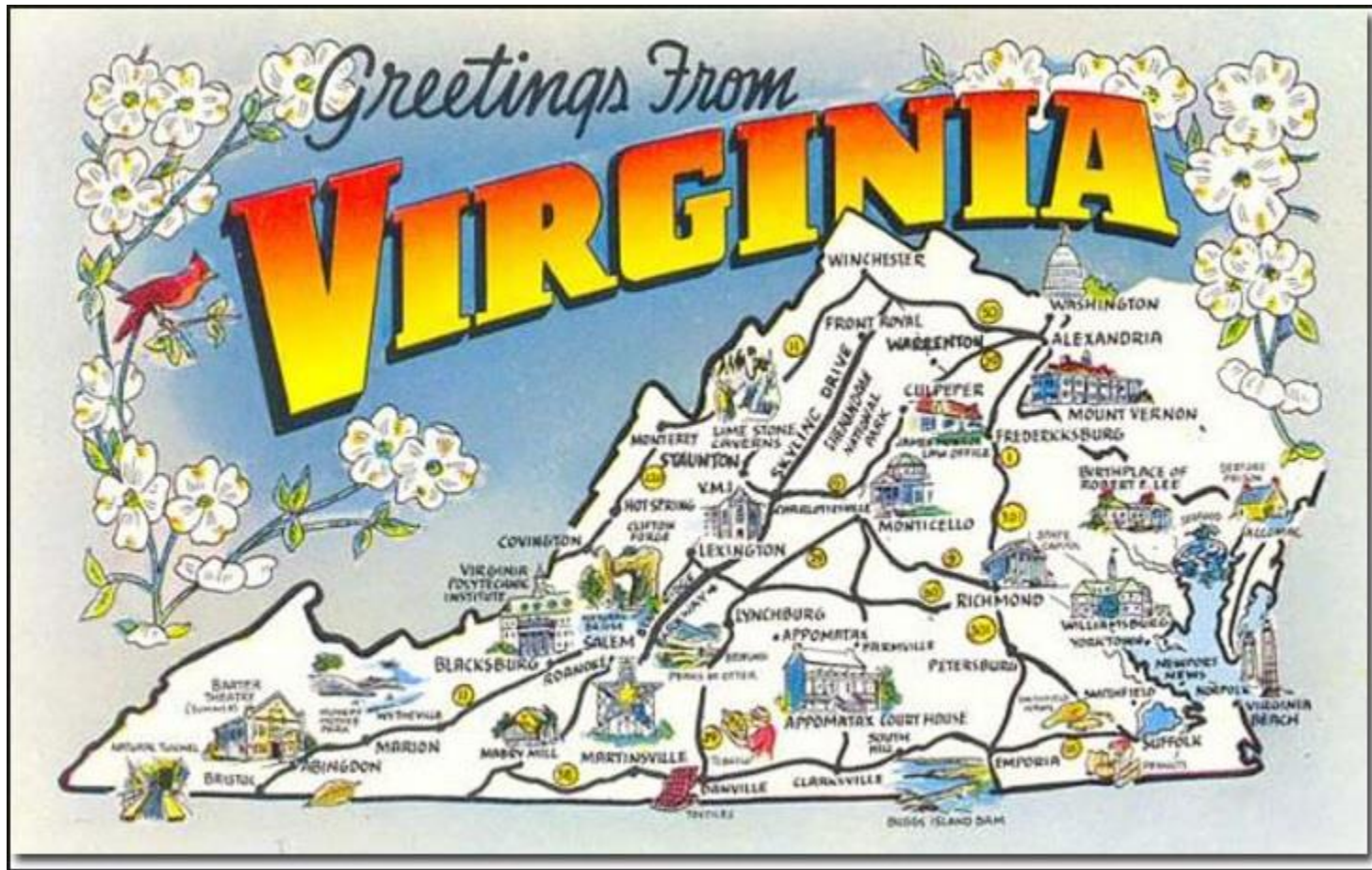


Testing a New Service: Curbside Food Waste Collection

Michael Clem
Resource Recovery Division
City of Alexandria, Virginia

Where is the City of Alexandria?



