INTRODUCTION – EXECUTIVE SUMMARY

With a strong commitment to the environment and future sustainability, the Miami-Dade County Department of Solid Waste Management (DSWM) provides an integrated solid waste management system that benefits the entire Miami-Dade County community.

Recent advances in technology have enabled the DSWM to improve the collection services provided to its customers. This application highlights the following waste collection system improvements:

• **AUTOMATED GARBAGE COLLECTION** — In 2007, the DSWM completed conversion of residential waste service from manual to automated garbage collection. Automated collection has proven to be more convenient for residents and safer and more efficient for DSWM employees.

• **AUTOMATED, SINGLE-STREAM RESIDENTIAL RECYCLABLE COLLECTION** — In 2008, the DSWM transformed recycling by introducing automated, single-stream collection. Enhancements have resulted in increased recyclable tonnages, greater participation and significant environmental benefits.

• **HYBRID AUTOMATED COLLECTION VEHICLES** — In 2010, the DSWM integrated six hybrid vehicles into its waste collection fleet. The eco-friendly vehicles are yielding cost savings and environmental benefits.

The DSWM is proud of these innovations that enable us to fulfill our Mission Statement: To provide our customers with exceptional waste collection, recycling and disposal services that protect, preserve and improve our environment and the quality of life in our community.
SECTION 1: DESIGN OF COLLECTION FACILITY/MANAGEMENT SYSTEM

OVERVIEW

The Miami-Dade County Department of Solid Waste Management (DSWM) has continuously provided innovative and efficient residential waste collection services. Using DSWM personnel and equipment, the DSWM is responsible for the collection and disposal of residential garbage and trash generated at more than 320,000 single-family household in unincorporated Miami-Dade County (County) as well as nine participating cities. Disposal is provided for via County-owned facilities. The first point of contact the DSWM has with the residential waste customer in the County is at the curb, which is where the DSWM’s collection, regulating and monitoring of solid waste responsibilities first becomes tangible. The transfer of waste from the transfer stations to processing or final disposal locations continues the DSWM’s responsibilities for the safe and proper handling of waste.

The DSWM collection program includes convenient, twice-weekly automated curbside garbage collection, twice-per-year curbside bulky waste collection, the availability of 13 Neighborhood Trash and Recycling Centers (TRCs), and single-stream automated recyclables collection conducted by private companies under contract with the County. These complementary waste collection services are designed to provide residents with a convenient and easy-to-use system for managing their household waste.

Collection efforts are an important part of planning for a sustainable future in solid waste management. The waste collection system that is currently provided to DSWM customers has been designed to integrate new technology, innovation and sustainability goals to enhance waste delivery services. With this vision in mind, the Department has implemented the following:

- In July of 2007, the DSWM completed the three-year phased conversion of its waste collection service to more than 320,000 customers from manual (three-member crews) to automated (one driver) service.
- In June of 2008, in an effort to increase recycling participation and convenience to customers, the DSWM converted its residential dual-stream recycling program into an easier and user-friendly single-stream, automated recyclables collection service.

DSWM Mission Statement:
“To provide our customers with exceptional waste collection, recycling and disposal services that protect, preserve and improve our environment and the quality of life in our community”
• In 2010, the DSWM was the first municipal solid waste agency to integrate six hydraulic hybrid waste collection vehicles into its automated waste collection fleet. The vehicles use stored hydraulic energy to power the vehicle as it makes house-to-house stops. The environmentally-friendly vehicles are more fuel efficient and have cleaner air emissions.

By implementing these programs, the DSWM has positioned itself as a public sector leader in planning, designing and implementing environmentally-friendly, technologically advanced and cost-efficient waste collection systems.

What Type of Collection System was Developed

In an ongoing effort to improve service delivery to its customers, the following enhancements were made to components of the waste collection system:

Automated Garbage Collection

In 2007, the Department completed the three-year phased conversion to automated garbage collection. Prior to automation, the Department relied on three-member crews (one driver and two waste collectors) to provide manual service at service area households. With automation, waste collection vehicles are equipped with a lifting mechanism that reaches out to the cart, lifts, empties the contents and returns the cart to its original position. The driver controls the entire process from the cab and does not leave the vehicle. After the collection, the resident is responsible for returning the cart to its storage place.

The DSWM’s transition from manual automated collection service has positively enhanced collection services — it is neater, cleaner, safer and more efficient for the environment, residents and employees alike. Timely route completion has also been achieved as a result of automation. The on-time completion rate increased from 93.53 percent in FY 04-05 to a steady 99 percent in FY 09-10.

Automated, Single-Stream Residential Recyclable Collection

In 2008, the DSWM revamped its residential recycling collection program. The 18-year-old dual-stream program had become less effective. A county-wide customer survey revealed that only around 28 percent of DSWM customers were very satisfied with the program. This was evidenced by declining participation rates and decreased recyclable tonnage.

The DSWM issued a Request for Proposal (RFP) that defined required result but not a specific process for achieving the results. In this manner, the DSWM was able to tap into the creativity and innovative know-how of the private sector to address a performance gap. Private companies presented their best thinking in their responses.

DSWM worked with the successful responders to refine their proposed process to better meet customer needs. Like traditional garbage collection, the curbside recycling program relied on manual labor for weekly collection of residential recycling bins.

DSWM issued a Request for Proposal (RFP) that defined required result but not a specific process for achieving the results. In this manner, the DSWM was able to tap into the creativity and innovative know-how of the private sector to address a performance gap. Private companies presented their best thinking in their responses.

The selected RFP process allowed the DSWM to develop a new curbside recycling program that included every-other-week collection, use of automated equipment and expanded recyclable material collection.

In the summer of 2008, the Department launched a new automated curbside recycling program that provided each household with a 65-gallon wheeled and lidded cart for storage and collection of recyclables. This program, like DSWM curbside garbage collection service, can be customized by the resident to meet the recycling needs of the individual customer household. Extensive public education and customer service have been critical to the success of this program. Currently, the program collects an average of 5,000 tons of recyclables per month — double the average monthly tonnage collected in the old, dual-stream program.

