GB2

BURNS McDONNELL

Study on the ECONOMIC IMPACTS of RECYCLING

TCEQ Trade Fair
May 2018

Slide 1

GB2 Ginther, Blake, 6/22/2017

Project Introduction

Study Background

- In 2015, the 84th Texas Legislature passed House Bill 2763, which directed the Texas Commission on Environmental Quality (TCEQ) to conduct a study on the economic impacts of recycling in Texas
- The *Study on the Economic Impacts of Recycling* (Study) meets the requirements of the law by building on the efforts of prior recycling studies and providing information on the following:
  - Current recycling efforts
  - Methods to increase recycling, such as the development of new markets for recycled materials and new businesses that may result from increased recycling
  - Funding methods to increase recycling
  - Job creation from recycling, as well as potential job creation that will result from increased recycling
  - Infrastructure needs and opportunities for rural and underserved areas

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Building on Prior Studies

- As directed by House Bill 2763, methodology to develop the Study was based on the efforts of prior recycling studies conducted in Texas
- Builds on the 2013 Texas Recycling Data Initiative (TRDI), which established a methodology for measuring recycling and presenting limited economic and jobs information
- Builds on regional studies completed for the Houston-Galveston Area Council (H-GAC) and the North Central Texas Council of Governments (NCTCOG)

Recycling Industry Committee

- American Forest and Paper Association (AF&PA)
- Carton Council
- Construction and Demolition Recycling Association (CDRA)
- Cooperative Teamwork and Recycling Assistance (CTRA)
- Glass Packaging Institute (GPI)
- Institute of Scrap Recycling Industries Inc. (ISRI)
- National Association for Polyethylene Terephthalate (PET) Container Resources (NAPCOR)
- National Waste and Recycling Association (NWRA)
- North American Hazardous Materials Management Association (NAHMMA)
- Recycling Council of Texas (RCOT)
- Society of the Plastics Industry (SPI)
- Solid Waste Association of North America – Lone Star Chapter (TxSWANA)
- STAR - Electronic Resource Recovery Council (ERRC)
- STAR - Texas Compost Council (TCC)
- STAR - Texas Product Stewardship Council (TxPSC)
- Texas Association of Business (TAB)
- Texas Association of Regional Councils (TARC)
- Texas Commission of Environmental Quality (TCEQ) Municipal Solid Waste Management and Resource Recovery Advisory Council (MSWRRAC)
- Texas Retailers Association (TRA)
- United States Environmental Protection Agency, Region 6 (U.S. EPA)
- Representative Ed Thompson (ex-officio)
- Senator José Rodriguez (ex-officio)

Points to Consider When Comparing Statewide Recycling Rate and Economic Data

- A number of states report recycling quantities, rates, and economic data
- Comparing this information across states is notoriously challenging and can be misleading
- Important to keep the points on the following two slides in mind when comparing the Study's recycling measurement and economic results to other studies
- Analysis is intentionally conservative, which likely understates recycling quantities and economic impacts

Statewide Recycling Rate and Economic Points to Consider (Table 1-1)

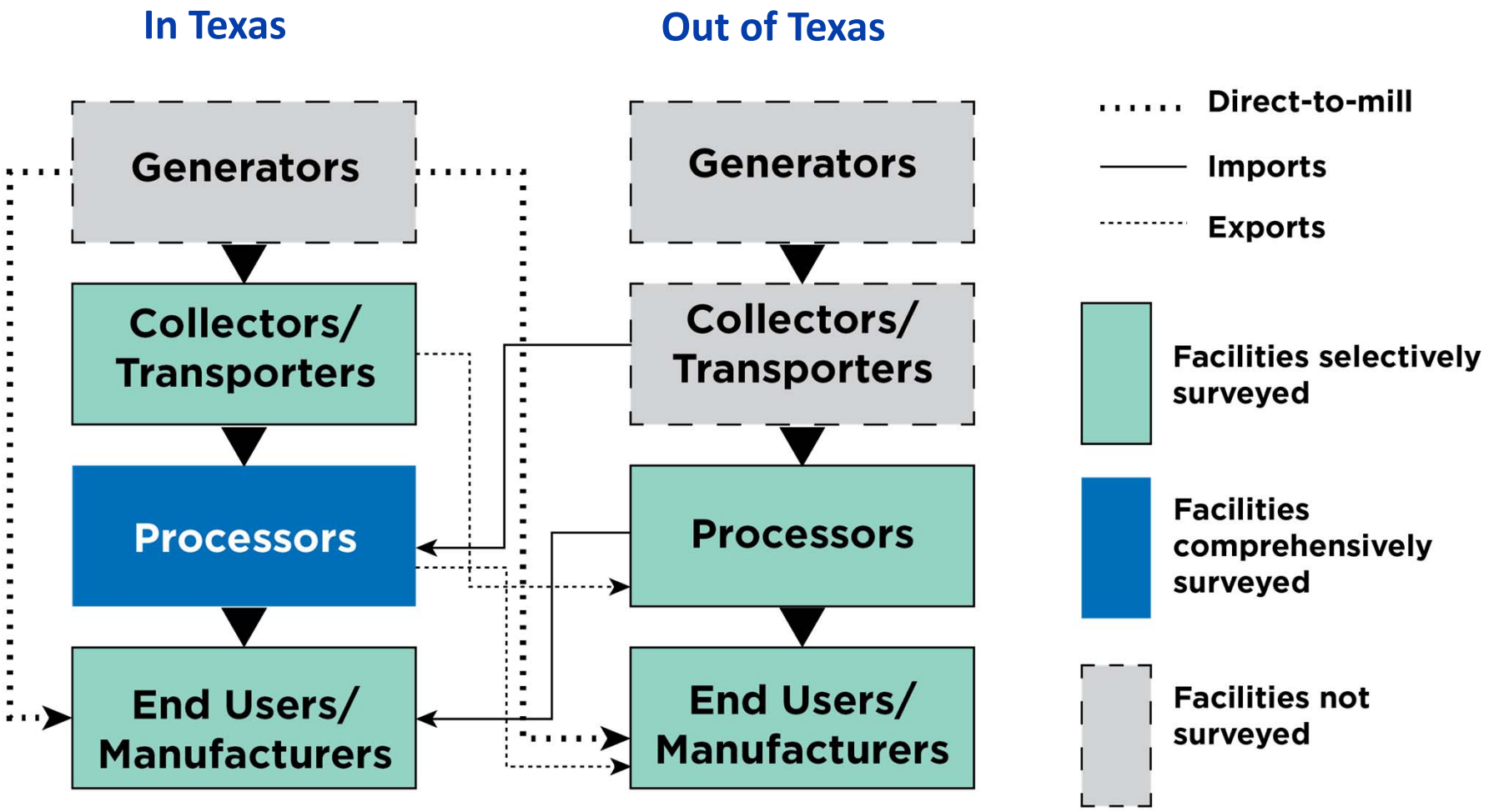
Issue	*Study on the Economic Impacts of Recycling* Approach	Approach for Some Other Statewide Studies
Definition of Recycling	Developed a methodology based on collecting data on municipal solid waste (MSW) as defined in Texas statute. Though not defined in Texas statute, the study also excluded source reduction, energy recovery, and reuse.	Some states may include reuse, energy recovery, certain source reduction activities, other conversion technologies or non-MSW material.
Voluntary or Mandatory	Approach was strictly voluntary.	States that mandate local agencies and certain businesses to submit recycling data may have a higher response rate.
Double Counting	Systematically focused on specific points in the material value chain to minimize double counting.	While some states take a similar approach, other approaches may not address double counting.
Addressing Data Gaps/ Extrapolation	Did not extrapolate; employed conservative estimates only in a few key areas where essential to produce consistent results.	States may use any number of approaches to derive estimates where needed to address data gaps.

