



**INNOVATIVE WASTE REDUCTION & RECYCLING GRANT IG8-06  
MRFing Our Way to Diversion: Capturing the Commercial Waste Stream**

**MATERIALS RECOVERY FACILITY  
FEASIBILITY STUDY**

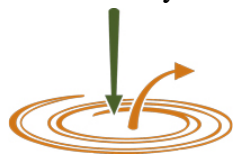
**September 2009**



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**PINELLAS COUNTY, FLORIDA**  
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# **SECTION 1**

## **INTRODUCTION**

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### **1.1 Background**

Recent efforts by all three Tampa Bay area counties (Pinellas, Hillsborough and Manatee) to promote recycling to businesses and commercial property managers have had limited success. Tampa Bay area recycling coordinators have observed very limited action by private sector recyclers to collect additional volumes of commercial recyclables in a manner that provides convenient and cost-effective alternatives to disposal. A lack of adequate materials processing infrastructure has been a serious impediment to increased recycling (particularly in the commercial sector) in Pinellas County and the Tampa Bay area.

To help address this issue, Pinellas County obtained an Innovative Waste Reduction and Recycling Grant from the Florida Department of Environmental Protection (FDEP) to conduct (1) a technology review of current processing technologies and facilities and (2) a feasibility study to evaluate the need for and viability of a local or regional materials recovery facility (MRF). While MRFs can be developed to recover a variety of materials, the focus of this study was MRFs designed primarily to recover and process fiber and containers.

Pinellas County Department of Solid Waste Operations (SWO) retained Kessler Consulting, Inc. (KCI) to assist with both elements of this project. This report presents the results of the feasibility study; the technology review is presented in a companion document.

### **1.2 Methodology**

KCI first analyzed the need for additional processing capacity in the Tampa Bay area. Recovery rates for 2007 and existing materials processing capacity were compared, and the potential to recover additional recyclable materials was estimated. Based on this information, the potential need for future processing capacity was assessed and is summarized in Section 2.

Based on research regarding MRFs throughout the U.S. and site visits to MRFs in Florida and California, KCI then analyzed various other factors that must be considered when developing a MRF. These factors, which are discussed in Section 3, include design options, adequate and consistent material throughput, facility ownership and operation, demand and markets for recovered materials, and potential costs and benefits.

Section 4 summarizes the findings of this analysis and discusses the feasibility of establishing a local or regional MRF in the Tampa Bay area.

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## **SECTION 2**

### **NEEDS ASSESSMENT**

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To evaluate the potential need for additional processing capacity, KCI compiled information about the MRFs currently operating in Pinellas, Manatee and Hillsborough counties (Tampa Bay area), as well as in the neighboring counties of Pasco, Polk and Sarasota. KCI then evaluated current and potential recovery of residential and commercial recyclables in the Tampa Bay area. These current and potential recovery rates were then compared with existing processing capacity to determine the potential need for additional capacity. As mentioned previously, the focus of this analysis was on fiber and containers.

#### **2.1 Existing Processing Infrastructure**

Six MRFs were identified in the Tampa Bay area, and five additional MRFs in Pasco, Polk and Sarasota counties. Contact information for each facility is provided in the Appendix and general operating information is presented in Table 2.1. A number of other smaller paper processors and brokers are located in the Tampa Bay area that receive and market fiber, but for the purposes of this study, only the largest processors were included in this analysis.

The combined annual throughput for the six MRFs in the Tampa Bay area is approximately 270,000 tons per year. Only three of the six facilities provided capacity information. This capacity data, combined with the existing throughput of the other three MRFs, yields an estimated processing capacity for the Tampa Bay area of 389,000 tons per year.<sup>1</sup> The five MRFs in neighboring counties have an annual throughput of about 183,000 tons per year, and an estimated annual capacity of 225,000 tons per year based on capacity information provided.

Even if sufficient processing capacity exists, none of the facilities in the Tampa Bay area currently process recyclables collected in either a dual or single stream because none have the ability to sort commingled containers. This places significant limitations on the development and expansion of recycling programs in the area. Nationally, the trend in recycling is away from source separating recyclables prior to collection and toward dual stream recycling at a minimum, and increasingly toward single stream recycling.

Several MRF operators in the Tampa Bay area indicated they have the ability to expand operations, some from handling source separated recyclables to either dual or single stream processing. To date, none of these facilities have initiated such upgrades. Staff in Polk County, located just east of Hillsborough County, stated they intend to convert to a single stream MRF within the next year or two. To the north of Pinellas County, Pasco County intends to close its MRF, possibly in 2011, and construct a new MRF. The county has met with several private processors, but has no firm plans for future MRF development.

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<sup>1</sup> Throughput refers to the actual quantity of materials processed by a MRF during a given time period. Capacity refers the quantity of materials the MRF is capable of processing. Unless otherwise stated, capacity figures usually assume the MRF operates for two shifts per day, which maximizes facility efficiency and cost-effectiveness.

**Table 2.1: Materials Recovery Facilities in Tampa Bay Area and Neighboring Counties**

TAMPA BAY AREA	PINELLAS COUNTY			HILLSBOROUGH COUNTY		MANATEE COUNTY
DETAILS	City of Clearwater	Recycling Services of FL	SP Recycling	Recycle America Tampa	Smurfit-Stone Tampa	Waste Pro
Year Built	1994	1988	n/a	1972	Purchased 1987	2008
Throughput (TPY)	12,220	81,000	30,000	49,280	84,000	13,000
Capacity (TPY)	18,000	n/a	60,000 (assuming 2 shifts)	120,000	Significantly greater than current throughput	26,000
Owner/Operator	Public/Public	Private/Private	Private/Private	Private/Private	Private/Private	Private/Private
Type of Program	Source Separated Drivers sort materials into ONP, mixed fiber, plastic and metal containers.	Source Separated Accepts various fiber types and containers. Indicated the ability to convert to dual or single stream.	Fiber Limited processing; primarily transfers loose paper.	Intermediate Processing of Dual Stream Processes only mixed fiber and OCC; transfers commingled containers to other facilities.	Fiber Processor Processes mainly fiber, but looking for all recyclables. Indicated capable of converting to single stream.	Intermediate Processing of Dual Stream Packs mixed paper and transfers commingled containers to Polk County.
Residential/Commercial	80% / 20%	50% / 50%	0% / 100%	90% / 10%	0% / 100%	n/a
Households Served	72,000	n/a	n/a	250,000	n/a	119,000
Areas Served	Cities of Clearwater, Largo, Safety Harbor, Belleair	Greater Tampa Bay Area	Pinellas, Pasco Hillsborough, Manatee	Multi-County area, Tampa, Hillsborough County	Tampa, Hillsborough, Sumter, New Port Richey	Manatee County

SURROUNDING AREA	PASCO COUNTY	POLK COUNTY	SARASOTA COUNTY		
DETAILS	WSI Pasco	Polk County MRF	FCR Sarasota	Recycle America Sarasota	WSI Sarasota
Year Built	1994	1994	1995	1990	1990
Throughput (TPY)	11,500	34,500	46,000	70,980	20,000
Capacity (TPY)	10,000 (assuming 1 shift)	52,000	71,000	n/a	n/a
Owner/Operator	Private/Private	Public/Private	Private/Private	Private/Private	Private/Private
Type of Program	Dual Stream Processes only ONP and OCC fiber grades and blue bags of commingled containers.	Dual Stream Processes mixed fiber, commingled containers and commercial fiber. Converting to single stream 2010/2011.	Dual Stream Processes mixed fiber and commingled containers.	Dual Stream Processes mixed fiber, commingled containers and commercial fiber.	Intermediate Processing of Dual Stream Packs mixed paper and transfers commingled containers for processing.
Residential/Commercial	46% / 54%	95% / 5%	n/a	75% / 25%	70% / 30%
Households Served	88,000	200,000	70,000	125,000	16,500
Areas Served	Pasco County	All of Polk County	Unincorporated Sarasota County; Parts of Unincorporated Hillsborough (rigid containers)	Manatee, Charlotte, Hillsborough Counties; Tampa; Sarasota - Commercial only	City of Sarasota and surrounding areas

Sources: Information sources included (1) Eileen Brettler Berenyi, *Materials Recycling and Processing in the United States: 2007-2008 Yearbook and Directory*; (2) FDEP's online facility permitting system; and (3) interviews with MRF and/or county staff.