Hybrid Automated Collection Vehicle

On the heels of the successful automated waste collection and recycling conversion, the DSWM began to explore green technology for use in its waste collection operation. In April 2009, the DSWM became the first municipal solid waste agency in the United States to be given the opportunity to test Autocar and Parker Hannifin’s unique series hydraulic hybrid vehicle in its waste collection operation. Testing was conducted over a four-week period using the loaner hybrid vehicle to service more than
2,500 households on two garbage routes in the DSWM service area. Results from the pilot study — greater fuel efficiency and a reduced carbon footprint — were encouraging and were the basis for the investment in six automated waste collection vehicles that were purchased and integrated into the waste collection fleet in the Fall of 2010.

Merits of the System

Automated Garbage Collection
The transition from the traditional three-person collection crew to a single driver using automated equipment has improved service delivery, efficiency and neighborhood aesthetics. Each household has been provided with a standard 96-gallon automated EZGo garbage cart for storage of household garbage and trash. Providing each household with a wheeled, lidded cart has increased convenience for the customer. Residents have the option to customize automated service to meet the needs of their individual household (e.g., exchanging carts for 35- or 65-gallon carts and/or purchasing an additional cart(s) at a minimal, one-time fee). This improved service has allowed DSWM to meet and exceed the expectations of the customers.

Automated, Single-Stream Residential Recyclable Collection
Like the automated garbage collection, the automated curb-side recycling program has allowed for an improved and more efficient system. The system is flexible, allowing customers to use cart sizes to meet the recycling needs of their individual household. Currently, the program averages 5,000 tons per month — double the monthly tonnage collected in the old, dual-stream program.

Hybrid Automated Collection Vehicles
The use of the hybrid vehicles increases fuel efficiency therefore reducing carbon emissions. The technology includes cost savings and environmental benefits.

Innovative or Unique Aspects of the System

Automated Garbage Collection
Automated collection allows the resident to place all garbage into one cart that is designed for this process. Automated collection is more efficient for the service provider because the automated collection vehicle normally requires only one person to perform the service. The conversion to automated collection was completed in July of 2007. Remarkably, the DSWM did not have to lay off any employees with this change.

Automated, Single-Stream Residential Recyclable Collection
The most unique aspect of this collection system is the how it has been designed to make recycling easy, convenient and practical for DSWM customers. With the theme “Easy on the Earth, Easy on You,” the new single-stream recycling program delivered a user-friendly alternative to the old recycling effort that taps into residents’ strong desire to recycle. From the delivery of wheeled and lidded carts (available in 3 sizes) to the availability of a comprehensive public information and customer service program, customer convenience is the common goal! Residents can “click” www.miamidade.gov/dswm to access a myriad of customer support services and information: They can use an online application to see their recycling day, sign-up for convenient recycling alerts to remind them of their upcoming recycling day, read “Happy Facts” on the tonnage and materials collected, review publications, print-out a calendar or watch videos on how the program works. And by calling the 3-1-1 Answer Center, recycling customers can order a cart size that meets the recycling needs of their home, purchase additional carts, report service delivery issues or get general information on the program. Every aspect of the program fosters ease of participation and has resulted in the collection of 120,424 tons from June 2008 through September 2010.
Hybrid Automated Collection Vehicles
The DSWM was the first municipal solid waste agency in the United States to pilot test the Autocar Xpeditor E3 hybrid garbage truck as well as the first municipal solid waste agency in the United States to purchase and integrate the vehicles into its waste collection fleet. The Autocar Xpeditor E3 hybrid garbage truck employs the unique Runwise series hydraulic hybrid technology. This hybrid technology uses stored hydraulic energy to propel the vehicle as it makes house-to-house stops rather than diesel fuel.

What Makes this System Different from the Rest
The innovative and creative approach the DSWM brings to its collection system has allowed the collection system operations to evolve beyond to a more sustainable system. This includes planning, pilot testing, and implementing, such as with the automated garbage collections and the hybrid automated collection vehicles. DSWM has also demonstrated a willingness to reach out to the private sector to provide innovation, as with the automated, single-stream residential recyclable collections. This approach has allowed the DSWM to develop a waste and recycling collection system that is efficient, cost effective, both user and service-provider-friendly, and environmental conscientious.
SECTION 2: ENVIRONMENTAL CONTROLS & REGULATORY COMPLIANCE

ENVIRONMENTAL PROTECTION

Automated Garbage Collection
The Automated Garbage Collection program offers many benefits that protect the environment. First, the service requires residents to place all of their waste in a sturdy, lidded waste cart. No extra bags or non-automated containers are allowed at the curbside for collection. This is a much neater and cleaner method of service delivery than manual collection. Use of the automated carts also significantly reduces the environmental impact of litter and odors resulting from spilled garbage cans and torn bags that were common occurrences under manual service. Furthermore, automated collection reduces employee and public exposure to decaying waste that is typical with bagged waste placed at the curbside.

Automated, Single-Stream Residential Recyclable Collection
There are also many environmental benefits associated with the single-stream, automated recycling program. Like the automated garbage collection program, the automated recycling program is a neater and cleaner method of collecting recyclables. The lidded cart eliminates spilled recyclables and paper litter that was often a challenge in the old two-bin recycling program. The spillage that was common from overflowing bins has been eliminated. The every-other-week collection schedule also has a positive impact on the County’s carbon footprint. Not only have we moved to fewer collections, but created additional emission reductions by adding a second service provider (and, therefore, a second operational location). Under the new system, trucks’ routes are closer to their dispatch and drop-off point, resulting in fewer miles traveled to begin and end each service trip. Other environmental protections include the removal of an average of 5,000 tons per month of valuable recyclable material from the waste stream. Collection of these materials prevents their disposal in landfills and allows for the conservation of important natural resources.

Hybrid Automated Collection Vehicles
The hybrid vehicles reduce the fuel consumption by about 11.65 gallons per day per vehicle, in comparison to the non-hybrid collection vehicles. Per the US Environmental Protection Agency (EPA), each gallon of fuel saved and not burned reduces the Carbon dioxide emission to the atmosphere by 22.2 lbs. This translates to an emission reduction of about 24.17 metric tons of carbon dioxide per vehicle per year.
Overall impact of the program on human health, environmental quality and resource conservation

The automated collection service results in positive benefits on human health because the drivers stay in the collection vehicles and do not come into contact with the garbage. There has been a significant reduction in recent years in the number of job-related injuries and Workers Compensation Claims. Injuries that were common with manual waste collection (e.g., back injuries from lifting overweight bags and cans, cuts and punctures caused by broken glass or improperly containerized sharps in bagged waste) are not typically experienced with automated waste collection service.