Statewide Recycling Rate and Economic Points to Consider (Table 1-1 continued)

Issue	*Study on the Economic Impacts of Recycling* Approach	Approach for Some Other Statewide Studies
Accounting for Residuals	Did not count residuals at materials recovery facilities (MRFs) and end-use facilities.	Some states may not account for residuals disposed at MRFs and/or at end-use facilities.
Generators Included	Included all types of MSW generators, such as residential homes, commercial businesses and institutions.	Some states report only residentially generated material, and some include certain industrial generators.
Counting Certain High-Volume Industrial Materials	Intentionally excluded industrial material from MSW statistics, but separately reported data on select industrial streams (e.g., metals).	Some states count certain high-volume industrial materials such as metals, pre-consumer paper or plastic manufacturing scrap.

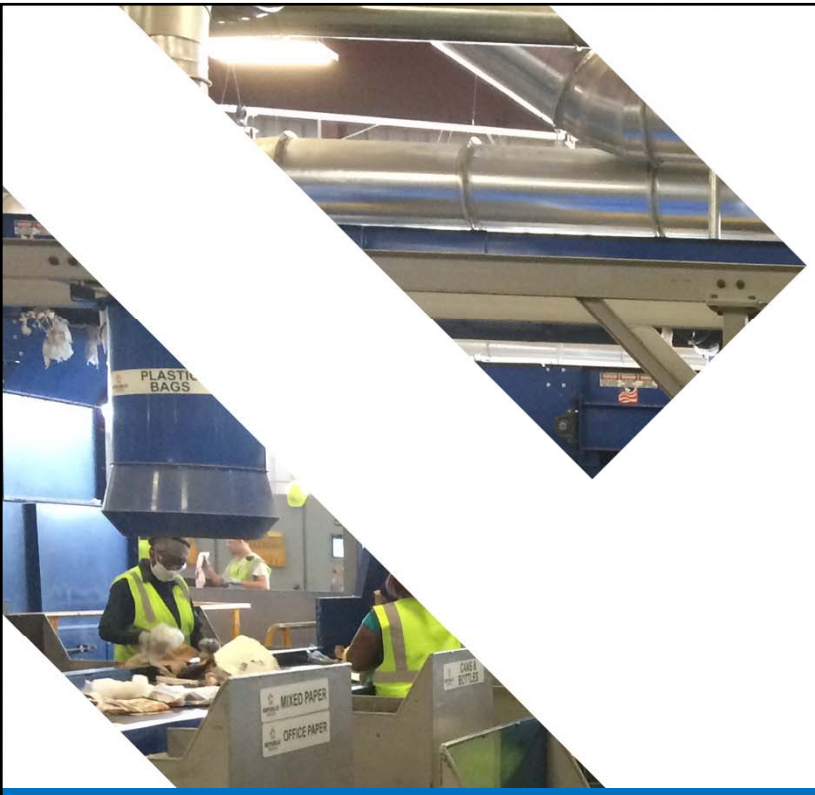
Methodology

Survey Focused on Processors and End Users/Manufacturers

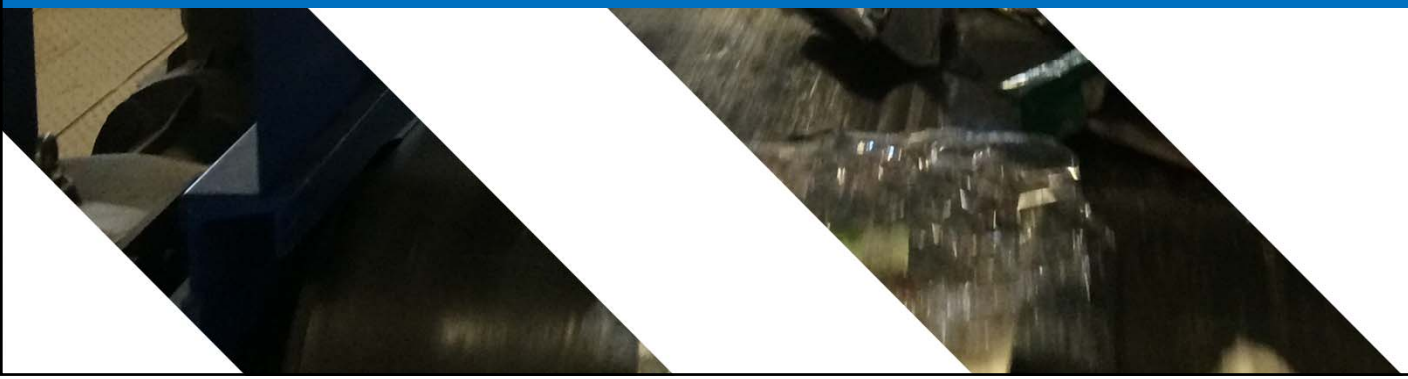


Material Categories

TYPICAL RECYCLABLES	ORGANIC MATERIALS	OTHER MATERIALS
Glass Containers, Other Glass **Metals** Ferrous, Non-Ferrous **Paper** Mixed, Old Corrugated Containers, Other Paper **Plastics** PET #1, HDPE #2, Plastics #3-7	**Biosolids (i.e. sludge)** **Food & Beverage Materials** **Yard Trimmings** **Brush & Green Waste**	**Construction and Demolition (C&D) Materials** **Electronic Materials** **Household Hazardous Waste (HHW)** **Textiles** **Tires** **Other**



Recycled Tons & Recycling Rate



Recycled Tons and Recycling Rate Overview

- Individual material summary example
- Material by material response
- Summary of survey results for all categories, including comparison to 2013 TRDI survey
- Recycling rate calculation

Material Summary Example: Glass

Pie Chart

Confidence Level

confidence: strong

The Story

Much of the recycled glass in Texas flows through MRFs to a small number of glass beneficiation facilities, which provide secondary processing to further prepare the material for end users. While most recycled glass containers in Texas flows through MRFs, some (mainly commercial window and plate glass) flows directly from generators to beneficiation facilities. To obtain a complete understanding of the quantity of glass recycled in Texas, the Project Team surveyed MRFs, glass beneficiation

The Story

Survey Tons

Survey Data: 165,527 tons

Facilities Responding

38 total facilities

- 22 MRFs
- 11 landfills and transfer/collection stations
- 5 end-use facilities, including glass beneficiation and end product manufacturing facilities

Responsive Facilities

The Project Team obtained data from 22 MRFs in Texas (as not all of the MRFs surveyed accept glass). Large commercial MRFs process material via long-term processing agreements with municipalities as well as commercial accounts. Therefore, they handle a large portion of Texas recycled glass. Additional quantities may also be recovered directly from auto shops and contractors. The Project Team believes the glass survey data presented above, which has been adjusted to eliminate double counting and residuals left over after processing, represents the vast majority of Texas glass that was recycled through MRFs in 2015. Of the 165,527 total tons, 88,470 tons are glass containers and the remaining 77,057 tons are other glass.

Supplemental Data

Third Party Data

The Project Team relied on the survey to collect all data related to glass and did not identify available supplemental sources of statewide data covering Texas. However, information from the Glass Packaging Institute was used to confirm the list of Texas-based recycled glass end-use facilities.

