

City of Knoxville Curbside Recycling: Benefits and Costs

Solid Waste Workshop
December 10, 2009

Presented by:
DSM Environmental Services for
The Climate Group

Project Team

➤ The Climate Group:

- Global Non Govt. Organization 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

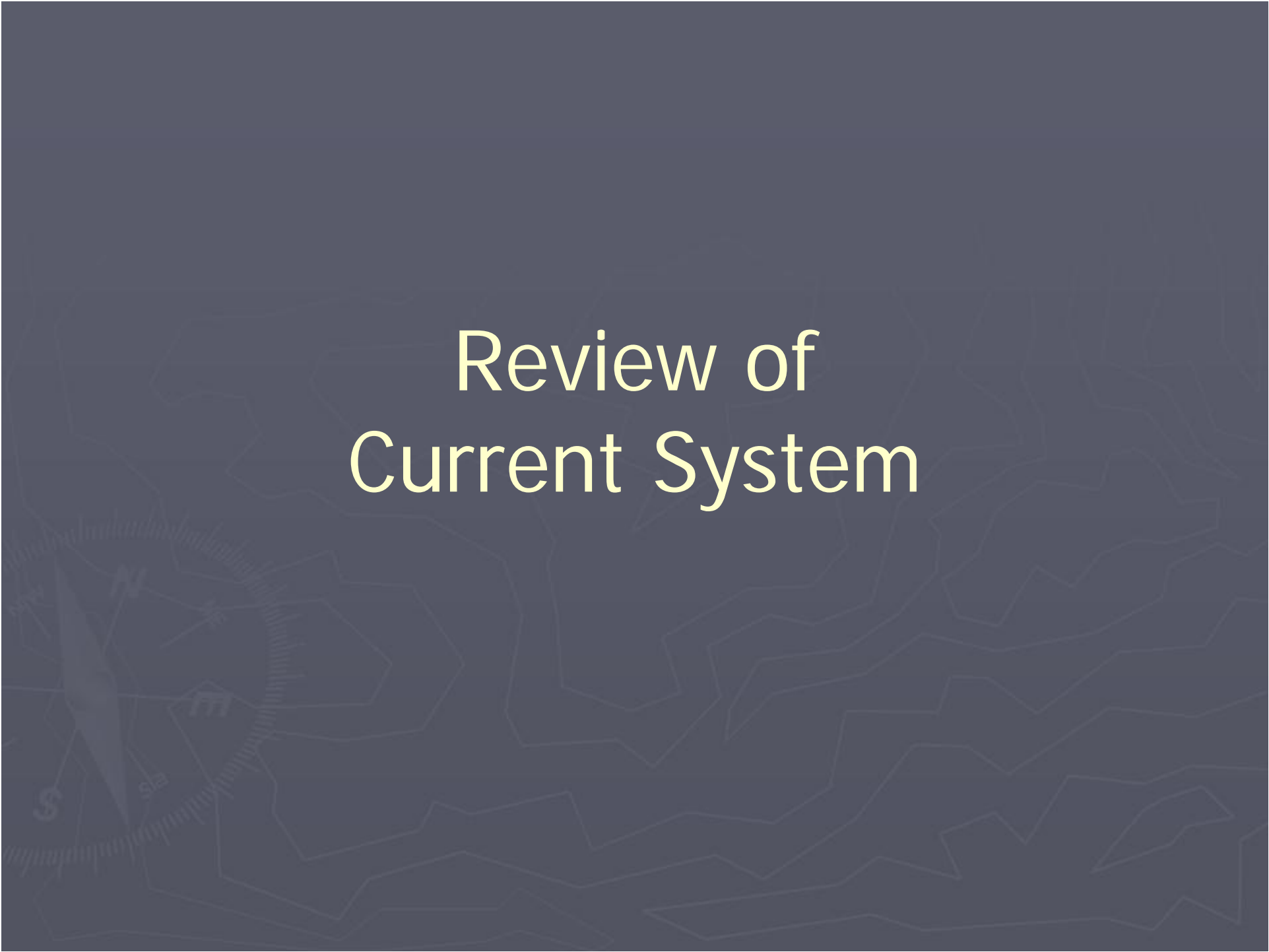
Contractors

- 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 working to improve municipal finance and environmental quality
- University of Tennessee Center for Clean Products (Cat Wilt)
 - Waste Audit (Household trash)
 - Telephone Survey

Workshop Purpose

Review with City Council
Potential to Add Curbside Recycling

Review of Current System

The background of the slide is a dark blue-grey color. It features a faint, light-colored graphic on the left side. This graphic consists of a compass rose with a needle pointing towards the top-left, overlaid on a topographic map with contour lines. The text 'Review of Current System' is centered in a light yellow-green color.

