45.0%	23.5%	187,794	44,067
Corrugated Boxes	85.0%	41.4%	230,283	95,235
Other Packaging	25.0%	0.0%	68,411	
<i>Total Paper and Paperboard</i>	<i>62.6%</i>	<i>27.5%</i>	<i>564,809</i>	<i>155,267</i>
Glass				
Durable Goods	0.0%	0.0%	17,202	0
Glass Containers	33.4%	3.9%	74,198	2,922
<i>Total Glass</i>	<i>27.1%</i>	<i>3.2%</i>	<i>91,400</i>	<i>2,922</i>
Metals				
Durable Goods*	23.8%	121.6%	127,072	154,496
Lead Batteries	96.1%	9.6%	12,208	1,174
Containers and Packaging	55.4%	2.0%	36,782	747
<i>Total Metals</i>	<i>35.4%</i>	<i>88.8%</i>	<i>176,062</i>	<i>156,417</i>
Plastics				
Durable Goods	6.4%	0.7%	86,881	573
Nondurable Goods	0.0%	1.9%	50,734	959
Containers and Packaging	12.1%	4.0%	108,443	4,304
<i>Total Plastics</i>	<i>7.6%</i>	<i>2.4%</i>	<i>246,058</i>	<i>5,836</i>
Rubber and Leather				
Tires	35.5%	8.6%	26,160	2,243
Other Durables	0.0%	0.0%	27,269	0
Nondurable Goods	0.0%	0.0%	8,244	0
<i>Total Rubber and Leather</i>	<i>15.0%</i>	<i>3.6%</i>	<i>61,673</i>	<i>2,243</i>
Textiles	15.0%	0.0%	104,004	10
Wood	14.5%	0.0%	125,883	60
Other	29.4%	18.5%	37,971	7,032
Food Scraps	2.8%	0.0%	275,547	0
Yard Trimmings	57.4%	29.2%	265,084	77,470
Inorganic Wastes	0.0%	0.0%	30,440	13
Total	34.0%	20.6%	1,978,931	407,270

* This table shows the New Mexico recycling rate for durable metal goods as reported to the NMED. As explained in the text box below, this value is likely inaccurate and has been modified for the purpose of this study to produce more realistic results.

The reported New Mexico metals recycling rate for 2011 is explored further and it is *important to note that the subcategory of durable goods within the metal category was calculated to have a 120% recycling rate*. This value was based on reported tonnages recovered for recycling and is intended to include ferrous metals from MSW such as iron and steel found in large appliances, furniture, tires and other durable goods. This is significantly higher than the U.S. rate of 23% and would mean that the state is recycling more durable metals than it generates. A more detailed investigation into the metal category suggests that there has been a disproportionate jump in metals recovered for recycling from 2009 to 2011. The subcategory of durable metals is the most obvious example of an unexpected increase in the New Mexico recycling rate for a specific material, but the metals subcategories of lead batteries and containers and packaging also show inaccuracy. These subcategories are not always reported separately unless collected directly at the landfills, and businesses collecting these materials may be combining the tonnage with durable metals.

Metal recycling continues to increase rapidly in many states and New Mexico is not alone in its struggle to obtain accurate metal generation and recovery tonnages. The strong commodity value of metal has ignited rapid growth of small mom-and-pop metal recyclers across the United States. Much of the metal is recycled by small scrap processors and scrap dealers who collect everything from steel and aluminum cans, lead acid batteries and white goods to industrial machines and automobiles. These businesses may not report information to NMED accurately by category, thus unintentionally combining MSW metals with industrial metals. These small companies often feed into larger companies and mix MSW and industrial material streams, making the reporting process difficult to control. The outreach effort of NMED to small processors and dealers has had a large impact, with more businesses than ever before now reporting tonnages of materials recycled. However, detailed information by stream and subcategory is not yet always reliable.

In light of the current landscape of metals recycling and the extremely high recovery tonnages reported to NMED, much of the durable metals recycling reported and categorized as MSW in New Mexico likely does not belong under the MSW category. This study assumes that a significant amount of reported metals under the durable goods category should actually be categorized as industrial recycling based on the US EPA definition and therefore the reported 2011 MSW durable metals recycling tonnage is not realistic. This report will substitute the U.S. 2010 overall metal recycling rate of 35% to estimate jobs related to the MSW metal category. The tons of recycled metals from durable goods will be adjusted from 153,000 tons to 60,500 tons. The adjusted value represents the tonnage needed to create an overall metal average of 35%. The adjusted value is still slightly higher than the reported 2009 New Mexico durable metals recycling value, which showed a 43.5% recycling rate for the subcategory. The adjustment will affect the overall recycling and waste generation totals as well. The total MSW recycling tonnage will change from 407,270 to 313,724, which in turn reduces the recycling rate nearly 5 percentage points, from 20.6% to 15.8%. These adjusted numbers will be used throughout this analysis as the status quo benchmarks within the metal category.

Table 2. Metals Recycling as a Percent of Total Estimated Category Generation

Metals	U.S. 2010	NM 2009	NM 2011	Rates Used in This Report
Durable Goods	23.83%	43.52%	120.56%	47.61%
Lead Batteries	96.10%	0.00%	9.62%	9.62%
Containers and Packaging	55.39%	14.91%	5.55%	5.55%
Total Metals	35.43%	34.52%	88.84%	36.19%

US EPA definition of metal recycling: By weight, ferrous metals (iron and steel) are the largest category of metals in MSW. The largest quantities of ferrous metals in MSW are found in durable goods such as appliances, furniture and tires. Containers and packaging are the other source of ferrous metals in MSW. Large quantities of ferrous metals are also found in construction materials and in transportation parts and products such as automobiles, locomotives and ships, but these are not counted as MSW in this report.

Although New Mexico's recycling rates are below U.S. rates for most material categories, a comparison of 2009 and 2011 recycling data demonstrates that New Mexico is making great improvements in nearly every material category, including glass recycling increasing by 193%, plastics recycling increasing by 147% and rubber and leather recycling increasing by 173% between 2009 and 2011.

Table 3. 2009 and 2011 Recycling Comparison

	Total Recycling NM 2009 (Tons)	Total Recycling NM 2011 (Tons)	Percent Change
Paper and Paperboard			
Newspapers	15,293	15,966	4%
Other Papers	8,081	26,954	234%
Corrugated Boxes	78,628	95,235	21%
Other Packaging	36,649	17,113	-53%
<i>Total Paper and Paperboard</i>	<i>138,651</i>	<i>155,267</i>	<i>12%</i>
Glass			
Glass Containers	998	2,922	193%
<i>Total Glass</i>	<i>998</i>	<i>2,922</i>	<i>193%</i>
Metals			
Durable Goods*	54,592	133,071	144%
Lead Batteries	0	1,174	
Containers and Packaging	5,415	2,040	-62%
<i>Total Metals</i>	<i>60,007</i>	<i>156,417</i>	<i>161%</i>
Plastics			
Durable Goods	163	573	252%
Nondurable Goods	0	959	
Containers and Packaging	2,202	4,304	95%
<i>Total Plastics</i>	<i>2,365</i>	<i>5,836</i>	<i>147%</i>
Rubber and Leather			
Tires	821	2,243	173%
Other Durables	0	0	0%
Nondurable Goods	0	0	0%
<i>Total Rubber and Leather</i>	<i>821</i>	<i>2,243</i>	<i>173%</i>
Textiles		10	
Wood	34	60	76%
Other	7,643	7,032	-8%
Food Scraps	0		
Yard Trimmings	75,028	77,470	3%
Inorganic Wastes	0	13	
Total	285,546	407,270	43%
Recycling as a Percent of Total Generation	14.5%	20.6%	

*This table shows recycling percentages as reported from NMED for 2011

1.3 Benchmarks

The analysis in this study estimates diversion by commodity using three benchmark recycling levels to predict direct job growth by commodity material and by industry sector: 34% (the 2010 U.S. average), 50% and 75%. The diversion benchmark levels are based on overall average of all materials and were selected to demonstrate realistic opportunities for the state:

- The **34%** benchmark represents reaching the U.S. average in any one material category. For instance, the New Mexico paper and paperboard recycling rate is 24.9%, while the U.S. rate is 62.6%; therefore, reaching the U.S. rate would mean increasing the New Mexico paper and paperboard recycling rate by 37.5 percentage points. However, in the food recycling category, New Mexico has a 2011 recycling rate of 0% and would only

need to recycle 2.8% of food waste generated to reach the U.S. average food recycling rate.

- The **50%** benchmark represents reaching 50% overall recycling. Several states are at or near the 50% recycling level, including California, Maine, Maryland, Massachusetts, Oregon and Washington. Several states also have recycling goals at or above 50%, including Connecticut, Delaware, New Jersey, New York and Rhode Island.
- The **75%** benchmark is calculated in the same way. For instance, the 2011 New Mexico plastic recycling rate is 1%. In order to reach a recycling rate of 75% for all material categories, the state plastics recycling rate would have to increase by 74 percentage points. The 75% goal was recommended as a U.S. goal for 2025 by the Tellus Institute in the report *More Jobs Less Pollution, 2008*, and was also adopted as the official goal for the state of Florida in 2010. This goal has proven to be attainable, as cities like San Francisco have reached an 80% recycling rate and have paved the way for innovative waste management solutions.

What do San Diego County, CA, Madison, WI, Logan County, OH, Sedona, AZ, Seattle, WA, St. Paul, MN, Boulder, CO, Austin, TX, Tokyo and the entire country of Scotland all have in common? The elected officials in each have signed into place the policies, goals and commitments to achieve "Zero Waste."

Table 4. State of New Mexico Current and Projected Waste Diversion by Material

New Mexico Waste Diversion Tonnages					
Category	Current NM, 2011 (Tons)	Current Recycling Rate	Additional Tons/ Diversion Needed to Meet U.S. Average Recycling Rate	Recycling Percent at 2010 U.S. Level	Additional Tons/ Diversion Needed to Meet 75% Diversion
Paper and Paperboard					
Newspapers	15,966	20%	40,079	72%	42,774
Other Papers	44,067	23%	40,357	45%	96,779
Corrugated Boxes	95,235	41%	100,486	85%	77,478
Other Packaging	0	0%	0	25%	51,308
Total Paper and Paperboard	155,267	27%	180,923	63%	268,339
Glass					
Durable Goods	0	0%	0	0%	12,901
Glass Containers	2,922	4%	21,890	33%	52,726
Total Glass	2,922	3%	21,890	27%	65,628
Metals					
Durable Goods*	60,500	48%	0	48%	34,804
Lead Batteries	1,174	10%	10,558	96%	7,981
Containers and Packaging	2,041	6%	19,626	55%	25,545
Total Metals**	63,715	36%	30,184	53%	68,331
Plastics					
Durable Goods	573	1%	4,976	6%	64,588
Nondurable Goods	959	2%	0	2%	37,092
Containers and Packaging	4,304	4%	8,855	12%	77,028
Total Plastics	5,836	2%	13,831	8%	178,708
Rubber and Leather					
Tires	2,243	9%	7,032	35%	17,377
Other Durables	0	0%	0	0%	20,452
Nondurable Goods	0	0%	0	0%	6,183
Total Rubber and Leather	2,243	4%	7,032	15%	44,012

Table 4. State of New Mexico Current and Projected Waste Diversion by Material

New Mexico Waste Diversion Tonnages					
Category	Current NM, 2011 (Tons)	Current Recycling Rate	Additional Tons/ Diversion Needed to Meet U.S. Average Recycling Rate	Recycling Percent at 2010 U.S. Level	Additional Tons/ Diversion Needed to Meet 75% Diversion
Textiles	10	0%	15,606	15%	77,993
Wood	60	0%	18,172	14%	94,352
Other	7,032	19%	4,145	29%	21,446
Food Scraps	0	0%	7,689	3%	206,661
Yard Trimmings	77,470	29%	74,731	57%	121,343
Inorganic Wastes	13	0%	0	0%	22,818
Total**	314,568	16%	372,909		1,169,630
Total Diversion			687,477		1,484,198

Assumption:

* Durable goods metal adjusted to subtract estimated industrial metals from reported New Mexico MSW figure.

**Category total reflects the new total diversion with a durable goods metal substitution. The U.S. 2010 recycling rate of 35% was used in place of the New Mexico reported overall metal rate. All projected diversion levels are based on additional tons needed over the current status quo recycling by material category.

1.4 Methodology

The methodology for estimating jobs created by the waste industry used in this study was developed based on findings from several sources. Since the 1990s, the ILSR has issued several studies on the subject and, subsequently, other studies have used ILSR jobs data in addition to developing their own jobs accounting methods. These studies include: the *U.S. Recycling Economic Information Study 2001*, prepared for US EPA and the National Recycling Coalition by R.W. Beck; *More Jobs, Less Pollution: Growing the Recycling Economy in the U.S. 2008*, prepared by the Tellus Institute; and *Recycling Economic Information Update Study 2009*, prepared for the Northeast Recycling Council by DSM Environmental. This study uses job multipliers, industry ratios and other data from the studies in Table 5, along with waste characterization breakdowns from the US EPA 2010 MSW Facts and Figures report to estimate the potential for additional jobs through increased diversion of recyclable materials in the state of New Mexico.

Table 5. Jobs Studies

Study Title	Overview and Link
Waste To Wealth research by ILSR	Recycling-based economic development has been a 30-year focus of ILSR's work and is the heart of their Waste to Wealth program. For three decades, ILSR has provided technical assistance linking reuse and recycling with community development and has documented the job creation and value added benefits of reuse and recycling. http://www.ilsr.org/recycling/recyclingmeansbusiness.html
Recycling Economic Information Update Study 2009 prepared for the Northeast Recycling Council by DSM Environmental	The research in this report was intended to provide state officials and the Northeast Recycling Council with an updated ability to communicate the economic value of the recycling industry in their states. http://www.nerc.org/documents/recycling_economic_information_study_final_report_2000.pdf
The U.S. Recycling Economic Information Study 2001 prepared for US EPA and the National Recycling Coalition by R.W. Beck	This study demonstrated that the nation's recycling and reuse industry is highly diverse in terms of which recovered materials are utilized, average establishment sizes and which technologies are employed. Twenty-six recycling and reuse industry categories were used to determine economic information. http://www.epa.gov/osw/conserve/rrr/rmd/rei-rw/pdf/n_report.pdf

Table 5. Jobs Studies

Study Title	Overview and Link
More Jobs, Less Pollution: Growing the Recycling Economy in the U.S. 2008 prepared by Tellus Institute	This report assesses the impacts of implementing a bold national waste diversion strategy in the United States over the next two decades, specifically, the impact on jobs growth if the United States were to achieve 75% national waste diversion. http://www.teamster.org/sites/teamster.org/files/11911RecyclingJobsFullReport.pdf

Table 6. Direct Job Multiplier Table

Direct Jobs Through 1,000 Tons of Material					
Material Category	Diverted				Disposed
	Collection	Processing	Manufacturing	Reuse Remanufacturing	Total Waste Collection, Landfill and Incineration
Paper and Paperboard					
Newspapers	–	–	–	–	–
Other Papers	–	–	–	–	–
Corrugated Boxes	–	–	–	–	–
Other Packaging	–	–	–	–	–
Total Paper and Paperboard	1.67	2	4.16	NA	0.76
Glass					
Durable Goods	–	–	–	–	–
Glass Containers	–	–	–	–	–
Total Glass	1.67	2	7.85	2.35	0.76
Metals					
Durable Goods	1.67	2	4.2	20	0.76
Lead Batteries	1.67	2	4.2	20	0.76
Containers and Packaging	1.67	2	17.63	20	0.76
Total Metals	–	–	–	–	–
Plastics					
Durable Goods	–	–	–	–	–
Nondurable Goods	–	–	–	–	–
Containers and Packaging	–	–	–	–	–
Total Plastics	1.67	2	10.3	20	0.76
Rubber and Leather					
Tires	–	–	–	–	–
Other Durables	–	–	–	–	–
Nondurable Goods	–	–	–	–	–
Total Rubber and Leather	1.67	2	9.24	7.35	0.76
Textiles	1.67	2	2.5	7.35	0.76
Wood	1.67	2	2.8	2.8	0.76
Other	1.67	2	2.5	NA	0.76
Food Scraps	1.67	1.25	0	NA	0.76
Yard Trimmings	1.67	1.25	0	NA	0.76
Inorganic Wastes	1.67	0.5	NA	NA	0.76

Multipliers are based on data from Tellus 2008 and Beck 2000.

– Indicates that jobs multipliers for that material category/subcategory are not available and multipliers specific to the broader material category or more specific materials subcategory are instead used.

NA: Not applicable

This jobs study uses metrics developed from past analyses of recycling industry jobs to estimate both the current recycling industry activity based on New Mexico's 2011 diversion levels and to predict industry job growth based on higher recycling levels. The information in this study was developed to provide an overview of the economic impact of

recycling industry growth within the state of New Mexico. It is based on a compilation of U.S. estimates and was developed to provide officials and planners with insight into the unseen value of recycling. The study used two approaches to determine the number of jobs related to the recycling industry: an estimated approach and a survey.

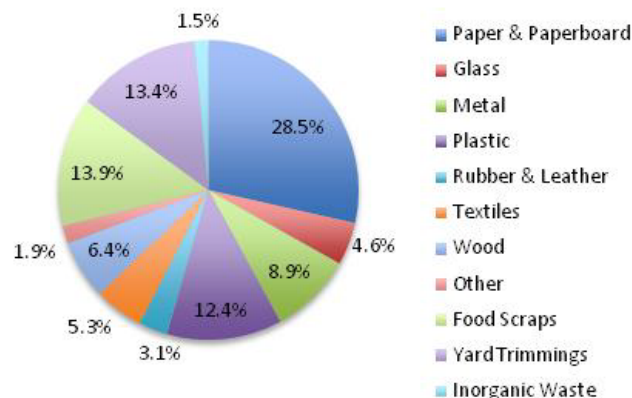
Estimated Approach

Step 1. Estimate Recycling Rates by Commodity:

As a current waste characterization study has not been conducted for New Mexico, this study utilizes the 2010 US EPA *Solid Waste Facts and Figures* report to determine waste stream composition based on MSW generation. The U.S. average waste generation percentages by material type were applied to New Mexico's total waste generation tonnage to estimate the tons of each material category generated in New Mexico. While

material-specific waste generation estimates for New Mexico used in this report likely vary somewhat from the actual New Mexico waste stream, the methodology used in this study serves as the best available estimate of material-specific waste generation in New Mexico.

Diagram 1. US EPA 2010 Total MSW Generation



Step 2. Estimate Jobs by Commodity: This study uses the 2011 recycling rates by material category (as described in Step 1) to estimate jobs by category (as shown in Table 6). The primary source for job multipliers was Tellus, 2008.¹

Step 3. Estimate Total Direct Jobs: This study used industry sector ratios determined by Tellus to calculate the number of jobs located in each sector of the recycling industry (collection, processing, manufacturing, reuse and remanufacturing). The ratios in Tellus are based on the current number of jobs per sector within the U.S. recycling industry. Applying these ratios demonstrates that if New Mexico were recycling at higher levels than in 2011, there would be a greater number of recycling industry jobs, based on today's sector ratios, as the quantity of recycled materials increases.

The estimates of direct recycling industry jobs by sector used in this study are conservative. As the population grows and the collection and processing sectors become more efficient, the mix of jobs within the industry will change. There will likely be a lower

¹ However, Tellus points out that the organics processing numbers may be low, so instead of using .5 jobs per 1,000 tons of diversion (as in Tellus), this study substituted 1.25 jobs (R.W. Beck) per 1,000 tons. R.W. Beck focused on active processing of organic materials for beneficial use. As a result, the number of establishments and the potential economic activity associated with inactive composting techniques (i.e., allowing materials to slowly and independently decompose over time) may not be fully reflected in the totals. There is no detailed recent study of compost sector jobs; therefore, the R.W. Beck numbers reflect the best available detailed information. R.W. Beck contacted 584 establishments with 3,340 employees and 4,182 thousand tons of throughput. Based on this, it is assumed that the 1.25 jobs per 1,000 tons of organics processed is still a conservative number.

percentage of direct jobs related to collection and processing and a higher percentage of jobs related to reuse and remanufacturing, as shown in Table 8.

Step 4. Estimate Indirect and Induced Jobs: Indirect and induced jobs were determined using R.W. Beck multipliers. The subcategory multipliers developed by R.W. Beck are based on category averages by sector. For instance the glass and paper categories both fall under manufacturing and both yield a different number of direct jobs per ton. The R.W. Beck study includes all category information to determine a manufacturing sector average. The sector averages will vary depending on the mix of activity in any one category. The R.W. Beck subtotals and totals were produced so that relative comparisons could be made.²

While the multipliers provided in the R.W. Beck report were not developed specific to the New Mexico recycling industry, they were the most relevant multipliers currently available. Therefore, in order to understand the potential for recycling industry growth through greater diversion of recyclable materials in New Mexico, the R.W. Beck multipliers were used in this study. However, for more detailed future studies of recycling industry growth, individual industries or large corporations should look further into specific sector multipliers. These multipliers are not intended to predict future growth, but simply are used in this study to estimate potential recycling industry growth based on 2011 population and MSW generation.

Direct, Indirect and Induced Definitions

Based on U.S. Recycling Economic Information Study by R.W. Beck

Direct effects refer to the operational characteristics of the firms or institutions that are studied. The direct jobs are the jobs that are associated with those establishments.

Indirect effects measure the value of additional economic demands that the direct firms or institutions place on supplying industries. When firms produce goods or conduct business or when public entities provide public goods or services, they must make many purchases. Some of these are from suppliers in the area. Some are not. Public utilities, communications systems, fuel, wholesale goods and services, manufactured goods, financial and legal services, raw and processed commodities and a variety of professional services are necessary to produce the direct values described above.

Induced effects accrue when workers in the direct and indirect industries spend their earnings on goods and services in the region. Induced effects can also be called *household effects*, and the terms are often used interchangeably. When workers in direct and indirect industries purchase goods and services for household consumption, they in turn stimulate another layer

² The R.W. Beck study states: Users of these findings must be cautious to avoid claims about the recycling and reuse industry that may be unwarranted given that there is some degree of inflation in the subtotals or totals. Based on other modeling experience, it is believed that aggregation bias may have inflated the subtotals and totals by up to 15%, and possibly higher. It is important to note that this bias is associated with any total that is derived from indirect and induced information, including total economic activity and subtotal/total multipliers. Alternatively, totals derived only from direct information do not include bias. Multipliers reveal potential changes in an economy attributable to a change in direct activity in a particular industry in that same economy. Multipliers can be instructive for anticipating economic growth in the case of a new or expanding firm and economic decline in the case of a plant closing. Economic multipliers are often misunderstood and therefore improperly used. The national industry sector subtotals of collection, processing, manufacturing and reuse were used as an average for all categories within that sector. The subtotals may vary because of the mix of activity within each sector and also due to regional difference.

of the economy. Most induced activity accrues to retail, services and finance, insurance and housing spending. Because employment is stimulated in these industries as well, their demands for inputs increase, yielding an additional round or additional rounds of indirect purchases and additional rounds of induced activity.

Actual Job Count Survey

Research through internet, telephone and email was conducted in order to estimate the current number of jobs within New Mexico's recycling industry. The industry in New Mexico is diverse and made up of some very small collection, processing, and reuse companies, therefore it was difficult to obtain precise sector job numbers. However, an accurate count of manufacturing sector jobs was obtained. Section II contains detailed tables of the current available industry sector information.

1.5 Direct Job Estimates

In 2011, New Mexico diverted 407,000 tons of MSW and, based on the direct job multipliers summarized in Table 6, these diverted materials have created 2,159 direct jobs. *Not all of these jobs are located in New Mexico. Some materials are collected and exported to out-of-state manufacturing facilities.* As shown in Tables 7 and 10 increasing the New Mexico recycling rate to the current U.S. average of 34% would create 2,982 additional direct recycling industry jobs, of which 1,887 would be local. Reaching the 75% diversion goal would increase the total number of direct jobs to 11,571 of which 7,322 would be local.