Location of the City of Alexandria, VA



Voted Most Romantic City in the United States



DRAFT WITH ONLY PRELIMINARY REVIEW

Background:

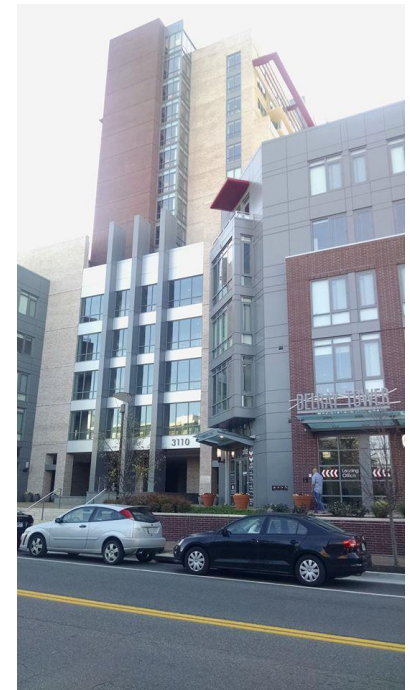
Why collect food waste separately from the regular trash?

- U.S. Environmental Protection Agency recommends it because:
 - Landfilled and incinerated food-waste produces climate-changing emissions;
 - Food waste takes up limited landfill space;
 - Food waste is composted into a natural soil amendment used to conserve soil;
 - Separate collection improves awareness of how much food is wasted each week.



More Background: Prior Alexandria Efforts at Food Waste Recovery

- **Farmers' Market Collection Stations - staffed**
 - On-going for nearly 3 years;
 - Approximately 500 visits per weekend by customers;
 - Approximately 3 tons of food waste collected weekly;
 - Sold 2,500 collection buckets.
- **Apartment Buildings (EPA Grant)**
 - 2 locations (450+ living units);
 - Central collection carts located on lower-floor of buildings;
 - Free collection pails and bio-degradable liners;
 - Low participation (less than 12%);
 - No operational difficulties (no smell, pests, or spills);
 - Programs not popular enough to justify continuing.
- **Schools**
 - Successful with regard to participation;
 - Collection service unreliable and relatively expensive;
 - Program cancelled 2013.



Residential Pilot Description



- Staff collects food waste curbside from residents living on selected residential trash service routes;
- Free service offered to 2,400 households;
- City provides 5-gallon collection buckets with sealable lids and kitchen countertop collection baskets to transfer food waste to the larger buckets;
- Duration of pilot = 3 months (April 11 to July 15);
- Food waste is delivered to Prince Georges' Western Branch composting facility.





Questions To Be Answered By the Pilot:

1. Is there a 'critical mass' of residential curbside customers interested in separating food waste for special collection?
2. Does separating food waste cause problems for the customer such as odors or pests?
3. If a customer initially agrees to separate food waste, will they stick with it?
4. Does food waste pose unique collection challenges compared to regular trash?
5. How much would a full-scale food waste collection service cost?
6. What are the measured environmental benefits?

1. Is there a 'critical mass' of residential curbside customers interested in separating food waste for special collection?

2,400 households received invitations and 406 signed up, a 17% participation rate. For the sake of comparison, 65% of the residential customers participate in the recycling program.

'Parking Lot' Question: Why didn't more people sign up? (revisited on slide 13)



An Official (Exclusive) Invitation



ECO-CITY  ALEXANDRIA

MARCH 16, 2016

RE: Invitation to participate in the City's Residential Food Waste Collection Pilot Program

Dear Sir or Madam,

The U.S. Environmental Protection Agency estimates that food waste makes up 20% of a household's regular trash and recommends that this food waste be composted. In 2009, City Council adopted an Environmental Action Plan setting a goal of diverting waste for beneficial use. For the past two years, our department has conducted food waste collection at farmers' markets across the City. This program has been hugely successful with over 400 participants bringing nearly a ton of food waste each week.

This spring, the Department of Transportation & Environmental Services is testing the feasibility of collecting food waste separately from regular trash at the curbside. The food waste will be composted into a natural fertilizer. Because you receive City-provided trash collection services and live on a collection route that has been selected, you are invited to participate at no cost in a 3-month pilot program. The program starts in April and runs three months. Please note that only addresses receiving this letter will be eligible to participate in this pilot program. Routes have been randomly selected from across the entire City to ensure a representative sampling of our customers.

Participants will be asked to place food scraps and trimmings in a special container for curbside pick-up on their regular trash collection day. This five-gallon storage container with a lid will be provided to all participants free of charge. In addition, participants will be asked to complete a short survey at the beginning and end of the pilot program. Details from the survey as well as information collected during the pilot will help the City evaluate the feasibility of launching the program full-scale in future years.

To sign-up visit: www.alexandriava.gov/FoodWaste or call customer service at 703.746.4357.