ONP – Old Newspapers    OCC - Old Corrugated Cardboard    n/a - not available

## 2.2 Current Recovery of Recyclable Materials

Based on annual reports submitted to FDEP, over 365,000 tons of fiber and containers were recycled in the Tampa Bay area in 2007 (Table 2.2). This figure exceeds the reported throughput of 270,000 tons of recyclables per year for the six MRFs in the area, indicating that recyclables are likely being transported out of the area for processing. Approximately 213,000 tons of fiber and containers were recycled in the three neighboring counties (Table 2.2), which also exceeds the estimated annual throughput of 183,000 tons for MRFs in those counties. On a per capita basis, the average recovery rate for fiber and containers in the Tampa Bay area counties ranged from 266 to 327 pounds per year, and averaged 298 pounds per capita.<sup>2</sup>

**Table 2.2: Fiber and Containers Recycled in 2007**

<b>Tampa Bay Area</b>	<b>Pinellas</b>	<b>Hillsborough</b>	<b>Manatee</b>	<b>Combined</b>
Newspaper (tons)	26,299	37,992	11,791	76,082
Cardboard (tons)	54,878	110,450	20,476	185,804
Office Paper (tons)	25,401	9,139	1,451	35,991
Other Paper (tons)	9,114	12,895	4,769	26,778
<b>Total Fiber (tons)</b>	<b>115,692</b>	<b>170,476</b>	<b>38,487</b>	<b>324,655</b>
Glass (tons)	1,796	4,613	3,869	10,278
Aluminum Cans (tons)	2,428	2,894	372	5,694
Plastic Bottles (tons)	1,638	2,691	1,276	5,605
Steel Cans (tons)	3,951	14,190	860	19,001
<b>Total Containers (tons)</b>	<b>9,813</b>	<b>24,388</b>	<b>6,377</b>	<b>40,578</b>
<b>Total (tons)</b>	<b>125,505</b>	<b>194,864</b>	<b>44,864</b>	<b>365,233</b>
Population	944,199	1,192,861	315,890	2,452,950
Recovery Rate (lbs./capita/year)	266	327	284	298

<b>Surrounding Area</b>	<b>Pasco</b>	<b>Polk</b>	<b>Sarasota</b>	<b>Combined</b>
Newspaper (tons)	10,668	13,981	26,362	51,011
Cardboard (tons)	21,360	50,041	37,939	109,340
Office Paper (tons)	803	4,915	1,248	6,966
Other Paper (tons)	195	10,015	3,320	13,530
<b>Total Fiber (tons)</b>	<b>33,026</b>	<b>78,952</b>	<b>68,869</b>	<b>180,847</b>
Glass (tons)	1,371	1,602	10,056	13,029
Aluminum Cans (tons)	508	1,524	1,379	3,411
Plastic Bottles (tons)	1,126	1,982	3,069	6,177
Steel Cans (tons)	1,302	6,025	2,247	9,574
<b>Total Containers (tons)</b>	<b>4,307</b>	<b>11,133</b>	<b>16,751</b>	<b>32,191</b>
<b>Total (tons)</b>	<b>37,333</b>	<b>90,085</b>	<b>85,620</b>	<b>213,038</b>
Population	434,425	581,058	387,461	1,402,944
Recovery Rate (lbs./capita/year)	172	310	442	304

Based on FDEP 2007 Solid Waste Annual Report Data.

<sup>2</sup> These figures include residential and commercial recyclables. A per capita rate was calculated for comparison purposes.

## 2.3 Potential Increased Recovery of Recyclable Materials

Of the six counties included in Table 2.2., Sarasota County had the highest per capita recovery rate for fiber and containers (442 pounds per capita per year), demonstrating that this recovery rate is achievable. Therefore, to develop a “ballpark” estimate of the additional tons of fiber and containers that could feasibly be recovered in the Tampa Bay area, a target recovery rate of 440 pounds per capita per year was applied to the Tampa Bay area population.<sup>3</sup> Assuming a recovery rate of 440 pounds per capita, 174,000 additional tons of fiber and containers would be recovered in the Tampa Bay area annually (Table 2.3).

**Table 2.3: Estimated Potential for Increased Recovery of Fiber and Containers**

County	Population	2007 Recovery of Fiber & Containers (tons/year)	Potential Recovery of Fiber & Containers (tons/year) <sup>1</sup>	Potential Additional Tons/Year
Pinellas	944,199	125,505	207,724	82,219
Hillsborough	1,192,861	194,864	262,429	67,565
Manatee	315,890	44,864	69,496	24,632
<b>Tampa Bay Area</b>	<b>2,452,950</b>	<b>365,233</b>	<b>539,649</b>	<b>174,416</b>

<sup>1</sup> Based on a per capita recovery rate of 440 pounds/capita/year.

To check the reasonableness of this figure, KCI conducted further analysis of the potential to increase recovery of recyclable materials in the residential and commercial/industrial/institutional (commercial) sectors in the Tampa Bay area.

### 2.3.1 Residential Sector

Unincorporated Pinellas County and three municipalities within the county do not have established curbside recycling programs. These areas represent the greatest potential for increased material recovery in the residential sector. Based on recovery rates in other Florida jurisdictions, a reasonable material recovery rate to expect from an effective curbside recycling program is 400 pounds per household per year.<sup>4</sup> Pinellas County’s proposed use of 64-gallon recycling carts, which increases customer convenience, should help the county achieve this level of recovery. Assuming a recovery rate of 400 pounds per household, establishing curbside recycling in the areas mentioned would result in collection of an estimated 30,000 additional tons of residential recyclables per year (Table 2.4).

<sup>3</sup> The use of 440 pounds per capita per year is further substantiated by Lee County, which recovered 340 pounds of fiber and containers per capita in 2007. This was prior to initiating mandatory commercial recycling and associated program modifications, which are expected to increase recovery rates.

<sup>4</sup> The terms effective and progressive are used throughout this document to refer to programs that typically use tools, such as mandates, education, technical assistance, incentives, design to maximize convenience, and enforcement, to proactively encourage recycling participation.

**Table 2.4: Estimated Potential for Increased Recovery of Residential Recyclables**

Jurisdictions Without Curbside Recycling	# of Single-Family Units	Potential Recovery (tons/year)*
Madeira Beach	1,200	240
Redington Shores	669	134
St. Petersburg	70,776	14,155
Unincorporated Pinellas County	78,000	15,600
<b>Total</b>	<b>150,645</b>	<b>30,129</b>

\*Based on a recovery rate of 400 pounds/household/year.

Pinellas County is in the process of establishing a countywide curbside recycling program. Municipalities with existing curbside recycling programs will have the option of joining in the county-run program or continuing to make their own collection and processing arrangements. Either way, additional material recovery would be expected in these municipalities as well because of the increased focus on and public education regarding recycling. Therefore, 30,000 tons per year may be a conservative estimate of the additional residential recyclables that could potentially be recovered. Applying the same 400 pound per household per year figure countywide could result in additional tonnage of approximately 40,000 tons.

Hillsborough and Manatee counties, as well as the major cities in each (i.e. Tampa and Bradenton), either have contracts for processing curbside recyclables or place processing responsibilities on their collection service providers. Therefore, residential recyclables collected in these jurisdictions are currently committed contractually and would not immediately be available as throughput to a new or expanded facility. However, expanding the processing infrastructure in the Tampa Bay area would increase competition and benefit these entities when they procure processing services in the future.

### 2.3.2 Commercial Sector

Even greater potential exists in the commercial sector to increase material recovery. In 2007, approximately 2.36 million tons of commercial waste was disposed in the Tampa Bay area. To estimate what percentage of this waste stream is comprised of recyclable fiber and containers, KCI utilized the results of Pinellas County's 2007 waste composition study. Based on this study, recyclable fiber and containers made up approximately 38% by weight of commercial waste (Table 2.5). Applying this 38% figure to the commercial waste disposed indicates that an estimated 552,000 tons of recyclable fiber and containers were disposed in the Tampa Bay area.