Refuse Collection

- Weekly curbside collection service for 58,819 City households (provided under contract by Waste Connections)
 - 44,221 curbside
 - 14,598 back door
- Collection fleet:
 - Curbside using 15 rear loading packer trucks
 - Backdoor using 8 pickups and small packers



Recycling

- Free drop-off recycling at 11 locations
 - Paid for by City with some operated under contract to Goodwill
 - 5890 tons dropped off in 2009
 - Based on surveys (Feb – March 2009):
 - 59% from City residents
 - 16% from City businesses
 - 25% from non-city households and businesses
 - Free use or lease of locations harder to guarantee

- Curbside recycling by paid subscription
 - \$6.50 - \$7 / month for bi-weekly collection (95 gallon cart)
 - About 2000 homes currently signed up with Waste Connections or Waste Management

- Current residential recycling rate is roughly 8%



Cost Summary (FY 09)

City Costs	(\$)
Household Trash Curb Collection	\$3,400,000
Household Trash Back Door Collection	\$1,400,000
Refuse Disposal Tip Fees	\$1,580,000
Drop-off Recycling Net Costs	\$490,000
	\$6,870,000

Other Costs

- Greenhouse gas emissions
- Traffic and congestion
- Air quality
- Costs to residents to recycle
 - Subscription
 - Drop-off self transport

Surveys of Drop-off Recyclers

- Conducted 108 on-site surveys
 - Interview recyclers and weigh material
 - 76 from City (7 business), 34 from County
- Based on surveys:
 - 740 Pounds delivered per user per year
 - 153 miles driven out of way to recycle
 - 12% City resident participation rate