Sincerely,

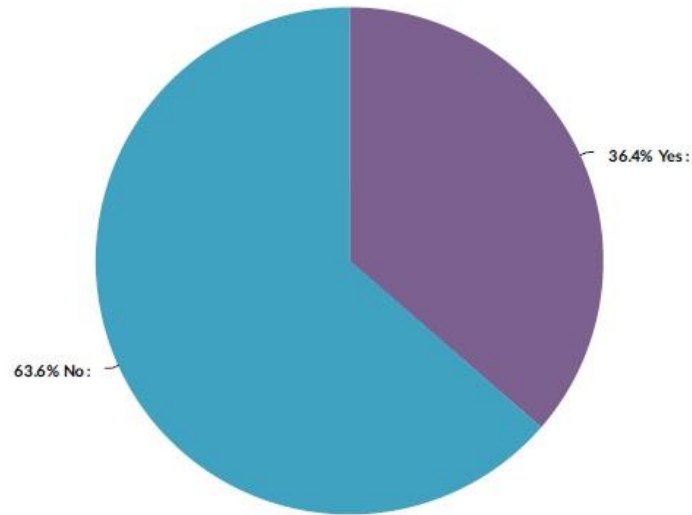
Jeffrey F. DuVal
Deputy Director
Transportation & Environmental Services
jeffrey.duval@alexandriava.gov

DRAFT WITH ONLY PRELIMINARY REVIEW

2. Does separating food waste cause problems for customers such as odors or pests?



10. Did the collection bucket get smelly and/or disgusting?



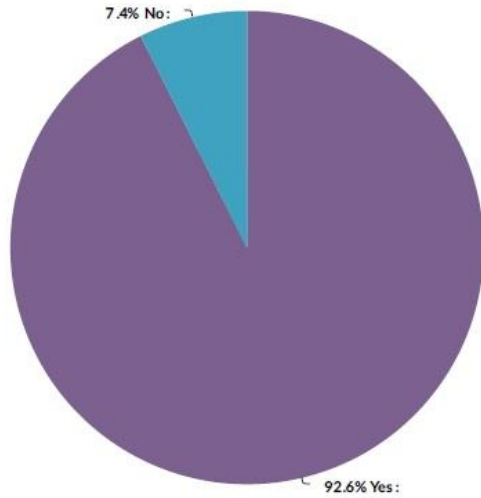
| Value | Percent | Count |
|-------|---------|-------|
| Yes | 36.4% | 117 |
| No | 63.6% | 204 |
| Total | | 321 |

In the post-pilot survey, the following was reported:

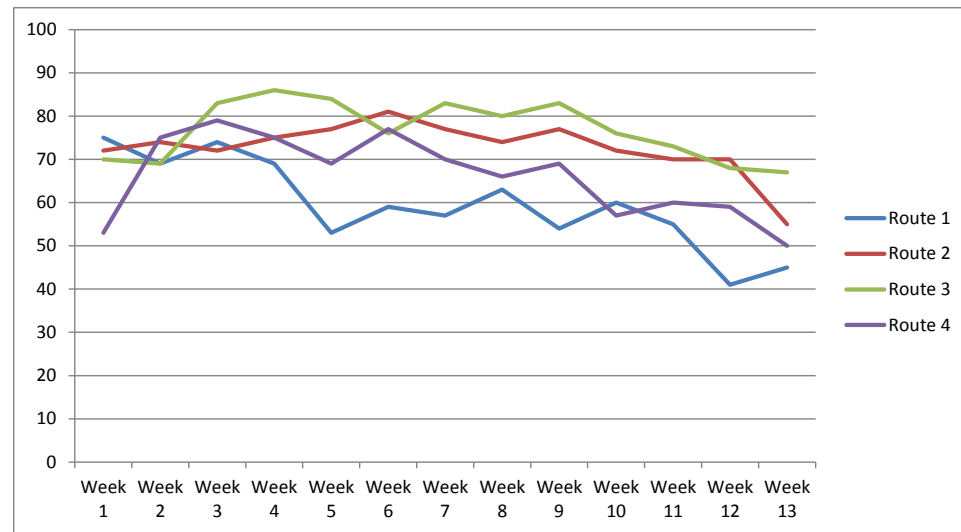
- 36% said their 5-gallon bucket was smelly or disgusting;
- 69% had to wash their bucket regularly;
- And on a positive note, 99% said that their storage bucket did not attract rodents or pests even though many kept it outdoors.