Table 7. Estimated Jobs by Material through Waste Diversion

Estimated Total Direct Jobs Created by Material Category from Diversion						
Category	NM Rate	Estimated Jobs Due to NM Recycling	U.S. Average	Estimated Additional Jobs by Increasing Recycling Rate to U.S. Average	75%	Estimated Additional Jobs by Increasing Recycling Rate to 75% Diversion
Paper and Paperboard	27%	1,216	63%	1,417	75%	2,101
Glass	3%	34	27%	252	75%	756
Metals	36%	529	35%	474	75%	881
Plastics	2%	82	8%	193	75%	2,497
Rubber and Leather	4%	29	15%	91	75%	568
Textiles	0%	0	15%	172	75%	859
Wood	0%	0	14%	118	75%	610
Other	19%	43	29%	26	75%	132
Food Scraps	0%	0	3%	22	75%	603
Yard Trimmings	29%	226	57%	218	75%	354
Inorganic Wastes	0%	0	0%	0	75%	50
TOTAL	16%	2,159	34%	2,982	75%	9,412
Extended TOTAL				5,141		11,571

The estimated recycling industry job stream is divided into four sectors: collection, processing, manufacturing and reuse and remanufacturing. According to the Tellus study, the manufacturing sector contributes approximately 50% of the total recycling industry

jobs, the reuse and remanufacturing sector contributes about 5% of jobs and the collection and processing sectors combined contribute the remaining 45% of jobs, as shown in Table 8. Tellus also predicts that, in 2030, with a 75% diversion rate, the sector percentage mix will change. The collection and processing sectors will become more automated and improve efficiencies and will therefore decrease the number of employees per ton of material. The share of jobs in the reuse and remanufacturing sector will increase, as more employees per ton will be required.

Table 8. Sector Jobs as a Percent of the Recycling Industry (Tellus)

Estimated Jobs Recycling Industry Sector by Management Activity		
	2008	2030 Green Economy
Collection	23%	16%
Processing	22%	20%
Manufacturing	50%	51%
Reuse and Remanufacturing	5%	13%

- *The collection sector (23%)* is made up of government and private collection programs. These direct jobs will remain local because the materials must be collected or dropped off and consolidated regionally.
- *The processing sector (22%)* is made up of organics processing and composting facilities, MRFs and material wholesalers and dealers. For the most part, these jobs will remain local; however, some materials in New Mexico are currently collected and moved to Texas and Colorado MRFs for processing. A more developed processing infrastructure will help keep additional commodity diversion within the state.
- *The manufacturing sector (50%)*: New Mexico's location and total supply limitations hinder its appeal to some manufacturing businesses. When there is no local manufacturing available, the needed feedstocks will flow out of the state and support economic growth in other states.
- *The reuse and remanufacturing sector (5%)* will produce primarily local jobs; however, some remanufacturing of textiles and a few other products will likely occur in other states.

In order to fully estimate the total impact of waste diversion on the recycling and reuse industry, indirect and induced job growth should also be considered. Similar to the method used to calculate direct jobs, the multipliers from the R.W. Beck study were used to estimate indirect and induced jobs. Applying the multipliers for indirect and induced jobs to current New Mexico waste diversion rates will provide a benchmark for estimating indirect and induced job growth at potential future diversion levels. The R.W. Beck study multipliers include both full- and part-time jobs. As discussed earlier, it is worth noting that these multipliers are older and not specific to the state of New Mexico; however, they are currently the best available resources for estimating recycling industry jobs and are used to provide a comparative benchmark.

In 2011, there were 6,746 direct, indirect and induced jobs as a result of New Mexico's recycling efforts, of which 52% or 3,526 were local.

Table 9 summarizes estimates of direct, indirect and induced jobs based on four levels of recycling in New Mexico: New Mexico's 2011 rate of 16%, and the U.S. 2010 average rates

of 34%, 50% and 75%. Based on the “status quo” rate, there are a total of 6,746 direct, indirect and induced jobs as a result of New Mexico's recycling efforts. We assume that the collection-related jobs (888) are all local, the processing-related jobs (1,176) are both local (approximately 95%) and exported (approximately 5%) to other states and that the reuse and remanufacturing industry jobs (230) are also local. With robust recycling infrastructure, jobs in the collection, processing and reuse sectors could easily remain primarily local. However, the manufacturing sector jobs are primarily exported out of state.

New Mexico currently has six companies in the recycling manufacturing sector; however, most of the materials collected and processed within the state are moved outside the state for manufacture. Based on the telephone survey conducted as part of this study, there are 309 direct manufacturing jobs in the state, or 29% of the total estimated direct manufacturing jobs (1,083) created as a result of New Mexico's recycling efforts. This means that approximately 71% of the existing direct recycling manufacturing sector jobs from New Mexico recycling occur outside the state, supporting the economy of other states.

Increasing New Mexico's recycling rate from 16% to the national average of 34% would create 9,318 new direct, indirect and induced jobs, of which 4,871 would be local, in the collection, processing, manufacturing and reuse sectors.

If New Mexico increased its recycling rate to the U.S. average rate of 34%, there would be approximately 16,064 total jobs, of which 7,677 or 48% would be local. As a result of the state's recycling efforts, this would break down to 2,115 jobs related to collection, 2,801 jobs related to processing and 547 jobs related to the reuse and remanufacturing sector. With increased recycling infrastructure in the processing sector, approximately 95% of the processing sector jobs could remain local. The 10,601 total jobs in the recycling manufacturing sector will be based in both New Mexico and outside the state. Based on the current share of 29% direct recycling industry manufacturing jobs based in New Mexico, approximately 748 (of 2,579) direct manufacturing jobs would remain in-state while 1,831 jobs would be based in other states. Those states would in turn benefit from additional job growth due to indirect and induced effects.

Increasing New Mexico's recycling rate from 16% to 50% would create 17,358 new direct, indirect and induced jobs in the collection, processing, manufacturing and reuse sectors, of which 9,074 would remain local.

Increasing New Mexico's recycling rate from 16% to 75% would create 29,410 new direct, indirect and induced jobs in the collection, processing, manufacturing and reuse sectors, of which 15,374 would remain local.

Including current jobs related to recycling, the total potential for direct, indirect and induced jobs as a result of New Mexico's recycling efforts is 16,064 jobs (8,397 local) at the U.S. average recycling rate of 34%, 24,104 jobs (12,600 local) at a recycling rate of 50% and 36,156 jobs (18,900 local) at a recycling rate of 75%.

The manufacturing sector has the greatest potential for job growth. New Mexico currently retains approximately 29% of direct manufacturing jobs as a result of New Mexico's recycling efforts. Assuming that this share stays constant, New Mexico's recycling efforts will support approximately 1,122 direct manufacturing jobs at a 50% recycling rate and 1,684 jobs at a 75% recycling rate. In order to keep more potential direct manufacturing related jobs local and benefit from the additional indirect and induced job growth, ***it's vital that the state economic development teams encourage key manufacturing industries to establish facilities in New Mexico. Local and state policies must also be developed and adopted to support reaching these recycling rate goals.***

Table 9. Estimated Direct, Indirect, and Induced Jobs by Recycling Sector

Potential Job Growth Through Diverted Waste Stream Materials				
	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
Current NM 16%				
Recycling Collection	502	65	321	888
Recycling Processing	476	252	448	1,176
Recycling Manufacturing	1,083	1,603	1,766	4,452
Reuse Remanufacturing	98	63	69	230
TOTAL	2,159	1,983	2,604	6,746
U.S. Average 34%				
Recycling Collection	1,195	155	765	2,115
Recycling Processing	1,134	601	1,066	2,801
Recycling Manufacturing	2,579	3,818	4,204	10,601
Reuse Remanufacturing	233	149	165	547
TOTAL	5,141	4,723	6,200	16,064
50% Diversion				
Recycling Collection	1,793	233	1,148	3,174
Recycling Processing	1,701	902	1,599	4,202
Recycling Manufacturing	3,870	5,728	6,309	15,907
Reuse Remanufacturing	349	224	248	821
TOTAL	7,714	7,087	9,304	24,104
75% Diversion				
Recycling Collection	2,690	350	1,721	4,761
Recycling Processing	2,552	1,353	2,399	6,303
Recycling Manufacturing	5,806	8,592	9,463	23,861
Reuse Remanufacturing	524	335	372	1,232
TOTAL	11,571	10,630	13,955	36,156

The job multipliers from the R.W. Beck 2010 US EPA report used in this study are based on national information and do not apply specifically to any one state. However, since there is no detailed New Mexico-specific job multiplier data available, this report uses the R.W. Beck multipliers to develop benchmarks to demonstrate potential direct, indirect and induced jobs related to the recycling sectors. The total indirect and induced jobs reflect both full- and part-time jobs.

Based on the current in-state recycling industry job breakdown, this report estimates that approximately 63% of the overall direct job increases will stay local (or 52% of total jobs: direct, indirect and induced).

The following assumptions were made about potential job retention related to growth of the four recycling industry sectors:

- **Collection:** All collection job growth will remain local.

- *Processing:* Approximately 95% of processing job increases will remain local. Today (2012) Las Cruces and Silver City bring collected recycling materials to Texas. Because of their proximity to El Paso processing facilities, it's estimated that materials diverted in these areas will continue to move out of state. Currently, Waste Management processes some collected materials out of state as well, however there is new in-state processing capacity planned for Waste Management in 2013. In order to estimate the expected retention of in state processing jobs due to recycling growth, the population and associated waste of Las Cruces and Silver City (5.2% of the New Mexico population total and related waste) have been factored out of estimated local job growth.
- *Manufacturing:* A survey of the current recycling manufacturing sector jobs reveals 309 local direct jobs or 29% of the total estimated direct jobs - see Table 19 Section II.
- *Reuse:* The reuse industry sector is very diverse and it is highly likely that the majority of new jobs will remain local.

Table 10. Potential Job Growth through Diverted Waste Stream Materials

Potential Job Growth Through Diverted Waste Stream Materials (New Mexico vs. Out of State)				
	Direct Jobs Likely to Remain in NM 63%	Direct Jobs Likely to Leave the State 37%	Total Jobs Likely to Remain in NM 52%	Total Jobs Likely to Leave the State 48%
Current NM Rate 16%				
Recycling Collection	502	0	888	0
Recycling Processing	452	24	1,117	59
Recycling Manufacturing	314	769	1,291	3,161
Reuse Remanufacturing	98	0	230	0
TOTAL	1,366	793	3,526	3,220
US Average 34%				
Recycling Collection	1,195	0	2,115	0
Recycling Processing	1,077	57	2,660	140
Recycling Manufacturing	748	1,831	3,074	7,527
Reuse Remanufacturing	233	0	547	0
TOTAL	3,253	1,888	8,397	7,667
50% Diversion				
Recycling Collection	1,793	0	3,174	0
Recycling Processing	1,616	85	3,992	210
Recycling Manufacturing	1,122	2,748	4,613	11,294
Reuse Remanufacturing	349	0	821	0
TOTAL	4,881	2,833	12,600	11,504
75% Diversion				
Recycling Collection	2,690	0	4,761	0
Recycling Processing	2,424	128	5,988	315
Recycling Manufacturing	1,684	4,122	6,920	16,941
Reuse Remanufacturing	524	0	1,232	0
TOTAL	7,322	4,250	18,900	17,256

SECTION II. Jobs through Diverted Materials

2.1 Overview

Robust recycling economies like Lane County, OR, with 57% diversion and Chittenden County, VT, with 68% diversion demonstrate that a strong commitment to waste diversion creates local recycling industry growth (see the appendix, Successful Collection and Processing Programs). Lane County is home to one of the nation's largest regional nonprofit recyclers, St. Vincent de Paul, which has grown from 7 employees to more than 400 over the past decade through increased reuse and recycling. Chittenden County is home to two products that are manufactured entirely using materials recovered from landfills: Local Color Paint and Montvale Compost. Municipalities across the country that have successfully diverted resources out of the waste stream and into the supply stream have created local jobs and reduced the municipal costs associated with waste, while saving valuable landfill space. This section will explore opportunities for job growth in each sector of the recycling and reuse industry.

Job creation from recycling far outweighs disposal on a per-ton basis. Jobs and wages increase the more recyclable materials move from collection to processing to manufacturing. Sorting and processing recyclables provides 10 times more jobs than if these materials were thrown away. Manufacturers that use recyclable materials to make new products employ even more people, and at higher wages, than sorting and processing companies. For instance, some recycling-based paper mills and plastic product manufacturers employ between 25 and 60 times as many workers as landfills do on a per-ton basis. Source: ILSR <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>

2.2 Collection Sector

The recycling collection sector is made of municipal and private materials, including: paper, metals, glass, plastics, textiles and electronics. For every 1,000 tons of material collected, this sector creates about 1.67 local jobs [see Table 6]. Increasing commercial and residential recycling collection within the state will directly increase local jobs. This includes materials sent to MRFs, compost facilities and other processors.

Table 11. Estimated Local Collection Sector Jobs

Potential Collection Job Growth Through Diverted Waste Stream Materials				
	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
Current NM 16%				
Recycling Collection	502	65	321	888
U.S. Average 34%				
Recycling Collection	1,195	155	765	2,115
75% Diversion				
Recycling Collection	2,690	350	1721	4,761

**The sectors of collection, processing and reuse are sometimes combined, as many companies perform more than one function (i.e., composters and scrap metal dealers). Therefore, this represents an estimate and should be looked at along with the other sectors.*

Collection sector jobs are all New Mexico based.

Often officials believe that recycling is more expensive because of the increase in municipal jobs. It is true that more labor is needed to maintain a robust recycling program than to maintain a landfill program. However, the municipality will decrease the cost of handling waste (labor, tip fees and transport) and also has an opportunity to sell the recycled materials collected. There is a net gain of approximately 1.1 new jobs in recycling collection for every job lost in waste collection.

Several municipalities offset the additional recycling labor collection costs with programs that turn a profit or, at a minimum, neutralize the additional labor costs. These may include composting food and yard debris, or glass recycling. These communities cover the cost of more robust recycling programs and create a win-win situation (see the appendix, Successful Collection and Processing Programs). There are 15 curbside collection programs in the state of New Mexico. Curbside collection is available to 324,017 households, or nearly half of the population. There are also multiple full- and part-time jobs associated with drop-off programs and more specific Hub-and-Spoke recycling programs. There are currently an estimated 502 direct jobs related to collection supporting the New Mexico recycling industry.

Table 12. Curbside Recycling Programs

Municipal and Private Curbside Collection Programs	# Households Served
Albuquerque	176,000
Bernalillo County	23,398
Farmington	13,594
Holloman Air Force Base	1,057
Kirtland Air Force Base	1,243
Las Cruces	30,150
Los Alamos County	6,870
Los Ranchos de Albuquerque	1,913
Mesilla	918
NM State University	300
Rio Rancho	30,737
Santa Fe	27,000
Santa Fe County (partial)	3,508
Silver City	4,358
Town of Bernalillo	2,971
TOTAL	324,017

The hub-and-spoke model is a solid waste management system with a centralized processing facility (hub) providing services to smaller surrounding communities (spokes). This model promotes strategic placement of recycling infrastructures such as collection trailers or roll-off containers to aid in the recycling of materials in more rural areas. Pooling regional resources into hubs allows for a steady stream of material that can fuel large MRFs or processors.

There are many successful recycling collection programs throughout the United States. Below are examples of one successful municipal program and one successful private program. See the appendix, Successful Collection and Processing Programs, for more examples.

San Francisco, CA:

According to Mayor Gavin Newsome in a 2010 City of San Francisco press release, "The recycling industry trains and employs men and women in local environmental work that can't be outsourced and sent overseas, creating 10 times as many jobs as sending material to landfills. San Francisco is showing once again that doing good for our environment also means doing right by our economy and local job creation. For a growing number of people, recycling provides the dignity of a paycheck in tough economic times."

The city's aggressive recycling strategy is creating jobs and stimulating growth in a new green economy. In 2010, the city of San Francisco achieved a 77-percent landfill diversion rate, setting a recycling rate record for the highest of any city in the United States. The city uses a three-container PAYT system,

which creates a financial incentive for residents to save money by recycling more. The residential and commercial rate structure offers curbside collection of trash, recycling and organics (food and yard). The PAYT structure has changed the way residents value trash: nearly all households fill less than a 32-gallon container of trash per week and instead divert most of their waste for recycling, reuse or composting. The city's "Zero Waste" goal has created extensive services and guidance for residents to assist with recycling nearly all material types. The city is paving the way for other municipalities by developing innovative recycling technology, systems and job categories.

http://www5.sfgov.org/sf_news/2010/08/san-francisco-achieves-77-landfill-diversion-rate-the-highest-of-any-us-city.html.

Wilmington, MA:

Social-entrepreneur creates 100 jobs collecting and selling used books.

Got Books was launched in 2000 as a part-time online project for company founder and president Bob Ticehurst. According to Bob, "When (at the age of 22) I decided to resign, I called my mother first. She told me, 'Bob, you can do anything you put your mind to.' When I called Dad, he said, 'Are you an idiot? You have a great job, get a secure paycheck and you want to sell books out of our basement?' " Bob collected books from individuals and universities and sold the books online, splitting the profits.

In June of 2006, Got Books launched a new book recycling program for municipalities. Book donation containers about the size of a parking space were placed at public locations such as a Department of Public Works building or recycling center to encourage residents to drop off unneeded books. When the containers were filled, Got Books picked them up. This symbiotic relationship was beneficial to both Got Books, who received the collected items, and the towns, who saved money on trash removal costs, reduced waste in their communities and in some cases received payment for the books. Today, Got Books has nearly 500 drop-off donation containers placed throughout New England, five used book superstores and nearly 100 employees.

<http://www.gotbooks.com/>

2.3 Processing Sector

Processors can be either municipal or private sector companies. The processing sector adds two new direct jobs for every 1,000 tons of materials diverted from the landfill, as shown in Table 5. At a 75% diversion rate, there would be a total of 2,552 direct processing jobs and 6,303 direct, indirect and induced processing jobs supporting the New Mexico recycling industry. Based on the estimated current local processing jobs, 95% of new job growth would remain local. There are three general facility types in the processing sector of the recycling industry:

Table 13. Potential Processing Sector Job Growth Through Additional Diversion of Recyclable Materials

	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
Current NM 16%				
Recycling Processing	476	252	448	1,176
U.S. Average 34%				
Recycling Processing	1,134	601	1,066	2,801
75% Diversion				
Recycling Processing	2,552	1,353	2,399	6,303

- 1. Compost and miscellaneous organics producers:** Establishments that produce compost, mulch, bark or bedding from yard and wood waste, biosolids, food and other organics.

2. **MRFs:** Establishments that process recovered recyclable materials, usually from curbside/drop-off collection or recyclables separated from solid waste.
3. **Recyclable material wholesalers and dealers:** Paper stock dealers, scrap metal processors, wholesalers of recovered electronics, textiles and plastics and other establishments that sort, remove contaminants and densify recovered materials and prepare them for end use (e.g., granulating plastics, cleaning up cullet).

2.3.1 Compost and Organics Processors

Healthy soil is critical for air and water quality and for productive lawns and gardens. New Mexico soils are severely deficient in organic materials, nutrients, and the ability to hold and retain water in the root zone for plants to grow. Applying compost is one way to reverse these conditions, creating healthy and productive soils in New Mexico. Additional environmental benefits can be realized by diverting food scraps from the waste stream and turning them into nutrient-rich compost. There are various ways to produce compost using food scraps ranging from fruits and vegetables to even bones and meats.

Organics processing is a great way to reduce material in landfills and create jobs with minimal start-up expense. According to *BioCycle* magazine's report on "U.S. Residential Food Waste Collection and Composting" from December 2009, 90 municipalities across the United States reported offering food waste collection programs, and many municipal programs were unreported. Two cities, San Francisco and Seattle, have even gone as far as to make residential organics collection mandatory.

The compost processing sector contributes about 1.25 jobs for every 1,000 tons of diverted materials (R.W. Beck, 2001), providing a great opportunity for both public and private job growth. This study estimates that 226 direct, composting-related jobs currently support the New Mexico recycling industry. By increasing New Mexico's recycling rate to the current U.S. average rate, New Mexico could add 240 direct composting jobs, bringing the state total to 467 direct composting jobs. At a 75% diversion rate, New Mexico's recycling efforts would lead to an additional 957 direct composting jobs, bringing the state total to 1,184 direct jobs.

Table 14. Potential Direct Job Growth at Composting Facilities through Additional Diversion of Recyclable Materials (Includes Both Collection and Processing Jobs)

Category	NM Rate	Estimated Jobs Due to NM Recycling	U.S. Average	Estimated Additional Jobs by Increasing Recycling Rate to U.S. Average	75%	Estimated Additional Jobs by Increasing Recycling Rate to 75% Diversion
Food Scraps	0%	0	3%	22	75%	603
Yard Trimmings	29%	226	57%	218	75%	354
Extended Total				467		1,184

Soilutions Organics, Albuquerque

Soilutions is a New Mexico facility that diverts and recycles organic material from the waste stream. The compost processing operation began as a necessary offshoot of Jim and Karen Brooks' permaculture/landscape-design business in 1987. Permaculture landscapes seek to establish sustainable relationships between plants, animals and people. In so doing, the long-term needs of social, biological and economic systems are met simultaneously. Soilutions recycles a wide range of materials, including all fruits and vegetables; meat, chicken and fish, including bones, fat and skin; bakery goods; coffee grounds and filters; all dairy products; biodegradable paper goods such as towels, cups and plates; soiled and waxed cardboard; natural cloth and fibers (no synthetics); biodegradable service ware and flowers and cuttings. Soilutions offers pick-up and drop-off services and employs 8 office workers and compost operators. Soilutions sells their compost to nurseries and retailers across the state, including Whole Foods. The facility creates a greater economic impact by employing additional contracted drivers to deliver their products. By building a relationship with local municipalities, research facilities, landscapers, nurseries and growers, Soilutions diverted more than 32,000 cubic yards of organic wastes from landfills in 2011.

Table 15. New Mexico Compost Facilities

Compost Facilities	Location
Albuquerque/Bernalillo County Water Utility Authority	Albuquerque
Artesia, City of	Artesia
Belen, City of	Belen
Biogrind	Ruidoso
Carlsbad, City of	Carlsbad
DeBaca County	DeBaca County
Estancia Valley Solid Waste Authority	Torrance County
Garcia Landscape Materials	Velarde
Gardner's Turf Grass, Inc.	Santa Teresa
Holloman Air Force Base	Alamogordo
Las Cruces, City of	Las Cruces
Lincoln County Composting	Ruidoso
Los Alamos, County of	Los Alamos
Midwest Bio-Systems	Las Cruces
Mountain Rich Soils	El Prado
Naturally New Mexico Foods	El Rito
New Mexico State University	Las Cruces
Raton City Landfill	Raton
Sandoval County Landfill	Rio Rancho
Roswell Municipal Landfill	Roswell
Santa Ana Pueblo	Santa Ana Pueblo
Santa Fe, City of	Santa Fe
Sierra Contracting	Ruidoso
Sierra Vista Growers	Chamberino
Soilutions	Albuquerque
Tucumcari, City of	Tucumcari

2.3.2 Material Recovery Facilities and Small-Scale Baling Operations

A consistent, high volume of post-consumer materials (plastic, paper, glass and metals) is critical to the successful operation of MRFs. MRFs typically create about two jobs per 1,000 tons of recycled materials. The materials separated at the MRF become feedstock for manufacturing facilities, creating additional direct jobs along the recycled materials supply

chain in converting and manufacturing. Many MRFs start as small, independently-owned businesses and could operate in conjunction with the collection process in order to ensure supply quality. The state of New Mexico has two MRFs: one is owned by paper manufacturer Bio Pappel, located in Albuquerque, and the other is the Buckman Road Recycling and Transfer Station run by the Santa Fe Solid Waste Management Agency. At the time of this report, not all recyclable materials collected in New Mexico are processed in local MRFs; a large amount of the collected materials is transported to neighboring states such as Texas and Colorado. The two existing local MRFs are currently running under capacity and two additional MRFs are under development. Once these two new facilities open in 2013, the majority of recyclable materials collected in New Mexico will again be processed in New Mexico. The first, operated by Friedman Recycling of Albuquerque, will open in 2013 and employ 35 people. The second new MRF will be opened by Waste Management, also in 2013. In addition to these full-sized MRFs, a mini-MRF in Carlsbad expanded in July 2012 in order to handle and sort regional generation of recyclables.

