Addressing Houston's Long-term Municipal Solid Waste Management Needs

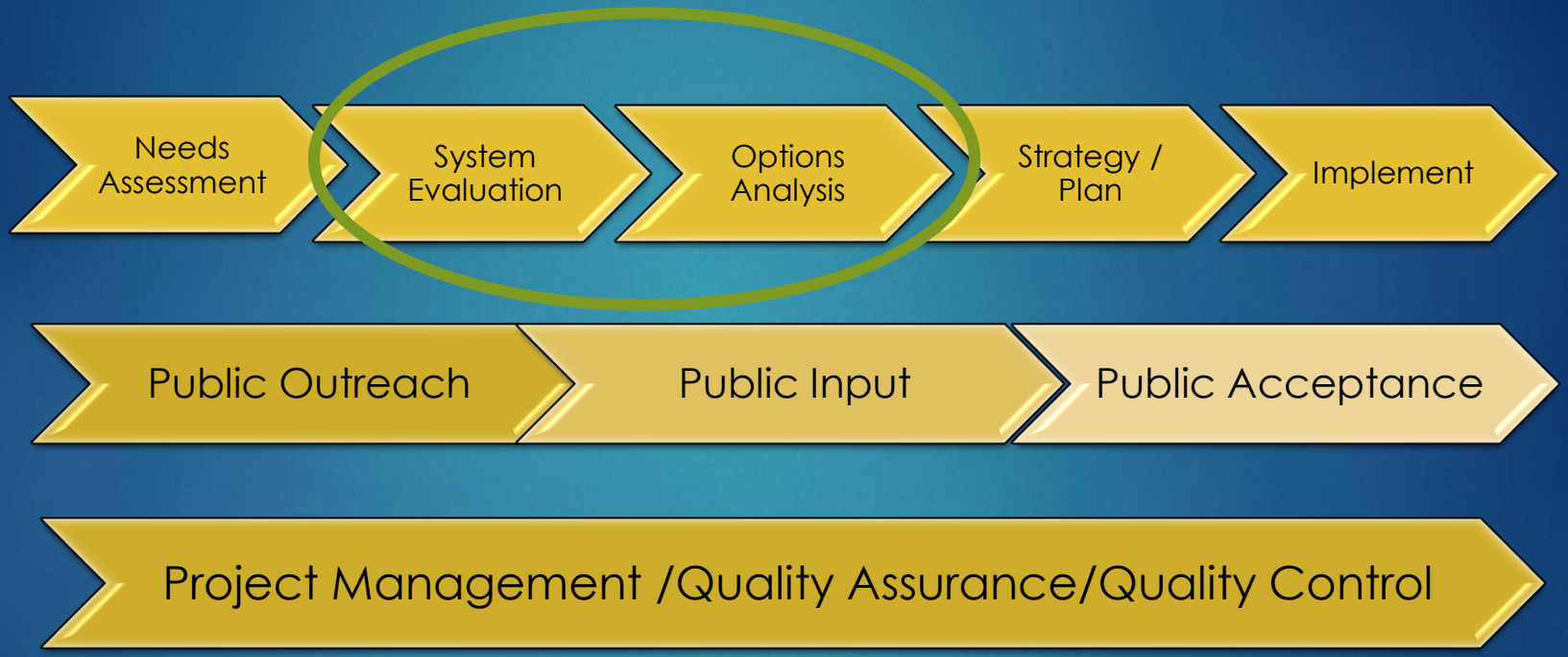
City of Houston Integrated Resource Recovery Management Plan