3. If a customer agrees to separate food waste, will they stick with it or quit?

2. Did you participate in the pilot up until its conclusion on July 15?



| Value | Percent | Count |
|--------------|---------|------------|
| Yes | 92.6% | 302 |
| No | 7.4% | 24 |
| Total | | 326 |



Parking Lot Question: Why Didn't More People Sign Up?

Professional Opinion: Food waste is too 'off-putting' for many customers to handle.

- Only 17% signed up, can this base group be expanded? Doubtful, since we are collecting a sloppy, smelly, unappealing product.
- Consider traditional bottle and can recycling.
 - Food and beverage containers are designed to look appealing (many are shiny and colorful)
 - Advertising dollars are spent to create a positive association between containers and pleasant images.
- Now consider food waste
 - Most food waste is not visually appealing and does not appear 'clean'.
 - No advertisers have spent millions creating a positive 'aura' around food waste.
 - It smells. Many people are sensitive to smell.



4. Does food waste collection pose collection challenges compared to regular trash?

“You bet it does!”

- Rotting food is especially smelly
 - Sealed containers are necessary for storage to avoid attracting pests
 - Sealed container captures moisture and causes the material to break down in the heat of summer.
 - Sealed warm containers are ideal for growing mold which may release spores. Collection staff may inhale these spores.
- Food waste is heavy
 - Emptying containers is a challenge (370 lb. per cart)
 - Truck weight limits can be exceeded
- Food waste has a very high water content (35-40%)
 - Special non-leaking trucks required
 - Leakage when emptying containers
 - Freezes in the winter time
 - Expensive to haul water (40% H₂O)



5. How much would a full-scale food waste collection service cost?



- The method used was relatively inexpensive since capital investments were minimal.
 - The system consisted of a pick-up truck pulling a trailer that held up to eight 65-gallon carts.
 - Customer receives a 5 gallon bucket with lid; countertop container and bio-bag liners;
- The crew consisted of a driver and a helper (\$42.50 an hour)
- Servicing a route took approximately 4.0 hours per day (24 routes per week);
- At the completion of the route, the carts were placed in an open-air storage area.
- The carts were emptied weekly by a vendor who combined Alexandria’s food waste with that from other accounts (\$10 per cart = hauling + processing)
- The material was delivered to the Western Branch facility in Prince Georges County, MD.

COST= \$1.81 PER HOUSEHOLD PER VISIT (ONCE A WEEK); \$94.12 PER YEAR*
(estimated cost if provided by contractor is \$3.90 per visit; \$202.80 per year*)

*Does not include recruitment letter or website design or customer service support

How does the cost of residential food waste collection (if City-wide) compared to other solid waste collection services?

| Service | Cost per single 'set out' or 'service visit' (one set out per week per customer) | Average Lbs. per 'set out' | Number of 'set outs' per week | Cost per year when spread over all trash customers | Cost per ton Collection And Disposal |
|---|--|----------------------------|-------------------------------|--|--------------------------------------|
| Residential Food Waste Collection (estimates based on Pilot data; 20% participation rate) | \$1.81 | 8 | 2,760 | \$13.17 | \$450 (577 tons) |
| Residential Recycling (blue cart) | \$0.86 | 21 | 12,818 | \$28.94 | \$83 (6,900 tons) |
| Residential Yard Waste (collected separately from trash) | \$2.70 | 8 | 1,972 | \$14.03 | \$674 (410 tons) |
| Residential Regular Trash (black cart) | \$1.94 | 33 | 19,721 | \$100.88 | \$117 (17,000 tons) |
| Farmers' Market Food Waste Collection | \$2.28 | 13 | 500 | \$3.00 | \$375 (158 tons) |