Through New Mexico's hub-and-spoke program, 20 additional small-scale baling facilities for presorted materials have been developed to facilitate recycling in communities challenged by low population and geographic location. These hub communities will benefit from more robust material streams and increased jobs due to recycling.

By diverting commodity materials such as glass, metals, paper and plastics at a 34% recycling rate—the current U.S. average—the state of New Mexico could create an additional 573 direct jobs at MRFs and other recycling processing facilities. Likewise, if the state increased the recycling rate to 75%, New Mexico would process an additional 797,363 tons of recyclables and lead to 1,595 additional direct jobs at recycling processing facilities.

Buckman Road Recycling and Transfer Station, Santa Fe, NM

The center serves as a regional MRF or collection point for materials from the city of Santa Fe, Santa Fe County and the region surrounding Santa Fe. The center is run by the Santa Fe Solid Waste Management Agency and has 18 employees dedicated specifically to recycling. The center is a full-service recycling facility accepting all standard recyclable materials (i.e., paper, glass, plastics, metals) along with a wide range of other materials, including but not limited to, bicycles, books, carpet padding, electronics, small appliances, hazardous waste and green waste. The agency is also dedicated to educating the public about the importance of waste diversion, including waste reduction, recycling, composting and the proper handling of special waste. <http://www.sfswma.org/>

Rainbow Recycling/CARC, Carlsbad, NM

The Carlsbad nonprofit entity CARC Inc., an organization that provides services and employment to developmentally disabled adults, recently expanded their Rainbow Recycling operations to a new 6,000 square foot facility in July 2012 to expand recycling processing for the region. The facility currently employs 6 full-time positions. The facility handles cardboard, paper, plastics and metal containers and aims to work with Eddy County, Carlsbad and Artesia to receive increased recycling tonnages. CARC also provides secure document collections and shredding services at their former recycling facility, which employs 12 developmentally disabled individuals. <http://www.carcinc.org/rainbow-recycling/>

Table 16. Potential Processing Sector Direct Job Growth at MRFs and Other Processors Through Additional Diversion of Recyclable Materials
(Including Scrap Metal but Excluding Organics Processors)

	Estimated Current NM Diversion'	Additional Tons/ Diversion Needed to Meet U.S. Average Recycling Rate of 34%	Additional Tons/ Diversion Needed to Meet 75% Diversion
Tons of Recyclables Processed	230,054 tons	286,343 tons	797,363 tons
Total Estimated Jobs at MRFs and Other Processors	460 jobs	573 jobs	1,595 jobs

2.3.3 Material Wholesalers/Dealers and Other Processors

Recycled materials wholesalers and dealers are the middlemen in the recycling process, routing commodities from collectors and processors to manufacturers. When a MRF, municipality or company has separated and baled commodity materials, they have two options: selling directly to a converter or manufacturer, or selling to a wholesaler or dealer who acts as a middleman. When a municipality is located near a manufacturer or converter and has a clean, steady supply of recyclable materials, it can be more economical to sell its materials directly to the manufacturer/end user. However, in most cases, municipalities don't have the time to source end markets for their materials and often don't have enough material to ensure that a supply is sent to the manufacturer. Wholesalers can buy materials from many local MRFs and are able to ensure that a steady supply is sent to their customers. Wholesalers may purchase, consolidate, process or clean the materials. However, in some cases, the wholesaler does not even handle the material, just sending a truck to pick up processed recyclable materials and deliver them directly to the manufacturer or end user.

It is difficult to classify jobs related to wholesalers and dealers under just one sector of the recycling industry, as wholesalers and dealers are involved in parts of the collection, processing and reuse sectors (i.e., many dealers collect material, sort clean and process, and even repair their material). For instance, scrap metal dealers collect metals directly from businesses, individuals, municipalities and landfills. Many scrap metal dealers also process or repair their own materials. For instance, a washer or dryer can be repaired and resold, broken into pieces and sold to small repair shops or individuals or consolidated by commodity material and sold to a manufacturer.

Table 17 includes a list of collectors and processors that fall under wholesaler/dealer category in New Mexico. However, many smaller metal recyclers are not included.

Table 17. Collectors and Processors in Wholesaler/Dealer Category (Based on Survey)

Other Collectors and Processors	Location	Type
A-1 Auto Salvage	Farmington	Metal
A. C. T. Recycling Center LLC	Alamogordo	Metal
Acme Iron & Metal Company	Albuquerque	Metal
Adelante Paper Shredding	Albuquerque	Paper
Advanced Chemical Transport	Albuquerque	HHW
Aguirres Recycling	Ranchos de Taos	Metal
Airport Auto Acres, Inc.	Santa Fe	Metal

Table 17. Collectors and Processors in Wholesaler/Dealer Category (Based on Survey)

Other Collectors and Processors	Location	Type
Alamo Recycling	Alamogordo	Metal
Albuquerque Car Crushers	Albuquerque	Metal
Albuquerque Metal Recycling	Albuquerque	Metal
Albuquerque Recycling, Inc.	Albuquerque	Metal
American Metals Co.	Gallup	Metal
Artesia Metals	Artesia	Metal
Associated Records	Roswell	Paper
B & B Waste Management	Portales	Metal
B & H Enterprise	Shiprock	Metal
B & R Recycling	Gallup	Metal
Balderas Appliances	Las Cruces	Metal
Basin Pipe & Metal	Alamogordo	Metal
C & B Recycling	Carlsbad	Metal
C & S Oil	Portales	Metal
Capital Scrap Metals	Santa Fe	Metal
Cintas	Albuquerque	Paper
Clovis Recycling	Clovis	Metal + cardboard
Coyote Scrap	Las Cruces	Metal
Daves Custom Hauling	Albuquerque	Metal
Earth Day Recycling Collection	Albuquerque	Fiber + plastic + metal
Go Green Recycling Collection	Albuquerque	Fiber + plastic + metal
Document Solutions Inc.	Albuquerque	Paper
Ed's Recycling Center	Clovis	Metal + cardboard
Envirosolve Waste Services	Albuquerque	Metal + cardboard + HHW
Friedman Recycling Collection	Las Cruces	All
Gallegos Scrap Metals	Espanola	Metal
Garza Scrap Metal	Tucumcari	Metal
GreenPaso Services	Dona Ana	Metal
Highway 85 Trading Post	Las Cruces	Metal
Hilltop Recycling Bin	Los Alamos	Metal
Hobbs Iron and Metal	Hobbs	Metal
Iron Mountain Paper Shredding	Statewide	Paper
J & M Enterprises	Artesia	Metal + cardboard + other
Las Cruces Recycling (USA, Canada)	Las Cruces	Metal
Martos Recycling Center	Las Cruces	Metal
Master Fibers	Albuquerque	Metal + fiber + plastic
Morning WoodCutters Recycling Service	Socorro	Metal + cardboard + other
Mr. G's Santa Fe Recycles	Santa Fe	Metal + cardboard + other
New Mexico Recycling, Inc.	Milan	Metal
Pueblo Metals Recycling	Albuquerque	Metal
R&M Metal	Albuquerque	Metal
Ray Durham	Alamogordo	Metal
Recycle Taos Collection Service	Taos	Metal + cardboard + other
Rhino Environmental Services	Albuquerque	Metal + cardboard + other
Rio Grande Autos	Albuquerque	Metal
Rio Rancho Recycling	Rio Rancho	Metal
Rudy's Downtown Recycling	Albuquerque	Metal
S&H Hauling (collections)	Albuquerque	Metal + fiber + plastic
Safety-Kleen	Statewide	Metal + HHW
Salvage Plus Metal Recycling	Kirkland	Metal
Santa Fe Recycling Services	Santa Fe	Metal + cardboard + other
Shred It	Statewide	Paper

Table 17. Collectors and Processors in Wholesaler/Dealer Category (Based on Survey)

Other Collectors and Processors	Location	Type
SOS Pawn and Recycling	Portales	Metal
Southwest Disposal	Alamogordo	Metal + cardboard + other
The Paper Recycler Collections	Santa Fe	Metal + cardboard + other
Total Destruction Paper Shredding	Alamogordo	Metal
Unicor Recycling Collection Service	Albuquerque	All
Valley Scrap & Metal	Kirkland	Metal
Waste Connections Collection Service	Mesilla	All
Waste Management Collection Services	Various	All
W Silver Recycling of NM	Albuquerque	Metal
Western Metals Recycling	Albuquerque	Metal
Whitcamp Salvage	Roswell	Metal + cardboard + other
Wise Recycling	Statewide	Metal

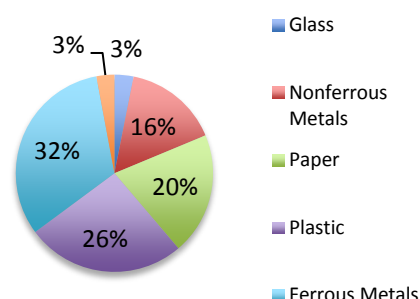
Albuquerque Metal Recycling, Albuquerque, NM

Albuquerque Metal Recycling is the largest scrap metal recycler in New Mexico. Family-owned since 1956, they have four recycling yards currently operating. Albuquerque Metal Recycling, Acme Iron and Metals, Ace Metals and now Rio Rancho Recycling are buyers of all nonferrous and ferrous commodities. With the addition of a 5,000-horsepower auto shredder set to be running by the end of 2012 they continue to grow. They employ 100 office and site people.

2.4 Manufacturing Sector

Direct jobs in the recycling manufacturing sector can be separated into five categories. Based on the U.S. waste stream manufacturers, the breakdown is as follow by type of employment and number: glass – 3% (glass containers and manufacturing of glass products); metals – 16% (nonferrous smelting and refining, nonferrous product producers, nonferrous foundries); paper – 20% (paperboard pulp mills, paper-based and cardboard product manufacturers); plastics – 27%; iron and steel – 34% (ferrous mills and foundries); other processors – 3%, including rubber and pavement. Diagram 2 summarizes the current share of total U.S. recycling manufacturing sector jobs by recycled material type based on the Tellus study.

**Diagram 2. U.S. Recycling Industry
Percent of Manufacturing Jobs by Type
and Employment Number**



The manufacturing sector has the greatest potential for additional direct, indirect and induced job growth because manufacturers are reliant on local resources to maintain their businesses (everything from legal, accounting and marketing, repairs, and new parts).

By increasing recycling rates in New Mexico to U.S. average rates, the recyclables diverted for recycling could support approximately 2,579 direct manufacturing jobs (314 local) and a total of approximately 10,601 (7,527 local) direct, indirect and induced jobs. Likewise, at a statewide 75% diversion rate, the recyclables diverted for recycling could support approximately 5,806 (1,684 local) direct manufacturing jobs (existing and new jobs) and a total of approximately 23,861 (16,941 local) direct, indirect and induced jobs. Unfortunately, many of these jobs will not stay in the state unless more end-markets for recycled commodities are developed. It is important for New Mexico to create strategies to encourage manufacturers to locate in the area. Manufacturing from recycled commodities, including paper rolls, metal ingots, billet or rods, metal castings, plastic lumber, sheet or shapes and glass containers, are critical large industry employers.

Table 18. Potential Manufacturing Sector Direct Job Growth Through Additional Diversion of Recyclable Materials

	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
Current NM 16%				
Recycling Manufacturing	1,083	1,603	1,766	4,452
U.S. Average 34%				
Recycling Manufacturing	2,579	3,818	4,204	10,601
75% Diversion				
Recycling Manufacturing	5,806	8,592	9,463	23,861

There are currently 314 jobs in New Mexico in the recycling manufacturing sector. The state has a manufacturer of each major commodity type (glass, metal, paper/cardboard and plastic). In-state jobs represent approximately 29% of the total manufacturing jobs supported by New Mexico's current recycling efforts. Therefore, the remaining 71% of the manufacturing jobs supported by New Mexico's diverted materials are located in other states, Mexico or China.

Table 19. Current Recycling Manufacturing Jobs in New Mexico (Based on Survey)

Manufacturing Companies	Type	Number of Employees
Growstone	Glass	27
Academy	Metal	150
Bio Pappel	Cardboard	125
J B International	Plastic	12
Total Direct Manufacturing Jobs		314

Table 20. Estimated Current and Potential Manufacturing Sector Direct Jobs Through Additional Diversion of Recyclable Materials by Commodity

Category	NM Rate	Estimated Jobs Due to NM Recycling	U.S. Average	Estimated Additional Jobs by Increasing Recycling Rate to U.S. Average	75%	Estimated Additional Jobs by Increasing Recycling Rate to 75% Diversion
Paper and Cardboard	27%	646	63%	753	75%	1,116
Glass	3%	23	27%	172	75%	515
Metals*	35%	295	35%	368	75%	630
Plastics	2%	60	8%	142	75%	1,841
Rubber and Leather	4%	21	15%	65	75%	407
Textiles	0%	0	15%	39	75%	195
Wood	0%	0	14%	51	75%	264

Table 20. Estimated Current and Potential Manufacturing Sector Direct Jobs Through Additional Diversion of Recyclable Materials by Commodity

Category	NM Rate	Estimated Jobs Due to NM Recycling	U.S. Average	Estimated Additional Jobs by Increasing Recycling Rate to U.S. Average	75%	Estimated Additional Jobs by Increasing Recycling Rate to 75% Diversion
Other	19%	18	29%	10	75%	54
Food Scraps	0%	0	3%	0	75%	0
Yard Trimmings	29%	0	57%	0	75%	0
Inorganic Wastes	0%	0	0%	0	75%	0
TOTAL	15%	1,040	34%	1,600	75%	5,022

Sum of current and predicted direct jobs by commodity category will not match manufacturing sector total. This table reflects manufacturing jobs only to obtain total jobs (collection, processing and manufacturing and reuse) by commodity category (see Table 6).

The table contains all manufacturing jobs (local and out of state)

*Although this report estimates that New Mexico's status quo recycling rate for the durable goods subcategory of metals is above the current U.S. level, overall the metal category jobs will still increase from the status quo to the U.S. rate because the subcategory of mixed containers is still well below the U.S. rate (see Table 2 for detail).

The Glass Manufacturing Sector

The glass recycling sector makes up about 3% of U.S. recycling industry jobs and is divided into two types of glass manufacturing:

- 1. Glass container manufacturing plants:** Establishments that produce finished glass containers.
- 2. Glass product producers:** Establishments that produce glass products other than containers, such as fiberglass, abrasives, specialty products and glass aggregate used for roads.

Glass can be recycled many times across its lifetime. According to the US EPA, 90% of all recycled glass is used to make food containers. Most glass manufacturers rely on a steady supply of crushed glass material called "cullet". There are two basic grades of cullet: high-quality cullet can be used for abrasives, aggregate substrate, bead manufacturing and decorative applications; lower-quality cullet can be used for fiberglass insulation, roadbed aggregate, driving safety reflectors and decorative tiles.

Glass is an ideal sector to promote local growth. New Mexico's 2011 waste stream contained approximately 90,232 tons of glass, but the current glass recycling rate is only 3%. Because of its density, glass is more expensive to transport than other recycled materials, and therefore, if diverted for recycling, would be most economically recycled at local manufacturing facilities.

If New Mexico raised its glass recycling rate to the 2010 U.S. average of 27%, the industry could create 172 direct, local manufacturing jobs. If New Mexico's glass recycling rate was further raised to 75%, the total glass diversion could support 515 local glass manufacturing jobs including, public works and highway department jobs (see Table 20). This does not include the additional collection and processing jobs that would be created to support additional glass diversion (see Table 4).

Based on the volume of potentially available material, there are three opportunities for glass recycling in New Mexico:

- **Utilize glass as a resource for municipal projects:** Glass can be ground by individual municipalities and used as roadbed aggregate and drainage materials within the municipality for road construction and other municipal projects. This offsets the cost of purchasing materials from outside sources.
- **Sell ground glass to private contractors:** Mixed glass material can also be ground and sold to private contractors as a less expensive substitution for sand in construction projects. This could create a small stream of revenue for the municipality to offset the expense of the glass crusher and to support new employees.
- **Sort glass and sell in bulk to specialty manufacturers:** Diverted glass can also be collected and sold in bulk, uncrushed, to niche manufacturers that produce tiles, countertops, landscaping materials, sea glass and other specialty products. Over the past decade, there has been great innovation in incorporating recycled glass into kitchen and bath building materials. For these applications, contamination in the recycled glass feedstock matters very little.

Table 21. Examples of Niche Glass Recycling Opportunities

Company Description	
	Vetrazzo: Manufacturers of a patented crushed glass countertop invented in 1996 by a scientist in Berkeley, CA. More than 10 years later, the patented product has appeared on HGTV, the DIY Network and shows like The View. In 2006, Vetrazzo opened its manufacturing plant and corporate headquarters in the refurbished Ford assembly building at Ford Point in Richmond, CA. http://vetrazzo.com/eng/products/color_palette
	Lithiston: Uses customized eco-friendly cement combined with other recycled materials such as glass and fly ash. Their products come in a variety of colors and, like other kitchen countertop materials, offer a high degree of heat and stain resistance. http://www.lithistone.net/index.php
	Onix: Creates recycled glass mosaic tiles that allow for unique, creative and eco-friendly designs. Onix has had its products certified for international export, guaranteeing to consumers that its products have been made using 98% recycled glass. http://www.onixmosaic.com
	Lions Club and other eyeglass recycling: Eyeglasses must be recycled separately from other glass materials. Functioning eyeglasses still retain high value and are collected by the Lions Club and other civic organizations, where they find a new home with someone in need. Some artists also recycle cracked or broken eyeglasses. http://www.lionsclubs.org/EN/our-work/sight-programs/eyeglass-recycling/index.php
	Oceanside Glass: The tile is made from silica sand, an abundant natural resource, and up to 86% recycled material. The company uses more than 2 million pounds of glass from curbside recycling programs each year. http://www.renewedmaterials.com/
	Fireclay: The Debris Series features more than 112 glaze colors and contains more than 60% recycled materials, creating a beautiful, sustainable ceramic product. Fireclay's products are made in the United States using locally sourced post-consumer and preconsumer waste materials, which are recycled into high-quality ceramic tile. Fireclay's Debris Series qualifies for points under the Leadership in Energy and Environmental Design certification program. http://www.fireclaytile.com/

Local examples of recycling opportunities:

Growstone, Albuquerque, NM. Growstone manufactures products for the horticultural, agricultural, water filtration and building industries, and other markets making use of recycled glass that would otherwise be buried in landfills. The company reclaims, recycles and remanufactures millions of pounds of discarded glass and uses it to produce a highly productive growth medium for the horticultural and agricultural industries. Growstones, which are made in the United States from 98% recycled glass, possess superior air-filled porosity and excellent water-holding capacity and are reusable without breaking down over time. Growstone was founded in New Mexico in 1993 and the idea became a reality in 2009. The company operates 24/7 at Albuquerque's Cerro Colorado Landfill grinding and baking scrap glass into an agricultural product. The company runs an 8,000-square-foot plant at the Westside landfill and just raised \$3 million in capital from private investors and the State Investment Council's Co-Investment Fund. Growstone plans to use the funding to ramp up operations tenfold over the next six months, increasing capacity to 3,600 tons annually. Growstone pays \$20 per ton for the glass it receives from the city of Albuquerque, which collects about 3,000 tons of scrap glass annually. Growstone currently employs 27 people.

New Mexico Experimental Glass Workshop, Santa Fe, NM. The New Mexico Experimental Glass Workshop explores and expands the application of hot glass as a contemporary art media by making it accessible to non-glass artists through progressive programming. Using recycled glass from the local area, the nonprofit entity puts a creative twist on recycling. www.nmegw.org

Abilene, TX (*American Recycler Magazine*, 2000). The city pulverizes glass to use in city projects, which would otherwise have required the purchase of new materials. Glass aggregate, made from collected containers and other scrap, is pulverized to a size of three-eighths of an inch or less in diameter. The city received a grant to purchase a glass pulverizer and started creating the aggregate to use in road base as a test for the Texas Department of Transportation. After receiving approval to use the materials, the local engineers began using pulverized glass for sand filters, pipe bedding markers, around pipes in the ground, in leachate fields and in septic system liners. Because Abilene is pulverizing glass collected in the municipality, it has allowed collection of comingled glass, which in turn allows other communities to bring glass to the city without separating the colors. Many of the surrounding counties only have about 5,000 residents each; bringing comingled glass to Abilene provides a way for them to recycle glass that would otherwise be landfilled. The city stockpiles the glass after it has been pulverized so it is available when needed for projects and sells it for half the market rate for sand. It is sold as a base for swimming pools and is also used in sand filtration systems to clean swimming pool water.

Metals Recycling Manufacturing Sector

Two types of metals are collected for recycling: ferrous and nonferrous. Metals can be found in both the MSW and industrial waste streams. Metals are 100% recyclable and can be reused infinitely.

- **Ferrous metals commonly found in the MSW waste stream include:** milled steel; cast iron steel (heavy machinery and machine tool parts); stainless steel (medical and kitchen); carbon steel (tools like screwdrivers); and wrought iron (gates and railings). Ferrous metals are magnetic. Ferrous metals support 34% of U.S. direct recycling manufacturing jobs, including:
 - Ferrous steel mills: produce iron and steel slabs, billets, bar, plate and sheet from scrap and/or raw materials, including upstream preparation and downstream stamping and cutting
 - Iron and steel foundries: produce cast iron or steel products
- **Nonferrous metals commonly found in the MSW waste stream include:** gold, silver, aluminum and copper, which could be considered durable or nondurable, depending on what they are used for. Aluminum is readily available in the residential stream and other precious metals are available in electronics. Nonferrous metals support about 16% of U.S. direct recycling manufacturing jobs, including:
 - Nonferrous secondary smelting and refining mills: recycling and alloying of nonferrous metals into primary shapes, including billets and ingots
 - Nonferrous product producers: production of nonferrous primary products through extrusion, rolling or drawing processes; nonferrous foundries produce castings from nonferrous metals

**Table 22. Estimated Current and Potential Manufacturing Sector
Direct Jobs Through Additional Diversion of Metals**

Estimated Total Direct Manufacturing Jobs Created by Material Category from Diversion						
Category	NM Rate	Estimated Jobs Due to NM Recycling	U.S. Average	Estimated Additional Jobs by Increasing Recycling Rate to U.S. Average	75%	Estimated Additional Jobs by Increasing Recycling Rate to 75% Diversion
Metals						
Durable Goods *	48%	254	24%	0	75%	146
Lead Batteries* (Reported at landfills only)	10%		96%	0 (These jobs included in durable goods tonnage)	75%	34
Containers and Packaging	6%	36	55%	323	75%	450
Total Metals	36%	290	35%	323	75%	630

Estimated New Mexico rate represents status quo, U.S. average and 75% rates represent additional jobs over the status quo.

New Mexico durable goods rate is already over the U.S. rate, so raising the subcategory of containers and packaging to the U.S. average would increase the overall category to 53%.