Automated, Single-Stream Residential Recyclable Collection: There are many benefits to human health, environmental quality and resources conservation associated with this service. Because collection services are controlled using the robotic arm from inside the vehicle, there is improved worker safety and reduced risk of injury to employees.

The quality of our environment is enhanced because reusable materials are kept out of the waste stream and ultimately out of the landfill. Furthermore, recovering recyclables for remanufacture supports resource conservation. The production of recycled-content products is a cleaner, more efficient process that requires less energy, generates cleaner air emissions and reduces dependency on raw materials such as water, petroleum, and trees.

Compatibility with the environment

Automated Garbage Collection
This program is compatible with the environment in that it provides for a neater and cleaner and more aesthetically pleasing method of waste collection than the traditional manual waste collection.

Automated, Single-Stream Residential Recyclable Collection
This system is compatible with the environment because it reduces litter, increases the collection of valuable recyclable material, and decreases the amount of waste that goes to the landfill. The streamlined collection schedule reduces the use of fossil fuel and the associated air emissions, resulting in a decreased carbon footprint.

Hybrid Automated Collection Vehicles
These vehicles are compatible with the environment because less diesel fuel is consumed which results in the production of less CO2.

Is the site in environmental compliance for operating a collection system

All trucks and equipment used in the automated waste collection and recycling programs are in compliance with local, state and federal environmental regulations.

Have they submitted any awards, letters or facility inspection data — See Supplemental Materials pages 21 - 24

The DSWM’s programs have received extensive and very positive coverage in local newspapers as well as industry/trade publications. The hybrid trucks were recently recognized along with other County hybrid vehicles and alternative fuel fleet vehicles with the Champion for Alternative Fuel Vehicles and Alternative Fuels Award presented by the Gold Coast Clean Cities Coalition.

In 2010, the DSWM received the Quality Achievement Award for its Single-Stream Curbside Recycling Program during the Annual Florida Sterling Awards Banquet. The Florida Sterling Council recognizes organizational performance excellence...
in the public and private sectors.

Is the system integrated and complimentary to other local solid waste management systems.

The DSWM has the significant responsibility of providing solid waste collection, recycling and disposal services for one of the largest-population municipal communities in the United States. The DSWM mission to provide solid waste services and the necessary facilities to support continued population growth in a manner that promotes public health, sanitation, environmental protection and operational efficiency has led to the development of an integrated solid waste management system. The disposal system consists of three landfills, a contract operated waste-to-energy plant, three major transfer stations, 13 Neighborhood Trash and Recycling Centers, and 2 home chemical collection centers. The DSWM also contracts with a private company for the use of two nearby landfills to supplement disposal capacity. The collection system has been in effect since the DSWM was originally formed, and has continued to evolve and grow to support and compliment the County’s transfer and disposal operations.
SECTION 3: PROGRAM PLANNING

DESCRIPTION OF THE COLLECTION SYSTEM PLANNING PROCESS

The collection system planning process is performed on an on-going basis and corresponds directly to the development of various documents. In an effort to effectively plan for future programs and services, DSWM staff regularly research and monitor changes in the industry, technology, marketplace competition, customer preferences, and the regulatory environment. Staff also monitor industry journals and attend waste industry conferences to plan for the future. The planning process for each of the programs is highlighted below:

Automated Garbage Collection

In the early 2000’s, the DSWM determined that their collection system no longer represented the most efficient manner to perform garbage collection for their customers. In beginning the planning process, the DSWM began searching for a service that would provide a safer, cleaner and better way of providing collection services. Through an evaluation process, DSWM determined that an automated collection would help them provide their customers with the desired level of service and decided to begin a pilot program to evaluate the technology. The pilot program began in 2002 with automated collections in a small area of the County. The 12-month pilot program included use of retrofitted “flipper” vehicles collecting from 4 residential routes. During the pilot program, the DSWM evaluated the workforce impacts, customer service, aesthetics, implementation, and costs.

Automated, Single-Stream Residential Recyclable Collections

Planning for this new automated program began as the 18-year-old dual stream, curbside recycling program began to experience declining participation, decreased recyclable tonnage and reduced customer satisfaction. Through the RFP process, the DSWM was able to work with successful responders to refine their proposed process to better meet customers’ needs. This planning process allowed the DSWM to develop a new curbside recycling program that included every-other-week collection, use of automated carts and vehicles and expanded recyclable material collection at no additional cost to the customer.
Hybrid Automated Collection Vehicles
In 2009, DSWM was considering collection alternatives that would provide more sustainable solutions. While evaluating various alternatives, the DSWM worked in partnership with Parker Hannifin Corporation and Autocar Corporation to test run a hydraulic hybrid version of an automated side loader. A pilot program was planned out and implemented in 2009. The hybrid vehicle was compared to non-hybrid vehicles that are currently used by DSWM. The pilot program allowed the DSWM to evaluate fuel efficiency, carbon emissions, and vehicle maintenance. Using data collected during the pilot program, the DSWM decided to purchase 6 hybrid automated collection vehicles, which were delivered and placed into service during the last several months of 2010.

Automated, Single-Stream Residential Recyclable Collection
The DSWM’s careful planning process has allowed the conversion to highly successful single-stream, residential recyclables collection program. The program allows the resident to place all recyclables into one cart designed for automated collection. Automated collection is more efficient for the customer as well as the service provider because the automated collection vehicle requires only one person to perform the service. Every-other-week collection means less collection vehicle traffic on the residential streets in any given week, which has positive benefits from public safety, environmental and system costs perspectives.

Hybrid Automated Collection Vehicles
As indicated, the hybrid fleet has only been in service for six months. The DSWM is currently monitoring the performance of the vehicles to confirm the findings of the pilot test. Preliminary data confirms that the fuel consumption is significantly reduced as are the carbon emissions. Cost savings on the vehicle maintenance, specifically the brakes, will require additional time. However, based on the success of the planning process, DSWM is anticipating the collection system will be converted to hybrid vehicles in the next 10 years.

Discuss System Downtime if Any
System downtime is not applicable for any of the systems outlined in the DSWM application.
SECTION 4: PERFORMANCE, ECONOMICS AND COST EFFECTIVENESS

Describe the efficiency of the operation:

The automated waste collection program is a highly efficient operation serving more than 320,000 households within 7 distinct garbage collection zones/areas. The operation employs 312 drivers, waste collectors and supervisors. This number is significantly lower than the 400 employees utilized in the labor-intensive manual collection operation. There are 186 traditional automated trucks and 6 hydraulic hybrid trucks used in the operation.