Mayor's Advisory Task Force Meeting
June 13, 2019

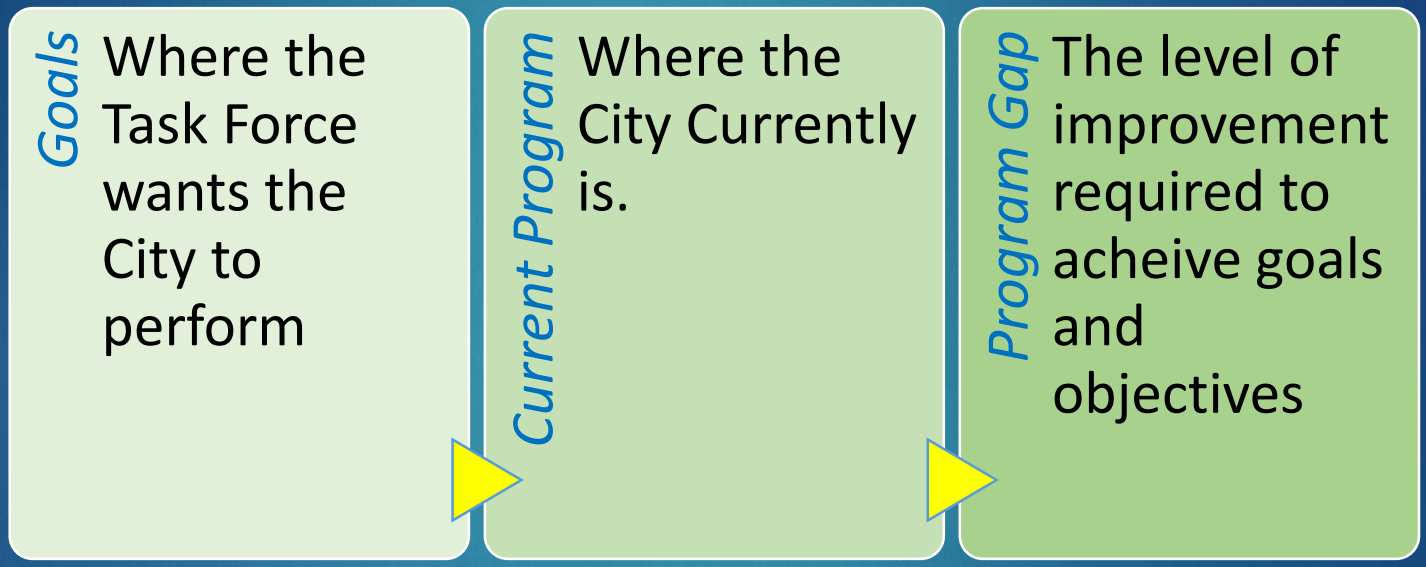
Task 5: Waste Management Activities Analysis

SOURCE REDUCTION, REUSE, RECYCLING AND ORGANICS

Program Planning Process



Gap Analysis



Sustainable Materials Management

The Product Life Cycle Materials Economy

Source: U.S. EPA
https://www.epa.gov/smm/sustainable-materials-management-basics

Product Life Cycle

Material Stage	Definition	Local Government Impact
Upstream	Extraction, Design, Manufacturing Process	Limited, through policies or regulations of materials
Midstream	Consumption and Use	Encourage or facilitate reuse, repair, repurpose (extend longevity)
Downstream	Processing and Disposal	Recycling, composting, energy recovery

Source Reduction

Activities designed to reduce the volume or toxicity of waste generated, including the design and manufacture of products with minimum toxic content, minimum volume of material, and/or longer useful life - EPA

Existing City Programs

Source Reduction

- **Grasscycling**
  - April 2010, City began compost bag program for yard waste
  - Grasscycling is promoted as free alternative to compost bags
- **Green Houston (Green City Project)**
  - Office of Sustainability initiatives include:
    - Zero Waste starter kit (promotion and education)
    - Climate Action Plan
  - Green Building Resource Center:
    - Compost bin sale (coupled with rain barrel sales)

Needs and Gaps

Source Reduction

- Source reduction is not currently a primary focus for the City, with the exception of grasscycling and the GRBC webpage dedicated to promoting zero waste habits.

Potential Future Actions

Source Reduction

- **Overall Objective: Encourage and facilitate waste prevention and reduction for all Houston residents and businesses, while leading by example.**
  - *Four specific objectives for discussion*

Potential Future Actions

Source Reduction

- Specific Objective: Expand education of residents and businesses to include source reduction opportunities.
  - Include tips to promote source reduction activities in the City's ongoing education and outreach materials.
  - Update the Solid Waste webpage to include source reduction tips.

At home:
- Backyard composting
- Think before you buy
  - Consider packaging
  - Buy in bulk

Away from home:
- Reusable beverage container
- Reusable containers for left overs
- Reusable straws
- Reusable shopping bags

Potential Future Actions

Source Reduction

- Specific Objective: Evaluate and modify, as appropriate, the City's current purchasing practices and guidelines for City buildings and facilities to lead by example
  - Create a sustainability purchasing team to develop an Environmentally Preferable Purchasing Guide (EPPG) to promote and encourage environmental stewardship across all City agencies.

Potential Future Actions

Source Reduction

- Specific Objective: Implement a citywide "Green Building Code" to codify requirements for new construction and redevelopment projects to meet certain environmental criteria that include source reduction in coordination with the LEED certification in practice for City facilities

Potential Future Actions

Source Reduction

- Specific Objective: Support, facilitate and participate in state and national level discussions to impact manufacturer's type and amounts of manufacturing materials and longevity of products.
- State:
  - Plastic bag ban taken up by the State legislature, after the recent Texas Supreme Court ruling making local government ordinances unenforceable.
  - Monitor other state level efforts.
- National:
  - Monitor national level efforts for product stewardship opportunities to support.