**Lead Acid Batteries are banned from landfills and according to NMED are estimated to be recycled at the U.S. average.*

However, because many are brought to outside dealers first, their tonnage is included in the durable goods recycling number and not broken out. The direct job numbers are reflected in the durable goods subcategory. The 10% recycling in the above chart represents what is actually brought to New Mexico landfills.

As noted in Section 1.2 (Methodology), this report is using the U.S. recycling rate of 35% as a baseline for the metal recycling category. The subcategory of durable goods has been adjusted accordingly (see Section 1.2 for more detail).

Based on the U.S. rate, the metals sector is estimated to have created approximately 323 direct jobs due to an increase in the subcategory containers and packaging (not necessarily within the state). If this sector grows to a 75% recycling rate, it could create an additional 630 direct jobs. Ferrous metal recycling has lower commodity values than the nonferrous sector. Many scrap dealers within the state also collect cans. New Mexico's container packaging sector has a 6% recycling rate; however, this rate could be higher but not separately recorded.

Although attracting a large metal manufacturer to the state is unlikely, there is still enormous growth potential for scrap metal processing of both ferrous and nonferrous metals. These items are large and can easily be identified and kept out of landfills. The state of New Mexico has been very proactive in this sector. Developing the sector further could produce nearly 900 direct jobs (see Table 7) and also provide municipalities with a great revenue stream for scrap metals. There is one local New Mexico metal manufacturer:

The Academy Group, NM, refines precious metals, including silver and gold, from leftovers such as flake, scrap, sludges, sweepings, filings and buffings. Academy manufactures bullion, provides materials (sheet, wire and casting grain products) for jewelry makers and silversmiths, and operates silver-recovery equipment for the photo processing, medical and graphic arts industries. It operates half a dozen locations throughout the United States, including its refinery in New Mexico. Brush Engineered Materials bought Academy in early 2010 for about \$25 million and operates the company as a wholly owned subsidiary employing 150 people.

Paper Recycling Manufacturers

Americans use about 85 million tons of paper and paperboard each year, according to the US EPA, and 63.4% of it was recovered for recycling in 2009. The 2011 New Mexico paper recycling rate was 25%. Paper can only be recycled about five-to-seven times before the wood fibers become too short and worn to be used to make new paper. Corrugated is the highest grade of paper and can be used in any recycling process, therefore commanding a slightly higher price. Paper products cannot be recycled "up the chain," meaning that they cannot become a higher grade than they were. Paper cartons cannot be recycled into high-grade office paper. Even so, in 2007, almost 37% of the fiber used to make new paper products in the United States came from recycled paper.

Newspapers are one of the most recycled products. In 2006, 88% of newspapers were recycled in the United States and today approximately 19% are recycled in New Mexico. Newsprint itself is often made from recycled newspaper. Other products made from newspaper include phone books, construction paper, egg cartons, cereal boxes, paper plates and cardboard containers for berries or mushrooms. Newspapers can also be recycled into kitty litter and building materials like sheet rock, insulation and countertops.

Office paper and higher grades of paper, like copier paper and stationery, can be recycled into similar high-grade paper.

Recycled corrugated cardboard becomes paper lunch sacks or grocery bags, paperboard and new cardboard boxes, including the wavy middle part that gives corrugated cardboard its strength. Recycled cardboard can also be made into office products, such as binders and folders and even into building

supplies like interior and exterior siding and flooring. Corrugated paper is the most valuable because the fibers are the longest and these long fibers are in high demand.

Recycled paperboard and mixed paper are the lowest quality of recycled paper. Paperboard is the thin gray board used to make the boxes your spaghetti, cereal and shoes come in, or the thin brown board your paper towel and toilet paper rolls are made from. It is also referred to as chipboard cardboard. Together, paperboard and mixed paper can be recycled into the paper backing on asphalt shingles and more paper towel rolls and paperboard products. Junk mail can be combined with paperboard and recycled.

Approximately 401,541 tons of paper remains in New Mexico's waste stream, all of which can be recycled or composted. If New Mexico increased its paper recycling rate from 27% to the U.S. average of 63%, it could create an additional 1,417 industry direct jobs. For total direct jobs, see Table 7. For manufacturing-only jobs, see Table 23.

Diagram 3. Paper Recycling

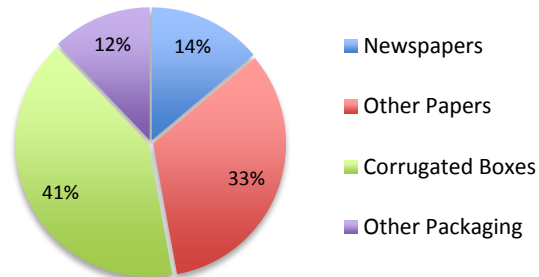


Table 23. Paper Recycling by Category

Category	Total Generation NM	Total Recycling NM	Estimated Waste (Remaining) NM	Material Recycling Rate
Newspapers	78,320	15,966	62,354	20%
Other Papers	187,794	44,067	143,727	23%
Corrugated Boxes	230,283	95,235	135,049	41%
Other Packaging*	68,411	0	68,411	0%
Total Paper and Paperboard	564,809	155,267	409,541	27%

*Other packaging is not separated and therefore is combined with the category "other papers."

Two types of paper industries fall in the paper recycling sector:

- Paper and paperboard mills/deinked market pulp
- Paper-based product manufacturers produce cellulose-based products from recovered paper or paperboard (e.g., cellulose insulation, hydro-seeding, molded fiber trays)

According to the Recycled Paperboard Alliance, there are regional manufacturers of gypsum (wallboard) or molded fiber board (egg carton-type trays) and paper board that are looking for a steady stream of supply, including low-grade papers. There are also opportunities to use recycled feedstock in the manufacturing of paper towels, toilet paper and niche products like recycled office and school supplies and notebooks, or building supplies. New Mexico has one paper mill using recycled feedstock.

Bio-Pappel, Prewitt, NM, is a cardboard manufacturer and processor. It employs 120 in its mill and 20 in its Albuquerque MRF. Most of the cardboard generated in New Mexico ends up here to be recycled. The factory takes recycled cardboard and turns it back into the cardboard liner used to make new boxes shipped to packaging companies around the world. It handles 23,000 tons per month of material, with only a quarter of that recycled

product coming from New Mexico. The plant is one of the greenest facilities of its kind, receiving numerous awards for a reverse osmosis system used to recycle its water and using steam from an adjacent electricity-generating plant to power it.

United Fibers, Chandler, AZ, produces ecological thermal insulation for homes and businesses. Its products are manufactured using 85% recycled paper fibers generated from municipal curbside recycling programs. United Fibers currently recycles many of the telephone books collected from New Mexico residents. The phonebooks are collected through county landfills and through Dex's Greencycle program. Dex places phonebook collection dumpsters in partnership with communities where phonebooks are issued. <http://green.dexknows.com/DexGreen/homeAction.do>

Table 24. Examples of Niche Opportunities Using Recycled Paper

Company and Description	
	Skatelite is the world's leading manufacturer of ramp surfaces used by the top skaters, BMX riders, action sports camps and competitions. The surface is produced by Richlite, a manufacturer of surface materials for aerospace and industrial purposes since 1946. The material is primarily made from recycled paper. City park, private park and competition logos can be printed directly on Skatelite material. Unlike decals, the logos will never wear off. http://www.skatelite.com/home.html
	PaperStone Products manufactures RainStone sustainable cladding and PaperStone sustainable countertop materials. RainStone's architectural cladding panels are ideally designed for exterior applications in any climate. While the panels deflect most of the rain, the ventilated cavity between the panels and the building structure allows air to circulate, carrying away any additional moisture and minimizing formation of mold and mildew. PaperStone is known as a sustainable countertop material, but is used in a variety of creative ways, from conference tabletops, signs and plaques, window sills, cutting boards and cutlery handles to furniture, restroom partitions, cabinets and indoor wall cladding. http://www.paperstoneproducts.com/rainstone.php
	Ecologic is a bottle that combines a sturdy outer molded fiber shell made from cardboard boxes and old newspapers with a thin inner plastic pouch and resealable cap. The pouches are recyclable and the outer molded fiber carton is recyclable or compostable. Ecologic is a woman-owned business started by a mom who wanted to make a difference. http://www.ecologicbrands.com/
	USG Corp. , manufacturer of gypsum ceiling panels and sheet rock. Their unique design-oriented ceilings portfolio offers hundreds of products that meet or surpass the definition of high-recycled content by containing more than 50% total recycled content, including mineral wool, paper, old ceiling panels, aluminum and steel. http://www.usg.com/index.html
	Western Pulp has been producing molded fiber products since 1958. They feature shipper cartons for wine, compostable pots for floral and greenhouse use and protective shipping innerpacks made from recycled paperboard, newspaper and magazines. http://westernpulp.com/
	The CreaFill Company of Kent County, MD, has successfully incorporated recycled cellulose fibers into construction mortar, grout, pipe coatings, paint, roof coatings, highway asphalt, trim and moldings. They have practiced environmental stewardship for more than 10 years. The CreaFill facility has been producing fibers from reclaimed magazine, newspaper, office and craft stock. CreaFill upcycles recycled paper into carefully milled and refined functional fillers for building and chemical applications. http://creafill.com/

Plastic Industry Converters and Manufacturers

According to the US EPA, plastics make up more than 12 percent of the municipal solid waste stream. The largest amount of plastics is found in containers and packaging (e.g., soft drink bottles, lids, shampoo bottles), but they also are found in durable (e.g., appliances, furniture) and nondurable goods (e.g., diapers, trash bags, cups and utensils, medical devices). The U.S. recycling rate for plastics is currently 8% and the New Mexico rate is 1%. The United States has the capacity to be recycling plastics at a greater rate than it is currently recovering. The capacity to process post-consumer plastics and the market demand for recovered plastic resin exceeds the amount of post-consumer plastics recovered from the waste stream. Manufacturers are desperate for the material, which yields great margins for those who are collecting and processing it. There are two categories of plastic manufacturers:

- Plastic converters transform recovered plastics into raw materials (recycled feedstock) such as flake or pellet ready for remanufacture.
- Plastic product manufacturers transform feedstock plastics directly into products (e.g., plastic lumber) or convert a recycled plastic flake or pellet into an intermediate or end product.

The plastic stream contains a larger potential job growth opportunity than any other material stream for New Mexico. Increasing the plastics material stream to a 75% recycling rate would yield 2,497 direct industry jobs (both local and out of state) with additional potential for local indirect induced jobs (see Table 7). According to the Association of Postconsumer Plastic Recyclers, more than 1,800 businesses in North America are involved in recycling post-consumer plastics. There is only one in the State so it is important to consider incentivizing plastics manufacturers to locate in New Mexico.

JBC International, LLC is a five-year-old company with current recycling operations in Juarez and Chaparral. The regional plastics recycling company employs 12 people. The Chaparral facility collects plastic products and recycles them into usable production inputs for industrial applications.

<http://nmed.sks.com/uploads/PressRelease/6a122154b5224d64bbcc48b833aa6a48/PR-JBCInternationalPlantChaparral-10-04-2010.pdf>

If the state were to increase plastic recycling from 2% to the U.S. average of 8%, 142 new direct manufacturing industry (see Table 20) jobs would be created. If the rate were to increase to 75% recycling, 1,841 direct manufacturing jobs would be created (See Table 20). According to Tellus, recycling plastic creates 9.3 direct manufacturing jobs for every ton diverted. Attracting plastic manufacturers to the state and feeding current manufacturers with a steady supply would have a very positive economic effect. Recycling plastic uses 70% less energy than using virgin materials and plastic can be recycled over and over infinitely.

Plastic Types

Plastic #1: Polyethylene terephthalate, also known as PETE or PET. Most disposable soda and water bottles are made of #1 plastic, and it's usually clear. Recycled PET can be turned into carpet and fabric, and back into bottles.

Plastic #2: High-density polyethylene, or HDPE. Most milk jugs, detergent bottles, juice bottles, butter tubs and toiletries bottles are made of this. It is usually opaque. High-density can be turned back into bottles and also into plastic lumber, furniture and playground equipment.

Plastic #3: Polyvinyl chloride, or PVC. It is used to make food wrap, bottles for cooking oil and plumbing pipes. PVC is a tough plastic and can be recycled into pipes.








Plastic #4: Low-density polyethylene, or LDPE. It is used to make grocery bags, some food wraps, squeezable bottles and bread bags.

Plastic #5: Polypropylene. Yogurt cups and similar wide-necked containers are often made from this, as well as water bottles with a cloudy finish. It is also found in medicine bottles, ketchup and syrup bottles and straws. Recycled polypropylene can be made into many items, from new bottles to hangers, brooms and yard rakes, plastic trays, pallets, nonfood containers and tubs.

Plastic #6: Polystyrene, or Styrofoam, from which disposable containers and packaging are made. It is also found in disposable plates and cups. Foam can be recycled back into foam.

Plastic #7: This number basically means "everything else." Other materials can be ground and added to aggregate for building blocks and road barriers.

Table 25. Niche Plastic Manufacturers Using Recycled Feedstock

	<p>Eco-Products produces the EcoLid® 25, which is made from recycled polystyrene and is the world's first recycled content hot cup lid, and BlueStripe™ cutlery, also produced from 100% recycled polystyrene. Polystyrene is recyclable as a material, but it's not commonly accepted or recycled in most places. http://www.ecoproducts.com/index.php</p>
	<p>Clothes Made From Scrap, Inc. makes clothes made from recycled PET soda bottles. The bottles are refined and purified, chopped down and processed into spun fiber strands. These strands are then knitted and woven into fabric. The process begins at a local recycling depot, where the plastic pop bottles are sorted and baled for pickup. The fabric can then be made into fleece, T-shirts, carpeting, bags, caps, etc. http://www.clothesmadefromscrap.com/products.htm</p>
	<p>Patagonia: In 1993, Patagonia adopted fleece made from post-consumer recycled plastic soda bottles, becoming the first outdoor clothing manufacturer to do so. Over the course of 13 years, Patagonia has saved some 86 million soda bottles from the trash heap. That's enough oil to fill the 40-gallon gas tank of the diminutive Chevy Suburban 20,000 times. Patagonia has also started the world's first garment recycling program, with this offer to consumers: "Bring us your old, worn-out fleece (from any maker) and we'll make a new polyester garment from it using an innovative process." http://www.patagonia.com/us/home</p>
	<p>Barco Products manufactures outdoor items for municipalities and parks like benches, road signs, bike racks, speed bumps, barricades and containers out of recycled polypropylene plastic #5. http://www.barcoproducts.com/</p>
	<p>Bedford Products makes recycled plastic boards for fences, docking, benches, tables, etc. The process uses 100% recycled post-consumer HDPE milk jugs. http://www.plasticboards.com/</p>
	<p>Playmart is a family-owned, woman-owned business that produces playground equipment in amazing designs from recycled milk jugs. http://www.playmart.com/index.shtml</p>
	<p>BWAY manufactures rigid industrial containers made of post-consumer and post-industrial high-density polyethylene, polypropylene and steel. Recycled polypropylene is used to make hybrid paint cans as well as automotive battery cases and cables, brooms, brushes, ice scrapers, oil funnels, bicycle racks, garden rakes, storage bins, paint cans and shipping pallets. http://www.bwaycorp.com/</p>

Other Manufacturing

1. **Rubber Industry:** The rubber industry is divided into two types of rubber manufacturing:
 - Rubber product manufacturers make products using crumb rubber or cut rubber shapes and stampings as feedstock
 - Rubber products producers
2. **Pavement Mix Producers Tires/Rubber Asphalt:** The production of asphalt paving mix from recycled tires waste residues can be substituted for natural aggregate materials in paving applications. Rubber and asphalt (commonly known as RAP) is a road paving material made by blending ground-up recycled tires with asphalt to produce a binder that is then mixed with conventional aggregate materials. This mix is placed and compacted into a road surface. According to the *Rubberized Asphalt Concrete Pavements in New Mexico, Market Feasibility and Performance Assessment*, prepared for the New Mexico Environmental Department, the South Central Solid Waste Authority and New Mexico State University in June 2011, there are regional crumb rubber manufacturers in Texas and Arizona. These facilities have the ability to take in tires from New Mexico and also produce materials for use in New Mexico roadways.
http://www.nmenv.state.nm.us/swb/documents/RubberizedAsphaltConcretePavementsInNM_Final.pdf
 - **CRM, Phoenix, AZ:** CRM has plants in Los Angeles, Phoenix and Albany. The CRM plants are the largest in North America. The 100,000-square-foot Phoenix plant is located on 50 acres and has the capacity to recycle up to 8 million tires annually. About 90% of Arizona's waste tires (6.1 million tires) were recycled in 2010 at the Arizona facility. The Arizona plant has both ambient and cryogenic processes and supplies rubber for the massive resurfacing of all of the metropolitan concrete freeways with asphalt-rubber in what is known as the "Quiet Pavement Program." Both of the plants also supply crumb for use in playgrounds, artificial turf, equestrian arenas and a large variety of molded consumer products.
<http://crmrubber.com/news.html>
 - **State Rubber and Environmental Solutions, Denver City, TX:** State Rubber has a facility located across the Hobbs, NM border in a town called Denver City, TX. The facility collects tires from a 350-mile radius of the plant. The 27,500-square-foot facility is capable of processing 40 million pounds or 1.6 million passenger tires annually. In 2012 State Rubber processed more than 300,000 tires from New Mexico. That is 15% of the scrap tires generated in the state. Approximately 7 million pounds of steel wire from the tires per year is sent to Hobbs Iron & Metal in Hobbs, NM for recycling. Crumb Rubber recovered from the tires is shipped for many uses in several states. The facility has 29 full-time employees and has tire disposal customers throughout a large portion of New Mexico and West Texas.
www.staterubber.net
 - **Glass and Plastic Aggregate (CAP):** Glass and plastic aggregate, a mix of colors crushed to a small size, is substituted for many construction and utility projects in place of pea gravel or crushed rock, often saving municipalities thousands of dollars (depending



on the size of the project). Glass aggregate is not sharp to handle. In many cases, state departments of transportation have specifications for use, size and percentage of quantity for use. Common applications are as pipe bedding—placed around sewer, storm water or drinking water pipes to transfer weight from the surface and protect the pipe. Another common use is as fill to bring the level of a concrete floor even with a foundation. Use of glass aggregate helps close the loop in **glass recycling** in many places where glass cannot be smelted into new glass. *Mitigating the Effects of Gravel Mining Upon Rural NM, and Alternative Materials in Road Construction*, produced by the Rural Conservation Alliance in 2004, evaluates the use of glass and plastic in gravel mixes for roads. See this report on alternative aggregate material to mitigate the effects of mining in New Mexico.

<http://www.raintreecounty.com/Recycle.html>

- **Asphalt Shingles:** Roofing shingles represent a tremendous burden on our landfills. Because shingles are made of asphalt, the product can easily be recycled into paving materials that actually improve roads. Discarded roofing shingles represent a real opportunity to turn construction waste into a renewable resource as an asphalt base or hot mix additive for paving. Using roofing shingles as part of the paving process not only frees up landfill space, it makes the paving end product better. Pavement produced with an asphalt shingle mix:
 - Increases the life of pavement
 - Reduces fatigue cracking
 - Increases pavement resistance to wear and moisture
 - Decreases susceptibility to rutting in asphalt roads
 - Improves control of dust and noise on unpaved and secondary roads

When the process reaches a basic level of use, recycled shingles will represent a more economical option, as well.

2.5 Reuse and Remanufacturing

Reuse and remanufacturing is the recovery of materials and products for the same or a similar end use. It involves taking useful products such as furniture, books and appliances discarded by those who no longer want or need them and redistributing them to those who do. In contrast to recycling, which recovers materials for processing, reuse recovers the original product. Reuse, therefore, primarily involves collection and redistribution of goods. Repair and repurpose are often other functions of reuse operations, when durable goods need only minimal repair to be fully functioning again. This is a diverse sector and involves many businesses and material streams.

The reuse sector is even more job-intensive than recycling. It is a knowledge-based industry, with a premium placed on accurate sorting and pricing, and good inventory management (ILSR, 2000, <http://www.ilsr.org>).

Table 26: Sampling of Reuse Industry Jobs in New Mexico

Reuse Industry	Type	Location	Number of Employees
Albuquerque Habitat for Humanity ReStore (there are 7 Habitat ReStores in NM)	Nonprofit	Albuquerque ReStore	12
Albuquerque Recycling	Electronics	Albuquerque	20
Big Brothers Big Sisters	Nonprofit	Various	20
Enchantment Electronics	Electronics	Albuquerque	8
Good Will Industries	Nonprofit	Various	300
Right Way Pallet	Wood	Albuquerque	7
Wood U Recycle	Wood	Albuquerque/Milan	26

Computer and electronic appliance demanufacturers: Sort, grade, dismantle and/or rebuild used electronic appliances.

Motor vehicle parts (used): Clean, sort, inspect and remanufacture wholesale and retail used automobile parts.

Retail used merchandise: Retail thrift stores, antique shops, reuse centers and other shops dedicated to selling used merchandise, including textiles, housewares and building materials.

Tire retreaders: Remove old tread from worn tires and add new tread.

Wood reuse: Process used wood for reuse, e.g., pallet rebuilders, construction materials, furniture.

Wholesale materials exchange services: Facilitate the reuse of products and materials by commercial and industrial establishments.

Table 27. Estimated Direct Jobs Through Diversion in the Textiles, Wood and Electronics Streams

Estimated Total Direct Jobs Created by Material Category from Diversion						
Category	NM Rate	Estimated Jobs Due to NM Recycling	U.S. Average	Estimated Additional Jobs by Increasing Recycling Rate to U.S. Average	75%	Estimated Additional Jobs by Increasing Recycling Rate to 75% Diversion
Textiles	0%	0	15%	172	75%	859
Wood	0%	0	14%	118	75%	610
Electronics		Unknown	25%	123	75%	370
TOTAL		0		413		1,840

Textiles

The U.S. textile recycling industry, with some 2,000 companies, annually removes 2.5 billion pounds of post-consumer textile product waste from the solid waste stream. Between 1990 and 2003, the United States exported nearly 7 billion pounds of used clothing and worn textile products around the world (World Trade Atlas). The average American throws away about 68 pounds of clothing and textiles per year. Most of the textile recycling firms are small, family-owned businesses, with fewer than 500 employees, the majority having between 35 and 50 people. Textile recycling firms contribute to the revenue base of federal, state and local governments. In addition, these firms purchase a large percentage of their raw materials from charitable institutions, which in turn use these funds to house, feed and train

the less fortunate. Industry members are able to recycle 93% of the waste they process—without producing any new hazardous waste or harmful byproducts. Textile recyclers export 61% of their products, thus reducing the U.S. trade deficit. Few communities have textile recycling programs; about 85% of this waste goes to landfills, where it occupies about 4% of landfill space. The textile industry creates 8.5 jobs per every 1,000 tons of material (ILSR).