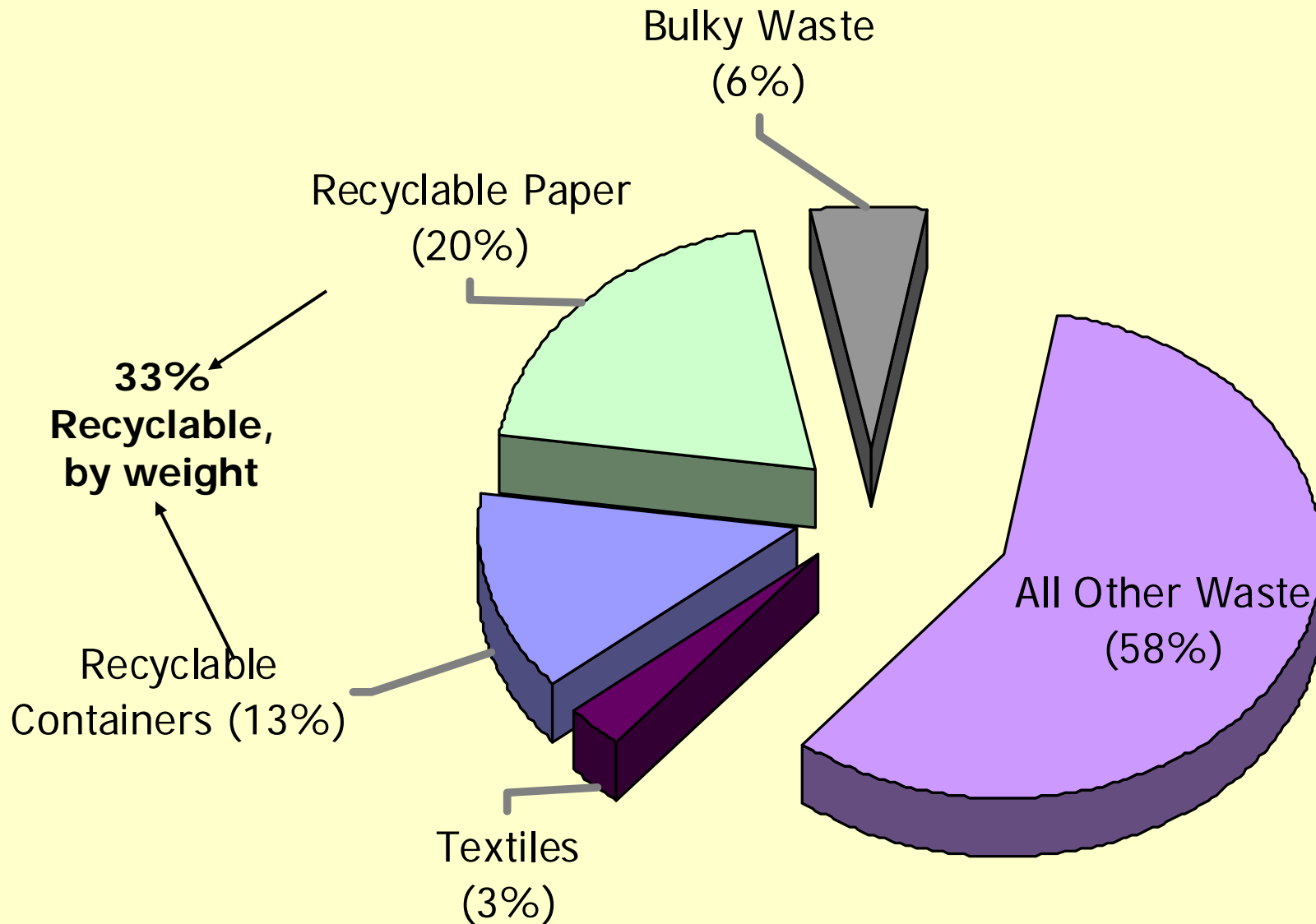
Applying Survey Results

- City residents drove roughly 1.5 million miles to drop off recyclables last year
 - Emitting roughly 200 metric tons of carbon emissions
- Cost City residents \$800,000 at IRS mileage rate

Waste Composition Study

- Random sample of household trash from five representative refuse collection routes in Knoxville
- Sorted trash into 18 categories for weighing
- Sorting conducted by University of Tennessee team

Waste Audit Results



Comparison of Recyclables in Knoxville Waste to Other Cities

➤ DSM sort data:

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

➤ Why not higher?

- No yard waste (most rates include yard waste)
- Weight based (on volume basis roughly 53%)
- Bulky wastes included impacts rates

How Could Knoxville Increase the Recycling Rate? (Lessons Learned from Other Cities)

- Parallel recycling and refuse collection
- Single stream collection (paper and bottles and cans mixed together)
- Large volume carts
- Clear messages about how to recycle, and the value of recycling
- Economic incentive to recycle

Applying Lessons Learned to Knoxville

- Provide curbside collection of recyclables on the same day as refuse collection
- Provide high volume carts
- Ask residents to place all recyclables together in cart
 - Single stream processing already available in Knoxville at RockTenn
- Provide incentive for households to separate recyclables from trash

Parallel Collection



Carts for more volume



Single Stream Processing





Costs

- DSM estimates that adding curbside and carts for all households would increase annual costs by an estimated \$1.7 million
 - Includes amortization of upfront costs of carts
 - Capital cost of \$3.2 million to purchase 58,900 carts
- But through recommended changes to system, added costs can be mitigated:
 - Charges for backdoor service
 - Increases in transfer station fees
 - Diversion savings
 - Reduction in cart costs (through block grant)
 - Reduction in number of drop-offs

Ways to Reduce Costs

- Because carts are expensive, they could be reserved for those that pledge to use them
- Drop-off recycling could be significantly cut back if curbside available
- Backdoor service at no extra cost is unusual for a municipality to provide except for the medically necessary and seniors over 70
 - Charging for backdoor could raise money for solid waste or recycling services

Recommended System

- Least cost method to maximize diversion:
 - Provide carts to those that subscribe to use
 - Provide every other week collection
 - Cut back on drop-offs
- Balance budget by:
 - Backdoor collection for additional fee, except for medically necessary and seniors over 70
 - Bring tipping fees up to current regional standards at the Solid Waste Management Facility (Transfer Station) to ensure cost recovery

Estimated Cost Assuming an Initial 20,000 Households Request Carts for Recycling

- Collection Contract Cost of \$840 - \$1.2 m
- Cart costs mostly covered by 700k block grant and balance is in 2010 budget
- Processing cost estimated at \$125k
- Public education and promotion budget

Minus Potential Cost Savings and Increased Revenues

➤ Cost Savings

- Avoided disposal costs
- Reduced drop-off recycling costs

➤ Increased Revenues

- Increased transfer station fees
- Potential charge for back door collection
(unless medical necessity)

Program Cost Range

- Based on our preliminary analysis, the net cost for adding curbside recycling assuming Knoxville makes the recommended changes to the existing solid waste system, range from a break even (\$0) to as much as \$500,000.

Benefits



Added Jobs

- Collection
- Materials Processing
- Admin/outreach
- Total estimated at 8-10 new jobs in Knoxville
 - Most in collection which are reasonable paying jobs
- Supports U.S. manufacturing jobs – key issue for long-term competitiveness

Sustainability Benefits

➤ Greenhouse Gas Emissions Reductions:

- Recycling 4000 additional tons = 9800 MTCO₂ Equivalent
- Net Fuel Reductions = 1.1 millions lbs of CO₂

➤ Fuel / Embedded Energy Savings

- Reductions from increased recycling (4000 additional tons saves 65,000 MBTU's)
- Savings from reduced trips to drop-off recycling centers (70,000 gallons of gasoline from City residents alone and 132,000 gallons total)

Metrics

- Emissions reductions based on US EPA WARM model which may underestimate climate change benefits of recycling
 - New studies indicate that land use and materials management may represent as much as 40% of total carbon impact
- Value of diversion
 - Residential recycling rate at 8% could double under this approach (based on waste sort)

Implementation

- Phased in region by region best for collection efficiency
- Contract options for carts, cart delivery and service delivery
- Need to address incentives and outreach