

City of Knoxville Curbside Recycling Opportunities

Discussion
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Presented by:
DSM Environmental Services for
The Climate Group

Project Team

➤ The Climate Group:

- Global NGO focused on public policy and technologies needed to accelerate a low carbon economy
- Recycle Together initiative focused on local infrastructure that will increase recycling and reduce GHG emissions
- Goal is to incorporate recycling as key element of local climate action plans

➤ DSM Environmental Services:

- Contractor to The Climate Group to provide technical assistance and expertise to Cities
- 20 years of experience with U.S. cities, and in 16 countries around the world improving waste/recycling and environmental management

Applying Lessons Learned from Other Cities to Knoxville

- High recycling rates associated with:
 - Parallel, curbside recycling and refuse service
 - Large volume carts
 - Single stream collection
 - Clear messages about how to recycle, and the value of recycling
 - Economic incentive to recycle

Current System: Refuse Collection

- 58,819 Households served weekly under contract to Waste Connections:
 - 44,221 at curbside
 - 14,598 with back door service
- Weekly refuse collection using:
 - 15 Rear loading packer trucks
 - 8 Pickups and small packers for back door

Recycling

- Free drop-off recycling at 11 locations
 - 5890 tons collected last year
- Subscription curbside available
 - Waste Connections and Waste Management offer service
 - \$6.50 - \$7 / month for bi-weekly
 - Single stream collection with 95 gal cart by Waste Connections
 - About 1900 homes now signed up
 - Waste Connections says tonnage more than doubled with switch to SS
- Current residential recycling rate is roughly 8%

Current Annual Costs

➤ Costs to City:

- Drop-off recycling at \$490,000
- Curbside refuse collection at \$4.8 million
 - Backdoor service costs an extra \$230,000 under contract bid prices but cost of serving backdoors likely far greater

➤ Other Costs to Residents:

- Subscription recycling estimated to cost 1900 Knoxville households \$150,000
- Drop-off recyclers cost of (self) transport to drop-offs estimated at \$800,000 last year based on user surveys of miles driven (out of way) at IRS rate

Initial Conclusions

- Roughly 33% of residential waste is potentially recyclable
 - Based on weight – greater based on volume
- Recycling rate could be increased to 22% - 27%
 - Holston Hills subscription households estimated at 47%
 - But lower income neighborhoods (with less material available for recycling) and lower capture rates (typical of those not paying for service) would offset the high rates
- This would reduce GHG emissions by roughly 5640 MTCE per year

Added Costs

- Adding curbside for everyone increases costs by an estimated **\$1.7 million**:
 - There are not enough savings from elimination of backdoor service to pay for curbside recycling collection for everyone
 - Eliminating cart costs (through a City bond issue) and charging actual cost for backdoor service (for those willing to pay) narrows the gap to about **\$780,000**

Costs (cont.)

- If the City considers total system costs, then curbside recycling for everyone can be added at no additional cost
 - Subscription curbside costs are eliminated
 - Self transport costs for drop-off users are eliminated
- Moving to a “Denver” based system where carts supplied only by request could bring curbside recycling to Knoxville at about the cost of the current refuse collection system
 - Assuming City purchases the carts
 - In first year

Importance of Sustainability

- Greenhouse Gas Emissions Reductions
 - From increased recycling
 - From reduced trips to drop-off recycling centers
 - From accounting for the embedded energy in materials recovered for recycling

Greenhouse Gas Emissions Reductions

- Curbside recycling for all Knoxville residents would reduce emissions by roughly 5640 MTCE
 - Based on US EPA WARM model
 - But model may underestimate landfill methane emissions and overestimate carbon sequestration
 - Embedded energy more than doubles the reductions (12,000 MTCE)