Increasing textile diversion in New Mexico to a 75% level could create 859 new direct jobs. New Mexico could also take advantage of exporting the clothes across the border to Mexico. <http://www.smartasn.org/textilerecycle/facts.pdf>

Wood

Wood can easily be prevented from entering the landfill and many new products can be retrofitted or refurbished into new and similar products. There are several categories of wood recycling, including wood pallet recycling, waste wood, reusable lumber, wood chips and products made from recycled or refurbished wood such as economical furniture and cabinets. ***Recycling wood at the 75% level could create 610 local direct jobs.***

Riteway Pallet Manufacturing, Albuquerque, NM: New Mexico's largest pallet recycler has a wide range of recycled and reconditioned pallets available in several grades. Nonstandard and unrepairable pallets are run through dismantling machines, where all salvageable wood is removed, inspected and recut for reuse. Used pallets are transformed into high-quality recycled products. Scrap lumber and sawdust are recovered with a sawdust recovery system that captures the dust from all related machinery. Riteway Pallet currently employs seven people. <http://ritewaypallet.com/index.html>

Wood U Recycle, NM: Wood U Recycle prevents needless landfill use by collecting clean wood waste. It accepts construction wood waste in the Albuquerque area that is converted into pellets for wood stoves. This material is ground up and shipped to Mt. Taylor Machine, LLC, in Milan, a local wood pellet manufacturing company. Once processed, the newly manufactured Tiny T'Embers™ are for sale to the public. Wood U Recycle helps convert roughly 10 million pounds of wood into Tiny T'Embers each year. For heavy woods, pallets or material with a lot of nails there is a small fee, which is much less than the landfill. If the material is very clean, i.e., cut-offs from framing contractors or truss manufacturers, there is no charge for processing it. Wood U Recycle *employs 26 people.* <http://nmpellets.com/>

Reclaimed Creations, Boulder, CO: Recycles used wood pallets, fencing, reclaimed wood flooring and building materials to create unique eco-friendly furnishings. It sells handcrafted indoor and outdoor furniture, as well as household items like picture frames and wood paneling. It sells the products wholesale to dealers as well as through its online retail store. Reclaimed Creations was founded in 2008 and has *7 employees.* <http://reclaimedcreations.com/index.htm>

Electronics

According to US EPA, every year, Americans generate almost 2.5 million tons of used electronics (computers, monitors, televisions and cell phones), which are made from valuable resources such as precious metals and rare earth materials, as well as plastic and

glass. "Urban mining" is the term used to describe the recovery of precious metals and other valuable materials from electronics products, as opposed to extracting minerals and other raw materials from the ground. Reusing and recycling discarded electronics helps the environment by saving energy and keeping hazardous materials out of landfills; it also boosts local economies and creates jobs. According to the ILSR, for every 1,000 tons of recovered material there are 29 jobs created. In several states, including California, Connecticut and South Carolina, electronics are banned from landfills due to their toxicity—but these bans create a huge opportunity for job growth.

<http://www.usatoday.com/tech/news/story/2011-12-18/electronics-recycling/52055158/1>.

Per capita annual electronics disposal is about 17 lbs. per year. ***If New Mexico were to recycle 75% of electronics, there would be 370 new direct jobs created.*** The electronics industry has the potential to provide both for-profit and not-for-profit jobs with further increased diversion. There are several electronics recyclers in the state of New Mexico.

Albuquerque Recycling, Inc. offers a collection pick-up service of all electronics including computers, laptops, servers, monitors, printers, copiers, televisions, cell phones and cameras. The service is provided to the general public, businesses, schools, hospitals, financial institutions and government agencies. The company employs 20 people.

<http://www.albuquerquerecycling.net>

Enchantment Electronic Recycling, LLC operates in a 16,000-square-foot facility and recycles millions of pounds of obsolete electronics every year using state-of-the-art technologies and equipment to provide maximum recovery of material and minimal impact to the environment. Enchantment handles all kinds of electronics recycling needs, from hard drive shredders to fluorescent lamp machines. Enchantment launched in 2005 and employs 8 people. <http://enchantmentrecycling.com>

Nonprofits

Nonprofit organizations also create paying jobs through reuse and benefit the community at the same time. Encouraging growth in the nonprofit sector is a cost-effective way to divert specific materials from the landfill and help the local community. Many drop-off sites allow nonprofits to place a bin as well as advertise to collect their specific material.

The Greater Albuquerque Habitat for Humanity works hard to encourage all ages, both men and women, to participate in their program and work to complete Habitat's mission to build community one home, one family at a time. This program makes it possible for low-income families to own simple, decent affordable homes. The ReStore is a resale operation that accepts donations of new or gently used building materials, windows, millwork, tools, flooring, doors, appliances, furniture, gardening tools, and cabinets. Almost 250 tons of material is diverted each year through the ReStore. All donations are tax deductible and tested or repaired. Proceeds generated from the ReStore are used by the Greater Albuquerque Habitat for Humanity to purchase materials to build or rehab homes for those in need of affordable housing. The ReStore operation provides 60% of the funds needed to build our homes - with 163 homes built to date in Albuquerque. The ReStore has 12 staff, 6

of which are permanent full-time positions and 25 volunteers provide assistance at the ReStore. There are 7 ReStores in New Mexico providing similar services.

Examples of Coast-to-Coast Nonprofit Success

- Bikes Not Bombs has salvaged more than 16,000 used bicycles during its 15-year history and sent them to grassroots organizations in Central Africa and the Caribbean.
- Carelift International, Inc. has received donations from more than 140 hospitals in 35 states and has delivered millions of dollars of medical supplies, equipment and pharmaceuticals to needy hospitals overseas.
- Extras for Education diverts approximately 150 tons of industrial overruns/discards from landfills each year, and gives away approximately \$1.5 million worth of materials.
- Planet Aid sent 240 tons of quality second-hand clothes to HUMANA People to People Projects in Angola in 1998.

<http://loadingdock.org/reto/>

Art

Artists can take advantage of the waste stream and reuse materials in many different ways. Recycling provides a source for resources that may otherwise be expensive. Many artists create objects as well as furniture, rugs, light fixtures and many usable, affordable products. Both high-end and inexpensive products use the waste stream as a supply source to help the bottom line.

The Santa Fe Art Festival: The Recycled Art Market was the core idea for this whole festival. All of the vendors create arts and crafts from at least 75% recycled/reused materials. Collages, picture frames, clocks, furniture, rugs and jewelry are just some of the items that are available. The festival has more than 65 of the finest artists and crafters selling recycled goods. Competition to be included is tough and only the most creative get in. Last year more than 2,500 people came through the doors to buy their holiday gifts. The festival is a great opportunity for small entrepreneurs and a great boost for the local economy.

Table 28. Niche Businesses







Company	Description
	Ralanzo chairs and furniture are made from 100% ground-up plastics that have been molded into unique shapes. Plastic waste obtained from electronic devices, toys, drink trays, stadium seats, and so forth is used in very few end products due to the complexity of separating the various categories. Rodrigo Alonso Schram is a graphic designer who has worked with Renault, Lucky Strike, Warner Bros, Sony and several others. His work has been featured in magazines and also been in shows such as MTV, EMMY awards, The Bachelor, The Apprentice and the Ellen Degeneres Show. http://ralonso.com/
	Summit Soap is a grassroots company dedicated to being different, responsible and caring for our local community. The soaps are made using purified waste cooking oil, a resource that has been overlooked and treated as waste throughout the history of commercial eateries. http://www.summitsoap.com/
	RSI: This Tempe, AZ, firm makes recycled modular office furniture. RSI takes old furniture and refurbishes it back to new product using recycled content. They paint, fabricate and laminate every part of the system so it looks brand new on the outside. As a result, the product is the best of both worlds: it looks as good as new and a high percentage of it is made out of recycled content. http://www.resy.net/

Table 28. Niche Businesses

Company	Description
	Scapile NY is the collaborative work of designers Bart Bettencourt and Carlos Salgado. Seeking to create a positive environmental impact with their work, these two have developed a unique method of collecting and repurposing discarded scraps of wood from New York's woodworking industry. Since its inception in fall 2003, this project has continued to yield an ever-evolving line of furniture and product that by its very nature insists each piece be one of a kind. Their work has been featured in several magazines like Time, House and Garden, and Elle Décor. http://inhabitat.com/interview-scapile/ http://studioaparte.com/
	Jaws is a glass cleaner cartridge with a low-environmental-impact filter system filled with cleaning concentrate. The Jaws concentrated box attaches to a water source and mixes the product as it goes. The Jaws box is made from recycled PP and the company produces mailing instructions to make sure the filters themselves get recycled. http://www.recycleJAWS.com/
	Ghetto Goldilocks: Exclusively recycled, rescued, reused and reclaimed materials create one-of-a-kind handmade clothing. The pieces are collected from many different sources. The artist mixes fabrics and colors and styles to produce a hip and trendy clothing line that can be seen in small boutiques around the country. http://ghettogoldilocks.com/GhEttO_GoldiLocks/First_Impression.html

SECTION III. Strategies to Increase and Maintain Recycling Levels That Can Sustain a Robust Recycling Economy

3.1 Overview

There is tremendous job growth potential buried in New Mexico landfills: from large national companies like Waste Management to small entrepreneurial niche companies. However, without a steady supply of feedstock materials, the state recycling sector cannot attract such businesses.

It is imperative to achieve a continual stream of recycled material to supply and grow New Mexico's recycling and reuse industry sectors. New Mexico's geographic landscape and low population density have been barriers to infrastructure expansion. The first critical factor required to increase supply is convenient access to recycling, either through drop-offs or curbside collection. Through the rapid expansion of the **"Hub-and-Spoke"** program starting in 2010, more municipalities will have access, but continued development is essential.



The hub-and-spoke model is a solid waste management system with a centralized processing facility (hub) providing services to smaller surrounding communities (spokes). This model promotes strategic placement of recycling infrastructures such as collection trailers or roll-off containers to aid in the recycling of materials in more rural areas. Pooling regional resources into hubs allows for a steady stream of material that can fuel large MRFs or processors.

Unfortunately, access does not necessarily mean that all people will become recyclers. According to the National Recycling Coalition there are three categories of recyclers:

- The *"always recyclers"* are equal to about 10% of the population. These recyclers go out of their way, at home or away from home, to reduce, reuse and recycle everything.
- The *"sometimes recyclers"* are equal to about 80% of the population. Sometimes they do, but sometimes they forget.
- The *"never recyclers"* are equal to about 10%. These are the most difficult to attract.

The goal is to move the *"sometimes"* recyclers into *"always"* recyclers. This group reacts well to incentives like PAYT, which can divert materials for recycling and reuse by as much as 30–60%. Waste bans and legislation are also effective in diverting specific materials such as lead acid batteries; tires; yard waste; electronics and even commodity materials like paper, plastic and glass.

This section will review the potential success of two proven tactics for waste diversion and analyze the effect implementation would have on new direct jobs:

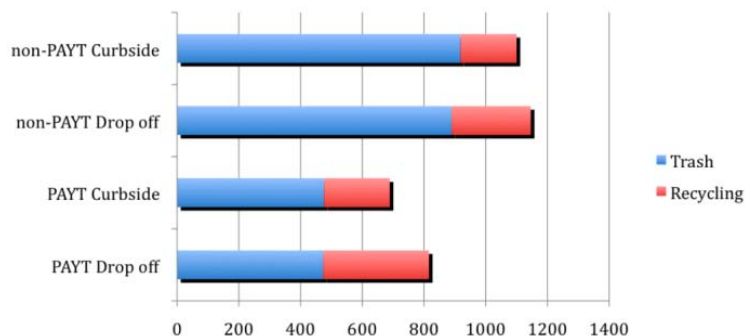
- PAYT (both residential and commercial)
- Waste bans

3.2 Pay As You Throw (PAYT)

A 2010 study of New England communities demonstrates that a PAYT pricing structure can reduce *residential waste by approximately 49%* and consistently maintain diversion levels. Commercial and residential PAYT programs, in conjunction with multiple recycling outlets for commodity materials as well as reuse items, have documented *waste diversion*

between 20%–60% of total MSW. Please see case studies in the appendix for more examples of PAYT success stories. According to US EPA's Janice Canterbury, "PAYT is long proven to be the most cost effective, environmentally sustainable MSW program that EPA can promote. While other initiatives may have positive benefits, PAYT is the single best way to prevent waste and reduce greenhouse gases while generating an equitable revenue stream for MSW departments." *Office of Solid Waste US EPA, 2008*

<http://www.epa.gov/epawaste/conserve/tools/payt/tools/bulletin/summer10.pdf>



Under rate incentive programs such as PAYT, residents and businesses are charged per unit for the collection of municipal solid waste, creating a direct economic incentive to recycle more and to generate less waste. Benefits of PAYT rate structures include increased diversion and recycling, increased landfill life, flexibility to adjust rates as needed, decreased tipping costs, decreased greenhouse gas emissions and job development opportunities. PAYT creates an acute awareness of the disposal costs by the user and thus develops a steady stream of materials looking for a new home.

The Northeast and the West Coast have been facing landfill closures, landfill and incineration moratoriums, high real estate prices and high labor costs, which have been increasing tip rates for the past three decades. In fact, areas on both coasts could be paying more than \$100 per ton in tipping fees, not to mention increasing transport costs. These areas have been forced to take action and have found consistent waste reduction success through PAYT. The good news for New Mexico is that these areas of the country have paved the way for New Mexico. Cities and towns have developed creative rate structures that are incentivizing residents to reduce waste and consistently maintain recycling levels. A PAYT program, coupled with diverse and robust collection infrastructures, can lay the groundwork for a community to reach a "Zero Waste" goal and a flourishing recycling economy.

Developing successful rate incentives requires a rate structure that will both cover the costs of the program and positively influence customer behavior. Determining a tip rate for the private or municipal hauler is very different than determining the rates that the hauler is charging the consumer. The hauler or the municipality determines the rate based on the landfill tip rate and the cost to administer the program. Each municipality incurs different costs to administer based on the level of services they provide: drop-off centers, curbside collection of waste, curbside collection of recycling and other administrative costs. Residents pay these costs either in taxes, fixed fees, private hauling fees or a combination. Ultimately, the rates that influence resident behavior will have to be set by the private hauler or the municipality. It is not possible to have a single statewide rate. Below are three potential roadmaps to a successful PAYT strategy for New Mexico.

- **Mandatory state rate incentive law:** Mandatory state residential PAYT has been implemented in three states: Oregon, Washington and Minnesota. These states, which all have recycling rates at or near 50%, have enacted statutes that require that all municipalities and their haulers use a rate structure that increases proportionately with greater disposal (i.e., PAYT). The states of Wisconsin, Iowa, Pennsylvania and Vermont encourage PAYT.
- **Landfill regulation:** Landfill regulations require private and municipal haulers to meet certain per capita disposal benchmarks and can require benchmarks to be met by certain dates. If benchmarks are not met, the hauler or municipality will be subject to increased tip fees or fines. This may be the simplest and cleanest approach. It allows the haulers and municipalities to develop a program that best meets their needs, but it provides an incentive and time frame to do so.
- **Individual municipal programs:** Allowing each individual municipality to implement its own PAYT program on its own time frame is the option taken by most states. It shifts high-level politics to the local level. This is a very slow process and requires a tremendous ongoing education effort.

Source: New Mexico Landfill Rate Analysis and Opportunities for Increased Diversion with PAYT and Rate Incentives, February 2012

3.2.1 Residential PAYT

According to *New Mexico Landfill Rate Analysis and Opportunities for Increased Diversion through PAYT with Rate Incentives*, February 2012 (ICF International), 49% of waste generated in New Mexico is associated with residential families. The total landfilled tonnage reported from MSW landfills is 1,688,000 tons. Based on the assumption that 49% of the material is residential, the approximate residential disposal is 817,366 tons. Assuming that 15% of the population resides in multifamily homes, and are therefore included in commercial waste, the “*residential single-family population*” of New Mexico is 1,700,000. Based on these assumptions, the statewide residential per capita disposal is .474 tons per year. The US EPA SMART Benefit Evaluation Tool (BET) was used to predict a waste stream change based on the implementation of residential PAYT throughout New Mexico.

US EPA's SMART BET combines residential waste and recycling information with nationwide average waste disposal data, typical PAYT results, and greenhouse gas emission factors (originally created for US EPA's Waste Reduction Model (WARM) to provide the greenhouse gas and cost savings that a community is likely to see after implementation of PAYT. The tool predicts results for residential PAYT implementation. ***It's important to make sure that the commercial and residential sectors are separated for design and measurement purposes.*** Measuring success of residential PAYT should be done using the common denominator of per capita disposal. Using per capita disposal of combined residential and commercial material will provide a measurement metric that is too broad. Separation of streams will make it easier to target enforcement and evaluate the success of design and rate strategies.

Based on the SMART BET, if New Mexico municipalities implemented PAYT, the overall MSW (residential and commercial) material landfilled would decrease by 23.5% from 1,668,000 to 1,275,000 tons. The recyclable material would increase by 391,762 tons, taking diversion to 705,037 tons or a 35.63% recycling rate (125% above 2011 recycling levels). ***Additional diversion through residential PAYT would create 3,327 new direct jobs of which 2,096 would be local, and a total of 10,300 new total jobs (including direct, indirect and induced), of which 5,356 would be local.***

Table 29. Estimated MSW Waste Stream Change with the Implementation of Residential PAYT

Estimated MSW Waste Stream Change With the Implementation of Residential PAYT							
Total MSW Generation	Total MSW Landfilled	Total Recycled (1)	Recycling Percentage (2)	Percentage of Landfilled (3)	Total Landfill After Residential PAYT SMART BET (4)	Total Diversion After Residential PAYT (5)	Diversion Percentage After Residential PAYT (6)
1,978,931	1,664,363	314,568	15.9%	49%	1,272,905	706,026	35.68%
	1,665,657	313,274	15.8%		1,273,894	705,037	

(1 and 2) Adjusted recycling tonnage after metal category adjustment (see Section 1.2 for detail).

(3) Percentage of residential waste landfilled based on ICF Landfill Rate Analysis, February 2012.

(4 and 5) SMART BET estimate based on residential tonnage and residential population assumption from 2012 Landfill Rate Analysis.

(6) Total diversion percentage based on total MSW generation (commercial and residential).

Table 30. The Effect of Residential PAYT on Diversion and Direct Jobs (local and out of state)

Estimated Job Growth Through Implementation of Residential PAYT				
	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
Current NM 16% Recycling Rate				
Recycling Collection	502	65	321	888
Recycling Processing	476	252	448	1,176
Recycling Manufacturing	1,083	1,603	1,766	4,452
Reuse Remanufacturing	98	63	69	230
TOTAL	2,159	1,983	2,604	6,746
Estimated NEW Jobs Through Residential PAYT Implementation to 34.7% Diversion Rate				
Recycling Collection	773	101	371	1,245
Recycling Processing	734	389	690	1,813
Recycling Manufacturing	1,669	2,471	2,721	6,861
Reuse Remanufacturing	151	178	53	381
TOTAL NEW JOBS	3,327	3,138	3,835	10,300
TOTAL JOBS AFTER PAYT	5486	5121	6439	17046

Diagram 4. 2011 MSW

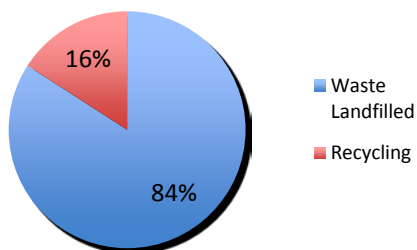
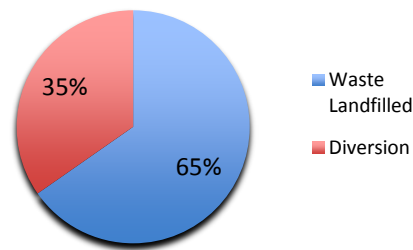


Diagram 5. Estimated MSW Stream After Residential PAYT Implementation



Based on an average tip cost of \$31.29 (determined by ICF in 2012 landfill rate analysis), residential PAYT would save approximately \$12,500,000 in avoided tip costs for municipalities at landfills, as well as saving valuable space and extending landfill life. These commodity materials have resale value as well. According to the ICF 2012 landfill study, New Mexico recycled approximately 200,000 tons of commodity materials with an estimated value of \$25,000,000 dollars. However, the state missed revenue of an estimated \$168,000,000 from valuable commodities that were disposed in landfills instead of recovered through recycling. Depending on commodity markets, diverting these materials not only creates jobs, but could have tremendous value to the state as well.

New Mexico is unique in that the majority of residential waste budgets are currently paid through municipal solid waste fees. Very few communities cover waste through residential property taxes. The fee structure provides awareness that trash does have a cost, unlike most property tax structures where the cost is hidden in overall taxes. Modifying the current fixed fee structures and creating a two-tiered rate is a cost-effective change that incentivizes a reduction in disposal and an increase in recycling, and at the same time creates a sound funding source that covers waste and recycling at varying service levels.

A two-tiered rate structure can be developed for municipalities that collect waste curbside or in alley-way dumpsters using multiple container size options or PAYT special-colored trash bags. The two-tiered approach also works for convenience drop-off sites or directly at the landfill through PAYT trash bags or PAYT tags. Most options can be implemented quickly and can adapt to the current design and collection structure with minimal additional cost. See *New Mexico Landfill Rate Analysis and Opportunities for Increased Diversion with PAYT and Rate Incentives* http://www.recyclenewmexico.com/pdf/Landfill_Report.pdf. Residential PAYT for New Mexico is a very simple solution to exceeding the national recycling rate and at the same time creating jobs and disposal equity for residents.

Commercial PAYT

PAYT has been working commercially on the West Coast for decades. Creating a fee structure that is unit based and provides recycling as part of the overall waste service creates the incentive to recycle more and throw away less. Case studies of combined

commercial and residential programs in King County, WA population 1,969,000 (65% diversion) [and Lane County, OR 350,000 (57% diversion) [along with many other West Coast counties show MSW waste reduction of greater than 50%. These sample regions demonstrate that in counties with multiple collection styles, implementation of both commercial and residential PAYT programs in combination with an extensive recycling and reuse infrastructure can achieve and maintain 50% diversion and greater.

Both Washington (2010 recycling rate 49%) and Oregon (2010 recycling rate 50%) are leaders in PAYT, demonstrating that well-designed rate structures can work in rural and urban environments, with diverse populations and demographic ranges, and in commercial, residential and multifamily situations. Oregon's *Opportunity To Recycle Statute* <http://www.leg.state.or.us/ors/459a.html> and Washington's *Waste Not Washington Act* have language that mandates municipalities to incentivize waste reduction through rate structures that encourage waste reduction, reuse and recycling through reduced rates for smaller containers. Both states also require that municipalities and private haulers embed the cost of recycling into the rate structure, thus making recycling available to all.

The following example demonstrates that if New Mexico implemented residential and commercial PAYT rate incentives and achieved a 50% diversion rate, the overall MSW disposal would decrease to 976,000 tons of material and increase diversion tonnage 675,000. Moving these diverted materials into the recycling and reuse supply streams would create approximately 5,555 direct jobs of which 3,515 would be local and 17,358 total new jobs (direct, indirect and induced), of which 9,074 would be local.

Table 31. The Potential Effect of Commercial and Residential PAYT on Diversion and Direct Jobs (both local and out of state)

Estimated Total Direct Jobs Created Through Implementation of Residential and Commercial PAYT					
Category	NM Rate	Estimated Jobs Due to NM Recycling	50% Rate of Recycling	Estimated Additional Direct Jobs Through Implementation of Residential and Commercial PAYT	Estimated Total Jobs
Paper and Paperboard	27%	1,216	50%	995	2,211
Glass	3%	34	50%	493	526
Metals	35%	529	50%	411	940
Plastics	2%	82	50%	1,637	1,719
Rubber and Leather	4%	29	50%	369	398
Textiles	0%	0	50%	573	573
Wood	0%	0	50%	407	407
Other	19%	43	50%	74	117
Food Scraps	0%	0	50%	402	402
Yard Trimmings	29%	226	50%	161	387
Inorganic Wastes	0%	0	50%	33	33
TOTAL	16%	2,159 2,131	50%	5,583 5,555	7,714

Table 32. Total Estimated Job Growth Through Commercial and Residential PAYT

Estimated Job Growth Through Implementation of Residential and Commercial PAYT and Achieving a 50% Recycling Rate				
	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs
<i>New Mexico Status Quo 20.6% Recycling Rate</i>				
Recycling Collection	502	65	321	888
Recycling Processing	476	252	448	1,176
Recycling Manufacturing	1,083	1,603	1,766	4,452
Reuse Remanufacturing	98	63	69	230
TOTAL	2,159	1,983	2,604	6,746
<i>Estimated Increase in Jobs Through Residential and Commercial PAYT Implementation to 50% Diversion Rate</i>				
Recycling Collection	1,291	168	826	2,286
Recycling Processing	1,225	649	1,152	3,026
Recycling Manufacturing	2,787	4,125	4,543	11,455
Reuse Remanufacturing	252	161	179	591
TOTAL	5,555	5,103	6,700	17,358
TOTAL	7,714	7,087	9,304	24,104

PAYT rate incentives for residential and commercial recycling have proven to decrease waste approximately 50%, save money for residents and municipal budgets and increase jobs. What are we waiting for?