With the exception of the “flipper” and manual routes which have two or three employees assigned to the crew, the automated program utilizes one driver per vehicle to service each route. Automated routes service an average of 1,069 households.

Automated Single-Stream Residential Recyclable Collection

This is also a highly efficient collection system. Because it is automated, only one driver is required to service a route. The drivers are no longer required to exit the vehicle to collect heavy, bulky bins as they had to do in the dual-stream program. As a result, the collection service is faster and allows the drivers to finish their routes in a more timely fashion.

Because the program allows for commingling of the recyclable material, fewer trips are required to the MRF. With the dual-stream program, drivers would have to make frequent trips to the MRF to unload when either the newspaper or commingled area of the truck was filled. With the new program, the driver only has to make trips to the MRF when the vehicle is completely filled.

Discuss operational performance — does it equal or exceed the goals and expectations set for this system and other similar systems elsewhere:

Automated Waste Collection

Program goals included a safer work environment for our employees, increased use of technology and more efficient service delivery. These goals have been achieved:

- This highly-efficient method of waste collection using the services of a one-person crew is provided to customers on 150 automated routes. Only 18 manual routes utilizing a three-person crew remain in the operation. These crews are used in those areas where automated service is not feasible.
• On-the-job injury rates have sharply declined since full implementation of automated waste collection. Additionally, worker exposure to loose garbage and potentially dangerous materials such as glass and uncontainerized sharp items has been significantly reduced.

• Employees who were previously hired as waste collectors have been provided training opportunities, enabling them to be promoted to automated waste truck driver positions.

• Annual on-time route completion has been consistently high at over 99 percent since 2007 (the conclusion of automated collection service conversion).

The program goals of improved customer service and service delivery have also been achieved. Automated curbside waste collection has enabled the DSWM to deliver a service that is cleaner, neater and more convenient for residents. The service also improves neighborhood aesthetics. What’s more, customer satisfaction rates associated with the service are extremely high; the waste collection program boasts a monthly complaint rate of only 2 per 10,000 households serviced.

Automated hybrid waste collection vehicles

The program goal was to achieve fuel savings of approximately 50 percent. To date, the DSWM fuel savings, as compared to the traditional trucks, meet the goal. The hybrid vehicles are currently averaging 2.50 to 2.75 miles per gallon (mpg). The traditional vehicles average between 1.45 and 1.65 mpg. Therefore, the hybrid vehicles, on average, are exceeding the goals originally established for the program. It is interesting to note, anecdotally, that other waste industry contacts have revealed that other hybrid technologies are not realizing the same fuel savings reported with the hydraulic hybrid trucks used by the DSWM.

Automated, Single-Stream Residential/Recyclable Collection

The operational goals of this collection program include improved and more efficient service delivery, increased customer participation, increased recyclable tonnage and reduced carbon footprint. These goals have been achieved:

• Reliable every-other-week collection service is provided to more than 350,000 households in the DSWM service area and in 12 inter-local agreement cities.

• Residents are able to commingle all of their recyclables in a convenient, wheeled and lidded cart for curbside collection. There is no need to carry heavy, awkward bins to the curbside.

• The lidded carts reduce the generation of litter and scattered recyclable materials. The result is improved neighborhood aesthetics and reduced impacts to the environment.

• Every-other-week pickups mean lower fuel consumption, reduced emissions and a reduced carbon footprint.

• Monthly recyclable material collected averages 5,000 per month. This represents more than 60,000 tons collected annually - almost double the annual tonnage collected in the dual stream program.

How does the organization foster customer service:

The DSWM creates an organizational culture that ensures Customer Service, with a positive customer experience. The DSWM contributes to customer engagement by ensuring that every employee understands and is committed to the County’s vision statement: “Delivering Excellence Every Day” and the DSWM’s mission statement: “To provide exceptional waste collection, recycling and disposal services that protect and preserve the environment and improve the quality of life in our community.” Management stresses the importance of delivering excellence at every point of customer interaction and contact. All employees have received education that enables them to provide excellent customer service that leaves a positive impression on our customers. The DSWM employs several programs that foster customer service. A description of these programs is provided below.

The DSWM’s approach to keeping customers satisfied also includes the service level provided by our dedicated 3-1-1 Answer Center and internal customer service staff who respond to customer needs and comments.
The Department’s 352,000 curbside recycling collection customers have access to the customer service function managed by the County’s 3-1-1 Answer Center and an internal customer service unit and public education/outreach provided through DSWM Public Information Officer (PIO) Division.

For all of our customers, a strong telephone-based customer service function is one of the key mechanisms. The County’s 3-1-1 Answer Center is responsible for the call intake function for all service inquiries. Citizens can request information an array of information including requests for EZGo and recycling carts and waste and recycling collection complaints. The call intake services are provided in English, Spanish and Creole and use a specialized line for hearing impaired customers. Once call intake occurs and service request (SR) numbers are issued, the DSWM internal Customer Service Unit accesses the SRs in the Customer Service Request (CSR) System and works with the appropriate Departmental staff or the recycling collection vendors to ensure the service requests are investigated, resolved and closed within the appropriate time frame.

Another key program that supports customer service is the DSWM’s public information and outreach program. One of the major components of our public information program is the DSWM website. All public information materials (tri-lingual brochures, print, radio and television advertisements, educational videos, outdoor advertising and signage) include the DSWM website address and customers are directed to visit the site for more detailed program and service descriptions. The website is updated each week, and more frequently, if necessary, to ensure the accuracy of service information. Residential customers can download brochures, applications and service guidelines; determine their waste collection schedule, sign up for recycling alerts and review news releases and videos on services and programs.

Does the collection system operate within its budget and are the costs appropriate for a system in the industry that is comparable in size:

Automated Waste Collection
The automated waste collection operates within the budget established for the service.

Hybrid Automated Collection Vehicles
The initial cost for purchasing the prototype vehicles was $380,000 per vehicle. Future investments in this type of automated vehicle will be at a reduced cost. The anticipated return on the investment is six years. This is well within the industry norm.