**Table 2.5: Recyclable Fiber and Containers in Commercial Waste Disposed**

Recyclable Material	Pinellas County Commercial Waste Stream (% by weight)
Corrugated Cardboard	8.7%
Newspaper	4.1%
Office Paper	5.7%
Other Recyclable Paper	9.2%
<b>Total Fiber</b>	<b>27.7%</b>
HDPE Containers	0.6%
PET Containers	1.3%
Other Recyclable Plastic Containers	0.5%
Tin/Steel Cans	1.1%
Glass Containers	5.9%
Aluminum Containers	0.7%
<b>Total Containers</b>	<b>10.0%</b>
<b>Total Recyclables</b>	<b>37.7%</b>

Based on Pinellas County's 2007 Waste Composition Study.

The quantity of additional recyclables that could reasonably be recovered from the commercial waste stream in the Tampa Bay area would depend upon the additional level of effort expended by each county on its respective commercial recycling program, business participation in recycling, and the demand for additional commercial recyclables by local processors. A conservative target would be to strive to capture at least 25% of these recyclables, which would yield an additional 138,000 tons of fiber and containers for recycling annually (Table 2.6).

**Table 2.6: Estimated Potential for Increased Recovery of Commercial Recyclables**

County	Commercial Waste Generated (tons)	Commercial Recyclables Recovered (tons)	Commercial Waste Disposed (tons)	Assumed % Fiber & Containers	Estimated Fiber and Containers Disposed (tons)	Target % for Additional Recovery	Estimated Potential for Additional Recovery (tons)
Pinellas	829,060	293,892	535,168	38%	203,364	25%	50,841
Hillsborough	1,219,725	496,166	723,559	38%	274,952	25%	68,738
Manatee	319,575	124,162	195,413	38%	74,257	25%	18,564
<b>Totals</b>	<b>2,368,360</b>	<b>914,220</b>	<b>1,454,140</b>		<b>552,573</b>		<b>138,143</b>

Increasing material recovery in the Tampa Bay area by these amounts would increase the current commercial recycling rates, which range from 35-41%, to 42-46%. According to annual reports to FDEP, a number of counties in the state have achieved commercial rates this high or higher. For example, 53% of commercial waste is recycled in Sarasota County.

As mentioned above, the Tampa Bay area counties would need to take action to increase commercial recycling rates. A number of Florida jurisdictions have developed more progressive programs to increase commercial recycling and provide good examples. Several of these are

highlighted in the sidebars, but these programs typically have one or more of the following elements:

- *Mandates* – Mandatory commercial recycling programs are effective only if they are actively enforced. Some communities have not had the political will to do this, but commercial recycling appears to be succeeding in those that have. Lee County has overcome the reluctance to fine businesses for not recycling by establishing an advance disposal fee instead.
- *Technical assistance* – Often linked to inspections for mandatory programs, staff generally provides information pertaining to recycling service providers or local markets, steps to establish a recycling program, container options and employee training. Perhaps most important is educating businesses about right-sizing their waste disposal services and the financial benefits that can be achieved.
- *Local processing infrastructure* – In areas where dual stream or single stream MRFs exist, facility operators typically are actively seeking materials to process at these facilities to improve overall operational efficiencies and cost effectiveness. For example, Waste Management, which operates Orange County’s MRF, collects single stream recyclables from businesses in the Orlando area to process at this facility. Because none of the MRFs in the Tampa Bay area process even dual stream recyclables, businesses must collect individual source separated recyclables, which requires more containers, space, time and employee education, and is generally more costly.
- *Award or recognition programs* – Many businesses appreciate the acknowledgement and free advertising received through such awards or recognition programs.

#### **Lee County’s ADF**

Beginning January 2008, Lee County mandated commercial recycling. County staff verifies that businesses have (1) a hauling contract for recyclables, (2) sufficient bins for collection, and (3) an educational program for employees. If businesses fail to comply, they are assessed a monthly advance disposal fee (ADF) ranging from \$100-\$400. The county estimates that the number of businesses recycling has doubled from 40% to 80%. Several large businesses report reductions in annual disposal costs of \$20,000 or more.

#### **Sarasota County’s 3-Pronged Approach**

Commercial recycling has been mandatory in Sarasota County since 1991. The county uses a three-pronged approach to spur businesses to comply: (1) outreach and education that focuses on “right-sizing” disposal and recycling services, (2) business recognition through the Green Business Partnership (GBP) program, and (3) code enforcement.

Since 2005, county staff have visited more than 2,700 businesses and increased recycling participation from 62% to 87% of these businesses. In addition, 75% of businesses that had not previously been recycling experienced a reduction in solid waste costs.

The GBP program was also started in 2005. Businesses must meet specified environmental standards, which include recycling and waste reduction, to achieve certification. More than 100 businesses are currently Green Business Partners.

## 2.4 Potential Need for Additional Processing Capacity

Combining the 30,000 tons of residential recyclables and 138,000 tons of commercial recyclables yields a total of approximately 168,000 tons per year (TPY) of additional fiber and containers that could reasonably be captured for recycling in the Tampa Bay area. This figure matches well with the “ballpark” estimate of 174,000 tons per year, indicating that approximately 170,000 tons of additional recyclables would be a reasonable and achievable target. On average, this would be about 650 tons per day (TPD) of dual stream or single stream recyclables. For Pinellas County alone, a reasonable target would be approximately 80,000 tons of additional recyclables per year. This includes 30,000 tons of residential recyclables (115 TPD) and 50,000 tons of commercial recyclables (190 TPD).

A significant impediment to increasing recycling, especially commercial recycling, is the lack of dual or single stream processing capacity in the Tampa Bay area. This has resulted in selected recovery of easy to capture materials such as corrugated cardboard, but has made recycling of mixed fiber grades and commingled containers more difficult and costly. Businesses seldom have the space or resources to segregate materials by type on site. If a processor can be found that will accept mixed recyclables, collection and processing fees may be cost prohibitive in part because they also include the expense of transporting recyclables out of the area for processing.

The private sector has not filled this processing gap, indicating the need for public sector involvement either by developing such capacity or creating incentives to encourage private sector development. Pinellas County is taking a step towards providing an incentive through its curbside recycling bid. However, the curbside bid divides the county into three service areas, and the quantity of recyclables collected in a single service area might not be sufficient to warrant MRF development. If a single vendor is awarded a contract for all three service areas, it might provide a sufficient quantity of recyclables to warrant development of a local MRF.

Even if the private sector meets the need to process residential recyclables, dual or single stream processing capacity would be needed if the Tampa Bay area counties expect to improve commercial recycling participation. As mentioned above, effective commercial recycling programs might reasonably anticipate recovering an additional 50,000 TPY in Pinellas County alone and 140,000 TPY in the Tampa Bay area. This would support a 200-500 TPD MRF.

## SECTION 3

### OTHER FACTORS AFFECTING MRF DEVELOPMENT

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In addition to the needs assessment, other factors should also be considered when evaluating the feasibility or desirability of developing and constructing a MRF. These include the items below, which are further discussed in this section.

- Design options
- Adequate and consistent material throughput
- Facility ownership and operation
- Demand and markets for recovered materials
- Potential costs and benefits
- State and local solid waste policies

Although recyclables could be transported out of the area for processing, as mentioned previously, the cost of transporting these materials adds to the overall processing costs. This in turn makes recycling less cost-effective, which especially hampers commercial recycling. Therefore, the discussions in this section focus on Pinellas County and the Tampa Bay area.

#### 3.1 Design Options

The size and design of a MRF must be matched to the sources and composition of the incoming material stream. The three design options that might be considered for a MRF in the Tampa Bay area are dual stream, single stream and mixed waste MRFs. Provided below is a discussion of each. The *Materials Recovery Facility Technology Review*, which is a companion document to this report, provides additional information about each type of facility and the level of technology typically utilized.

- *Dual stream MRF* – This is the most common type of recycling collection currently found in Florida. Recovered materials are received in two streams, fiber and commingled container. Establishing a dual stream MRF in the Tampa Bay area would significantly expand recycling opportunities compared to existing processing facilities, which process only fiber or source separated recyclables.
- *Single stream MRF* – The trend in recycling is towards less segregation of recyclables prior to collection. More commingling of materials requires a greater effort in processing, including a combination of advanced technologies and manual labor to separate recyclables into quality feedstocks. Additional discussion about the trend towards single stream recycling and associated processing technologies can be found in the *Materials Recovery Facility Technology Review*, which is the companion document to this report. Establishing a state-of-the-art single stream MRF would make the Tampa Bay area a state leader in materials processing, and would enable the counties to reap the advantages of single stream recycling, including higher recycling rates. The added

expense of a single stream MRF would need to be justified by the anticipated throughput. Single stream MRFs are often designed to also accept dual stream recyclables.