Reuse

The use of a product more than once in its same form for the same purpose (conventional reuse), or for different purposes (repurposing) ***- EPA***

Existing City Programs

Reuse

- **Building Materials Reuse Warehouse Donations (in pounds)**

  - Accepts material from individuals, supply companies, and builders, and make it freely available for reuse by any non-profit organization
  - Since its inception (2009), the Reuse Warehouse has acquired approximately 9.5 million pounds of material

	CY 2017	CY 2018
Bitumen	3,148	40,880
Cardboard	42,021	20,000
Ceramic	28,483	19,683
Concrete	179,219	170,561
Doors	34,315	45,302
Glass	33,883	17,876
Masonry	185,542	209,863
MEP	25,224	52,765
Metal	185,271	53,670
Miscellaneous	4,804	3,995
Plastic	409,014	31,063
Soil	45,785	178,471
Wood	208,166	144,598
Total (Pounds)	**1,384,875**	**988,727**

Existing City Programs

Reuse

- **Chemical Swap Shop and ReStore**
  - Located at the Environmental Service Center (ESC) South
  - Household chemicals and paint that were brought to ESC South that appear to be in good condition are made available for citizen reuse
  - The ReStore acts as a book swap, a recycling information library, and a repository for craft items and post-consumer and post-industrial scrap
    - items available to the public during the Reuse Chemical Take-Away

Existing City Programs

Reuse

- **Materials Reused/Recycled (in pounds)**

	FY 2016	FY 2017
All Materials Collected[1]	871,569	854,004
Total # of Customers[2]	5,433	5,408
Material Reused/Recycled		
Antifreeze	16,648	8,557
Bandit Signs	28,800	20,149
Batteries	4,288	13,974
Cardboard	11,580	7,020
Cooking Oil	18,550	20,690
Electronics Collections	70,795	60,855
Motor Oil	33,169	31,483
Plastic Buckets	-	-
Reuse Books	722	1,701
Reuse Chemicals	17,964	18,467
Reuse Paint[1]	85,957	84,871
Scrap Metal	61,802	38,069
Shredco Paper[3]	-	4,600
Tires	5,244	3,418
Total (Pounds)	**355,519**	**313,854**
% of Materials Reused/Recycled	**40.79%**	**36.75%**

Needs and Gaps

Reuse

- The City is directly involved in promoting and facilitating the reuse of building materials and chemicals but is not directly involved in promoting or facilitating the reuse of other materials.

Potential Future Actions

Reuse

- **Overall Objective (Recycling and Reuse): Expand and innovate reuse and recycling opportunities to all Houston residents and businesses to increase diversion and recovery, while reducing contamination.**
  - *Five specific objectives for discussion*