Automated, Single-Stream Recyclable Collection
The cost of the automated recycling collection vehicles was incurred by the contracted collection vendors. Service delivery program costs are paid through long-term contractual agreements with the recycling collection vendors. The service is provided within the established annual budget. Customers did not have a fee increase for the improved service.

Are the economics typical of those found in the industry
Economics of the system are hard to compare throughout the industry due to the performance measures, including set out limits, frequency of collection, and density of the service area. The DSWM provides its customers with a high level of service, which is typically characterized by twice a week collection and no set-out limits. Automated collection is also considered a high level of service, due to the efficiency and ease for the customer to use the system. These services have continued to improve with no increase in cost to customers. These services are provided at a similar charge as the County to the north.

The DSWM is purchasing automated waste collection vehicles and hybrid automated waste collection vehicles through national companies that are required to competitively bid on the contracts for purchase. Therefore, the Department is obtaining competitive pricing for the equipment purchases. In the worse case, these prices, if not low, are at least typical in the industry.

The DSWM is also purchasing the hybrid automated waste collection vehicles through a competitive bidding process. Once again, these prices represent economics typical of the industry.

Was the system designed and operated (and generates revenue) as budgeted and expected:

The costs for the automated waste collection program (automated vehicles, fleet maintenance costs, employee regular and overtime pay and waste collection carts) are within the established annual budget. The hybrid waste collection vehicles have only been in the fleet for six months. Significant fuel savings have already been achieved in the first few months of operating the hybrid vehicles. It is also anticipated that these vehicles will also have lower maintenance costs.

The automated curbside recycling program operates within the annual budget established for this contracted service. The recyclable material collected through the program is sold to a private vendor. The County receives a guaranteed payment of $11.69 per ton for the recyclable material. This per-ton price guarantee ensures that the DSWM will receive revenue for the collected material and protects the program revenues during pricing shifts in recyclable material markets.
SECTION 5: UTILIZATION OF EQUIPMENT/SYSTEMS AND TECHNOLOGIES

TYPES OF EQUIPMENT BEING UTILIZED

Automated Garbage Collection
The DSWM performs garbage collection with its own vehicles and personnel. The garbage collections are performed with 238 collection vehicles. Of the fleet, there are 180 automated loaders. This does not include the six hybrid automated collection vehicles that are described below. The fleet also includes traditional rear-load garbage collection vehicles which have been retrofitted for use in the automated waste collection fleet and on any remaining manual routes. Following are the types and quantities of equipment used to provide automated service:

Automated Vehicles (brand and quantity)
- 89 Peterbilt 320 with a 31 Cubic Yard Labrie Body, Arm: Helping Hand
- 80 Condor with a 31 Cubic Yard Labrie Body, Arm: Helping Hand
- 8 Autocar with 16 Cubic Yard Heil Body, Arm: Rapid Rail — trucks are used to service smaller areas especially those with cul-de-sacs
- 3 Autocar with 33 Cubic Yard Heil Body, Arm Durapack 7000

The Automated arm on a garbage truck is designed to handle the strenuous workload that is typical in the waste collection. It is one of the most important components on a truck that must perform approximately 1,000 cycles daily.

Traditional Rear Load Vehicles Which Have Been Equipped With Flippers:
- 46 Peterbilt with a 29 Cubic Yard Body, the majority if not all have flippers that are simply mounted on to the tailgate of the truck so that the carts can be lifted as they are to heavy for manual lifting by our waste collectors.
- 6 Peterbilt with a 16 Cubic Yard Body, 4 have flippers, these trucks are used to service smaller areas especially those with cul-de-sacs
Automated, Single-Stream Residential Recyclable Collection

The automated single-stream collection of residential recyclables is performed by two private companies through contractual agreements with the DSWM. All vehicles and equipment utilized in the collection of the recyclable materials are owned and operated by the companies performing the services. The two recycling contractors utilize 38 vehicles to service more than 350,000 recycling households.

Hybrid Automated Collection Vehicles

The DSWM utilizes six (6) Autocar Xpeditor E3 hydraulic hybrid vehicles in its waste collection fleet. This truck employs the unique Runwise series hydraulic hybrid technology which uses stored hydraulic energy rather than diesel fuel to propel the vehicle as it makes house-to-house stops. The vehicles have a 33-cubic yard capacity Heil Body and a Durapack 7000 arm for lifting the waste carts.

Detail Efficiency and Effectiveness of Equipment

Automated Garbage Collection

The DSWM collects garbage from approximately seven collection zones with 168 Monday/Thursday routes and 167 Tuesday/Friday routes. Eighteen of the garbage collection routes remain manual (covering approximately 8,755 homes) due to difficulty in servicing the routes with automated collection technology. The number of households served per route range from as low as 200 homes to nearly 1,300 homes per route, and the current average number of households per garbage collection route is 1,069. This average includes automated and manual routes. The automated collections provide a more efficient collection service, as represented by the greater number of households per route (given the same collection time for both manual and automated collection routes).

Automated, Single-Stream Residential Recyclable Collections

The automated single-stream collection of residential recyclables is performed by two private contractors. All vehicles and equipment utilized in the collection of the recyclable materials are owned and operated by the companies performing the services. The contracts with the companies providing collection services specify that each collection vehicle must comply with applicable U.S. Environmental Protection Agency standards.

Under the single-stream program, trucks’ routes are closer to their dispatch and drop-off point, resulting in fewer miles traveled to begin and end each service trip. The program has successfully reduced the carbon footprint of the curbside recycling initiative.

Not only have we moved to fewer collections, but created additional emission reductions by adding a second service provider (and, therefore, a second operational location).

Hybrid Automated Collection Vehicles

The hybrid automated collection vehicles were pilot tested prior to the purchase. The pilot test of the hybrid collection vehicle ran for 14 service days between April and May 2009. The test runs were performed in one high-volume route with 1,540 residences and in one normal volume route with 987 residences. The DSWM closely monitored the fuel consumption of the hybrid system on a daily basis and the wear and tear on the brake shoes. After 14 collection days, the average fuel consumption was found to be 2.37 miles per gallon (mpg). The average fuel consumption for the non-hybrid collection vehicle (both rear load and automated), on the same route, after 15 service days of test runs during the period between March and April 2009 was found to range from 1.37 mpg to 1.43 mpg, respectively. Clearly, the hybrid collection vehicles are significantly more fuel efficient than the diesel fueled collection vehicles.