Tonnage Comparison to TRDI

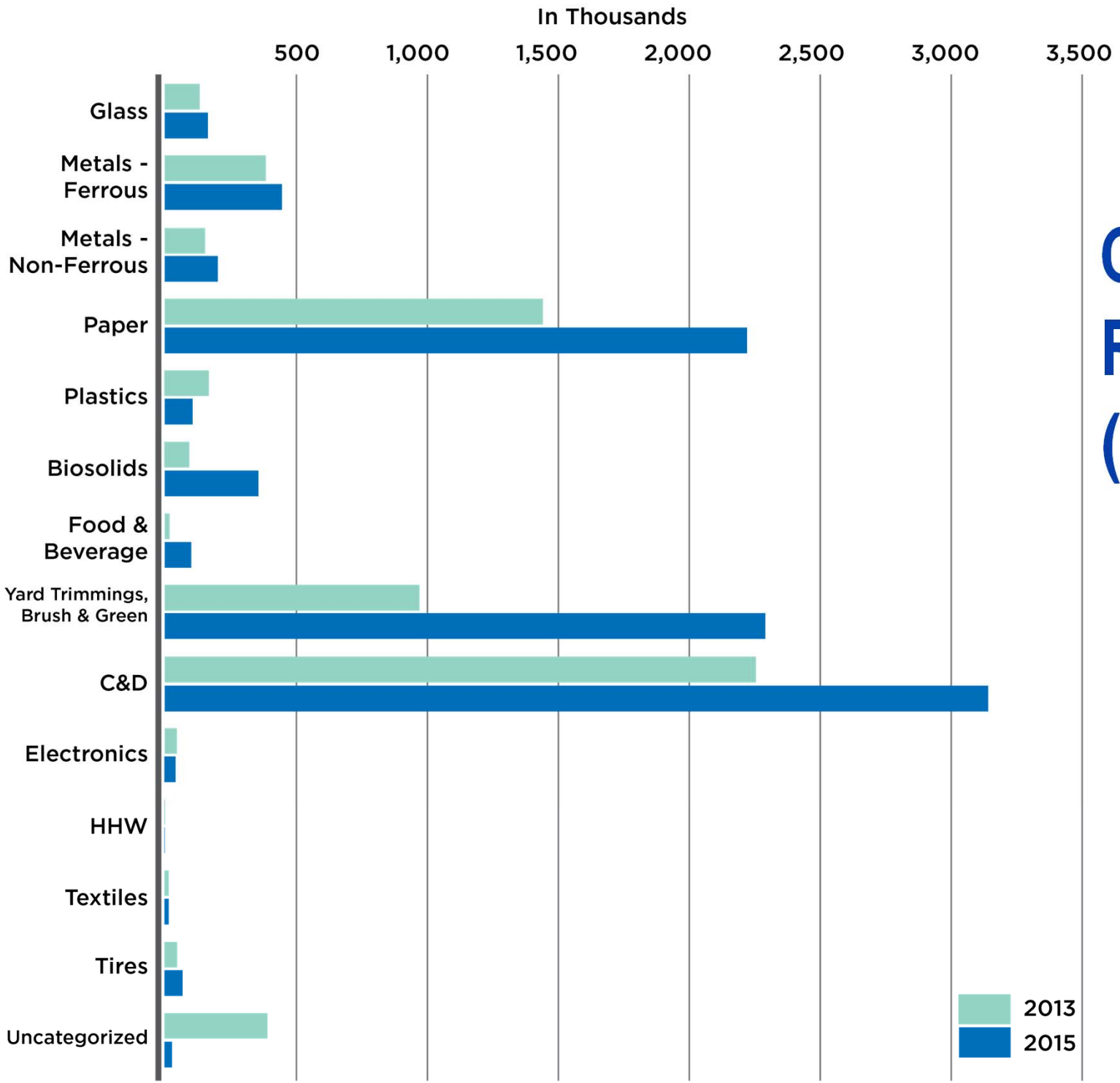
The 2015 estimate study result for recycled glass is 21 percent higher than the 2013 estimate study result of 137,222 tons. The Project Team believes this is probably a result of a more complete survey response rather than an actual increase in Texas glass recycling.

Comparison to TRDI Survey Data

Material **Recycled** from MSW Sources (Tons) (Table 3-1)

	Material	2013 Study (TRDI)
Typical Recyclables	Glass	137,222
	Metals – Ferrous 1	386,876
	Metals – Non-Ferrous 1	157,709
	Paper	1,444,632
	Plastics	169,216
Organic Materials	Biosolids	95,291
	Food and Beverage Materials	19,768
	Yard Trimmings, Brush, and Green Waste	970,233
Other Materials	Construction and Demolition Materials	2,253,598
	Electronic Material	47,271
	Household Hazardous Waste	2,308
	Textiles	16,852
	Tires	48,290
Uncategorized		393,527
	TOTAL	**6,142,793**

Comparing Results (Tons)



Recycling Rate Calculation

Total Recycled / (Total Recycled + Total Disposed)
= % Recycling Rate

2013

6,143,393 tons / (6,143,393 tons + 26,380,522 tons)

= 18.9% Recycling Rate

2015

9,171,707 tons / (9,171,707 tons + 31,049,545 tons)

= 22.7% Recycling Rate

Recycling Cost, Value & Quality

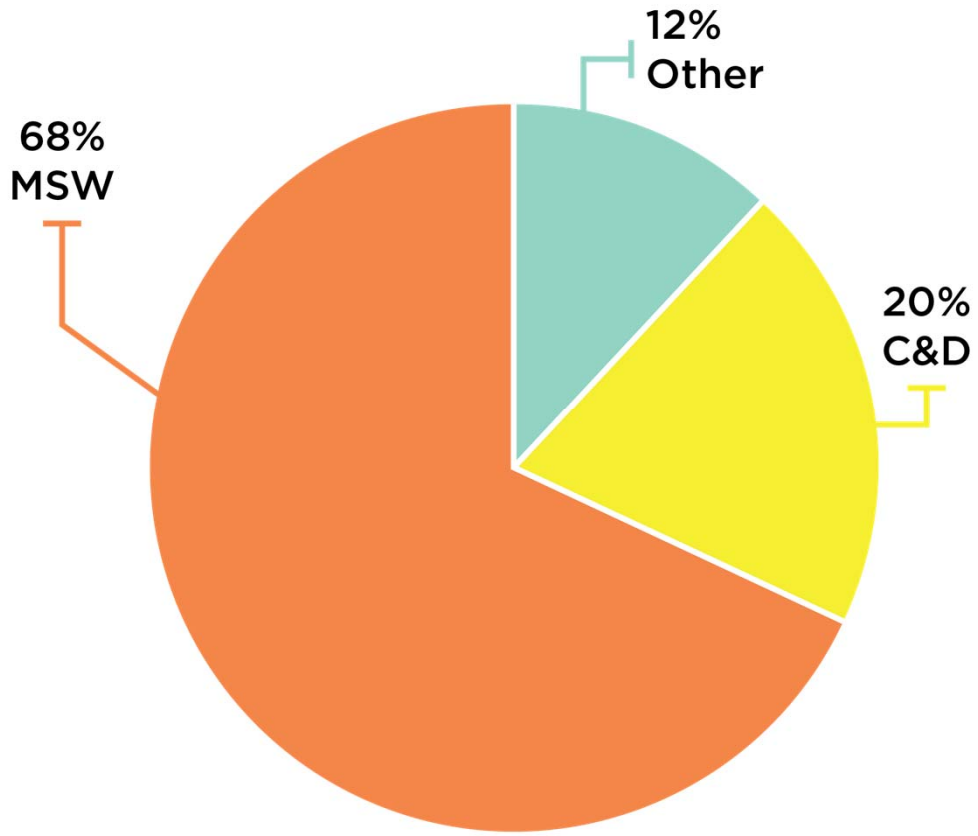
Estimated Annual Gross Value of Recycled Material in Texas (FY 2015) (Table 4-7)