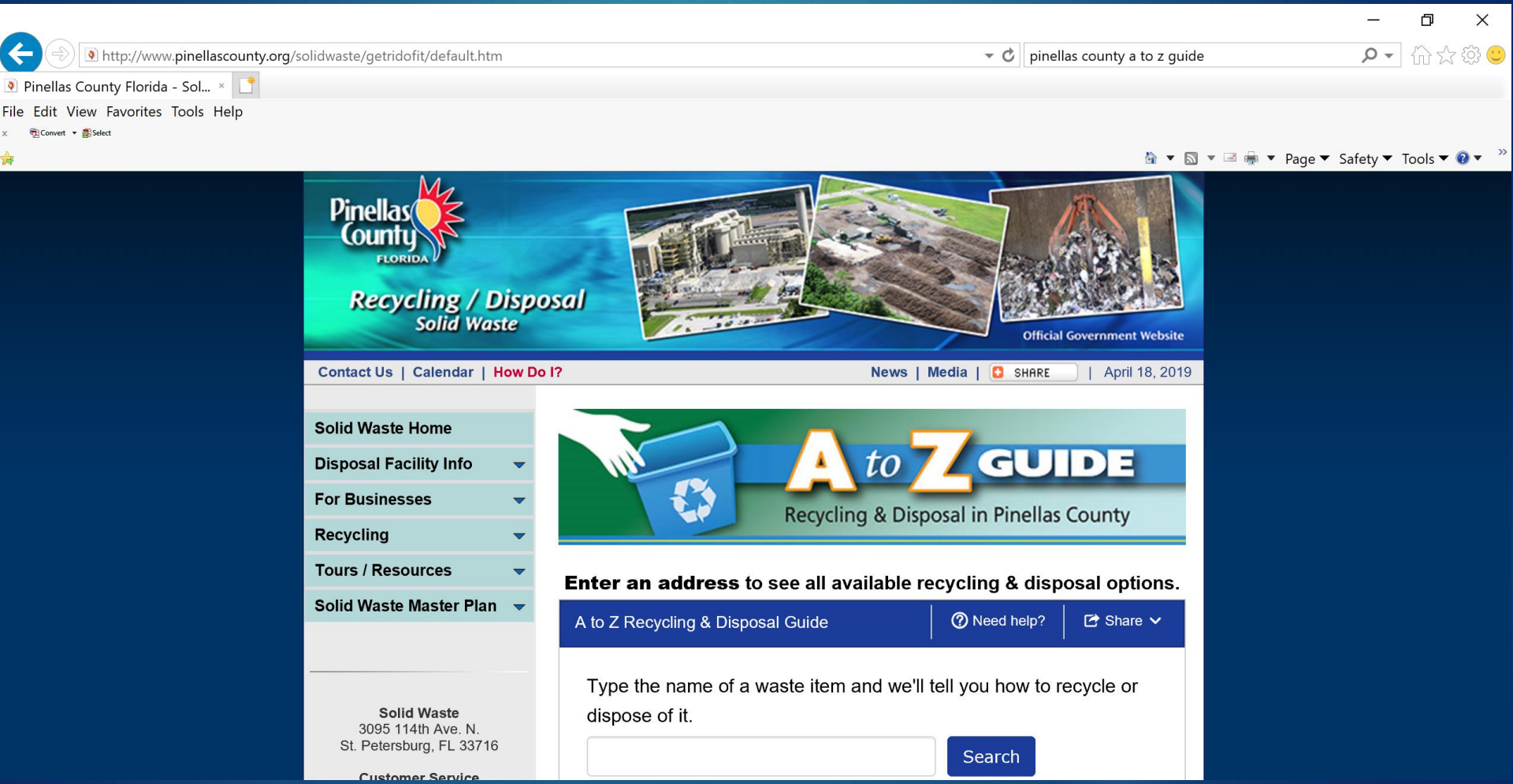
Potential Future Actions

Reuse

- **Specific Objective:** Encourage and facilitate the reuse of household and business items
  - The City could develop an interactive online tool to include on the City's solid waste webpage, to allow residents to type in an item, and the proper handling and options for reuse or recycling could be provided.

A to Z Guide Example

- http://www.pinellascounty.org/solidwaste/getridofit/default.htm



Potential Future Actions

Reuse

- Increase education and promotion of reuse opportunities including additional means (i.e. social media, radio, television spots)
- Implement a "Green Building Code" to codify requirements for new construction and redevelopment projects to meet certain environmental criteria (source reduction, reuse and recycling)
- Consider the need for additional City-run facilities for reuse, including which materials, how much material to anticipate, and accessibility of potential facilities
- City-hosted "fix it fairs" to facilitate refurbishing and reusing items

Potential Future Actions

Reuse

- Measure success by tracking single family generation rates and total generation rates.
- Measure success by increasing the number of citizens reached with education materials.

Recycling

A series of activities by which discarded materials are collected, sorted, processed, converted into raw materials, and used in the production of new products - EPA

Existing City Programs

Recycling

- Curbside Collection
  - City provides residential curbside recycling collection to approximately 387,000 households within its service area every other week using carts
- Recyclable materials in the City's program ("program materials") include:
  - Paper: Newspaper, magazines, catalogs, junk mail, office paper
  - Plastic: Containers No. 1 through 5, and 7
  - Aluminum cans and foil
  - Steel and tin cans
  - Glass
  - Cardboard (flattened)
  - Cartons: gable top and shelf stable cartons, juice cartons, soup cartons, soy milk/alternative milk cartons