- *Mixed waste MRF* – Processing mixed waste requires additional equipment at the front end of the system to separate potentially recyclable materials from garbage. Mixed waste MRFs can be used to complement curbside recycling programs by targeting multi-family and commercial recyclables, which are often difficult to capture in traditional recycling programs. Some state-of-the-art facilities are designed to handle both single stream recyclables and mixed waste, with the two lines merging at the end to achieve operational efficiencies. Given the fact that an estimated 38% of commercial waste disposed in Pinellas County consists of recyclables, a mixed waste MRF might be appropriate if the county wishes to divert these materials from disposal.

In addition to the level of material segregation prior to collection, other factors to be considered when designing a MRF include the following:

- *Targeted recyclables, now and in the future* – Knowing the relative percentages of recyclable materials in the incoming stream helps ensure the right types and configurations of equipment are used. It also determines the number of sorting stations and storage bunkers. MRF design should also anticipate future changes in material types or forms. For instance, most single-stream MRFs use star or disk screens to separate fiber from containers, but as more households shred their paper to keep information confidential, more of the paper is ending up with the containers stream and is ultimately disposed with the fines. This paper could potentially be separated and recovered if it is part of the facility design.
- *Anticipated throughput* – A new MRF should be designed for greater capacity than initially expected, both to handle times of peak generation and to allow the program to expand in the future. MRFs are sometimes designed to handle the known quantity of incoming materials during a single shift, which allows for expansion by adding a second shift.
- *Anticipated contaminants* – Although an effective outreach and education campaign can help minimize the amount of contamination, it is a reality of materials processing. Dual stream programs generally experience fewer rejects and residue than single stream programs. With mixed waste MRFs, operators often try to minimize residue levels by recovering organics for composting or fines for use as alternative landfill cover. For example, a number of mixed waste MRFs were visited in California that were part of fully integrated solid waste systems encompassing processing and disposal.<sup>5</sup>
- *Intended end markets* – The intended end market usually specifies the allowable levels of prohibited materials. MRFs can be designed to allow flexibility in the material grade to be recovered depending upon market prices. For example, during the recent drop in commodity prices, some MRF operators chose to market a lower grade of paper since market prices did not justify further separation by grade.

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<sup>5</sup> Additional information about the MRFs visited in California is provided in the *Materials Recovery Facility Technology Review*, which is the companion document to this report.

## 3.2 Adequate and Consistent Material Throughput

A sufficient quantity and constant supply of recyclables, or waste in the case of a mixed waste MRF, is required to justify the substantial capital investment required for a MRF and to operate the facility cost-effectively. Local governments can use various strategies to ensure that targeted recyclables or waste streams are delivered to a specific MRF.

- *Contracts and agreements* – In their contracts for residential recycling, many local governments designate the MRF to which recyclables are to be delivered. This can be a publicly owned MRF or a private MRF with which the government has a processing contract. Inter-local agreements between local governments are also common mechanisms for guaranteeing delivery of recyclables to a designated facility. Likewise, these mechanisms, as well as local ordinances, can be used to direct waste streams to specific facilities. However, local governments cannot direct the flow of commercial recyclables to a specific MRF for processing.<sup>6</sup>
- *Differential tip fees* – MRFs typically charge a lower tip fee (i.e. processing fee) than disposal facilities, and many MRFs, especially publicly owned facilities, charge no tip fee. Tip fees can also be adjusted to enable a MRF to compete with other facilities or to encourage customers to sort or collect waste or recyclables in the desired manner. For example, if a community constructed a mixed waste MRF aimed at recovering commercial paper, a lower tip fee might be charged for commercial loads of waste that are rich in fiber. The differential tip fee would have to be significant enough to encourage re-configuring collection routes.

Western Placer Waste Management Authority in California uses what could be considered a “reverse” differential tip fee. Essentially all MSW is processed at the Authority’s mixed waste MRF. To reduce the wetness of this waste, the Authority charges a reduced tip fee of \$38 per ton for wet MSW (as compared to \$68 per ton for other MSW) to encourage collectors to adjust their routes accordingly. Wet MSW bypasses the MRF and is sent directly to the landfill.<sup>7</sup>

- *Revenue sharing* – MRF owners/operators can establish formal agreements to share material revenues from the sale of recyclable commodities with the generator and/or collector. The terms of the agreement ensure the owner/operator covers its processing costs. For instance, the Solid Waste Authority of Palm Beach County attracts materials to its commercial MRF by entering into material purchasing agreements with local businesses or collectors that deliver clean loads of cardboard. The Authority shares 80% of net revenue after processing costs have been deducted.

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<sup>6</sup> Per current Florida law, “a local government may not require a commercial establishment that generates source-separated recovered materials to sell or otherwise convey its recovered materials to the local government or to a facility designated by the local government.” (Section 403.7046, F.S.).

<sup>7</sup> Additional information about the Western Placer Waste Management Authority’s MRF can be found in *Materials Recovery Facility Technology Review*, the companion document to this report.

### 3.3 Facility Ownership and Operation

The three basic forms of MRF ownership and operation, and the number of MRFs falling into each category in the U.S. and in Florida are provided in Table 3.1. A larger percentage of MRFs in Florida are publicly owned and operated, but many of these are small facilities that primarily process source separated or dual stream recyclables using low technology.

**Table 3.1: Ownership and Operation of MRFs in the U.S. and Florida<sup>8</sup>**

	United States	Florida
Privately owned and operated	68%	49%
Publicly owned and operated	20%	32%
Public owned and privately operated	12%	19%

The primary advantage of public ownership is that local government retains greater control over the facility and can ensure that the processing system is synchronized with county-initiated recycling programs. However, local government also assumes the risks and potential liabilities associated with the facility. Local governments may need to take the lead in establishing processing capacity when the private sector is slow to step in, as has been the case with private sector processors in the Tampa Bay area. This is especially true when programs are in start-up phases.

Private ownership is appealing to many local governments since the private sector provides the capital necessary to develop, construct and operate the MRF, and also bears the burden of ensuring an adequate and consistent facility throughput. In addition, private companies usually have more specialized expertise in MRF construction and operation, generally achieve higher operational efficiency, and are more experienced at marketing recovered commodities.

Public ownership and private operation allows local government to retain control, while utilizing the operational and marketing expertise of the private sector. Local governments can also provide incentives to the private sector to encourage private development and operation of a MRF. A few examples are provided below.

- *Guaranteed delivery of recyclables* – Pinellas County’s contract for curbside collection and processing will give contractors the authority to process the recyclables they collect. Currently, the county is planning to award seven-year contracts with the option of extending up to an additional three years, potentially giving contractors the right to these materials for ten years. Pinellas County is hoping this creates sufficient incentive for private firms to invest in upgrading an existing local MRF or creating new processing capacity.
- *Long-term lease or sale of public land* – Some privately owned and operated MRFs have either entered into a long-term renewable lease for land, or purchased land directly from

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<sup>8</sup> Eileen Brettler Berenyi, *Materials Recycling and Processing in the United States: 2007-2008 Yearbook and Directory* (Connecticut: Governmental Advisory Associates, Inc., 2007).

the local government. As an incentive to private firms, the local government can lease or sell the land at less than current market value.

- *Contract to construct and operate on public land* – Some local governments have contracted with firms to construct and operate a MRF for a specified period of time, usually at least 20 years, after which the facility converts to public ownership.
- *Traditional economic development assistance* – Local governments can also work with local economic development agencies to design a package of economic development assistance, including loans, grants, bond financing and technical and permitting assistance, to attract private development of processing capacity.