Creating a statewide policy similar to those in Washington and Oregon that mandates solid waste collection rates that encourage waste reduction, reuse and recycling through reduced rates and embedded recycling costs for both commercial and residential streams in both municipal and private hauler operations has been effective for counties and states across the West Coast. Structuring rates based on the average weight of solid waste disposed per container for containers of different sizes that do not decrease on a per-pound basis, or with increasing size of containers or per container service decrease with additional containers serviced.

3.3 Waste Bans

Although the US EPA states that PAYT is the single most effective way to reduce waste, bans both statewide and local, and legislation on specific products can also be a helpful first step to increasing diversion. The state of Massachusetts, along with the states of Wisconsin and North Carolina, have been at the forefront of using disposal bans as recycling incentive tools. All three states credit these bans with helping to expand private sector investment in recycling infrastructure and increasing diversion rates. Individual cities and counties throughout the country have also successfully used waste bans. Santa Cruz County in California has a



landfill ban on recyclable materials at two of its landfills. The same materials, which include yard trimmings, can be recycled at those landfills.

In **Montgomery County, Maryland**, commercial generators, residents and multifamily dwellers must recycle mixed paper, including office paper, corrugated cardboard, newspaper, boxboard, magazines/catalogs, telephone books and paperback books. Recycling of commingled containers, scrap metal and yard trimmings is also required.

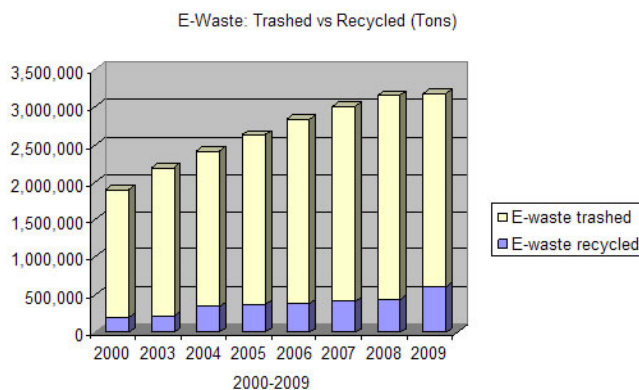
Table 33. Examples of Statewide Disposal Bans on Common Recyclables

State	Banned Materials
Massachusetts	Aluminum, metal and glass containers Single polymer plastics, recyclable paper Asphalt pavement, brick, concrete, metal and wood
Michigan	Beverage containers 1 gallon or smaller
Minnesota	Telephone directories
North Carolina	Aluminum cans Beverage containers consumed on premises of ABC permit holders Plastic bottles, wood pallets
Wisconsin	Newspaper, corrugated cardboard and other containerboard, magazines, office paper, beverage and food containers (glass, aluminum, plastic #1 and #2, steel and bi-metal), foam polystyrene packing material

Note: Commonly banned materials such as yard waste, tires, white goods and batteries are not included. Source: Kessler Consulting Inc. http://waste360.com/Recycling_And_Processing/increase-state-recycling-rate-201010

Traditionally, disposal bans have been placed on waste that could potentially release toxic substances into the environment (e.g., batteries, mercury-containing products and electronics) or that are difficult to dispose of (e.g., tires and white goods). New Mexico currently has a ban on lead acid batteries and motor oil. Some states have taken disposal bans a step further to add recyclable and compostable materials, such as yard waste, paper, metal, glass and plastic containers. With any waste ban, it's important to have a processing and end-market infrastructure in place for the banned materials. As New Mexico expands their hub-and-spoke efforts and the recycling co-op participation grows, bans on specific materials should be considered.

While there is currently no standard tracking mechanism, landfill managers and processors are aware and make significant efforts to keep tires as well as white goods out of landfills. The commodity value of these materials has produced an extensive network of scrap tire and scrap metal dealers throughout the state. NMED believes that a large number of these materials are diverted and reused or recycled.



3.3.1 Electronics Ban

Eight states have banned electronics from landfills: Connecticut, Indiana, New Jersey, New York (businesses only), North Carolina, South Carolina and Vermont. Colorado's electronics ban will go into effect in July 2013. Colorado's Senate Bill 133 includes computers, printers, televisions, digital video players and recorders.

[http://www.leg.state.co.us//CLICS/CLICS2012A/csl.nsf/fsbillcont3/BE40677619E5656187257981007F374C/\\$FILE/133_01.pdf](http://www.leg.state.co.us//CLICS/CLICS2012A/csl.nsf/fsbillcont3/BE40677619E5656187257981007F374C/$FILE/133_01.pdf)

Based on the U.S. per capita electronics disposal of 17 pounds per year, and ILSR metric of 29 jobs per 1,000 tons of recovery, New Mexico would create 493 new direct jobs from diverting 100% of electronics generation. Many of these jobs could remain local.

Sprint Zero E-Waste goal for 2017

- Collect 100% of Sprint's own electronic waste for reuse and recycling by 2017
- Collect 90% of all phones sold for reuse or recycling by 2017
- Require that 70% of all new devices launched by 2017 meet Sprint's environmental criteria
- Require that 100% of Sprint's recycling and remanufacturing vendors meet one of several responsible recycling certifications by 2013

<http://www.electronicstakeback.com/wp-content/uploads/ewaste-stats1.jpg>

There are two waste material categories that, if banned, would create ***primarily local direct jobs*** throughout the supply chain of collection, processing, manufacturing and reuse:

- Glass
- Organics (food and yard waste)

Both are very likely to remain local, glass due to the weight, and organics due to the weight and nature of the end product. Both materials can also offset municipal costs not only through avoided landfill tip and transport, but also because the materials can be easily reused in municipal projects that would otherwise require the purchase of outside materials such as road aggregate and mulch.

3.3.2 Glass Ban

Glass has an economic and environmental value but is seen by many recycling facilities as a nuisance because it has safety and handling issues as well as contaminating the paper and plastic in single stream systems, which affect the market value and ultimate recyclability. Glass is also very heavy and therefore expensive to transport. Today 90% of recycled glass goes back into glass bottles. The transportation required to get glass to a glass recycling operation many times makes glass a cost-prohibitive option for municipalities. However, recent research shows that glass is a great local product and municipal glass crushing operations help to save in disposal costs, as well as offsetting the costs of local municipal construction projects. Glass can be collected and ground locally, saving money on landfill disposal and hauling costs; helping to preserve the value of the recycling stream; saving money on aggregate in municipal roadway and construction projects; and potentially being

sold to local companies as a substitute for sand in building projects. Small local entrepreneurs like tile and countertop manufacturers can also use glass.

Glass beverage containers are banned from landfills in Massachusetts, Wisconsin and Michigan, as well as many individual municipal landfills. North Carolina's ABC law mandates recycling of beverage containers including glass from facilities permitted for alcohol sales (restaurants and bars). The bill has been so successful that in its first year, overall glass recycling for the state jumped 22%. Similarly, North Carolina's plastic bottle bill banning plastic bottles from all landfills saw a 50% increase from the last full year before the ban was put in place. See case studies on glass recycling success in the appendix.

<http://infohouse.p2ric.org/ref/50/49977.pdf>.

<http://www.slideshare.net/NCDENR/north-carolina-landfill-bans>

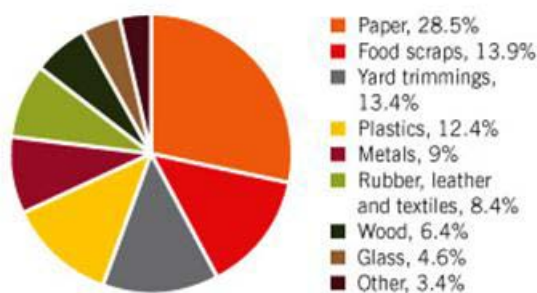
The current recycling rate for glass in New Mexico is 3%, compared to the U.S. average of 8%. Using Tellus Institute metrics, glass recycling creates 11.52 jobs per 1,000 tons of recycled material. If glass were successfully banned in New Mexico, the state would divert 92,465 tons of material and potentially create 1,019 local direct jobs. Using the hub-and-spoke system, glass crushers could be placed at hubs and glass could be recycled locally. This would require minimal costs compared to huge long-term cost and environmental benefits.

3.3.3 Organics

According to *BioCycle* magazine's December 2008 issue, 23 states have banned all or a portion of yard trimmings from disposal. Currently, yard waste makes up approximately 13% of the U.S. waste stream. Diverting yard waste creates valuable space in landfills and saves municipal tipping and hauling costs. Between 1990 and 2000, the amount of yard waste disposed in landfills or incinerators fell dramatically as nearly half of U.S. states enacted legislation to keep these materials out of the landfill. While only 12% of yard waste was diverted in 1990, more than 50% was diverted by 2000, and the rate now stands above 60%.

Diagram 6: Total MSW Generation (by material), 2010

250 Million Tons (before recycling)



Source: U.S. EPA

A properly organized municipal organics food composting program can:

- Create direct local jobs
- Feed people in need
- Subsidize food material for farmers (pigs, etc.)
- Reduce landfill tip and haul costs
- Create nutrient-rich compost for sale to the public or use by the municipality

Rapid City South Dakota Solid Waste Manager Jerry Wright said in an interview with the Rapid City Journal (2010), "In terms of sheer tonnage being diverted, the yard waste program can't be beat. In 2009, the material recovery facility diverted 3,810 tons of recyclables, earning \$335,000. The yard waste program raised only \$60,386 but diverted 4 1/2 times more in tonnage. It's the cheapest diversion program we have going. Residents of Rapid City love the stuff!"

US EPA 2010 waste characterization claims that 13.9% of waste disposal is food material with only 2% recycled. More than 30 million tons of food was dumped in landfills in 2009, (includes commercial and residential waste). This makes food waste the second-largest material by weight headed to our landfills and a huge source of methane emissions. Because of the weight and nature of food waste, it's an ideal material to divert from the landfill. As cities, counties, states, universities, military bases and Fortune 500 companies reach "Zero Waste" goals, the need for municipal food composting programs becomes more imperative. Together, yard and food material make up 25–30% of waste. Organic composting is "low-hanging fruit" in the waste diversion arena for New Mexico. There are already several facilities accepting yard debris so adapting or expanding current facilities is a cost-effective way to begin diversion. Organics composting is a perfect small business for small private entrepreneurs or for municipalities with available space. Organics composting requires minimal capital compared to building a MRF or a manufacturing facility. However, food composting requires either an active full-scale composting operation or digesting units. As New Mexico continues to grow the hub-and-spoke recycling network, local organic outlets should be considered.

Over the past five years there has been an explosion of success within the organics field. Momentum is picking up across the country as more programs are adopted. (Please see the appendix for composting case studies.)

- Oregon used municipal organics mandates to help reach its goal of 50% diversion by 2010, requiring curbside programs to provide some collection and drop off programs to provide depots for collection. According to the 2010 *Oregon Material Recovery and Waste Generation Rates Report*, Oregon recovered 2.17 million tons of its municipal waste stream and disposed of approximately 2.52 million tons. Organics, including yard debris, food waste and wood waste, represented the largest segment at 39%, followed by paper at 29%, metals at 19%, glass at 5%, "other" materials at 5%, plastic at 2% and electronics at 1%. <http://www.cool2012.com/community/policies/>
- Universities such as California State University, Chico; Clemson University; Cornell University; and the University of Wisconsin have implemented successful organics programs. <http://www.biocycle.net/2010/12/recycling-food-waste-101/>
- Large companies such as Walmart, Boeing, Kraft and McDonalds have pledged Zero Waste and included organics diversion in stores, factories and restaurants. These initiatives are pushing municipalities to respond quickly to the need for organics disposal.
- Military bases such as Buckley Air Force Base near Denver and Joint Base Lewis-McChord near Tacoma, WA are on the way to meeting Zero Waste goals. <http://www.army.mil/article/52403/net-zero-waste-goal-becoming-a-reality-at-jblm/>

- California (as of July 1, 2012) requires by state law (Mandatory Commercial Recycling Law, Chapter 476, Statutes of 2011 – Chesbro AB 341) that all businesses (public and private entities) that generate four or more cubic yards of waste weekly and multifamily housing of five or more units recycle. Under this new law, the affected businesses are obligated to show a good faith effort toward complying with the law's provision.
- Massachusetts state environmental officials are preparing to ban hospitals, universities, hotels, large restaurants and other big businesses and institutions from discarding food waste in the trash beginning in 2014, a measure that in coming years they hope to extend to homes as well.
- Vermont (as of June 12, 2012) became the first state to establish mandatory food recycling through Law H. 485, an Act Relating to Establishing Universal Recycling of Solid Waste. The universal recycling bill creates phased-in composting requirements starting with the largest processors of produce and eventually applying to any person who generates food waste.

Universities are driving local infrastructure to accommodate the Zero Waste commitment. Waste Management and Arizona State University are teaming up for the road to Zero Waste by 2015. https://asunews.asu.edu/20120126_zerosolidwaste

New Mexico does not have a waste characterization study. The US EPA 2010 Waste Characterization Study was used to estimate the effect of a potential organics ban (both yard and food) on local direct supply chain jobs and diversion. It's estimated that there are 187,614 tons of yard waste and 275,547 tons of food waste buried in New Mexico landfills. Diverting this waste would mean 548 and 805 direct local jobs, respectively.

Table 33. Estimated Supply Chain Job Growth in Electronics, Glass, Yard Debris and Food Waste from Waste Ban (these jobs will primarily stay local)

Potential Direct Jobs Created Through Waste Bans			
Category	Total Job Multiplier	Total Tonnage Diverted (at 100%)	Direct Jobs
Electronics	29	35,394	1,026
Glass	11.52	91,400	1,053
Yard Trimmings	2.92	265,084	774
Food Scraps	2.92	275,547	805

Table includes jobs through collection, processing, manufacturing and reuse where possible and assumes 100% diversion of specific banned material. Yard waste is already recycled at 29% in New Mexico, yielding an estimated 226 jobs. The above job total for yard waste includes these jobs. Glass is currently recycled at 3%, yielding an estimated 34 jobs (these jobs also included in the above total). Electronics are recycled at an unknown rate and are currently included in the metal and plastic categories. Based on the electronics industry estimate of 17 pounds per capita of electronics disposal, a ban (of 100%) would create 1,026 total direct jobs. Jobs from increased Glass, Yard and food materials would remain local.

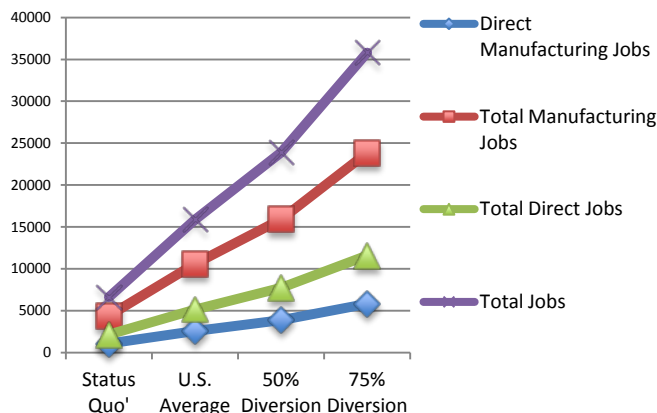
Statewide landfill bans can be helpful for municipalities as they increase educational efforts and review local policy; however residential bans are difficult to enforce. States with bans do see diversion rate increase but the US EPA still stands behind PAYT as a critical step toward increasing diversion.

SECTION IV. Incentives

According to the NMRC Landfill Study, in 2011 the state of New Mexico buried 1,665,000 tons of material, much of which could easily have been recycled or reused. Based on Section II, as diversion increases, New Mexico is likely to create more local direct jobs in collection (both public and private), processing (public and private MRFs and compost facilities) and in the reuse industry. The collection, processing and reuse sectors together make up 50% of the direct recycling industry and recycling manufacturers make up the other 50%. When considering the total job effects, the manufacturers represent 67% of total jobs. As with other industries, manufacturing produces more indirect and induced jobs as it is heavily reliant on the local community. Because the state only retains about 29% of the direct manufacturing jobs related to diversion, it is important to realize that as material streams grow the recycling manufacturers will provide the most local growth. *Currently the other 71% of New Mexico's diverted materials are supporting manufacturing and related job growth in other states, Mexico or China.*

In May 2012, the New Mexico Department of Workforce Solutions indicated that there were 869,000 employed individuals within the state. The unemployment rate was 6.7%. Based on a recycling rate of 75% with job retention of 100%, the jobs associated with waste diversion would be equal to 4% of the current labor force. Over the next decades, as industry dynamics change, recycling could become an integral part of economic growth in New Mexico.

Diagram 7. Recycling Manufacturing Job Growth vs. Overall Job Growth



4.1 Tax Incentives Can Be a Successful Strategy to Increase Recycling

Tax incentives for recycling manufacturing equipment have proven to be a successful approach to increasing recycling across the nation. State recycling tax incentives are a proven tool used to attract new manufacturing and foster the growth of existing manufacturing, increasing jobs through the processing of recycled material and generation of post-consumer products.

4.2 U.S. Statewide Tax Incentives

According to the US EPA, more than 25 states around the country have used some type of tax incentive or credit to encourage recycling. Many states offer tax incentives for

purchasing recycling equipment in the form of income tax, sales tax or property tax credits. These tax credits range from 10 to 50% of equipment costs.

Some creative approaches include:

- Offering a fixed amount of money (i.e., \$500) for each specified amount of investment in recycling equipment
- Requiring the recycling equipment to process post-consumer solid waste or produce material that is made from at least 25% recycled materials
- Limiting the credits to targeted commodities such as paper or plastic
- Offering tax credits based on tiers; different levels of credit are offered depending on the amount invested in the equipment
- Offering sales, real estate or property tax exemptions on construction and renovation of recycling facilities
- Offering employment income tax credits for each new employee added as a result of incorporating recycled products into the process
- Offering income tax credits to individuals who purchase a product made from recovered materials

The following EPA chart presents statewide tax incentives for recycling:

State	Tax Incentive Summary	Applicable Entities
AZ	Recycling equipment income tax credit for individuals and corporations equaling 10% of the installed cost of the equipment. Equipment must process post-consumer recyclables or produce finished products composed of at least 25% post-consumer recycled materials.	Individuals and corporations
AR	Recycling equipment income tax credit equaling 30% of the equipment costs. Equipment must handle at least 10% post-consumer solid waste.	Recycling businesses
DE	Recycling investment tax credit totaling \$500 for each \$100,000 invested. Recycling employment income tax credit of \$500 for each new employee added as a result of incorporating recycled products into the process.	Recycling businesses that use at least 25% (by weight) recycled materials or materials removed from the state's solid waste stream
FL	Recycling investment tax credit totaling \$500 for each \$100,000 invested. Recycling employment income tax credit of \$500 for each new employee added as a result of incorporating recycled products into the process.	
GA	Personal income tax credit for investment in recycling facilities, machinery or equipment. Amount of credit is equal to 3, 5 or 8% (based on tiers) of the qualified investment.	Manufacturing industries
HI	Recycling equipment sales tax reduction of between 0.5 and 4%.	Solid waste processing facilities
IA	Personal and real property tax exemptions for machinery and equipment used for recycling or reprocessing of paper, cardboard or plastic products. 100% sales tax exemption for purchases of industrial machinery, equipment, computers and replacement parts used in the recycling or reprocessing of waste products.	Recycling businesses as specified in description
ID	Recycling equipment income tax credit of up to 20% of equipment costs but not exceeding \$30,000 per year. Requires that 90% of the equipment's product be made from recyclables.	Recycling businesses that handle postconsumer paper, glass and plastic

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State	Tax Incentive Summary	Applicable Entities
KY	Recycling equipment personal income tax credit of up to 50% of the equipment costs. Recycling equipment sales and use tax exemption. Includes equipment used to collect, separate, compress, bale, shred or handle waste materials for recycling.	Recycling businesses
LA	Recycling equipment income tax credit for 20% of recycling equipment costs, less any other credits that are claimed. Equipment must process 100% post-consumer or recovered materials or make a product that contains 50% post-consumer or recovered materials. State, parish and local property tax exemptions for recycling machinery and equipment for up to 10 years. Applies only to recycling manufacturing companies.	Recycling businesses as specified in description
MD	Personal property tax exemption on tools, implements, machinery and manufacturing apparatus or engines. The exemption does not apply in certain counties.	Recycling businesses
MN	Sales tax exemption for construction costs for resource recovery facilities. Recycling processing equipment tax exemption for recycling processors only. Rebate of 6.5 or 7% of the equipment costs depending on whether the business is located in Minnesota. Equipment sales tax exemption for paper recycling companies.	Recycling businesses as specified in description
MT	Recycling equipment income tax credit of 25% for the first \$250,000 invested, 15% for the next \$250,000 and 5% on the next \$500,000. Reclaimable material income tax credit for taxpayers who purchase a product made from reclaimed materials. Tax credit is equal to 5% of the cost of the product.	See description
NC	Real and personal property tax, corporate state income tax and franchise tax deductions for recycling plants, facilities and/or equipment.	Businesses that purchase or construct facilities or equipment for recycling or resource recovery in North Carolina
ND	Recycling equipment sales and use tax exemption for recycling machinery and equipment in new or expanding recycling facilities.	Recycling businesses
NJ	Sales tax exemption for the purchase of recycling equipment.	Recycling businesses
NV	Personal property tax exemption of 75% for 10 years. Real property tax exemption of 25% for 20 years.	Manufacturing and recycling companies that meet the state's job creation and development goals and use raw or solid waste material from within Nevada
OK	Recycling facility income tax credit of up to 15% for machinery and equipment, construction and renovation and expansion financing.	Recycling businesses only, large manufacturers
OR	Three separate recycling tax credit programs with the credit taken against Oregon income tax. Credit can be taken from only one program. Reclaimed plastic tax credit of 50% of the plastic recycling capital investment taken at a rate of 10% per year for five years. Pollution control facility tax credit of 50% of the recycling equipment and facility capital cost taken at a rate of 5% per year for 10 years. Business energy tax credit of 35% of the recycling equipment capital investment taken over five years.	See description EXIT Disclaimer
SC	Recycling equipment sales and use tax exemption for machines used in the collection, separation, processing or reuse of materials that would otherwise become solid waste.	Recycling and manufacturing businesses
TX	Any equipment used for pollution control can receive a use determination from TCEQ that can be turned in to the appraisal district to get a property tax exemption. However, equipment used partially for pollution control and partly for production is eligible only for a partial use determination (i.e., you can only get the pollution control portion of the value). Since recycling is generally for pollution control and	See description EXIT Disclaimer

State	Tax Incentive Summary	Applicable Entities
	production, the equipment may not be eligible for a 100% use determination.	
UT	Recycling income tax credits of 5% on equipment and machinery costs and 20% on operating costs (maximum \$2,000). Only available for recycling collectors, processors and manufacturers located in state Recycling Market Development Zones. Sales tax exemption for manufacturers purchasing and leasing machinery and equipment. Sales tax exemptions range from 30 to 100% depending on what year the machinery is purchased. Available for all manufacturers, including recyclers.	See description
VA	Recycling equipment income tax credit equal to 10% of the equipment purchase price. Machinery and equipment must be used to manufacture, process, compound or produce items from recyclable materials. Retail sales and use tax exemption for machinery, equipment and power used by industrial recyclers.	Recycling businesses
WI	Recycling property tax exemption for machinery and equipment, including parts, used exclusively and directly in waste reduction or recycling.	Recycling businesses

US EPA <http://www.epa.gov/osw/conserve/rrr/rmd/bizasst/rec-tax.htm>. This chart has been altered to remove the New Mexico incentive that does not currently exist. Other incentives listed by EPA may also be outdated.