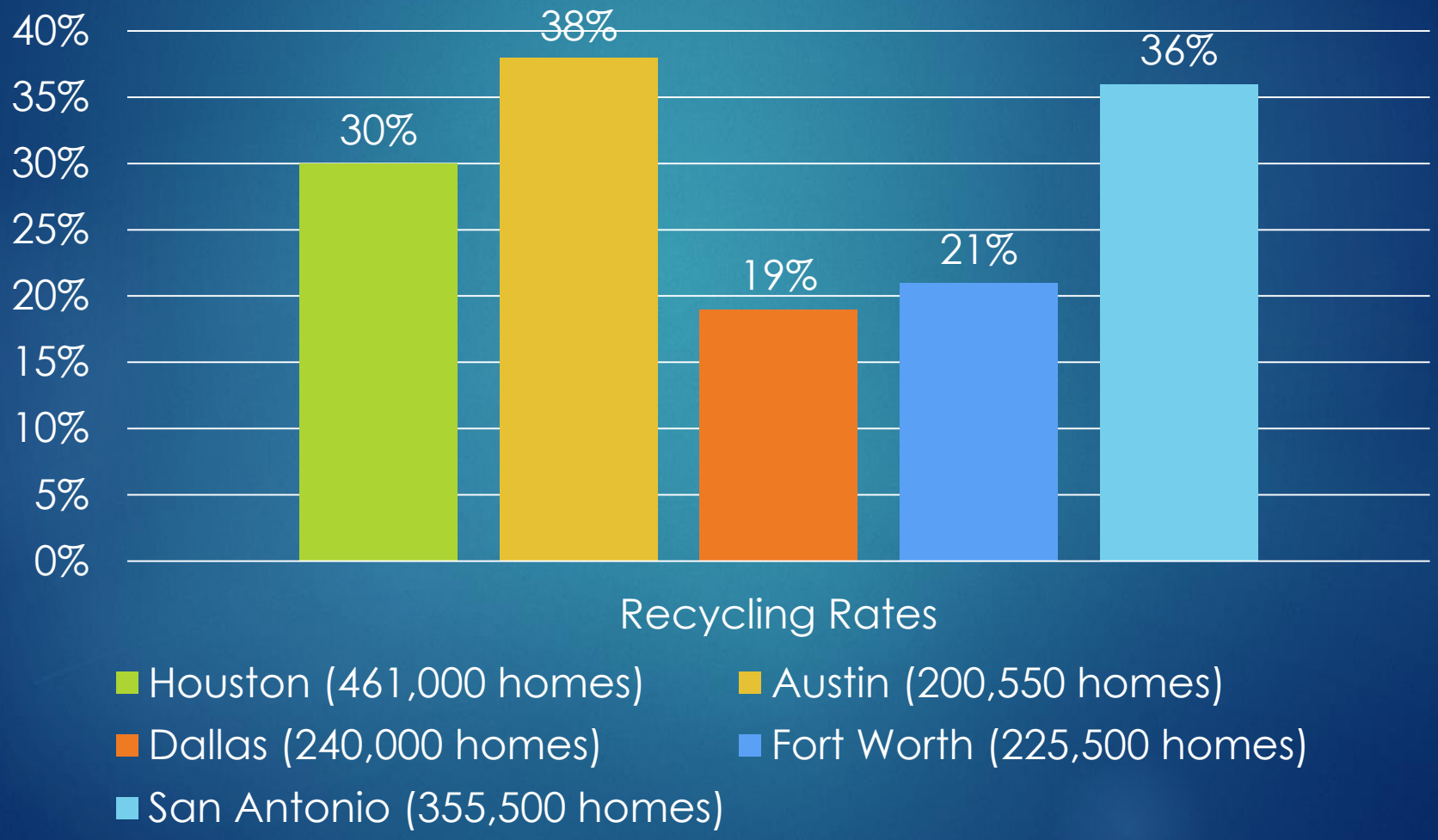
Existing City Programs

Recycling

- Single Family Curbside Collection

	FY 2016	FY 2017	FY 2018
SF Curbside Recycling (Tons)	62,287	51,497[1]	36,595
SF Yard & Wood Waste (Tons)	54,479	54,569	30,612
SF Bulky Waste (Tons)	287,064	174,742	195,829
SF Curbside Garbage (Tons)	385,660	431,717	445,397
Total Tons	789,490	712,525	708,433
Curbside Recycling Rate	7.89%	7.23%	5.17%
Curbside Yard & Wood Waste Diversion Rate	6.90%	7.66%	4.32%
Total Curbside Diversion Rate	**14.79%**	**14.89%**	**9.49%**

Recycling Rates Comparison



Existing City Programs

Recycling

- Multifamily Collection
  - The City's curbside recycling collection service is limited to apartment communities containing eight or fewer units
  - For residents residing in multifamily complexes with greater than eight units, recycling services through the City are limited to use of the Neighborhood Depository/Recycling Centers
  - Multifamily complexes can contract directly with a private hauler for recycling collection

Existing City Programs

Recycling

- Neighborhood Depository/Recycling Centers
  - The City operates six neighborhood depositories and three recycling centers for junk, tree, and recyclable materials