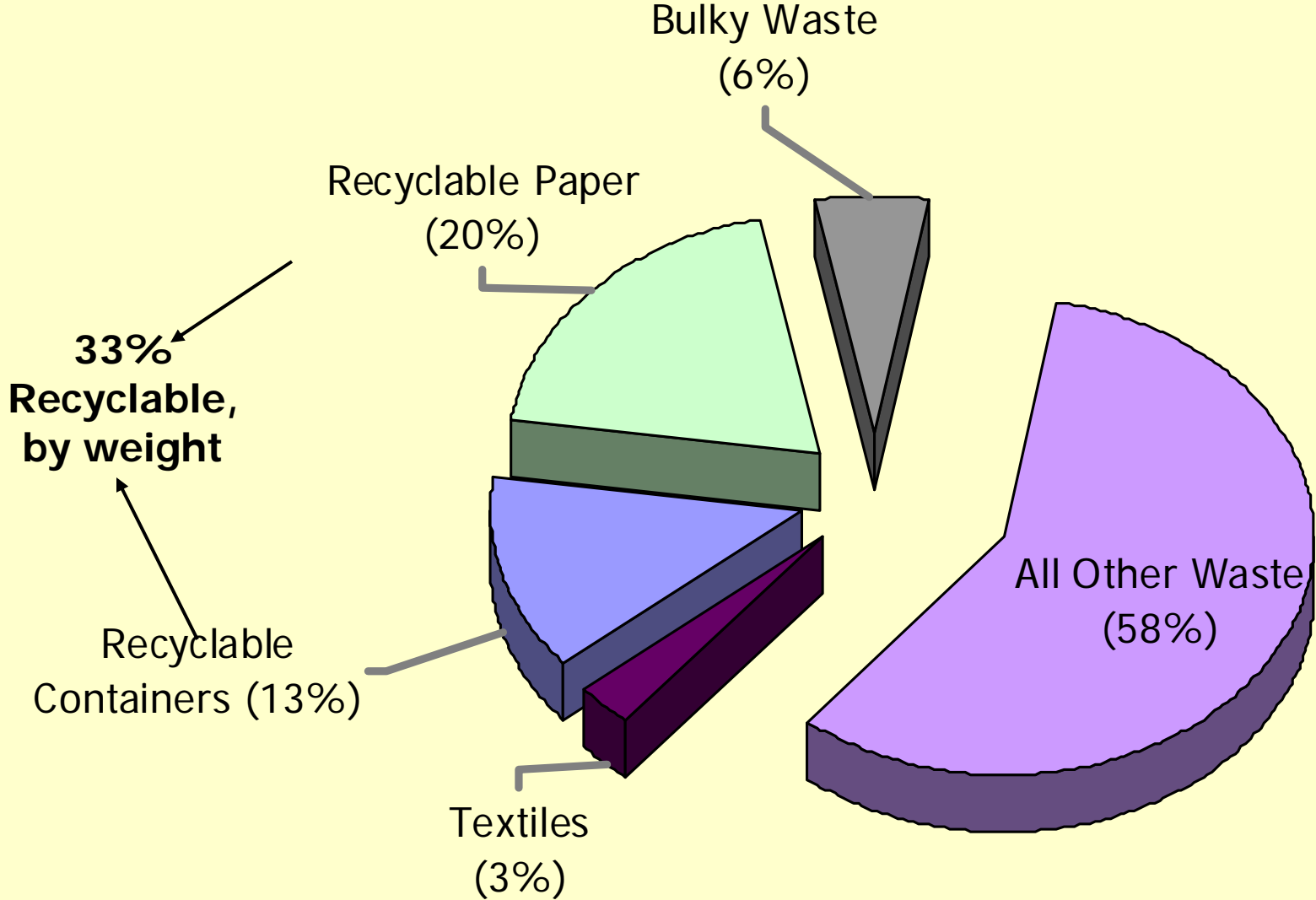
The Details



Knoxville Analysis Conducted To Date

- Composition of Knoxville Waste
 - % recyclable
- Profile of Drop-Off Users
- Telephone surveys on residents willingness to recycle and to pay for service
- Preliminary analysis of costs for parallel curbside collection of recyclables

Waste Composition (% by weight)



Knoxville Waste Comparison to Other Cities

➤ DSM Sort Data:

- Columbus, Ohio: 35%
- Cedar Rapids, Iowa: 33%
- Concord, NH: 31%

➤ Why not higher?

- Yard waste excluded (Recycling rates often include yard waste)
- Weight based (Volume based roughly 53%)
- Excluding bulky wastes, would increase to roughly 57%

Drop-off Survey Results

- 108 on-site surveys (weigh material)
 - 76 City (7 business), 34 County
- Based on surveys:
 - 740 pounds delivered per user per year
 - 153 miles driven out of way
 - 12% participation rate (City households)
- Application to City:
 - City residents drove roughly 1.5 million miles to drop off recyclables last year – emitting roughly 200 MTCE GHG emissions
 - Cost City residents \$800,000 at IRS mileage rate
 - Estimate @ 20% of drop-off material from outside City, and @ 20% from businesses

Curbside Options Analyzed

- Bi-weekly, curbside single stream recycling with carts:
 - To all refuse customers
 - To all refuse customers with incentive:
 - RecycleBank or unit based pricing
 - To first 20,000 households that sign up for service

Results

- Curbside collection for all households should achieve a recycling rate from 22% to 27%
 - Compares to current rate of roughly 8%
 - Difference in rates because only about 15% of households use drop-offs or subscribe to recycling
 - Note that UTenn telephone survey found 60% using drop-offs which conflicts with 12% result from on-site survey (12% consistent with other drop-off programs)
- Drop-off users spend more per ton than most curbside programs to deliver material to the drop-off because of their cost to transport recyclables in their car

“Denver” Model

- Carts (and service) available at no cost to all households who request them
 - Eliminates purchase of carts for households who would not participate
 - Households who request carts tend to be higher recycling households
- Lower cost to City in first year
- Recycling rate estimated at 16% to 20%
 - Lower cost “bridge” to City-wide curbside recycling
 - Could be introduced in pilot areas of City