4.3 Legislation/Resolutions for Tax Incentives

As noted above, the state of Utah developed the Recycling Market Development Zone Program through legislation in 1996/2000 via House Bill 249. The program was designed to stimulate and develop markets for recyclables in Utah by encouraging the use of local recycled commodities within the state's manufacturing and reuse industries. The practice helps prevent locally collected and processed materials from being exported out of the state, Utah provides investment incentives to businesses to expand operations and locate within the state.

The incentives offered in Utah are applicable to eligible recycling businesses located in designated Recycling Market Development Zones and include:

- Five percent Utah state income tax credit on the cost of machinery and equipment.
- Twenty percent Utah state income tax credit (up to \$2,000) on eligible operating expenses.
- Technical assistance from state recycling economic development professionals.
- Various local incentives.

Like Utah, other states have Recycling Market Development initiatives where counties and cities have developed their own zones with huge local incentives, as referenced below.

- California's Recycling Market Development Zones Program offers business loans designed to boost California's economy and create green jobs. California has many businesses that have prospered in part from Recycling Market Development Zones services. <http://www.calrecycle.ca.gov/RMDZ/Business/default.htm>

- Indiana has an official “Recycling Market Development Board” that provides grants for industry expansion. <http://www.in.gov/idem/recycle/2358.htm>
- South Carolina has a Recycling Market Development Advisory Council, which has four times as many recycling jobs per capita than any other state
<http://sccommerce.com/events/recycling-market-development-advisory-council> and
<http://www.epa.gov/osw/conserve/tools/payt/tools/bulletin/summer10.pdf>

Appendix: Successful Collection and Processing Programs

Municipal Collection

Peterborough, New Hampshire

Population: 6,000
Type of Service: Drop-off
Total Diversion: 80%
Year of Data: 2009



Although Peterborough is a small town (population 6,000), it has achieved 80% waste diversion by creating a small but state-of-the-art transfer station that includes a “mini mall” and a network of reclaimers and vendors to help support its efforts. The town attributes its successful waste diversion rate to implementing a Pay As You Throw (PAYT) program in 1999. Residents are required to dispose of their trash in prepaid, official blue PAYT trash bags. This system requires all nonrecyclable waste to be disposed of in special bags that are available for purchase at local merchants. This system is intended to promote and encourage recycling because there is no fee for the disposal of recycled materials; therefore, the more you recycle, the less your waste disposal will cost. Solid waste disposal is paid for through the purchase of these bags. This makes everyone responsible for the waste they generate. The Peterborough Recycling Center offers a “mini mall” for residents of Peterborough and Sharon. This is a wonderful opportunity for people to reuse items as part of the “reduce, reuse, recycle” philosophy. Residents are encouraged to shop for and drop off items that are clean, useable and in working condition. The town also runs a compost facility of yard and food scraps and sells the end product to local landscapers. The extensive services, coupled with the PAYT program, create a thriving facility that produces raw materials for local processors and manufacturers. <http://www.townofpeterborough.com/vertical/Sites/%7B792D537E-D69C-464A-80FB-790917F72F17%7D/uploads/%7B448B2CFD-BC1F-432C-8E7C-4B240E5102B0%7D.PDF>

Lane County, Oregon

Population:	350,000
Average Income:	\$23,869
Type of Service:	Commercial and residential drop-off, curbside and independent haulers
Total Diversion:	57.5%
Year of Data:	2010

Lane County achieved a 57.5% combined commercial and residential recycling rate in 2010—***one of the best in the United States***. Lane County's largest population center, Eugene, boasts a 53.5% recycling rate. The county covers 4,500 square miles and stretches from the coastline to the mountains; it is both rural and urban, with a range of income levels.

Sample Rate Structure	
Rate Per Month for Weekly Pickup Within Mobile Home Parks (County)	
20 gallon	\$8.40
32 gallon	\$12.45
60 gallon	\$23.40
90 gallon	\$29.80

Lane County and the city of Eugene owe the success of their programs to the **PAYT** rate structure for both residents and commercial businesses. Lane County residents utilize 17 drop-off sites and pay as they go for trash disposal or contract with private haulers who follow a strict linear rate structure. The county has a two-tiered tip fee structure that incentivizes waste reduction and utilizes savings to contribute to programs that create further waste reduction outlets as well as local jobs. The county and city have maximized the PAYT program by providing extensive education and support for alternative disposal, including:

- BRING, a nonprofit that provides education and business expertise, as well as a retail/resale outlet for residences
<http://www.bringrecycling.org/home/brg/index.html>
- MECCA Materials Exchange Center and the Master Recycler program
<http://lanecounty.org/Departments/PW/WMD/Documents/Repair2ReUsebro.pdf>
- The Repair 2 Reuse brochure and the Love Food Not Waste program

The county and city websites contain sources and lists to guide residents in the disposal of ordinary and unusual items. The county offers educational programs for schools and annual Trash Buster Awards for residents and businesses.

<http://www.lanecounty.org/Departments/PW/WMD/Recycle/Pages/default.aspx>

<http://www.eugene-or.gov/portal/server.pt?space=CommunityPage&control=SetCommunity&CommunityID=794&PageID=0>

Eugene is home to the Society of St. Vincent de Paul, one of the largest regional nonprofit operations in the country. St Vincent's has seven retail locations, a warehouse, and a recycling center that generates revenue of more than \$25 million dollars annually and employs 400 local residents. The nonprofit specializes in recycling mattresses, furniture, appliances and clothing and is home



to a glass recycling operation as well as a Styrofoam reuse program. St. Vincent's has developed its own line of fire starter called "Eco Fire," which is made from mattress filling and old wax candles. The line is now sold in outdoor retail chains like REI. St. Vincent's also recycles used mattress filling into a line of pet beds call "Dogma." St. Vincent's creative team has also developed a line of affordable mattresses by utilizing the wood frame and springs from old mattresses and adding new covers and stuffing to produce a brand-new, lower-cost alternative to brand-name mattresses. The incentivized rate structure for trash has enabled programs like St. Vincent de Paul's to obtain a steady stream of material to feed their stores and supply their remanufacturing industry. The PAYT rate structure provides the impetus to drop off old items instead of throwing them away. <http://www.svdp.us/>

Lane County's aggressive programs have also led the way for PaintCare Oregon's first-in-the-nation paint recycling program. The first eight-month pilot collected 285,000 gallons of paint in 2011. The paint "take back" program was passed in 2009. The program is funded by a deposit with no return value that changes based on the amount of paint purchased. The program now has 90 collection sites statewide. A combination of proper incentives, education and information can create a strong local recycling economy, long-term savings to residents and many local jobs. <http://www.paintcare.org/oregon/index.php>

Chittenden, Vermont

Population:	157,491
Type of Service:	Drop-off (18 municipalities with three curbside programs run by the municipality and 15 drop-off programs)
Total Diversion:	64%
Year of Data:	2011

Chittenden is in a solid waste district that includes 18 municipalities (made up of urban, suburban, and rural communities) with seven drop-off locations and a materials recovery facility (MRF). The largest municipality is Burlington, which handles its own curbside collection, but participates in all of the Chittenden Solid Waste District programs. The district manufactures two products—Local Color Paint and Green Mountain Compost—that have become brand staples to area residents and businesses. The hazardous waste center is able to recycle more than 70% of the latex paint it receives into Local Color (sold in one-gallon and five-gallon buckets), which actually turns a profit. The Green Mountain line of compost includes food scraps from all drop-off centers, which are mixed with yard debris. Green Mountain is a public-private partnership that provides revenue to offset the cost of maintaining the program. The waste district has a 64% diversion rate and comprises both municipal programs with curbside collection as well as drop-off programs in combination with private haulers. The centers use a pay-by-the-gallon method for disposal. For instance, an 18-gallon trash bag costs \$1.75 for drop-off, and all typical recyclables are free. The A-to-Z Recycling List covers recycling of



just about everything imaginable, including items that would not be found in a typical recycling program; for instance, the fee for dropping off a bathroom medicine chest is \$3.00.

The PAYT system provides a greater incentive to divert materials and has triggered a more substantial network of services than a flat tax or flat fee system would. The A-to-Z Recycling List and the Reuse List provide local vendors a direct link to the community and make recycling and reuse easy for residents by highlighting local businesses like Global Garage Sale that need materials (<http://www.globalgaragesale.net/>). The county also has seven reuse zones located at drop-off centers. The reuse zones act as swap shops for items like furniture, bikes and books. Because the diversion rate is so high, the overall cost of service is cheaper for most residents. The revenue provided to the district allows additional services like education for schools, the Creative Reuse Showcase (a local art competition), the Rover (a truck that rolls from area to area making hazardous waste disposal convenient for residents) and the Appliance and Tire Roundup program. The county employees even answer their phone by saying, "Waste Reduction Hotline." The Chittenden Solid Waste District produces revenue and jobs and also provides cost-effective services for residents.

Dare County, North Carolina

Population: 34,307
Type of Service: Drop-off
Total Diversion: Third-highest per capita recycling in the state, at 490 lbs. per capita
Year of Data: 2011

Dare County includes seven municipalities along coastal North Carolina and has the highest per capita recycling rate in the state. The county provides drop-off and some curbside collection, but what makes it unique is its aggressive glass recycling policy. The county boasts the largest glass crusher in the state, which was purchased in 2008. Since that time, the glass recycling rate has quadrupled. The town of Kill Devil Hills is known for its "recycled glass mulch" (tumbled by the Dare County Public Works Department), which can be seen around public buildings and is used for landscaping. To date, the county has not sold the glass for a profit, but the pulverizer diverts the glass out of the landfill and has helped extend its lifespan; it also saves in disposal costs. Kill Devil Hills is also known for promoting conservation in public forums: its website even offers instructions on how to construct a home compost tumbler and rain barrel. The Dare County recycling coordinator is known for his proactive emphasis on education and is savvy when it comes to playing the recycling markets. <http://www.ourstate.com/carl-walker/>



<http://www.darenc.com/publicworks/docs/RcylSrv.pdf>

City of Marion, Iowa

Population:	34,768
Type of Service:	Curbside
Total Diversion:	30% curbside commodity recycling—excludes yard waste and all other recycling
Year of Data:	2009
Rate Structure:	Fee includes disposal of 32-gallon container; additional trash is \$1.25 per bag

The city has reached a 30% curbside recycling rate for commodity materials plastic and glass. Glass was added to its curbside recycling/refuse service in 1999 after the Public Service Department challenged solid waste program employees to come up with a way that Marion could add recycling at little or no additional cost. A privately owned and operated, single-stream MRF, owned by City Carton and located in nearby Cedar Rapids, was available to process the material.

To meet the challenge, Marion's Refuse Collection Department employees suggested a change in the collection fleet from the current side-loading, single-compartment refuse trucks to dual-compartment trucks so that refuse and recycling could be co-collected. In 2008, Marion households set out more than 10,200 tons of curbside recyclables, or roughly 415 pounds per household, which served for a 30% recycling rate (this excludes glass as well as leaf and yard waste). All households are provided with an 18-gallon bin with a lid, but can purchase additional bins from the city. Flattened cardboard can be set out under the recycling bins. Recyclables can be set out in additional containers. Refuse set-outs *are limited to one container no larger than 32 gallons or 40 pounds. Each additional container or bag of refuse must be tagged with a sticker, which can be purchased from an area grocery or convenience store (as well as city hall) for \$1.25.*

If a problem arises with set-outs, the Public Works Department sends an employee out to visit the household and address any issues. Collection workers and route supervisors also use tags and door hangers to communicate improper set-outs or other problems with collection to households. Finally, the *limited refuse set-out quantities* provide an incentive to residents to set recyclable materials out for recycling. Marion's collection service is financed through a dedicated enterprise fund and monthly rates are set to reflect the cost of service. The 2009 rates were \$12 per dwelling unit per month and included one 32-gallon reusable refuse container per week (or bag), weekly curbside recycling and regular yard waste collection service. The maximum weight allowed per container was 40 pounds. Every additional refuse container (or bag) had to display a sticker (which could be purchased for \$1.25). Refuse containers not properly tagged may not have been collected by the city.
<http://cityofmarion.org/pubserv/recycling>

Grand Lake, Colorado

Population: 471
Type of Service: Community dumpster
Rate Structure: Residents pay for trash through a bag fee

“Grand Lake's Pay As You Throw Program Exceeds Expectations,” Sky Hi Daily News, 2011. Grand Lake implemented PAYT in 2011 and, other than a tiny glitch with the quality of its special garbage bags, the program is working magnificently. The town has a combination of local private haulers and town disposal. The program was designed with a several special goals in mind:

- Create an easy and central way for residents to dispose of trash
- Control encounters with wildlife due to irresponsible trash disposal
- Curb illegal dumping from passers-by and tourists
- Cover the costs of disposal
- Create a fair solution for second homeowners and vacationers—with the bags, you only pay for what you use

The program asks residents and visitors to buy town-issued trash bags from various retailers and use them to dispose of trash at a collection site on town property. Bags are \$4.00 each for a large size that holds about four 10-gallon kitchen bags, or \$3.00 for a small size that holds about three kitchen-size bags.

According to the town treasurer, “The program is wonderful.” It has reduced trash volume and it has even encouraged some homeowners who used to have private service to switch. The only negative is that the town does not have recycling. Residents have to bring their recycling to a neighboring town (not far away). Many weekend tourists take the recycling home with them or drop it on the way out of town.

The bags are printed with a map that has the disposal sites to make it easy for tourists. The town has minimal noncompliance (e.g., bags found in the dumpster that are not the PAYT bags). When noncompliance is found, the bags are searched for identification and a fine of \$100 is issued. Most people comply and the success of the program far outweighs the few noncompliant bags.

Since the program's inception, there has actually been less illegal dumping in town. Prior to the program, tourists and homeowners without private hauler service would drop their trash in public areas or at someone else's home, creating an unwanted bear problem. Now the program has structure and everyone follows the rules. The two small grocery stores in town no longer complain of illegal disposal in their dumpsters. It's a win-win for everyone.



Hamilton and Wenham, Massachusetts

Population:	8,000 and 2,500
Type of Service:	Curbside—municipal contract hauler, basic service through taxes, each home is allowed one 32-gallon container every other week
Total Diversion:	80%
Year of Data:	2009

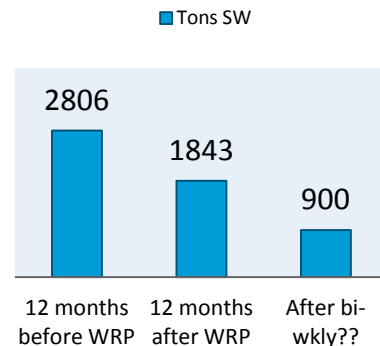
The neighboring Massachusetts towns of Hamilton (population 8,000) and Wenham (population 2,500) implemented a curbside organics collection program in conjunction with curbside PAYT garbage and recycling in April 2012. Prior to this system, in 2008, the two communities had started a basic service curbside PAYT program. Basic service allows each household “one free” 35-gallon container of garbage. All additional trash must be contained in an official town trash bag (large bags sell for \$1.75 each). The towns share a contracted private hauler. The initial PAYT program achieved tremendous results, reducing trash by 41% from 2,806 tons to 1,643 tons.



USE FOR YOUR HOUSEHOLD WASTE (NON COMPOSTABLE OR RECYCLABLE WASTE)

In 2009, the town's initiated an innovative weekly curbside composting pilot program with great results. The pilot homes reduced waste between one-half and one-third. The new program is town-wide in both communities. Residents were given a compost container and receive pickup each week of single stream recyclables and compost in a dual compartment truck. The “one free” container trash service was reduced to every other week. The residents place the compostable garbage in biodegradable bags certified by the Biodegradable Products Institute. There are no published results from the program; however, initial feedback is very positive and trash levels are expected to decrease to 900 tons.

Hamilton's SW



[http://www.hamiltonma.gov/Pages/HamiltonMA PublicWorks/trash](http://www.hamiltonma.gov/Pages/HamiltonMA_PublicWorks/trash)

[http://www.hamiltonma.gov/Pages/HamiltonMA PublicWorks/TrashInfo/SolidwasteFlyer](http://www.hamiltonma.gov/Pages/HamiltonMA_PublicWorks/TrashInfo/SolidwasteFlyer)

<http://www.slideshare.net/MassRecycle2011/hamiltons-curbside-organics-program-mr-32011>

The City of St. Peters, Missouri

Population: 52,575

St. Peters has a successful and efficient recycling program using one truck. The “Blue Bag” program is St. Peters’ automated curbside recycling system. The Blue Bag program makes it easy to discard recyclables. Residents put paper items and cardboard in one blue bag and put all containers (plastic, glass, tin cans, aluminum) in another blue bag. When either bag becomes full, it is double-tied shut and placed inside the city trash cart/dumpster. City Solid Waste vehicles empty the carts/dumpsters and the contents are taken to Recycle City (an MRF) to be sorted.



Instead of adding a separate route for recycling collection each week, the residents simply use the same container and separate the recycling by bag color. When the load reaches the transfer station, it's dropped on the floor and the blue bags are pulled aside and transferred to the MRF and the trash is then transferred to the landfill. At the MRF, the bags are opened with an automated bag breaker and the contents are then sorted by type. The leftover blue bags are baled and then recycled back into new bags. The system is efficient and saves on fuel and transportation costs that would have been incurred in weekly trash routes. The system allows multifamily dumpsters to participate in the same way. Residents collect the recyclables in the blue bags and place them into the dumpsters along with the trash. When the trash gets to the transfer station, the bags are separated from regular trash and sent to Recycle City. The city offers financial prizes to participating customers.

<http://www.stpetersmo.net/blue-bag-recycling-program.aspx>

Kansas City, Missouri

Population: 459,787

Average Income: \$49,394

Type of Service: Weekly curbside trash collection of up to two 32-gallon containers. Residents must purchase a special tag for all bags or items exceeding this amount

When Kansas City started its PAYT program, the city-contracted hauler decided not to accept glass. Residents did not have an outlet for recycling glass, so a local brewery and insulation maker turned that around by developing Ripple Glass, a company that has its sights set on doubling the city's glass recycling rate.

The concept started out as a citywide effort to encourage recycling and has turned into a bigger effort—from bars to restaurants, and residents. In 2000 a nonprofit called Bridging the Gap had a grant from the United States Environmental Protection Agency to work with local businesses on



sustainability issues. Two of the businesses involved were Boulevard Brewing Co. and Owens Corning, which had discussed using crushed beer bottles to make fiberglass insulation, but were constrained by the lack of glass hauling in the city. The Kansas City glass recycling rate was under 5% and the city only had a few drop-offs that accepted glass.

Owens Corning and Boulevard partnered to form Ripple Glass in 2009, with a mission to build a new glass recycling steam and processing facility. Ripple started with 25 big purple roll-off bins strategically placed around the city. Once this was launched, Ripple received so many calls from companies wanting bins on their premises that it ended up with a wait list for more than 70 locations. Originally planning to bring in 6,500 tons in its first year, Ripple is now looking to bring in close to twice that amount, which would double the city's recycling rate. Residents are incentivized to bring glass to the Ripple containers because they must pay for additional trash bags over the allotted 32-gallon container that is picked up weekly by the city.

Owens Corning, Ripple's sole customer for now, has brought the recycled content of its fiberglass insulation up to 50%. Ripple's glass recycling system is now expanding, placing smaller collection bins behind about 100 bars and restaurants in the city's downtown to make it easier for the businesses that produce the most glass waste to recycle it, and by adding optical sorting technology to its processing plant so that glass can be separated by color. This will allow amber bottles to be kept separate and then recycled back into bottles to supply Boulevard for its beer. Ripple plans to double its capacity in 2012. By filling the glass recycling void in Kansas City, Ripple has created a new life cycle for glass in the area: collect glass locally, crush it up locally, sell it to a local manufacturer and, soon, turn it back into bottles to be sold locally. Green Biz.com, August 2010.

<http://www.greenbiz.com/news/2010/08/12/filling-glass-recycling-void-kansas-city>

Middletown, Rhode Island

Population: 17,500

Average Income: \$57,322

Type of Service: Curbside automated containers in conjunction with PAYT bags

Total Diversion: Nearly 60%

Year of Data: 2011

Middletown has a population of 17,500 and boasts the highest recycling rate in the state of Rhode Island for the past five years. The town owes its success to its PAYT rate structure. In conjunction with Waste Management, the town allows residents to contract for curbside service (75% or 4,100 homes participate). Those who opt not to participate can hire a private hauler. Participating households have a two-tiered rate. The *first tier* is a fee for service of \$150.00 that residents pay monthly. This includes three containers: one for trash (grey), one for paper recyclables (blue) and one for mixed materials (green). Residents pay a *second tier* for each trash bag disposed of in the grey container. This structure encourages residents to reduce as much as possible and



therefore use as few bags as possible. Residents purchase special yellow Town of Middletown trash bags at participating retailers. All garbage is put in the bags and then placed into the grey containers. The trash containers are collected by Waste Management, using automated collection vehicles. When the automated arm tips into the trucks, a camera inside the cab allows the driver to view the bags as they drop. If the drivers see bags that aren't yellow, they make a note of the noncompliant household's address. The two-tiered rate encourages recycling and waste reduction. In 2010, Middletown recycled between 500 and 800 pounds per household, nearly 60% of waste.

<http://www.middletownri.com/government/9/Public-Works-Department>

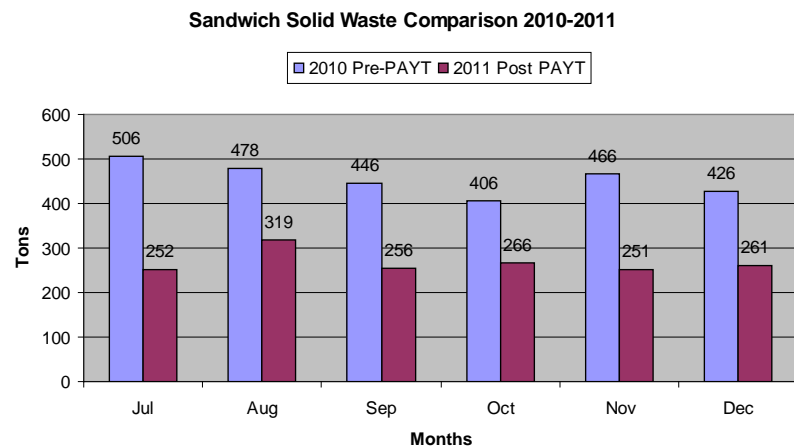
Sandwich, Massachusetts

Population: 2,962
Type of Service: Drop-off with PAYT bags
Total Diversion: Nearly 41%
Year of Data: 2011

Sandwich is located at the start of Cape Cod. At just over 5,000 homes, it is a tourist-based community, so the population increases considerably during the summer months. The town uses a two-tiered rate structure. The overall cost of service and maintenance of transfer station and convenience drop sites is included in the tax base and the cost of tipping the trash is included in the bag fee.