	CY 2017	CY 2018
Neighborhood Depositories		
North	459.15	482.36
Northwest	265.74	227.81
Northeast	132.16	136.60
South	88.21	65.61
Southwest	148.39	113.88
Southeast	126.79	138.17
City Recycling Centers		
Westpark Recycling Center	1,261.09	629.54
Clear Lake/Ellington Airport	481.23	232.78
Kingwood Recycling Center	359.54	291.81
Total (Tons)	**3,322**	**2,319**

Existing City Programs

Recycling

- Business Recycling
  - The City offers small to mid-size businesses curbside recycling in select areas for a small fee
  - 212 currently participate
  - Businesses can contract directly with a private hauler for recycling collection (no specific data available to the City)
- Waste Generation Report
  - Data extrapolated from the 2017 TCEQ Study indicates over 70% of the traditional recyclables diverted in the City come from sources other than the curbside recycling program and the drop off centers,
  - Indicates the business sector is currently very active in recycling

Existing City Programs

Recycling

- Environmental Service Centers
  - Drive through drop-off locations for Houston residents to bring their household hazardous waste (HHW) anti-freeze, batteries, fuel, oil, paint, paint thinner, pesticides, herbicides, household cleaners, and electronic scrap

Existing City Programs

Recycling

- Electronics Donation and Recycling
  - Electronic recycling at the North and South ESC locations, and the Westpark Consumer Recycling Center
  - The City maintains contracts with RAKI and CompuCycle for their electronics recycling
  - Over 2 million pounds of electronics reused or recycled

Existing Markets

Recycling

- FCC April 2019 Processing Report for Houston

	Composition	Tons to Sell	Value ($/ton)	Total Revenues
Old Corrugated Cardboard	20.21%	681.650	$67.69	$46,140.89
Mixed Paper	32.92%	1,110.335	$50.44	$56,005.35
Newspaper	0.00%	0.000	$0.00	0.00
Aseptic Packaging	0.04%	1.349	$0.00	0.00
Scrap Metals	1.61%	54.303	$95.00	$5,158.79
Aluminum Cans/Foils	0.70%	23.609	$1,120.00	$26,442.08
Plastic Bottle #2 Natural	1.42%	47.894	$445.00	$21,312.83
Plastic Bottle #2 Color	1.50%	50.592	$320.00	$16,189.44
Plastic Bottle #1	1.12%	37.776	$340.00	$12,843.84
Plastics #3 - #7	0.81%	27.320	$64.60	$1,764.87
Glass 3 Mix	9.07%	241.513	$5.50	$1,328.32
Contamination	30.60%	1,086.407	$27.00	$29,332.99
Total	**100%**	**3,362.75**		**$187,186.41**

Existing Markets

Recycling

- April 2019 FCC Payment to City

Net Revenue	-$121,871.56
Revenue Share	50.00%
City of Houston Payment	$121,871.56
Cost per ton	$34.33
Blended Value	$52.72
Payment to City for Education Fee	$8,333.33
Payment to FCC	$67,456.65
Payment to City	$8,333.33

Needs and Gaps

Recycling

- Contamination is a problem
  - January 30, 2016 showed "trash" at 22.82% (prior to FCC contract)
  - June 28, 2017 showed "trash" at 25.22% (prior to FCC contract)
  - December 12, 2018 showed "trash" at 30.6% (prior to FCC contract)
  - April of 2019 showed "contamination" at 30.6% (as reported by FCC)
- National average contamination rate for single stream recycling is about 25%
- No current means to track participation

Potential Future Actions

Recycling

- **Overall Objective (Recycling and Reuse): Expand and innovate recycling opportunities to all Houston residents and businesses to increase diversion and recovery, while reducing contamination.**
  - *Seven specific objectives for discussion*

Potential Future Actions

Recycling

- Specific Objective: Increase participation of single family homes in recycling programs, to increase amounts and types of materials and decrease contamination
  - Strict enforcement on contamination, which may require dedicated code enforcement officers
  - Begin tracking participation rates
  - Improve labeling on recycling containers
  - Increase education and promotion of the recycling program with additional means (i.e. social media, radio, television spots)
  - Increase recycling collection frequency to once per week

Potential Future Action

Recycling

- Specific Objective: Encourage greater recycling within the multifamily sector to increase amounts and types of materials and decrease contamination
  - Consider implementing a "universal" (i.e. mandatory) recycling ordinance to require multifamily residents to participate in recycling
  - Expand staffing to include personnel that can conduct audits and make recommendations for improved or new recycling programs at multifamily complexes, on a voluntary basis
  - Consider a licensing procedure for recyclables haulers that is renewed annually and contains reporting requirements track participation and contamination rates within the multifamily sector

