

Recycling Participation Study
Quarterly Report
September 12, 2011 through October 14, 2011

The City of Tucson Environmental Services Department (ES) completed a month long study commissioned to determine the recycling participation rate for the City's 130,000 + single-family home residential customers. ES staff members representing Collections, Recycling, Customer Service (Billing Information and GIS) and Public Outreach, met to determine the most efficient approach for conducting the study. The following parameters were set:

- 1) Use a statistically valid sample size for the residential customer base.
- 2) Data collected must be from every route on every collection day.
- 3) Single-family and multi-family dwelling equal to 4 units or less would be considered as one unit.
- 4) The study would be conducted over four consecutive weeks, uninterrupted by a holiday collection schedule.
- 5) Participation would be represented by at least one set out per four week period. Setting out recycle containers more than once during the sample period would count only as one set out.
- 6) Data would be collected on how many times a residential customer would set out recycle container for collection during the sample period.
- 7) Residential recycling collection drivers would be responsible for collecting field data.
- 8) Six addresses were selected per route for the study. All addresses were within the first hour of the driver's collection day.
- 9) Drivers were given a map daily with the houses and addresses identified on the route.
- 10) Drivers were instructed to mark each house with a red "X" to identify each house on the map that had a recycle container set out for collection.
- 11) Drivers were to turn in their maps to their supervisors at the end of each day.
- 12) Supervisors were to turn in their maps to the ES Residential Collection Superintendent no later than the following morning.
- 13) The ES Residential Collection Superintendent was to turn in all the maps to the Waste Diversion Manager for data entry the day after the data was collected in the field. For example, Monday's data would be submitted to the Waste Diversion Manager on Tuesday.
- 14) ES Waste Diversion will keep all maps to resolve data entry issues.

The Program began on September 12, 2011 and ran through October 7, 2012. Using a basis of 130,000 residential, a confidence interval of 5 and a 95% confidence level, a statistically valid sample size would need to be 383 residents would need to be checked. The City's actual sample size was 581, or a minimum of 5, maximum of 6 addresses per route (95 routes). **(Note: The actual confidence interval for a sample of this size at 95% Confidence level would be in the neighborhood of 4.1)**

Initial tabulation of the data indicated an 88% participation rate (513 first time set outs/581 sites). However, further research was done on the 68 (12%) sites that showed no participation. These addresses were compared to water billing data to determine if the residents had active accounts or were active but vacant. Of the 68 sites, 14 were found to be questionable and of these, four (4) were found to not have recycling service. The other 10 addresses need field verification for service level, if any. Taking this information into consideration the sample size was reduced by 4 which in turn increased the recycling Participation Rate to 89%. The data is summarized in table 1 below:

Total Sites (minus questionable addresses)	577			
Total 1st Time Set Out	513	1st Time	Cumulative	Weekly Outs
Week 1	286	50%	50%	50%
Week 2	120	21%	70%	52%
Week 3	69	12%	82%	57%
Week 4	38	7%	89%	56%
Participation	89%			

Additional data were collected to determine how many times per month individuals put out their recycling for collection. This data is summarized in table 2 below:

Total Set Outs (1st time & Repeats)	1235	
Total 1x per month	513	89%
Total 2x per month	169	29%
Total 3x per month	131	23%
Total 4x per month	97	17%

How to improve the Study:

Data collection needs to be more consistent. Some interpretation of the markings on the maps was necessary. Some maps were marked with X's some with O's and some with both. A great appreciation from the data entry staff goes out to the driver who mark the set outs with a smiley face ☺. For future studies, a clear "RED X" through the address would be preferred.

Address verification needs to be completed on the 10 sites noted above.

Study should be limited to single family residents. It is difficult to determine in multiple addresses on a map whether there are four houses in close proximity or a multi-family resident.