### 3.4 Demand and Markets for Recovered Materials

While the recycling marketplace is global, municipal recycling programs and MRFs are dependent on local infrastructures and commodity markets. Beginning in 2000, recycling markets experienced a wave of expansion and globalization, particularly in Asia. In 2007, the U.S. Department of Commerce reported that exports of recyclable materials had increased nearly threefold over the previous decade and that scrap paper was the number one American export by volume.<sup>9</sup> At least 10 of the 20 largest U.S. exporters shipped scrap paper in 2007, and America's two largest exporters, American Chung Nam and Weyerhaeuser, were paper manufacturing and recycling companies.<sup>10</sup>

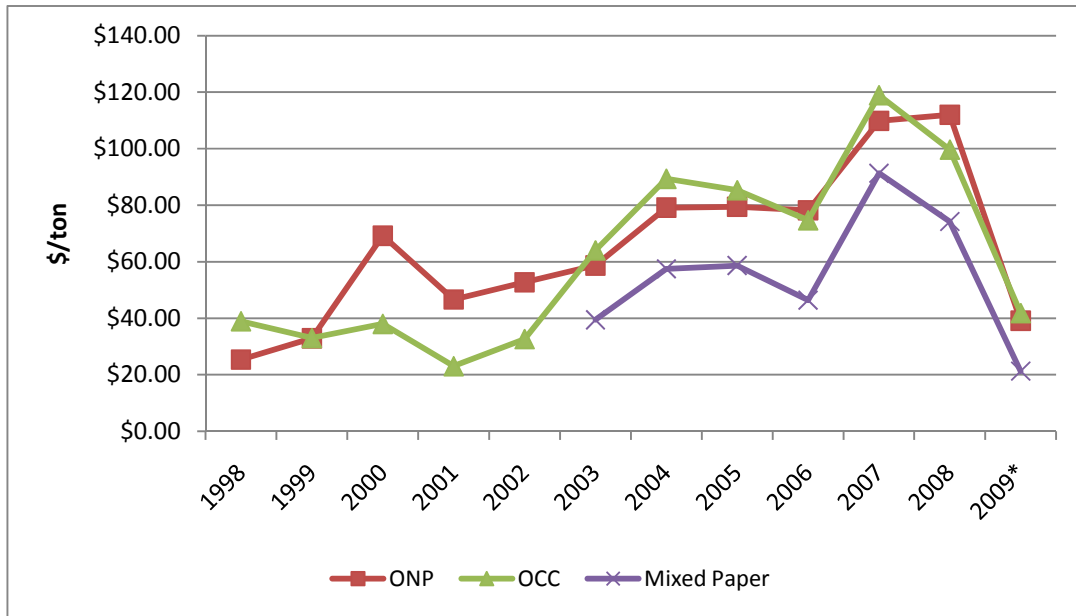
However, commodity markets are highly dynamic, as demonstrated in Figures 3.1 through 3.5. During the last ten years, prices paid for most recyclable commodities steadily increased in all regions of the country, including the southeast, and reached historically high levels during the first half of 2008. Since August 2008, the global financial crisis and constricting economy, both here and abroad, have had a significant impact on the price and value of all globally traded commodities, including recyclables. The price for many recyclable materials, which were at all-time highs during the first half of 2008, have in some cases lost 75% of their value due to a drop-off in demand of up to 20% since August 2008. While the drop in recovered material prices was more abrupt than past cycles, it is part of an ongoing cycle that has existed since recyclable commodities were first traded. As in past cycles, a market rebound is anticipated.

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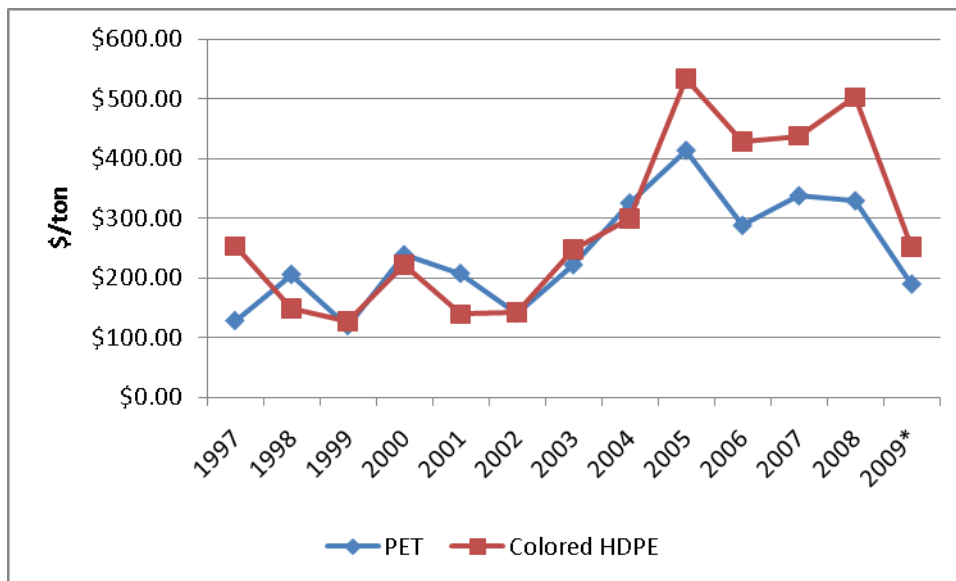
<sup>9</sup> U.S. Census Bureau, *Foreign Trade Statistics*, 2008.

<sup>10</sup> "U.S. Container Exports Still Dominated By Junk -- Scrap Paper, Scrap Metal and Bulk Commodities," *Manufacturing and Technology News*, July 31, 2008.

**Figure 3.1: Average Recovered Fiber Prices in Southeast U.S., 1998-2009**

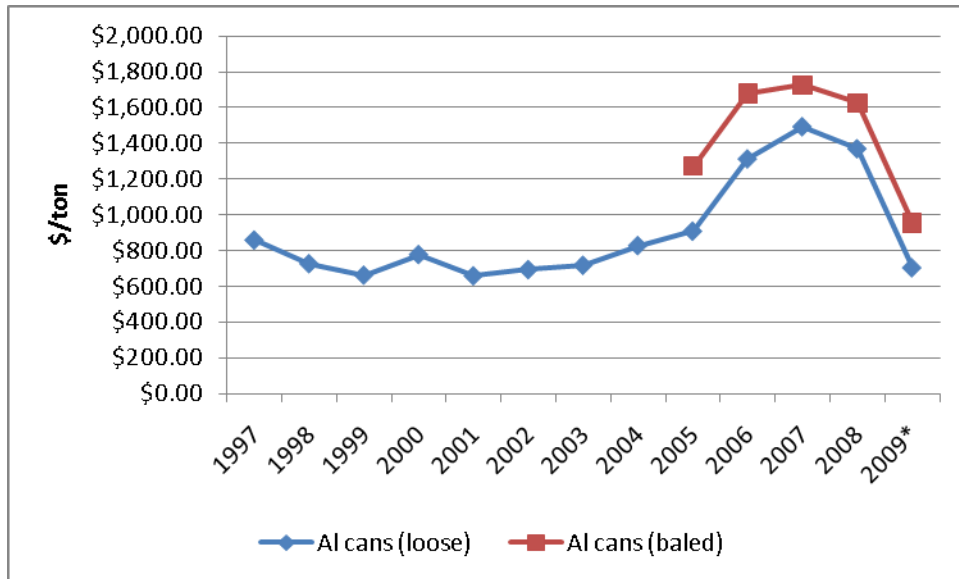


**Figure 3.2: Average Recovered Plastic Bottle Prices in Southeast U.S., 1997-2009**

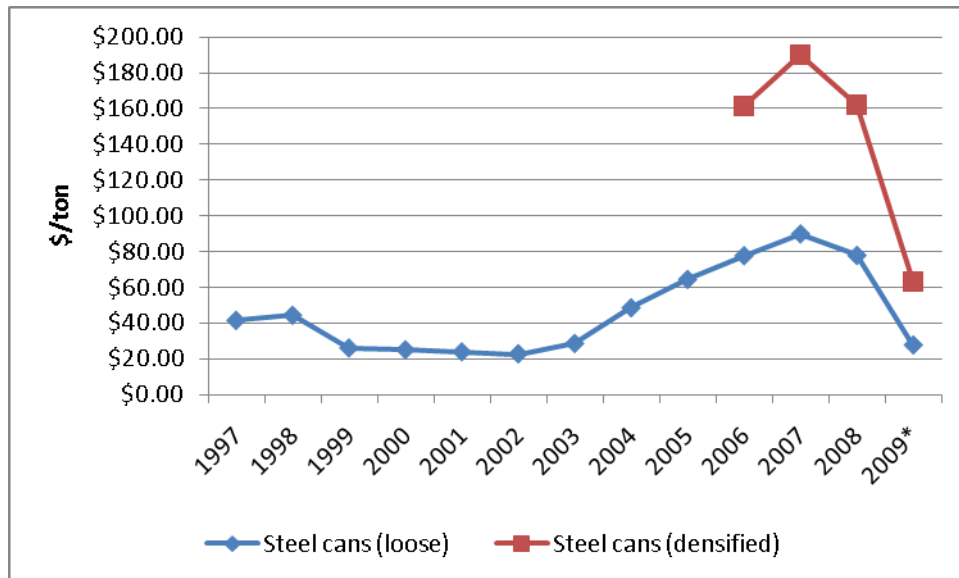


\*Average price from January-July 2009.  
 Source: Waste and Recycling News.