Residents and renters can purchase bags at local supermarkets and pay as they go for the material they generate. The results were extraordinary:

- Trailer trips to incinerator down 39%
- Bulk waste down 75%
- Solid waste down 41%
- Cost avoidance \$13,000 per month
- No need for extra help at the transfer station during peak hours
- Usage hours on equipment down



PAYT Programs in New Mexico

San Juan County

Type of Service: Drop-off PAYT with a bag fee and pickup truckload fee
Total Diversion: Nearly 40%
Year of Data: 2012

In July of 2011, San Juan County established a PAYT bag fee for trash at the county landfill and transfer station. The fee is \$1 per bag and \$6 to dump a pickup truckload of garbage at the transfer station. According to Commissioner Tony Atkinson, the program has been successful and fair. Fewer vehicles are taking trash to San Juan County-operated transfer stations and less trash is ending up at the regional landfill since the county started charging residents to throw away garbage. In the eight months since the county imposed the fee, 40% fewer vehicles have taken trash to transfer stations or the regional landfill. According to county documents, 155,000 vehicles took trash to transfer stations or the landfill, compared to 266,000 vehicles during the same eight-month period the year before. And about 46,000 fewer cubic yards of trash ended up at the landfill in the eight months since the county established the transfer station fee compared to the same eight months the year before.

Commissioner Scott Erickson agrees and believes that the fees are fair because they place much of the cost of disposing solid waste on the transfer station users. "If the price of coffee goes up, does it justify shoplifting?" he said. "I think we're doing a good thing; (dumping trash is) still an illegal act."

Others have voiced concern over illegal dumping. There is controversy as to whether the dumping has increased or whether people who dumped prior to the fees are continuing to dump. Commissioner Hathaway feels there has been an increase (in illegal dumping) on public land as well as on private land and that residents are holding onto their trash. However, Commissioner Atkinson feels the county has been dealing with illegal dump sites for years and doesn't know if the recent dump sites and the transfer station fees are correlated.

http://www.daily-times.com/farmington-news/ci_20671110/san-juan-county-commission-candidates-talk-trash-fees

Silver City

Population: 10,300

Type of Service: Curbside automated containers

Total Diversion: Recycling increased by 7.9% the first year of PAYT implementation

Year of Data: 2011

In 2007, Silver City implemented a modified PAYT program using a two-tiered rate structure. The town currently uses three fees for three sizes of containers (32-, 64- and 96-gallon):

Container Size	Disposal Fee	Service Fee	Cart Fee	New Full Rate
Senior Rate	\$2.67		\$0.80	\$3.47
35 gallon	\$4.20	\$8.59	\$0.80	\$13.59
65 gallon	\$7.81	\$8.59	\$0.95	\$17.35
95 gallon	\$11.41	\$8.59	\$1.05	\$21.05

- Monthly service fee includes all fixed costs
- Monthly disposal fee includes the cost of disposal and transportation
- Cart fee is basically a rental fee

When added together, the monthly differential does not create a big incentive to choose a smaller container. Most of the users received a 64-gallon container and the town increased recycling by 7.9%. Recycling was free to all homes, but the bins had to be requested. Only 30% of Silver City's homes requested bins. Among these homes, participation and tonnages continue to be high; however, the homes with no bins basically do not participate. The town did not provide any way to collect yard waste, and also did not limit the one-ton-per-month "free trash" rule (whereby residents can self-haul one ton of trash per month directly to the South West Solid Waste Authority landfill).

The town implemented single-stream recycling in 2009, which increased the volume of recycling; however, it did not increase the number of participating homes. Silver City and the South West Solid Waste Authority have continued their program with upgrades from recent grants. In order to ensure a steady supply of recyclable materials and the success of the PAYT program, they are considering four changes:

- Providing recycling containers to all homes without request
- Adding yard waste collection
- Adding a special colored trash bag fee in place of the monthly waste fee so that residents can truly pay for what they throw away
- Limiting the one-ton-per-month "free disposal" rule

Municipal Collection Programs Including Food and Yard Material

Boulder, Colorado

Population: 18,376
Type of Service: Curbside
Total Diversion: 46%
Year of Data: 2010

According to Biocycle magazine, the cities of Boulder and nearby Louisville recently regulated that haulers must offer organics collection, bundled at one rate with garbage and recyclables. Both Boulder and Louisville have PAYT programs, which enabled the organics program costs to be absorbed into the variable rate garbage structure. Western Disposal, a hauling and composting company, services about 95% of the city's residential clients, with 30,000 households in Boulder and Louisville. The landfill disposal fee in Colorado averages \$13 to \$14 per ton, so these are unique programs where money is not saved by diverting. The government was needed to level the playing field, requiring organics collection to be included with garbage service, at the same base price.

Trash	Compost	Monthly Cost	Recycling
32-gallon	32-gallon	\$11.20/month	Included
32-gallon	64-gallon	\$13.95/month	Included
32-gallon	96-gallon	\$16.70/month	Included
64-gallon	32-gallon	\$17.55/month	Included
64-gallon	64-gallon	\$20.30/month	Included
64-gallon	96-gallon	\$23.05/month	Included
96-gallon	32-gallon	\$23.90/month	Included
96-gallon	64-gallon	\$26.65/month	Included
96-gallon	96-gallon	\$29.40/month	Included

Boulder conducted residential organics pilot projects in 2005 and 2006 for about 2,500 households. The pilot programs were deemed successful, diverting 55–69% of residential organics. Residents receive trash recycling and organics services using a PAYT rate structure based on an option of multiple container sizes. Residents choose the size that meets their needs at a price that includes all services. If residents have excess trash they can purchase an extra bag for between \$4 and \$6. This encourages them to stick with the chosen size and reduce as much as possible. (The table above represents the city of Louisville's variable PAYT pricing structure.) The city of Boulder has a 51% overall diversion rate, and Louisville has a 47% diversion rate. <http://www.jgpress.com/archives/free/001992.html>

<http://westerndisposal.com/userfiles/Western%20Disposal%20Extra%20Trash%20On-Route%20Charge%20Sheet%202012.pdf>

<http://www.louisvilleco.gov/Portals/0/Public%20Works/refusefaqs.pdf>

Duluth, Minnesota: Western Lake Superior Sanitary District

Type of Service: Drop-off
Total Diversion: 45%
Year of Data: 2012

Western Lake Superior Sanitary District, based in Duluth, covers a 530-square-mile area in northeastern Minnesota and has a successful and unique PAYT program. The area is composed of incorporated and unincorporated areas. The Western Lake Superior Sanitary District provides a variety of

services, from recycling shed sites to organic food compost drops. The district does not pick up trash or recycling but works in conjunction with local haulers and municipalities. Residents within service areas call local haulers and contract for service. The district has a solid waste management fee, which is built into the hauler's cost. The fee is a unit-based cost to encourage residents to choose a smaller container. The fee is used to cover a variety of programs.

Specific municipalities (more populated areas) incentivize customers further by mandating that the hauler include free recycling pickup as well. The cost of recycling is built into the overall unit cost for the container. The Western Lake Superior Sanitary District does not set the rates but the system is set up to encourage the customer to choose the smaller container. Homes that are not located within the service area can bring their waste materials to community recycling centers; some, but not all, of the centers are pay-as-you-go for disposal. This modified PAYT program has created a bridge for meeting the needs of haulers in rural and populated areas and has achieved a 45% diversion rate.

One of the services provided by the Western Lake Superior Sanitary District is curbside collection of yard trimmings, and the district maintains residential food waste drop-off sites for residents to use. The sites are hosted by local businesses—a hardware store, a restaurant, an inn—as a way for the business to get traffic and free advertising. The district purchases compostable bags and provides them free to residents. This helps reduce contamination in the compost, and it also keeps the host sites for drop-off bins cleaner. Cases of the compostable bags are given to the host business, and when residents drop off a bag of food waste, they go into the business or recycling center and ask for another bag. The program covers Duluth and surrounding areas.



Volume-Based Fee

Container Size	Fee Per Pick-up	Annual Fee (Weekly Pick-up)
20 gal	\$.17	\$ 8.84
32 gal	\$.28	\$ 14.56
64 gal	\$.54	\$ 28.08

Every residence with garbage collection service pays a volume-based solid waste management fee to their garbage hauler as part of their garbage bill. "Volume-based" means the amount you pay is determined by the size of your garbage container. The haulers, in turn, pay the solid waste management fees to the WLSSD.

Rapid City, South Dakota

Population: 67,956
Type of Service: Curbside
Year of Data: 2009

"Composting Brings Green to City Coffers," according to Rapid City Journal, 2010.

Rapid City sold nearly 5,100 tons of compost made from residents' yard waste in 2009, raising more than \$60,000 toward landfill operations. Solid waste manager Jerry Wright said the city's compost program prevented more than 17,000 tons of grass clippings, tree branches, manure and scrap wood from being thrown out with the trash, thus saving landfill space and tip fees. According to Wright, "This is a significant amount of waste that could be efficiently and effectively reused without going into the landfill. Rapid City uses a PAYT container program to maximize the diversion of both commodity materials and yard waste to the landfill. Recycling may raise more revenue, but in terms of sheer tonnage being diverted, the yard waste program can't be beat." In 2009, the MRF diverted 3,810 tons of recyclables, earning \$335,000. The yard waste program raised only \$60,386, but diverted four-and-a-half times more in tonnage. "It's the cheapest diversion program we have going," Wright said. "Residents of Rapid City love the stuff!" Two more articles on this program can be found at: http://rapidcityjournal.com/news/article_d033ab02-08a1-11df-863e-001cc4c002e0.html and <http://www.americanrecycler.com/0504municipal.shtml>

King County, Washington

Population: 1,969,000
Type of Service: Drop-off and curbside
Total Diversion: 77% organics diversion from participating households
Year of Data: 2010

Compost Recycling for Business and Commercial Has Grown Jobs and Decreased Waste. In 2010, businesses in King County sent more than 200,000 tons of recyclable materials to the landfill. At 27% of the waste stream, the largest percentage of material still heading to the landfill is food scraps and food-soiled paper. King County operates a food and yard waste recycling program for residents and businesses and sends its material to Cedar Gove

Composting facility, which produces a line of several different compost types sold to regional stores and landscapers. Cedar Grove Composting operates the largest single composting facility in the United States on 26 acres in the community of Maple Valley (<http://www.cedar-grove.com/>). The success in King County started with the initiative to offer collection and the ripple effect is now seen in small businesses like *Pogacha*, a restaurant in Issaquah. Sarah Barnes, manager of Pogacha, says, "We started composting food waste last year and have had great success. We have cut our garbage by over half, and

Preventing waste shrinks garbage!

Garbage rates are based on container size (10-gal micro can to 96-gal cart). Your new Recycling Guide outlines many ways to reduce waste, such as:

- Buying durable items
- Donating used clothing
- Using your blue cart for recyclables
- Putting food scraps and food-soiled paper in your grey food/yard cart.

Be the first on your block to downsize your garbage!



even inspired many of our staff members to begin composting at home. We had initial resistance to this change but the transition was really smooth."

<http://your.kingcounty.gov/solidwaste/garbage-recycling/yardwaste.asp>

According to Biocycle magazine's December 2009 issue (<http://www.igpress.com/archives/free/001992.html>), about 50% of the residents of King County are participating in organics collection. Of those participating, the diversion of food waste is approximately 77%. King County uses a container-based proportional PAYT program to incentivize residents to participate in all recycling programs. The pricing is proportional in 10-gallon increments.

Seattle, Washington

Population: 666,000

Type of Service: Curbside PAYT container program, bag program and multifamily program

Total Diversion: 65%

Year of Data: 2011

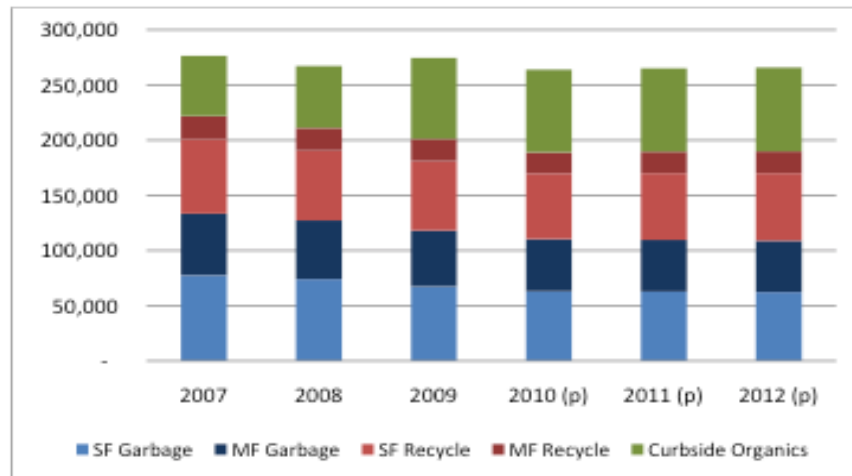
Seattle is part of King County but has a stand-alone PAYT collection program that encompasses the residential, multifamily and commercial sectors. The city has an array of programs that meet the needs of residents and businesses, including recycling, compost and an alley way pay per bag program. The Seattle website helps residents find a home for most unwanted items that might normally have been considered trash. The city also uses a near linear price structure, which encourages residents and businesses to choose the smallest container and therefore recycle, compost or reuse as much as possible.

Size	Trash Container Users	Compost Container Users
Micro	8%	
Mini	25%	
32 gallon	61%	19%
64 gallon	4%	5%
96 gallon	0.70%	68%

All residents within the city of Seattle are required by the Seattle Municipal Code to pay for garbage service. The more you recycle and the more food waste you put in your food/yard waste cart, the smaller garbage can you will need, and at a lower cost. By downsizing to a smaller container, you can save money and reduce waste going to the landfill. The PAYT price structure has encouraged more residents to choose smaller containers and therefore reduce waste. For detailed and updated information on Seattle's rate structures, see the Seattle Public Utilities Detailed Solid Waste Funds (2011–2012) Rate Study.

http://www.seattle.gov/util/groups/public/@spu/@billing/documents/webcontent/spu01_004264.pdf

**Figure V-2
Residential Tonnage**



Source: Seattle Public Utilities Detailed Solid Waste Funds (2011–2012) Rate Study

San Francisco, California

Population: 805,000

Type of Service: Curbside

Total Diversion: 78%

Year of Data: 2011

Rate Structure: Linear PAYT using containers for trash, recycling and organics

The City's Aggressive Recycling Program Also Creating Jobs and Stimulating Growth of New "Green Economy." Mayor Gavin Newsom announced that San Francisco had achieved a 77% landfill diversion rate, surpassing the goal of 75% landfill diversion by 2010 and setting national recycling rate records, the highest of any city in the United States. New statistics show that the city is up from the 72% landfill diversion of the year before.

The figures compiled by the city's Environment Department for 2008 show that San Francisco diverted just over 1.6 million tons of material—double the weight of the Golden Gate Bridge—through recycling, composting and reuse. Of this, only 560,000 tons went to landfill, the lowest disposal on record. "San Francisco is showing once again that doing good for our environment also means doing right by our economy and local job creation," said Mayor Newsom. "For a growing number of people, recycling provides the dignity of a paycheck in tough economic times. The recycling industry trains and employs men and women in local environmental work that can't be outsourced and sent overseas, creating 10 times as many jobs as sending material to landfills."

According to Kevin Drew, residential special projects recycling coordinator, the most critical component of the "Zero Waste" strategy is PAYT. The city created a PAYT rate structure that is designed to incentivize residents to recycle more and throw away less. It offers residents monthly payment choices for different container sizes that encourage waste reduction. For instance, if you opt for the 32-gallon trash bin, your recycling and organics collections are

free and you pay \$25 per month. If you opt for a 96-gallon, your recycling and organics collections are still free but you now pay \$75 per month. San Francisco makes material recycling and food/yard recycling convenient and easy. The cost structure encourages the majority of residents to choose the smallest container, thus driving the city's recycling rates up and landfill tonnages down.

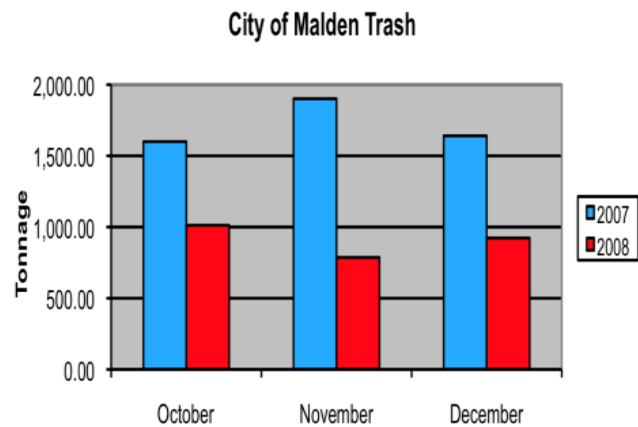
http://www5.sfgov.org/sf_news/2010/08/san-francisco-achieves-77-landfill-diversion-rate-the-highest-of-any-us-city.html

Collection Programs Including Food and Yard Material

Malden, Massachusetts and Portland, Maine

Average Income: \$56,244 and \$46,933
Type of Service: Curbside multifamily collection
Total Diversion: Over 50%
Year of Data: 2007–2008

The city of Malden, MA (59,450), and the city of Portland, ME (population 66,194), have successfully implemented multifamily collection with PAYT trash bags. Portland collects from units of less than 19 families and Malden collects from units of less than 9 families. Collection is done curbside in both cities. The bags are placed on the curb on their own or in a container. If the attendant spots a noncompliant bag on the curb, it is tagged with a fine and left behind. If the bag is concealed in the container and ends up at the transfer station, it is pulled aside and inspected.



The noncompliant bags are easy to identify because they are a different color than the PAYT bags. Both cities say it's amazing what items in the trash can identify a person. Most of the time the inspection reveals who the bag belongs to. Using the assessor's office, the address is determined and a fine is mailed out. Both cities say that the drivers know their routes, and even shortly after PAYT started, the drivers knew what to look for and which units were problematic. In the case of rental properties, the fine is sent to landlords and it is up to them to deal with the tenants.

The town of Middletown, RI, has automated collection and uses a camera to monitor bags as they are dumped from containers into the trucks. When the workers see a noncompliant bag, they make a note of where it came from. The city of Malden has a fine of \$300 per offense, and using noncompliant bags is considered to be the same offense as illegal dumping. If it's a first-time offender, they educate the resident and reduce the fine. After that they are very strict. They say that they have only a few repeat offenders.

Malden reduced its waste by one-half in 2008 when it started PAYT (see the graph provided by Malden Public Works). The city's waste has remained steady at less than 500 lbs. per capita. According to United States Environmental Protection Agency's 2009 Guidebook, Portland's per capita disposal is 380 annually, compared to the U.S. average of 1,100 lbs. per capita (Biocycle: The State of Garbage 2006). Both communities dispose of less than 50% of the national average residentially, and both state, "Hands down, the results of the PAYT program far outweigh the small amount of illegal dumping." PAYT is well worth the effort.

Private Collection Programs Including Food and Yard Material

Penn Waste, York, Pennsylvania

Type of Service: Curbside

Located in York County, PA, Penn Waste's innovative single stream recycling facility is the foundation of the company's commitment to waste less and preserve more. Each year, more than 78,000 tons of recyclable materials, including cardboard, plastic, glass and paper, pass through Penn Waste's 45,000-square-foot facility on their way to being recycled, repurposed and reused. When Penn built its facility, management realized that their customers needed to be incentivized in order to maximize the collected recyclables and reduce the waste. Penn Waste uses a PAYT rate structure or, as they call it, "Low Volume Generator Program," which means that the less waste and more recycling you generate, the less you pay. The rate structure encourages decreased waste and increased recycling to help ensure supply and efficiency to the MRF. <http://www.pennwaste.com/>

H & M Leasing Corp., Copiague, New York

Type of Service: Curbside

Founded in 1997 by a brother and sister, H&M remains today a small family business. The company was formed for two purposes: to act as a professional fundraiser assisting nonprofits such as firefighters' associations, children's charities and others to raise much-needed funds for their continued operation, and also to sell unwanted clothing discarded by Americans to individuals and families in third world countries, where used items are need and appreciated.

The company has partnerships with charities and municipalities and provides drop-off containers, as well as curbside collection for bulk items and biannual household collection of bagged textiles. Their services have resulted in thousands of dollars being transferred to nonprofit organizations for their use. The municipalities benefit by recycling items that would otherwise be disposed in a landfill. H&M acts as both the hauler and the dealer. The firm collects gently worn clothing, shoes, small toys, small appliances, pots, pans and dishes and then resells the materials for a profit or profit share, just as a recycler of aluminum or paper would do. <http://www.handmleasing.org/>



1-800-GOT-JUNK?, Vancouver, British Columbia

Type of Service: Curbside

A full-service junk removal company, the concept offers franchise opportunities. It offers junk removal services for home or business, including offices, retail locations, construction sites and more. It claims to be the junk removal company that handles the tough stuff—and it ensures that your junk gets recycled, donated or disposed of responsibly. The company accepts old furniture, appliances, electronics, tires, construction debris or yard waste. It was founded in 1989 and in 2011 had 120 franchises and nearly \$100 million in sales. Customers must make an appointment and 1-800-GOT-JUNK? will take away almost any material that fits in its trucks.



<http://www.1800gotjunk.com/>

Apple Valley Waste, Kearneysville, West Virginia

Service Area: Berkeley, Jefferson and Washington Counties in West Virginia

Type of Service: Curbside

Apple Valley Waste offers a PAYT service as an alternative to traditional fixed-rate waste collection service for their customers. In Berkeley County, residents on the PAYT program pay \$10 per month for unlimited dual stream recycling service and pay as they go for trash bags (price and service vary depending on county). Apple Valley sells the bags for \$32.50 to \$38.30 per pack of 10 large bags (\$3.25–\$3.88 per 30-gallon bag, depending on which county the residence is located in). Residents are very satisfied with the program. It allows them to reduce their trash as much as possible and save money. If a home uses only one bag per week, its average savings from traditional service is \$60.00 per year. Apple Valley incentivized residents further by providing yard waste pickup using stickers that sold for \$2.00 each. Residents purchase stickers in lots of five and use as needed for yard waste.

Elysium Events, Portland, Oregon

Type of Service: Events Recycling

Elysium, a Portland-based sustainable event management and consulting firm, is a company with a conscience. Elysium works with companies, organizations, event planners and producers to find solutions that minimize the environmental footprint imposed by event- and project-based activities. With a focus on working toward Zero Waste, clients have reached landfill diversion rates of 65–93%. Regardless of scale, large or small, Elysium can help. Race for the Cure Eugene had an 83% diversion; Eugene Track and Field Olympic Trials had 73% and Seattle Green Fest had a 97% diversion.



<http://www.elysiumeventsllc.com/index>

EcoScraps, Provo, Utah

Type of Service: Drop-off and pickup

EcoScraps transforms leftover fruits and veggies into highly nutritious, 100% organic soil through a special process similar to composting. Founded in 2010 by three Brigham Young University students, the company collects roughly 20 tons of food waste a day from more than 70 grocers, produce wholesalers and Costco stores across Utah and Arizona. Then it composts the waste into potting soil, which retails for up to \$8.50 a bag in nurseries and garden stores throughout the Western United States. The company has eight full-time employees and 14 part-time employees. Sales are expected to hit more than \$1.5 million in 2011. **According to Inc. Magazine** (May 2011), EcoScraps' story is another "twenty-something" success. In their dormitory parking lot, the three created a makeshift research lab, testing composting techniques on 24 garbage cans full of spoiled food. Through trial and error, they discovered that some foods produced healthy compost, while others didn't. With some help from professors in Brigham Young's agriculture department, the trio developed a technique to transform discarded fruits and vegetables into nutrient-rich compost in less than three weeks—a good deal faster than traditional composting, which can take up to three months or more. EcoScraps' business plan took second prize in Brigham Young's Social Venture Competition and won a grant from Sparkseed, a nonprofit fund that provides seed money and mentoring services to social entrepreneurs. The trio has since dropped out of Brigham Young to pursue EcoScraps full time. One of the founders noted, "We sensed that we had a great opportunity, and if we didn't take it, somebody else would."



<http://www.inc.com/magazine/20110501/social-entrepreneurs-how-ecoscraps-turns-trash-into-treasure.html>; <http://ecoscraps.net/#>