Potential Future Actions

Recycling

- Specific Objective: Encourage greater recycling within the commercial sector to increase amounts and types of materials and decrease contamination
  - Consider implementing a "universal" (i.e. mandatory) recycling ordinance to require businesses to participate in recycling
  - Expand staffing to include personnel that can conduct audits and make recommendations for improved or new recycling programs at businesses, on a voluntary basis
  - Consider a licensing procedure for recyclables haulers that is renewed annually and contains reporting requirements track participation and contamination rates within the commercial sector

Potential Future Actions

Recycling

- Green Building Code would include requirements for accommodating recyclables containers
- Identify deficits in end markets and work with vendors/processors to better develop lacking end markets
- Work with the private sector to evaluate the potential to develop additional end markets.
- Continue to evaluate evolving technologies for processing materials.
- Measure success by tracking diversion rates, number of citizens reached with education materials, participation rates across generating sectors, number of visitors and tons collected at drop off centers, total tons processed at regional MRF's, contamination rates, and total tons marketed.

Organics

Green Waste (yard and tree)
Food Residuals (pre- and post-consumer)
Biosolids

Unique Issues

Organics

- Single-family Residential yard and tree waste are collected by City.
- Source reduction is hard to measure. (conflicting metrics)
- Non-residential generation is vast, diverse and impossible to count.
- Non-residential is already partially diverted, but how much?
- Processing is all private sector. (all market driven- feedstocks and products)
- Contamination is "a killer!"
- Post-consumer food waste is low value, especially residential.
- Pre-consumer food waste is high value but broad collection is difficult.
- Some biosolids are landfilled.
- Composters that are close-in have limited authorizations.
- New technologies are emerging.

Metrics

Organics

Metric	Measurement	Source	Current	Define Future Success
Organics Disposal	Tons Disposed in Regional Landfills	TCEQ Annual Reports	21,000T/Yr Brush	Decrease Disposal
Non-residential Organics Processing	Total Tons Processed	Voluntary or Mandatory Reporting of Throughput	613,500 T/Yr in Region; >235,000 T/Yr in Houston	Increase Processing
Non-residential Organics Processing Capacity	Tons Capacity	Voluntary or Mandatory Reporting of Capacity	>815,000T/Yr in Region; 481,000T/Yr In Houston	Increase Capacity

Potential Future Actions

Organics

Overall Objective: Preserve landfill capacity and realize environmental and economic benefits by reducing the disposal of organic resources within regulatory and economic constraints.

1. Increase organics diversion among businesses and industries, focusing on pre-consumer organics
2. Enforce prohibition of green waste in solid waste and recycling carts
3. Decrease contamination in any non-residential organics collected for processing
4. Support product markets

Potential Future Actions

Organics

5. Divert all biosolids from landfill to composting
6. Encourage access to composting facilities capable of processing a broad range of feedstocks
7. Encourage diversion of brush from local landfills to processors
8. Reduce generation of organic wastes
9. Periodically monitor the development of waste conversion technologies to assess technical and economic feasibility

Construction and Demolition Debris (C&D)

Existing City Programs

C&D

- Largely handled by the private sector
- H-GAC indicates four Regional Recycling Drop Off Centers that accept construction waste, including:
  - City of Deer Park Drop off Center (in Deer Park)
  - Hardy Service Center (in Houston)
  - City of Houston Building Materials Reuse Warehouse
  - Greenstar Recycling (in Houston)