**Figure 3.3: Average Recovered Aluminum Can Prices in Southeast U.S., 1997-2009**

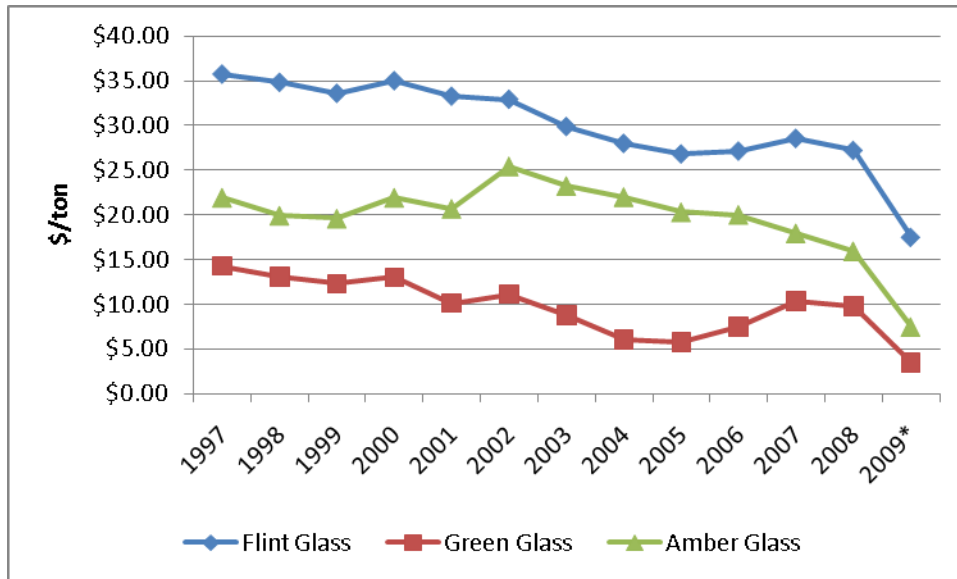


**Figure 3.4: Average Recovered Steel Can Prices in Southeast U.S., 1997-2009**



\*Average price from January-July 2009.  
 Source: Waste and Recycling News.

**Figure 3.5: Average Recovered Glass Container Prices in Southeast U.S., 1997-2009**

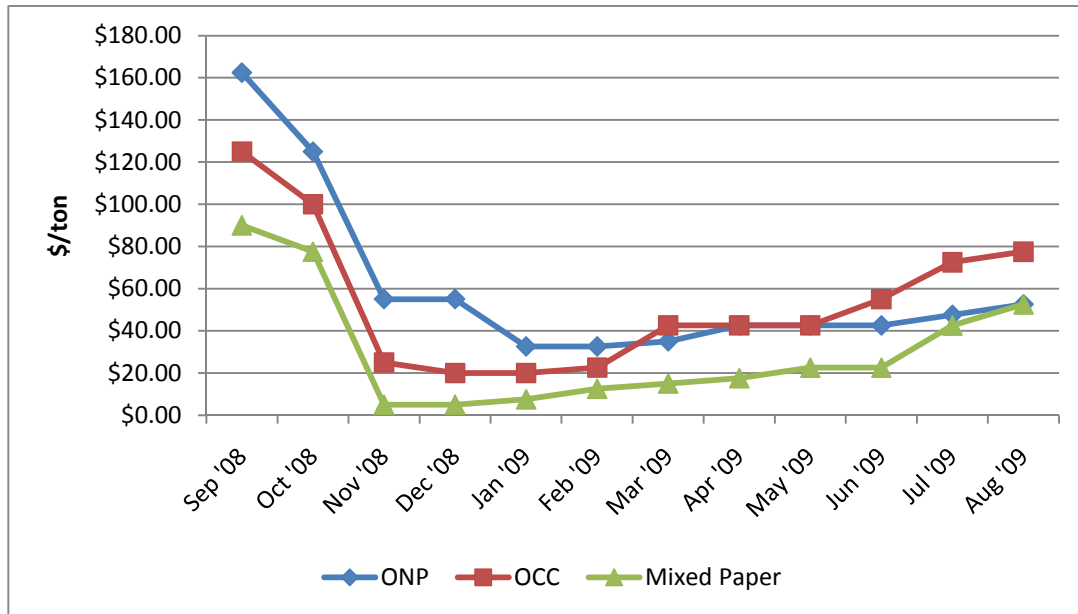


\*Average price from January-July 2009.  
 Source: *Waste and Recycling News*.

As an important source of raw materials for a range of manufacturers, recyclable commodity markets are closely aligned with global economic conditions. Earlier this year, most recyclable commodity prices, and recyclable fiber prices in particular, began to experience a recovery from the low prices reported at the end of 2008. Figure 3.6 demonstrates this trend for various fiber grades. This could signal that prices have reached bottom. Most economists, however, are not predicting economic growth to resume in the U.S. and globally until at least the first half of 2010. The prices for recyclables are likely to follow this trend.

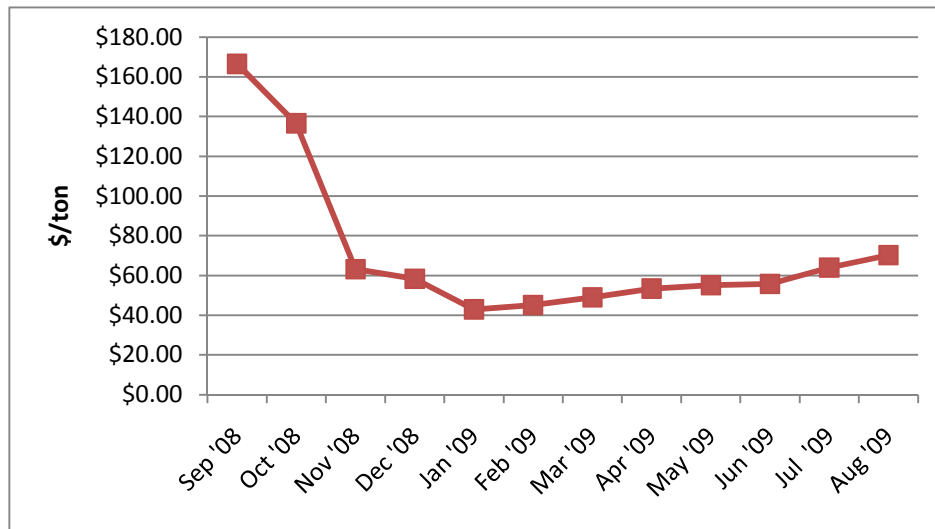
To provide an indication of the market value of curbside recyclables that might be expected in the Tampa Bay area, Figure 3.7 provides the estimated average market value of a typical ton of residential curbside recyclables in the Southeast U.S. over the past year. The gradual recovery from the market drop in late 2008 can also be seen in this figure.

**Figure 3.6: Recovered Fiber Prices in Southeast U.S., September 2008-August 2009**



Source: First reported prices for each month in *Waste and Recycling News*.

**Figure 3.7: Estimated Market Value of Curbside Recyclables in Southeast U.S.**



Source: Based on typical makeup of curbside recyclables and first reported price of the month in *Waste and Recycling News* for each commodity.

During periods of weakness in recyclables commodity markets, material quality and established relationships between buyer and seller are key factors dictating the ability of MRFs to consistently move material. Large MRFs with established market relationships and effective quality control systems are the most likely to weather these downturns in demand.

## 3.5 Potential Costs and Benefits

### 3.5.1 Capital Costs

In 2006, the average capital cost of a MRF in the U.S. was \$5.4 million.<sup>11</sup> With the trend towards larger, regional and more automated facilities come higher total capital costs, although the average cost per ton of throughput generally decreases.<sup>12</sup> Provided below is a summary of some of the key factors that impact the capital cost of a MRF.