DRAFT WITH ONLY PRELIMINARY REVIEW

6. What are the measured environmental benefits?

Part 1: Climate Changing Emissions & Energy

Part 2: Conserving Natural Resources



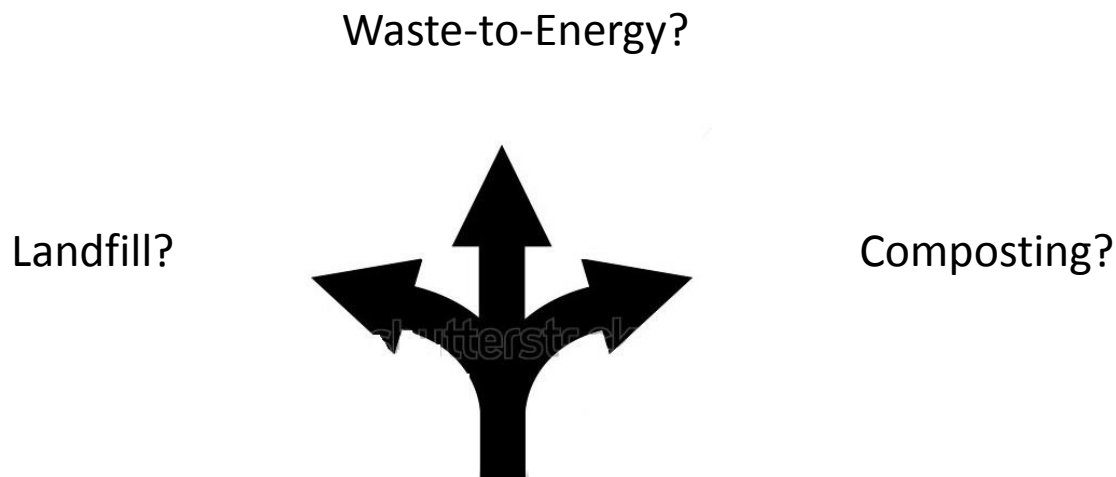
Environmental Impact - Part 1

Climate Changing Emissions & Energy

Waste Reduction Model (WARM)



EPA created the Waste Reduction Model (WARM) to help solid waste planners track greenhouse gas (GHG) emissions reductions from several different waste management practices.



Landfill?



DRAFT WITH ONLY PRELIMINARY REVIEW

Waste-to-Energy?



Compost?