To determine the wear and tear rate of the brakes of the pilot hybrid collection vehicle, the brakes were inspected for thickness before the route collection commenced in April. The brake thickness was then checked again at the conclusion of the 14 collection days. Very little reduction in the brake thicknesses were observed, demonstrating the ability to preserve the brakes by using its state-of-the-art technology which captures the truck’s energy in the accumulators allowing it to build pressure and drive the truck to the next house. Although only limited data was generated from the pilot test, it appears that the brakes will last longer with the hybrid vehicles. The average number of brake jobs for the non-hybrid automated collection vehicles is 3 per year. It appears that the hybrid vehicles will require only one break job per year. At a cost of $3,000 per brake job per vehicle, the DSWM could save as much as $5,000 per vehicle per year.

The hybrid vehicles reduce the fuel consumption by about 11.65 gallons per day per vehicle, in comparison to the non-hybrid collection vehicles. Per the US Environmental Protection Agency (EPA), each gallon of fuel saved and not burned reduces the Carbon dioxide emission to the atmosphere by 22.2 lbs. This translates to an emission reduction of about 24.17 metric tons of carbon dioxide per vehicle per year.
SECTION 6: WORKER HEALTH & SAFETY

Describe Employee Training Frequency and Safety Procedures

The Department operates an extensive training program for all employees. Those employed in the waste collection operation as drivers receive in-house training on the operation of the automated waste collection vehicles (both regular side-loaders and hydraulic hybrid side loaders). All drivers are regularly provided the opportunity to train on new equipment to be ready for future promotional opportunities. All of this training is promoted through the monthly publication of a training calendar by which all levels of staff may know what is available.

The DSWM provides collection personnel, including those providing the automated and manual services, with a significant amount of training over the year. This includes the following courses:

- New Employees Orientation (Work Place Safety)
- Defensive Driving Course (4 hours)
- Defensive Driving Course (8 hours)
- Reporting Property Damage and Vehicular Accidents
- Supervisory Safety Accident Investigation
- Safety Awareness Campaign
- Supervisor Forum

Each employee is required to attend the Defensive Driving Courses, both 4 and 8 hours, and the Reporting Property Damage and Vehicular Accidents Course on an annual basis. Supervisors are also required to Supervisory Safety Accident Investigation, Awareness Campaign, and Supervisor Forum on an annual basis.

Automated Single-Stream Residential/Recyclable Collection

Both contracted recycling vendors utilize in-house training programs that offer instruction in the operation of the automated vehicles and annual defensive driving courses.
Describe Injury Rates

Automated Waste Collection And Automated Hybrid Waste Collection Vehicles: With the implementation of automated waste collection, the DSWM has seen a steady decline in the number of job-related injuries and Workers Compensation Claims. Injuries that were common with manual waste collection (e.g., back injuries from lifting overweight bags and cans, cuts and punctures caused by broken glass or improperly containerized sharps in bagged waste) are not typically experienced with automated waste collection service.

Automated Single-Stream Residential/Recyclable Collection: Since the program was implemented in 2008, both contracted recycling vendors have reported zero job-related injuries associated with automated recycling collection service.
SECTION 7: PUBLIC ACCEPTANCE, APPEARANCE AND AESTHETICS
DISCUSS OVERALL APPEARANCE OF THE VEHICLES, MAINTENANCE FACILITY AND YARD

- Appearance of the Vehicles — All of the DSWM automated waste collection vehicles are branded with the Miami-Dade County logo and DSWM name. The newly acquired hybrid waste collection vehicles have additional graphics including the green.miamidade.gov logo and a graphic image indicating that the vehicles are fuel-efficient hybrid vehicles.

- Appearance of the Maintenance Facility — The DSWM’s automated waste collection vehicles are serviced at the County’s General Services Administration maintenance shops. These facilities are typically co-located with DSWM operations facilities and are neat, clean and well-maintained by GSA staff.

- Appearance of the Yard — the parking area for the waste collection fleet is also neat, clean and well-maintained by staff assigned to the Operations work sites.

- Automated Recycling Collection Vehicles — these vehicles are owned and operated by the contracted recycling collection vendors. The vehicles are branded with the company logos. The parking yards and maintenance areas for the contractors’ vehicles are neat, clean and well-maintained by the contractors.

Are the Facility and Vehicles Properly Maintained for Cleanliness

All DSWM waste collection vehicles are washed at the on-site truck wash facility located at each of the three Operations work sites. The recycling contractors also provide on-site truck wash facilities for their vehicles at their yards.

Does the Program Provide Public Relations Measures and Public Education Information

The DSWM public education and outreach activities provide an effective means by which customers and the general public can learn more about their waste collection services. One of the major components of the DSWM public information program is DSWM website. All public information materials (tri-lingual brochures, print, radio and television advertisements, educational videos, outdoor advertising and signage) include DSWM website address and customers are directed to visit the site for more detailed program and service descriptions. The website is updated each week, and more frequently, if necessary, to ensure the accuracy of service information. Residential customers can download brochures and service guidelines; determine their waste collection schedule and sign up for recycling alerts. Residents are also able to review news releases and videos on services and programs.
Vehicles use in both the automated waste collection and recycling programs are often featured at Career and Truck day presentations scheduled at Miami-Dade County public and private schools throughout the year.

Hybrid Automated Collection Vehicles
The hybrid waste collection vehicles have been “unveiled” to the public at a special event in September 2010. The vehicles have received and continue to be featured in local media and in industry/trade publications and websites.

Is the Facility a Good Neighbor
The DSWM’s waste collection yards are located close to residential neighborhoods and in light industrial areas. It is the DSWM’s policy and practice to operate these facilities and the associated vehicles in a manner that fosters good community relations. The facilities are clean, neat and identified with attractive signage that enhances the image of the facility in the community.

The contracted recycling vendors’ facilities are located in light industrial areas. The vendors also strive to be good neighbors by maintaining their facilities and associated vehicles so that they are clean, neat and visually appealing.
Miami-Dade County Goes Greener
Becomes First Municipality in U.S. to Use Parker Hannifin Hybrid Technology in Waste Collection Vehicles

Miami-Dade Mayor Carlos Alvarez and County officials received the key to the County's first hybrid waste collection vehicle. The County’s Department of Solid Waste Management has teamed up with Autocar, Parker Hannifin and Heil to become the first municipal solid waste agency in the United States to acquire and use Series Hydraulic Hybrid Powered trucks in its waste collection fleet.