- *Size and Capacity* – In general, the larger the material throughput, the higher the total capital cost. However, economies of scale can be realized, with the capital cost per ton processed falling as throughput increases. Based on data for U.S. MRFs, this decrease is especially steep until throughput reaches about 110 TPD, when the average cost per ton begins to level off at around \$38,000 (in 2006 dollars).<sup>13</sup>
- *Level of technology* – The higher the level of processing technology, the greater the capital cost (Table 3.2). On average, a “low technology” MRF with a conveyor, baler and magnetic separator cost about \$3 million in 2006. A “high technology” facility, with at least a mechanical sort line, averaged about \$7.2 million. However, high technology facilities also tend to be larger with greater material throughput, and are therefore less costly per ton of throughput.

**Table 3.2: Capital Costs Based on Level of Technology (in 2006 dollars)<sup>14</sup>**

Level of Technology	Average Cost	Average Tons per Day	Average Cost per Ton of Throughput
High	\$7,197,475	198	\$36,350
Low	\$2,989,535	63	\$46,711
All Projects	\$5,645,261	135	\$41,819

- *Dual stream versus single stream versus mixed waste MRFs* – Single stream MRFs utilize more advanced technology and have greater throughputs than dual stream MRFs. Therefore, the average capital cost of a single stream MRF in 2006 was \$7.6 million compared to \$4.9 million for a dual stream facility, but the average capital cost per daily ton of throughput was nearly 40% lower (\$66,630 for single stream versus \$105,690 for dual stream).<sup>15</sup>

Mixed waste MRFs also require advanced processing technology, as well as greater throughput since they process mixed waste and not just the recyclables in the waste. Based on discussions with equipment vendors, the cost of equipment alone for a 500 TPD mixed waste MRF can range from \$3-11 million depending on the level of technology

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<sup>11</sup> Berenyi, vii.

<sup>12</sup> Berenyi, 73.

<sup>13</sup> Berenyi, 73.

<sup>14</sup> Berenyi, 73.

<sup>15</sup> Berenyi, 35-36.

and targeted materials. Based on site visits to a number of mixed waste MRFs in California, equipment retrofits completed in the last three years cost \$14.7 million and \$26 million for 1,500 and 2,000 TPD mixed waste MRFs, respectively.

### 3.5.2 Operation and Maintenance Costs

Operation and maintenance (O&M) costs consist primarily of labor, equipment maintenance and disposal costs for residue. These costs are difficult to compare across facilities since many private facilities are not willing to share such information. Based on responses from 97 MRFs during a 2006 survey conducted by Governmental Advisory Associates (GAA), O&M costs fall significantly as throughput increases, and then level off for MRFs processing more than 100 TPD.<sup>16</sup> The average O&M cost for the smallest MRFs (less than 6 TPD throughput) was \$201.78 per ton. This decreased to about \$46.09 per ton for facilities processing 121 to 218 TPD, and then rose slightly to \$55.87 per ton for MRFs processing more than 218 tons per day. Most of the facilities that reported were publicly owned and operated. Therefore, these figures would be significantly lower if more private sector facilities were included. In addition, this survey included few, if any, mixed waste MRFs.

### 3.5.3 Benefits

MRF revenues are derived from materials sales (which were discussed in Section 3.4), processing or tip fees, and governmental transfers or subsidies. In addition, Pinellas County and the other Tampa Bay counties would realize additional benefits from a state-of-the-art regional MRF including the following:

- More advanced processing technology that would allow at least dual stream collection, and possibly single stream or mixed waste processing.
- Higher participation and material recovery rates that are usually achieved in programs that require less source separation by generators.
- Increased competition for recovered materials, which will benefit communities during competitive procurements for processing services.
- Ability to target recyclables not captured in traditional recycling programs if a mixed waste MRF is constructed.
- Local economic benefits including job creation.<sup>17</sup>
- Recognition as a state leader in recycling and sustainability.

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<sup>16</sup> Berenyi, 76.

<sup>17</sup> According to the U.S. Environmental Protection Agency, it is estimated that incinerating 10,000 tons of waste creates 1 job, landfilling the same amount of waste creates 6 jobs, but recycling 10,000 tons creates 36 jobs. Source: Presidential Proclamation 7377, America Recycles Day 2000, Federal Register: November 17, 2000 (Volume 65, Number 233), 69651.

### 3.6 State and Local Solid Waste Policies

Many of the more technologically advanced MRFs are located in states with recycling or waste diversion goals of 50% or higher, some of which are mandated goals. In some cases, local governments have established even higher goals than the state. These state and local goals and mandates have provided an incentive for public and private sector development of processing facilities, and also driven innovation in these MRFs to maximize material recovery.

Florida is in a position to become one of the country's leaders in recycling by passing an aggressive recycling goal, 75% by 2020, in the 2008 Energy Bill (HB 7135). This more than doubled the existing goal of 30%. This law has generated renewed interest in recycling throughout the state. Key elements of this 75% goal that could impact the development of additional MRF capacity in the Tampa Bay area include the proposed definition of the use of solid waste to create renewable energy as "recycling," as well as preliminary recommendations by FDEP related to commercial recycling and organics recovery. Other FDEP recommendations (particularly regarding funding mechanisms) are certainly important, but these stand out in particular and merit discussion in this feasibility study. (It should also be noted that this grant project was initiated prior to the drafting/passage of HB 7135).

FDEP's preliminary recommendations for achieving 75% recycling by 2020 include discussion of mandates for commercial recycling and organics recovery. KCI's observations of state-of-the-art facilities in California support FDEP's attention to these two elements as opportunities for significant waste diversion and recovery. While not essential at the most advanced facilities visited, up-front diversion of organics from the waste stream (sometimes referred to as wet/dry collection schemes) can improve operational efficiencies of a mixed waste MRF. Separate collection of commercial waste for processing of (wet) organics and (dry) recyclables could, in turn, facilitate compliance with commercial recycling mandates and improve recovery of commercial recyclables (both wet and dry portions).

The original language of HB 7135 states that "...any solid waste used for the production of renewable energy shall count toward the long term recycling goal..."<sup>18</sup> Equating such processes as WTE with recycling could diminish the need for additional recycling (of the traditional kind) by jurisdictions that currently have large capacities for WTE – like those in the Tampa Bay area – to comply with the 75% goal. However, regardless of this definition, Pinellas County has indicated that it will continue to pursue additional efforts to improve (traditional) recycling, such as residential curbside recycling and a Green Business Partnership program similar to Sarasota County's program.

Another consideration for Pinellas County is the expiration of its power purchase agreement with Progress Energy for electricity from the WTE plant at the end of 2025. Electrical revenues and capacity payments resulting from this agreement have enabled the county to maintain a low (\$37.50/ton) tipping fee. Negotiation of a new power purchase agreement will involve yet unknown factors, such as the future price of energy.

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<sup>18</sup> HB 7135, Section 403.7032(2).

All of the above are important factors for Pinellas County or any other entity that may consider developing additional MRF capacity in the Tampa Bay area, yet this list is far from exhaustive. How the Florida legislature responds to FDEP's final recommendations for achieving 75%, how local governments in the Tampa Bay area respond to new state recycling policies, and how private sector recycling firms respond as a result are all presently unknown. This report outlines the current "playing-field" for the Tampa Bay area, but the state-level rules are now subject to change. What is clear, however, is that processing capacity (measured by both volume and level of technology) in the Tampa Bay area currently lags behind many other parts of the state and nation, and that this is hindering efforts to make significant improvements to commercial recycling.

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## SECTION 4

### FINDINGS AND CONCLUSIONS

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Provided below is a summary of the findings of this feasibility study.