Recycled Material	Annual Tonnage	Rounded Value	Basis
TYPICAL RECYCLABLES			
Glass	165,527	$10,760,000	$65/ton
Metals – Ferrous	447,207	$47,400,000	$106/ton
Metals – Non-Ferrous	196,383	$281,220,000	$1,432/ton
Paper	2,212,562	$196,920,000	$89/ton
Plastics	107,851	$38,610,000	$358/ton
ORGANICS	2,390,012	$108,270,000	$30/CY for compost
C&D MATERIALS	3,136,727	$18,820,000	$6/ton
Total	**8,656,269**	**$702,000,000**	

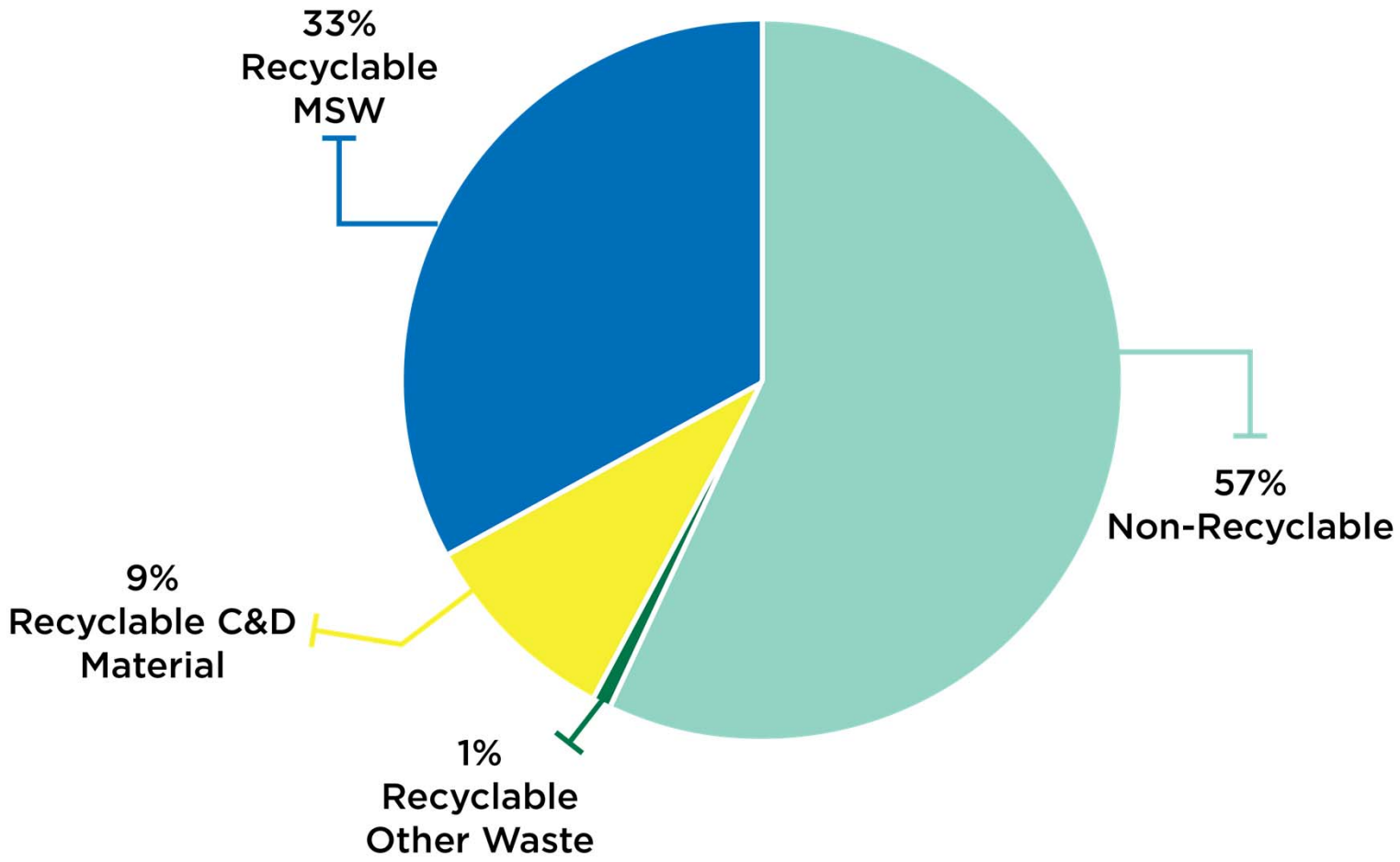
Estimated Amount of Recyclable Materials that Could be Recycled, but are Disposed