“Miami-Dade County is constantly looking for ways to ‘go green’ and become environmentally friendly so we are happy to be the first municipal government in the nation to use this unique hybrid technology in our waste collection vehicles,” said Miami-Dade County Mayor Carlos Alvarez. “We will consume less diesel fuel and reduce our carbon footprint with the help of this new equipment.”

“Hybrid technology is the key to a cleaner environment, and that’s why the Miami-Dade Department of Solid Waste Management has partnered with Parker Hannifin to integrate these vehicles into our waste collection fleet,” said Department of Solid Waste Management Director Kathleen Woods-Richardson. “Our hybrid trucks will allow us to do our part to help make Miami-Dade as ‘green’ and environmentally friendly as possible.”

Charles Gray, an official with the United States Environmental Protection Agency’s Office of Transportation and Air Quality, spoke at the unveiling ceremony, and congratulated the County on its integration of waste vehicles equipped with the series hydraulic hybrid drive technology.

The Miami-Dade County Department of Solid Waste Management is the largest government-owned and operated waste collection and disposal system in the southeastern United States. The Department serves more than 320,000 households in unincorporated Miami-Dade County and nine municipalities. Miami-Dade's solid waste system includes a network of landfills, transfer stations, neighborhood trash and recycling centers, and one of the largest waste-to-energy facilities in the United States. For more information about the Miami-Dade Department of Solid Waste Management, visit www.miamidade.gov/dswm.

Topics: Vehicles
Successful Recycling in a Down Economy

By Kathleen Woods-Richardson

Last June, the Miami-Dade County Department of Solid Waste Management celebrated the first anniversary of our single-stream curbside recycling program. Just a few weeks later, we proudly reported to our customers and local and industry media that a record-breaking 5,600 tons of recyclables had been collected during the month of June. This was the highest tonnage ever collected since Miami-Dade County started its curbside recycling effort in 1990. This announcement of our program’s first year of success and record-breaking tonnage has had many in the industry asking us questions like “What’s your secret?” and “How are you experiencing such success during a down economy?”

Several factors have enabled Miami-Dade County to produce the kind of newsworthy results that we’ve reported.

First, we started by giving our curbside recycling program a makeover. Beginning in 1990, the dual-stream recycling program was originally popular among our residents but in recent years had begun to experience less enthusiastic participation. Each household had been given two 18-gallon bins—one for separation of glass, aluminum, steel, aseptic packages and plastic bottles bearing the 1, 2, or 3 recycling symbol, and the other for newspapers, corrugated cardboard, and household batteries. While the two-bin program was “state-of-the-art” back in the ’90s, declining tonnages and set-out rates were an indication that our residents were not fully satisfied with the program. The county’s 2005 Customer Satisfaction Survey indicated that only 27% of survey participants were very satisfied with the dual-stream service. We recognized that we had the potential to achieve a greater satisfaction rate among our citizens; all we needed was a new program that would satisfy our customers’ desire for a more convenient program and an opportunity to expand the kinds of material collected.

With these needs in mind, we crafted a request for proposals for a comprehensive new recycling program that could include anything from automated cart service to expanded material collection to drop-off programs. After much deliberation, we recommended that we move to a new single-stream program that we firmly believed would increase residential participation and divert more material from disposal into our landfill and waste-to-energy facility. Approved in February 2008, the program provides for every-other-week collection of glass, aluminum, steel, narrow-neck plastics, aseptic packaging, newspaper, corrugated cardboard, and new types of recyclable paper, including junk mail, office paper, magazines, catalogs, and paperboard packaging. Two private vendors provide every-other-week collection services in three zones throughout the county. Moving from weekly collection to every-other-week service has allowed us to keep the cost of service delivery at an affordable, per-household price. At the same time, we’ve been able to reduce the carbon footprint associated with the delivery of this popular and highly visible environmental effort.

Service implementation had to be aggressive because the contract for dual-stream service (and associated options to renew) had expired; the county was paying for service on a month-to-month basis with the dual-stream vendor. We launched the phased delivery of wheeled carts to our 320,000 waste collection customers on June 30, 2008, using several contracted vendors and departmental staff at times. At the same time, we negotiated with municipalities in the county and were able to partner with the same 11 cities that previously participated in our single-stream recycling program through interlocal agreements to include an additional 20,000 households in the program. Other municipalities have expressed interest but have not yet committed. By January 2009, all 340,000 residences in these areas had the ability to recycle using the new single-stream program.

Our initial public education efforts took advantage of the “go green” movement. We adopted the theme “Easy on the Earth, Easy on You” to highlight the ease, convenience, and environmental friendliness of the new single-stream program. Web-based, direct-mail, and directly delivered public information materials were created to smooth the transition to the simpler single-stream program. The publications emphasized that no sorting was required and that there was no need to lug heavy bins to the curb every week. We worked closely with our county’s Enterprise Technology Department to use GIS technology in the development of the most efficient service routes for the recycling vendors. Additionally, our Public Information and Outreach Division worked with the county’s Government Information Center to fast-track the development of an online application allowing residents to determine when their new cart would be delivered and the start date for the new service. The online tools continue to provide residents with the ability to view and download their specific recycling calendar and to sign up for recycling alerts on the county’s Web portal. The alerts send e-mails to residents to remind them the night before their recycling day. This is a popular online subscription service.

Providing our customers with choices has been another area that has been critical to the success of the program. Our program is designed to allow our customers the ability to customize the recycling program to meet the needs of their individual households. For example, larger families and more avid recyclers can order a larger, 95-gallon cart. Those who consider themselves “super recyclers” can purchase an additional cart for a one-time fee of $50. And for those customers who have space constraints or who are unable to maneuver the 65-gallon standard-issue container, we offer a smaller 35-gallon recycling cart.

A big plus for our program is the contract for the sale of recyclable material. Under the dual-stream system, program revenue was subject to fluctuating market prices; profits and losses were shared by the county and the recycling contractor. The materials processing contract for the single-stream program materials allows our recycling collection vendors Waste Services Inc. and World Waste Services Inc. to deliver materials to conveniently located transfer stations operated by Waste Management Inc (WMI).