- No MRF currently operating in the Tampa Bay area (Pinellas, Hillsborough and Manatee counties) processes dual or single stream recyclables. Those facilities that receive dual stream recyclables transport commingled containers out of the area for processing, which elevates processing costs to cover the additional cost of transporting recyclables. This lack of state-of-the-art processing technology has been a barrier to expanding recycling in the area, especially commercial recycling.
- The quantity of fiber and containers currently collected for recycling in the Tampa Bay area and the neighboring counties (Pasco, Polk and Sarasota counties) exceeds the current throughput of the largest MRFs in these areas, confirming that some materials are transported out of the area for processing. Accurate capacity information for all facilities was not available. Several MRF operators indicated an interest in upgrading to dual or single stream processing.
- Pinellas County is preparing to establish curbside recycling in approximately 176,800 households. Once an effective curbside program is established, it would reasonably be expected to collect an additional 30,000 tons of recyclable materials per year.<sup>19</sup> The bid document and draft contract developed by the county require the selected vendors to process the curbside recyclables they collect. The county hopes that this provides an incentive for private sector development of dual stream or single stream processing capacity in Pinellas County or the Tampa Bay area.
- If Pinellas County also establishes an effective commercial recycling program, the county could reasonably expect to recover an additional 80,000 tons of recyclable fiber and containers annually.<sup>20</sup> If the other Tampa Bay area counties also establish effective commercial recycling programs, an additional 60,000 tons of recyclables might reasonably be recovered as well. Combined, this tonnage would require nearly 500 TPD of dual or single stream processing capacity. For this recycling opportunity to be realized, the counties will need to be willing to establish proactive and progressive commercial recycling programs.
- Development of a dual stream, single stream or mixed waste MRF to process commercial recyclables seems viable and even necessary to process the tonnages that could

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<sup>19</sup> This figure does not include the additional recyclables that might be collected, as a result of the countywide program, in municipalities that already have curbside recycling, which has been estimated at another 10,000 tons per year.

<sup>20</sup> As noted previously, the terms effective and progressive are used throughout this document to refer to programs that typically use tools, such as mandates, education, technical assistance, incentives, design to maximize convenience, and enforcement, to proactively encourage recycling participation.

potentially be recovered. Such a facility could target commercial recyclables or, in the case of a mixed waste MRF, multi-family and commercial waste streams that are rich in recyclables but not captured by established recycling programs. For example, San Jose, California utilizes a mixed waste MRF to target multi-family and commercial waste, which complements its single stream curbside recycling program.

- Local government(s) may need to take the lead if additional processing capacity is to be established, either directly or by providing incentives for private sector investment. One type of incentive would be to establish a progressive commercial recycling program that includes a mandate, extensive technical assistance and business recognition. A more direct incentive would be a public/private partnership in which a local government provides a location for development of a privately operated MRF.
- Various strategies could be used to encourage delivery of recyclables or, in the case of a mixed waste MRF, waste streams rich in recyclables to a new MRF. These include county contracts and agreements, differential tip fees and revenue sharing.
- Demand and markets for recovered materials fluctuate and, after reaching historically high levels for some materials, significantly declined during the latter half of 2008. Commodity market prices, especially fiber prices, have started to increase throughout 2009. As of July 2009, the market value of a typical mix of curbside recyclables was estimated to be nearly \$65 per ton in the southeast U.S.<sup>21</sup> This trend is expected to continue as the U.S. economy continues to strengthen and global markets improve.
- The capital cost of a new MRF can vary widely depending on the size and level of technology. In 2006, the average capital cost of a single stream MRF was \$7.6 million as compared to \$4.9 million for a dual stream MRF. However, because of the greater throughput of most single stream MRFs, the average capital cost per daily ton of throughput was 40% lower (\$66,630 for single stream versus \$105,690 for dual stream).<sup>22</sup> Efficient mixed waste MRFs require a high level of technology. Equipment costs alone for a 500 TPD facility can range from \$3-11 million depending on the technology, incoming waste stream and targeted materials.<sup>23</sup>
- Operation and maintenance (O&M) costs fall significantly as throughput increases, and typically range from \$40-60 per ton for MRFs processing more than 100 tons per day.
- Future state solid waste legislation that clarifies the 75% recycling goal and lays out a plan for achieving that goal might impact MRF development. Fundamental program changes would be needed in all three counties to achieve 75% recycling by 2020. FDEP has released the preliminary recommendations that will be included in its plan, but clear direction will not be known until after the 2010 legislative session. Key issues include

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<sup>21</sup> Based on commodity prices listed in *Waste and Recycling News*.

<sup>22</sup> Berenyi, 35-36.

<sup>23</sup> Additional information about MRF technology can be found in *Materials Recovery Facility Technology Review*, the companion document to this report.

counting WTE as recycling, mandating commercial recycling, and establishing organics recovery programs.

- Local policies and planning considerations will impact local government's desire to expand recycling and provide incentives for MRF development. These considerations are complex and individual to each county, but also have some commonalities. For example, most counties fund their solid waste systems at least in part through tip fees and, in the case of counties with WTE facilities, through revenue from power generation. Counties will need to balance the ability to maintain the operating efficiencies of existing facilities and the cost-effectiveness of their solid waste systems with establishing successful and sustainable recycling programs.

In conclusion, this feasibility study indicates that additional residential and commercial recyclables are available for recovery, but that existing processing facilities in the Tampa Bay area are not currently equipped to process even dual stream recyclables. Development of a single stream or mixed waste MRF in the Tampa Bay area would provide state-of-the-art processing capacity that is sorely lacking.

A single stream and/or mixed waste MRF would provide numerous benefits to Pinellas County and the Tampa Bay area. Single stream recycling programs typically have higher participation and recovery rates than dual stream or source separation programs, as well as more efficient collection operations and lower collection costs. A mixed waste MRF could target recyclables in multi-family and commercial waste streams that are not currently captured by existing recycling programs. A state-of-the-art MRF would help establish Pinellas County and the Tampa Bay area as state leaders in recycling and sustainability.

The private sector has not yet stepped up to fill this gap in state-of-the-art processing; therefore, local governments will need to play a leadership role in encouraging MRF development. This leadership can take the form of actually contracting for MRF development, or by creating incentives for private sector development. The best incentive is ensuring that adequate quantities of recyclable materials will be available for processing once a MRF is developed.

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## APPENDIX

### TAMPA BAY AREA AND NEIGHBORING COUNTY MRF CONTACTS

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#### TAMPA BAY AREA

##### Pinellas County

###### City of Clearwater

Katrina Dowd, Recycling Specialist  
170 N. Hercules Ave.  
Clearwater, FL 33765  
Phone: 727-562-4938  
Fax: 727-562-4939

###### Recycling Services of Florida

Larry Saylor, Plant Manager  
3560 126<sup>th</sup> Avenue North  
Clearwater, FL 33762  
Phone: 727-573-9150 x26

###### SP Recycling

Joe Baker, Manager  
8810 Enterprise Boulevard  
Largo, FL 33773  
Phone: 727-507-0777  
Fax: 727-524-2444

##### Hillsborough County

###### Recycle America Tampa

Bobby Edelen, Facility Manager  
Larry Dalla Betta, Municipal Account Mgr.  
6210 North 53<sup>rd</sup> Street  
Tampa, FL 33610  
Phone: 813-621-3051  
Fax: 813-621-0531

###### Smurfit-Stone Tampa

Jeff McCowan, Controller  
5111 N. 26<sup>th</sup> Street  
Tampa, FL 33610  
Phone: 813-238-6433  
Fax: 813-237-4105

##### Manatee County

###### Waste Pro/SP

Andy Toller, Regional Operations Manager  
7921 15<sup>th</sup> Street  
Sarasota, FL 34243  
Phone: 941-737-6469  
Fax: 941-355-9028

#### SURROUNDING AREA

##### Pasco County

###### Waste Services, Inc. Pasco

Jeff Turner, Facility Manager  
14220 Hays Road  
Spring Hill, FL 34610  
Phone: 727-856-5823  
Fax: 727-857-9751

##### Polk County

###### Polk County MRF

Ed Sparks, Director of Recycling  
50 Environmental Loop  
Winter Haven, FL 33880  
Phone: 863-284-4319

##### Sarasota County

###### FCR Sarasota

Jose Vitale, Facility Manager  
4700 Middle Ave.  
Sarasota, FL 34234  
Phone: 941-359-0445  
Fax: 941-359-0360

###### Recycle America Sarasota

Jean Whelan, Facility Manager  
3100 N. Washington Blvd.  
Sarasota, FL 32234  
Phone: 941-355-9230  
Fax: 941-984-2063

###### Waste Services, Inc. Sarasota

Gerald De Vrigilis, Facility Manager  
1325 N. Osprey Ave.  
Sarasota, FL 34236  
Phone: 941-953-6559  
Fax: 941-366-1651