Environmental Impact - Part 1

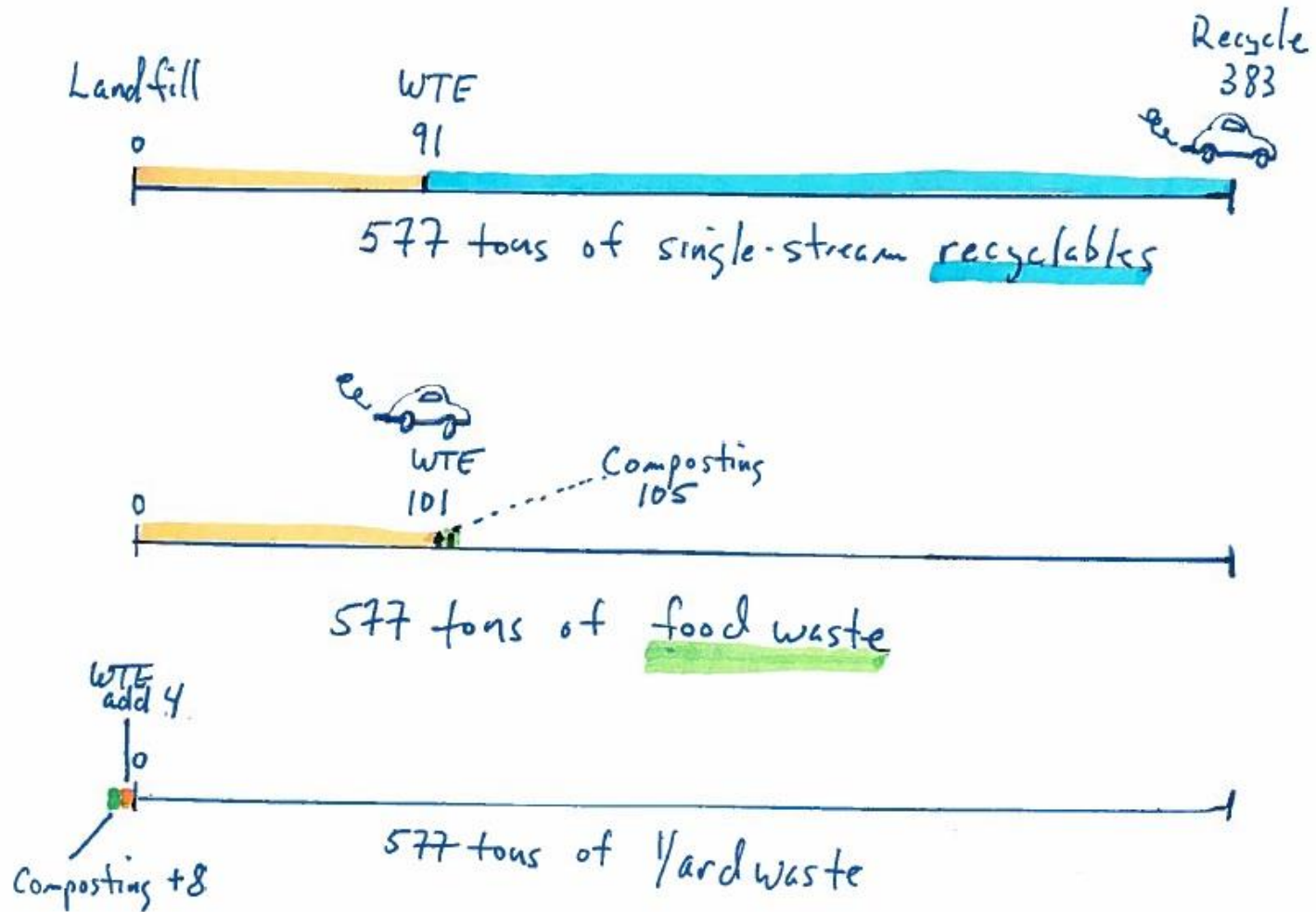
Climate Changing Emissions & Energy



| Service | Metric ton CO2 Release Avoided per Year | Equivalent to # of cars taken off the road | Cost per car taken off the road | BTU Energy Gained | Equivalent to Barrels of Oil Saved |
|---|---|--|---------------------------------|-------------------|------------------------------------|
| Residential Food Waste Collection | 20 Tons | 4 | \$69,338 | <1,524> | <262> |
| Residential Recycling (blue cart) | 16,429 Tons | 3,459 | \$166 | 56,933 | 9,799 |
| Residential Yard Waste | <12> Tons | <2> | Adds 2 cars | <1,256> | <216> |
| Residential Regular Trash (Compared to Landfilling) | 7,170 Tons Compared to Landfilling | 1,509 | \$1,318 | 79,438 | 13,730 |
| Farmers' Market Food Waste Collection | 5 Tons | 1 | \$54,913 | <413> | <71> |

DRAFT WITH ONLY PRELIMINARY REVIEW

Cars Taken Off the Road for a Year Emissions Avoided (Reduced)



Environmental Impact - Part 2

Conserving Natural Resources

Comparison between Recycling & Composting



DRAFT WITH ONLY PRELIMINARY REVIEW

Recycling.... Flying right-side up



What resources are conserved in a year?

The City's 6,900 tons of recyclables are sorted into:

- paper (4,416 tons) = 283,000 trees;
- plastics (248 tons) = 248,000 gallons of gasoline;
- metals (158 tons) = saves energy and avoids landscape degradation;
- glass (1,518 tons) = unfortunately, currently saves nothing.

This material is sold for approximately **\$496,800** even with recent low commodities prices. It has been much higher in the recent past.

And the cost of collection and disposal is **\$234,600** cheaper than managing the material as 'regular trash'.

We're flying right-side up.

Composting Food Waste

– Flying Upside Down



What resources are conserved by composting food waste?

If the City were to initiate a City-wide food waste recovery, the 577 tons of food waste is composted annually into:

- 22,000 bags of compost (a natural soil amendment);
- ‘Retail value’ of the material in 40 lb. bags is estimated to be \$173,000;
- City pays an extra **\$209,843**
(additional amount paid over and above managing the material as ‘regular trash’);
- The City does not receive any of the \$173,000.

The City is spending \$1.21 to create each \$1 unit of value.

We’re flying ‘upside down’. Is this sustainable?

But wait, it gets even worse



Bulk price of the contents of this 40 lb. bag if picked up at the compost facility?

81 cents

The real 'value creation' ratio is: \$11.70 to create \$1 of value

So where do we go from here?



Recommendations



- Do not initiate a residential curbside food waste collection program at this time.
 - Because of its relatively high cost and small environmental benefit.
 - No regional facility that accepts food waste combined with yard waste (required for efficient collection).
- Re-orient/Redesign the Farmers' Markets Food Waste Recovery Program
 - Close the stations for winter (Dec. 21 until March 21)
 - Easier on customers and staff
 - Not many new customers so outreach is minimal
 - Corrects chronic budget shortfall
 - Repurpose the stations to educate customers about 'wasting food' rather than converting food waste to compost (Waste reduction rather than waste recovery).
 - Collecting food separately from regular trash is a 'consciousness raiser' about how much good food is thrown away. (The Natural Resources Defense Council and the Ad Council along with USDA and EPA have initiated a national awareness campaign on this topic.
 - Work with community gardeners, Virginia Agricultural Extension and school-student environmentalists/scientists to compost food waste from farmers' markets at a location in Alexandria (Keep it Local).