Existing Markets

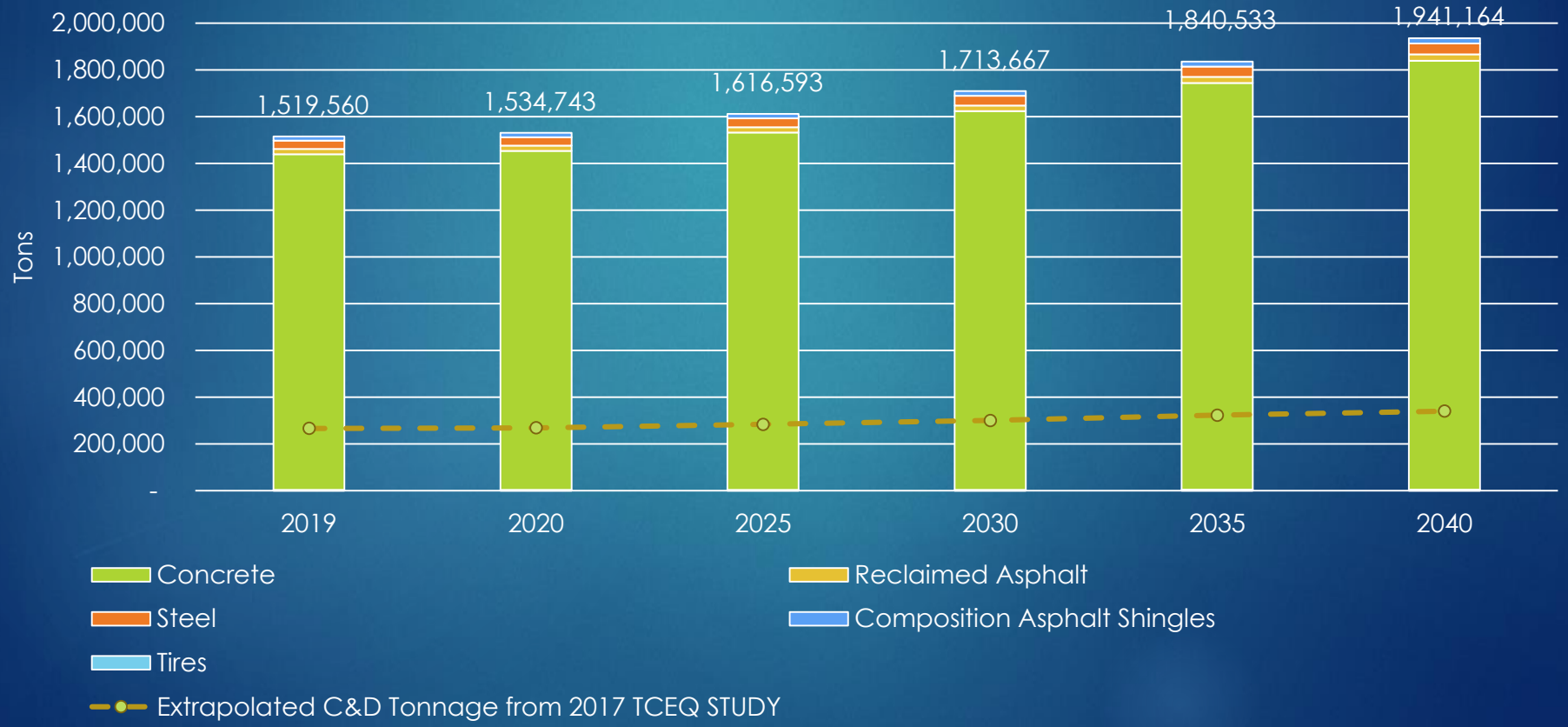
C&D

- Cherry Companies represents the largest C&D processor in the region, and reports annually recycling:
  - More than two million tons of concrete for use in road base material,
  - About 30,000 tons of reclaimed asphalt paving for use in hot mix material,
  - Over 50,000 tons of steel to fabricate new steel products,
  - Approximately 23,000 tons of composition asphalt shingles for use in hot mix material, and
  - Nearly a half million automotive and truck tires for alternative fuel

Existing Markets

C&D

- Waste Generation Report estimated that approximately 1.5 million tons of C&D material are diverted annually from within the City
- C&D Diversion Forecast



Needs and Gaps

C&D

- The City is not directly involved in C&D collection, processing or disposal, which is largely handled by the private sector.
- The actual amount of C&D being diverted in the City is far greater than TCEQ reported in their 2017 Study.
- Based on the Waste Generation Report and supporting data, the City has an estimated diversion rate of approximately 32.4%.
  - 75% of the diversion rate is due to C&D. Excluding C&D, the diversion rate is approximately 10.9%.

Potential Future Actions

C&D

- **Overall Objective: Increase Resource Recovery through Reuse, Recycling, C&D and Organics Diversion.**
- **Specific Objective: Maximize landfill capacity and realize environmental and economic benefits by reducing the disposal of C&D and organic resources within regulatory and economic constraints.**
  - Three potential future actions for discussion

Potential Future Actions

C&D

- Work with the private sector to develop markets for the following materials, which could divert additional C&D materials from the landfill:
  - Sheet rock
  - Carpet
  - Treated wood
  - Gypsum
  - Glass

Potential Future Actions

C&D

- "Green Building Code" to codify requirements for new construction and redevelopment projects to meet certain environmental criteria, including C&D diversion (along with source reduction, reuse, recycling)
- Universal (i.e. mandatory) C&D recycling ordinance
  - Would require a debris management plan and certain diversion metrics for any construction or demolition project in the City.
  - The requirements of the ordinance could be enforced through the permitting process.