The materials are then transported by WMI to their materials recovery facility just outside of Miami-Dade County. WMI pays the county a flat, per-ton rate for the recyclables. No matter what the market is for the various materials, the county is guaranteed a per-ton rate that only changes annually based on the Consumer Price Index. We consider this a safe and risk-averse approach; the department receives revenue from the sale of recyclables even when the recycling markets are depressed. Likewise, WMI gets a greater benefit when the markets are favorable.

As we begin the second year of our program, we continue to look at ways that we can increase customer satisfaction, participation rates, and recycling tonnages. The department takes seriously the county’s mission of “Delivering Excellence Every Day.” Toward that end, we will continue monitoring our service providers to ensure consistent recycling service delivery. Ongoing education is also key to the program’s continued success.

This fall, we will launch the second phase of our public education program. We like to call it the “happy facts” about recycling. For the past year, we’ve stressed how easy it is to recycle with our one-cart program, and we’ve provided our residents with the how-to information that is so important for initial program success.

Going forward, we’ll take advantage of the program’s positive momentum, placing even greater emphasis on the environmental benefits of recycling and the need to divert materials away from our disposal sites.

I look forward to announcing our recycling achievements in the months to come and the second anniversary of our successful single-stream program in June of 2010.
Hybrid Garbage Trucks Saving Miami-Dade Big Money

| April 5, 2011 |

A garbage man’s average routine may seem pretty boring — stop, pick up trash, go, repeat. But the viewpoint of 20-year Miami-Dade Solid Waste Management employee John Lewis is a bit different — Lewis enjoys a quieter ride in his new Autocar Expeditor E3 hybrid garbage truck, which he considers one of many benefits made possible by emerging hybrid technology.

“The design is the same, and [the truck] is a little bit slower,” Lewis said, “but it’s a whole lot quieter and carries a lot more garbage.”

While quietly carting trash from his two routes — covering about 30 miles and spanning more than 1,200 homes — Lewis is helping make “hydraulic hybrid” engineering the future of municipal waste disposal.

Hybrid garbage trucks, like the Autocar E3, that Lewis drives are the latest application for an emerging hydraulic-based technology that its developers say can reduce fuel and maintenance costs for municipalities, while also reducing their carbon footprint.

For government agencies, the biggest attraction might be the promise of cost savings. According to Danny Diaz, fleet manager director of Miami-Dade’s Solid Waste Management Department, the new vehicles are saving so much money that he hopes to convert his fleet to all-hybrid within the next 10 years.

Hydraulic Partnership

A prototype of the hydraulic hybrid vehicle was given in April 2010 to Miami-Dade County — one of three districts in southern Florida now using Autocar Expeditor E3 trucks to collect waste. The goal was to help the hybrid system manufacturer, Parker Hannifin, fine-tune its product before launching it into mass production this month.

The perfect place to test it out was Miami, home to one of the largest municipal waste fleets in the country.

 “[Parker Hannifin] wanted us to use the truck to see what its performance was like, and what they could improve upon,” said Diaz, who added five more trucks to his fleet last December.

What started as a pilot instead became Parker Hannifin’s first business partnership. The single test truck was enough to convince Diaz — whose 193-truck fleet services 340,000 homes each day — to purchase several more trucks, each equipped with the company’s cutting-edge hydraulic hybrid technology known as RunWise.

How Hydraulic Hybrids Work

The hydraulic hybrid system uses stored hydraulic energy instead of diesel fuel to power the truck during waste collection stops. A hydraulic launch assist system, also known as a parallel hybrid, is bolted onto the truck’s existing power train and connects using an electronically controlled transfer case.

The system stores energy captured during braking and releases that stored energy during acceleration, allowing the vehicle to run without using fuel. The application is most efficient during frequent stop-and-go use, such as trash pickup.

“The more a vehicle stops and starts, and the heavier and bigger it is, the better this technology works,” said Vance Zanardelli, manager of Parker Hannifin’s energy recovery unit.

The company claims its system allows for energy savings of up to 70 percent versus nonhybrid trucks. In terms of fuel, that translates to roughly 45 to 50 percent savings over diesel-only vehicles, Zanardelli said.

“One of the biggest advantages [over other hybrid systems] is that it allows you to absorb the energy you’d lose from braking,” he said. “In comparison, a normal hybrid system — like the one you’d find on a Toyota Prius — only recovers about 20 percent of that lost energy. I don’t know of any other hybrid system available today that can give you that kind of savings.”

Hydraulic Hybrid Savings

An upfront investment is required to see those long-term savings. The vehicles are marked up about $100,000 over traditional diesel-only models. But purchasing them is becoming more feasible; this year the U.S. Environmental Protection Agency approved the RunWise system as an emerging technology, which could result in more grants to help counties like Miami-Dade — and other municipalities nationwide — purchase hybrid vehicles.

For cities like Miami and Hialeah, Fla., — which have joined Miami-Dade County in purchasing hybrid garbage trucks — a fleet of hybrids can save millions of dollars, said Diaz. One factor is less spending on fuel. In less than one year, Miami-Dade’s hybrid trucks collected 2,300 tons of garbage and used approximately 4,000 gallons of fuel, according to Diaz’s calculations. When compared to the rest of the diesel-run fleet, that’s impressive: In a similar span from October 2009 to September 2010, traditional trucks used approximately 2.4 million gallons of fuel, which averaged about 12,800 gallons per vehicle.

“We’ve estimated these hybrids can save us over $1 million in fuel costs in just one year if we go full-hybrid,” Diaz said. “That’s huge.”

The savings don’t stop there. Each truck in Diaz’s fleet makes an average of about 1,000 stops per day, which is tough on brakes, he said. Conventional versions require new brakes every three months, but not the hybrids.

“So far, we haven’t had to replace the brake pads on any of our hybrid vehicles,” Diaz said. “We’re looking at having to do it only once each year — and we’re hoping those savings can also be applied to tires.”

And besides the cost savings, each hybrid hydraulic truck reduces carbon dioxide emissions by as much as 40 tons per year.

All that should be good news for Parker Hannifin, which went public with its technology last week — meaning more municipalities nationwide will have the opportunity to use the hydraulic launch assist system to save money not only on fuel consumption, but also wear-and-tear maintenance.
The savings likely won’t stop at the dump, however. The company is working to install its RunWise system in city transit buses as well as UPS and FedEx fleets.

“This is just the tip of the iceberg,” Zanardelli said. “We’re looking to make a big impact on how cities nationwide save on energy, and to help make the world a better, cleaner place.”