Approach

- In 2015, an estimated 31,049,545 tons of solid waste, including recyclable material, was generated and disposed in Texas
- Compared annual disposal quantities to waste characterization studies for MSW, C&D and Other (e.g. solid waste other than from MSW and C&D) (Figure 5-1)



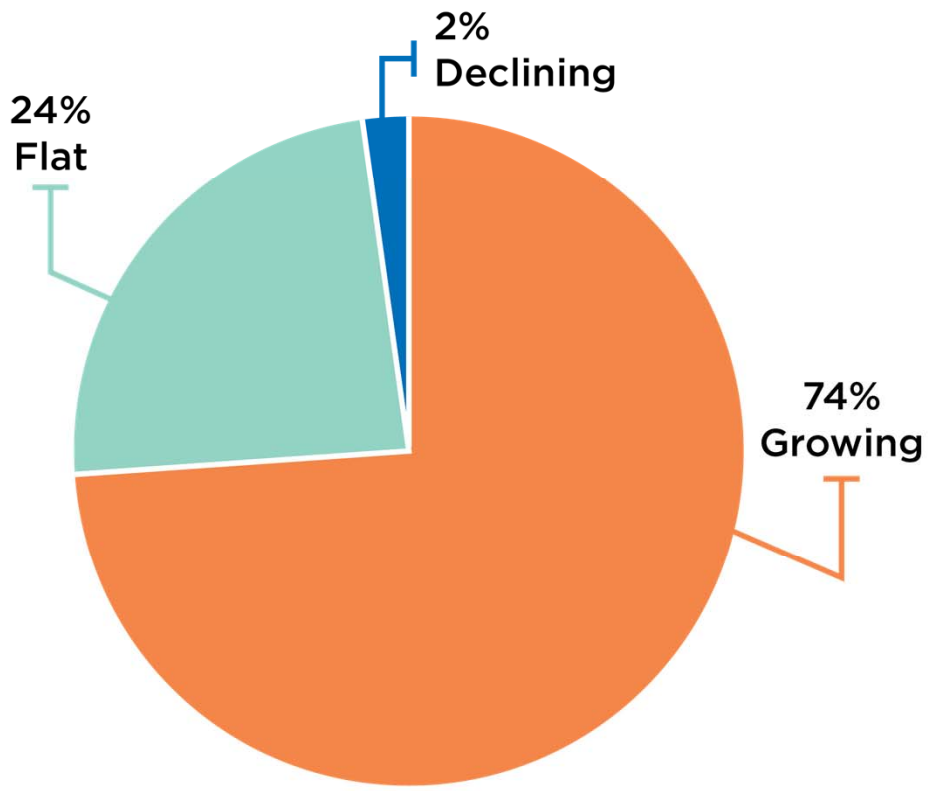
Aggregate Composition by Waste Type by Recyclable or Non-recyclable (2015) (Figure 5-5)



Aggregate Composition of Disposed Material by Waste Type by Recyclable Material Category (2015) (Table 5-6)

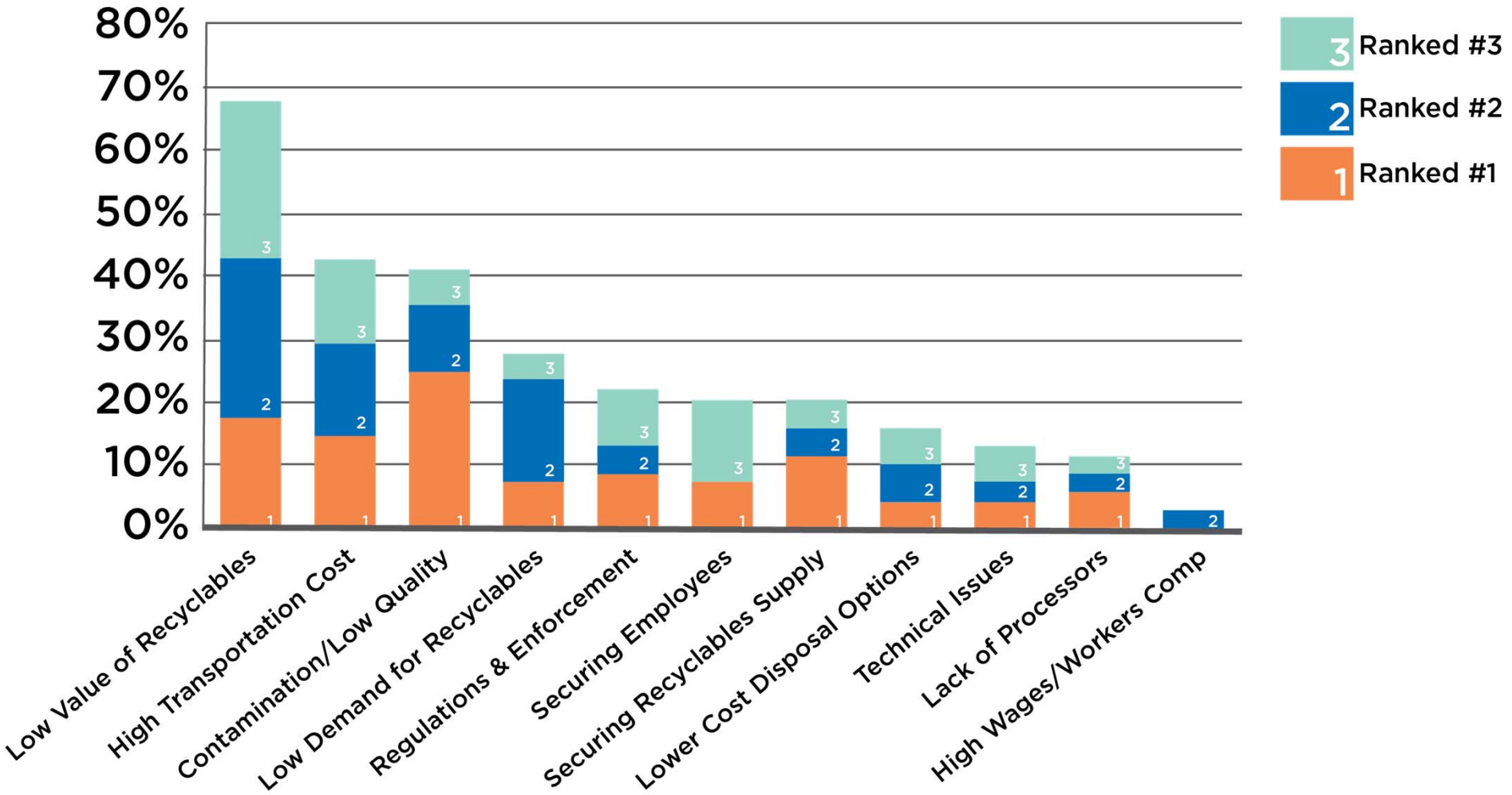
Waste Type	Recyclable Material Category	Total Tonnage Disposed	Assumed Recovery Rate		
			20%	40%	60%
MSW	Glass	657,577	131,515	263,031	394,546
	Metals –Ferrous	338,010	67,602	135,204	202,806
	Metals –Non-Ferrous	285,869	57,174	114,348	171,521
	Paper	4,085,648	817,130	1,634,259	2,451,389
	Plastics	810,902	162,180	324,361	486,541
	Organic Materials	4,096,225	819,245	1,638,490	2,457,735
	Clean/Unpainted C&D Aggregates	12,763	2,553	5,105	7,658
	Subtotal	**10,286,994**	**2,057,399**	**4,114,798**	**6,172,196**
C&D Materials	Concrete/Cement	1,812,331	362,466	724,932	1,087,399
	Paper	375,184	75,037	150,074	225,110
	Ferrous	317,953	63,591	127,181	190,772
	Brush	209,849	41,970	83,940	125,909
	Subtotal	**2,715,317**	**543,064**	**1,086,127**	**1,629,190**
Other	Brush	427,989	85,598	171,196	256,793
	Subtotal	**427,989**	**85,598**	**171,196**	**256,793**
TOTAL		**13,430,300**	**2,686,060**	**5,372,120**	**8,058,180**

Respondent Expectations for the Amount of Recyclable Materials Their Operations Will Handle **Over the Next One to Three Years (Figure 6-1)**

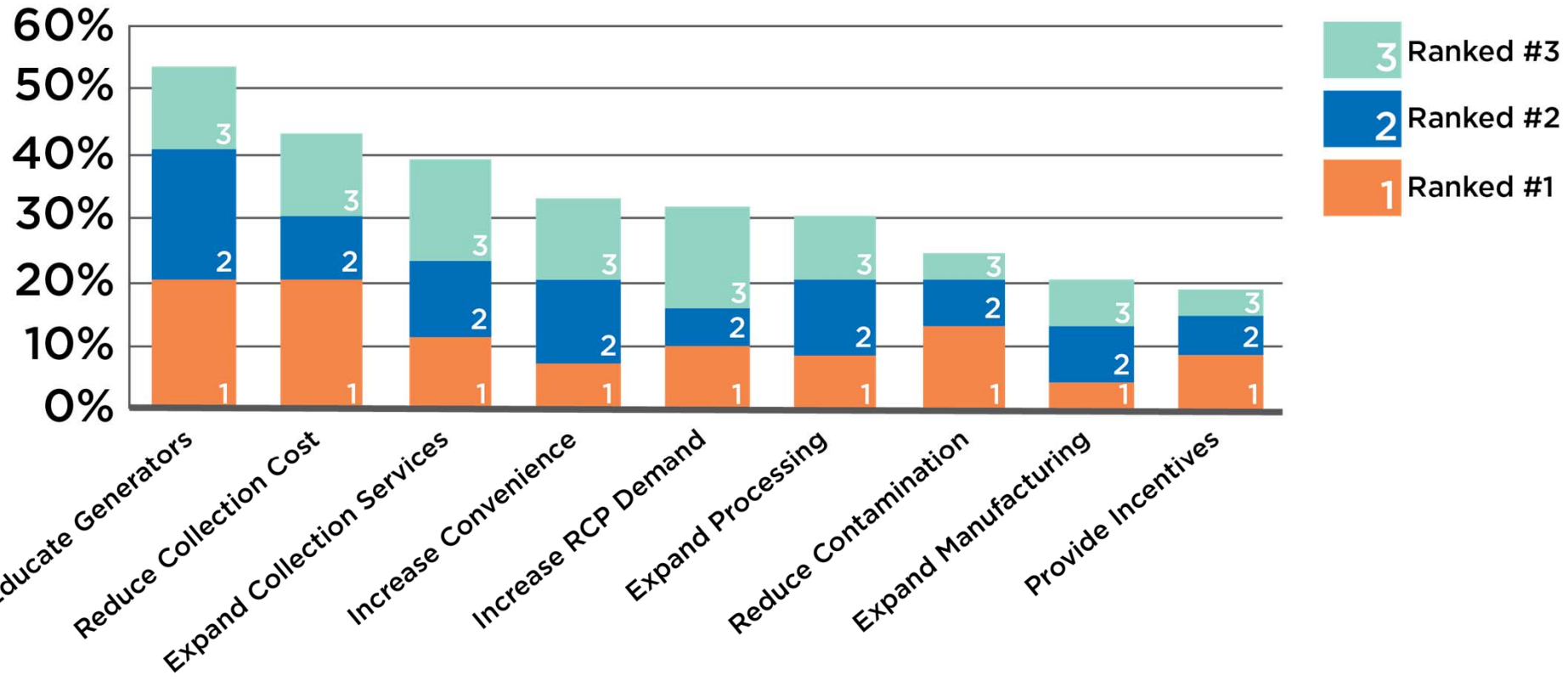


RESULTS FROM KEY SEGMENTS
PUBLIC ORGANIZATIONS: 88% EXPECT GROWTH
PRIVATE COMPANIES: 67% EXPECT GROWTH
GLASS RECYCLING: 80% EXPECT FLAT
ORGANICS RECYCLING: 90% EXPECT GROWTH

Barriers Constraining Expansion of Recycling Business Activity as Reported in Surveys (Figure 6-2)



Recycling Expansion Opportunities as Reported in Surveys (Figure 6-3)



Advancing the Opportunities

STRENGTHEN EXISTING PROGRAMS

- ✓ **ADOPTION OF STRONG MUNICIPAL CONTRACTING PRACTICES**
- ✓ **ADOPTION OF SUSTAINABLE LOCAL FUNDING MECHANISMS**
- ✓ **IMPROVED AND EXPANDED EDUCATION PROGRAMS**
- ✓ **ADOPTION OF BEST MANAGEMENT PRACTICES IN COLLECTION AND PROCESSING SYSTEMS**

Grants and Other Funding Sources

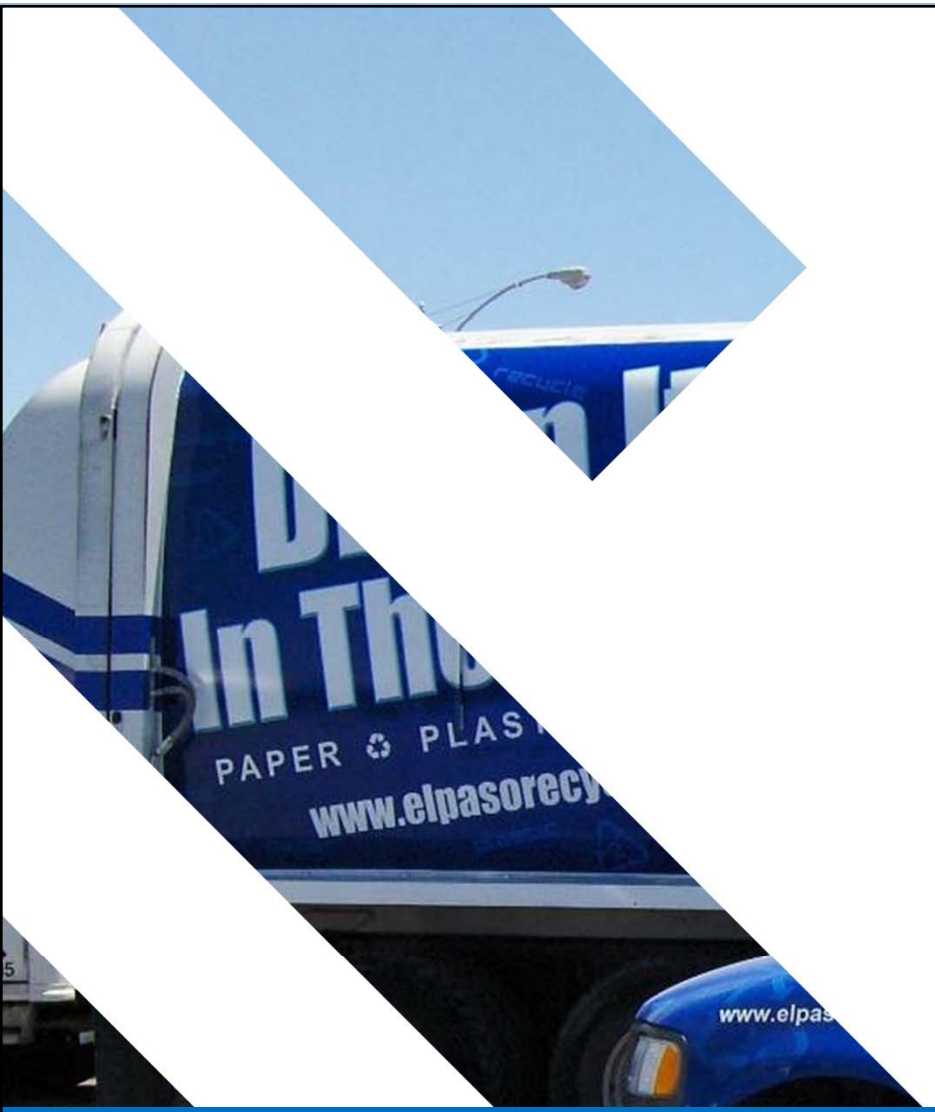
Grants and Other Funding Sources

Funding Sources: Identifies potential funding from State of Texas, Federal and private sources

For each source, included:

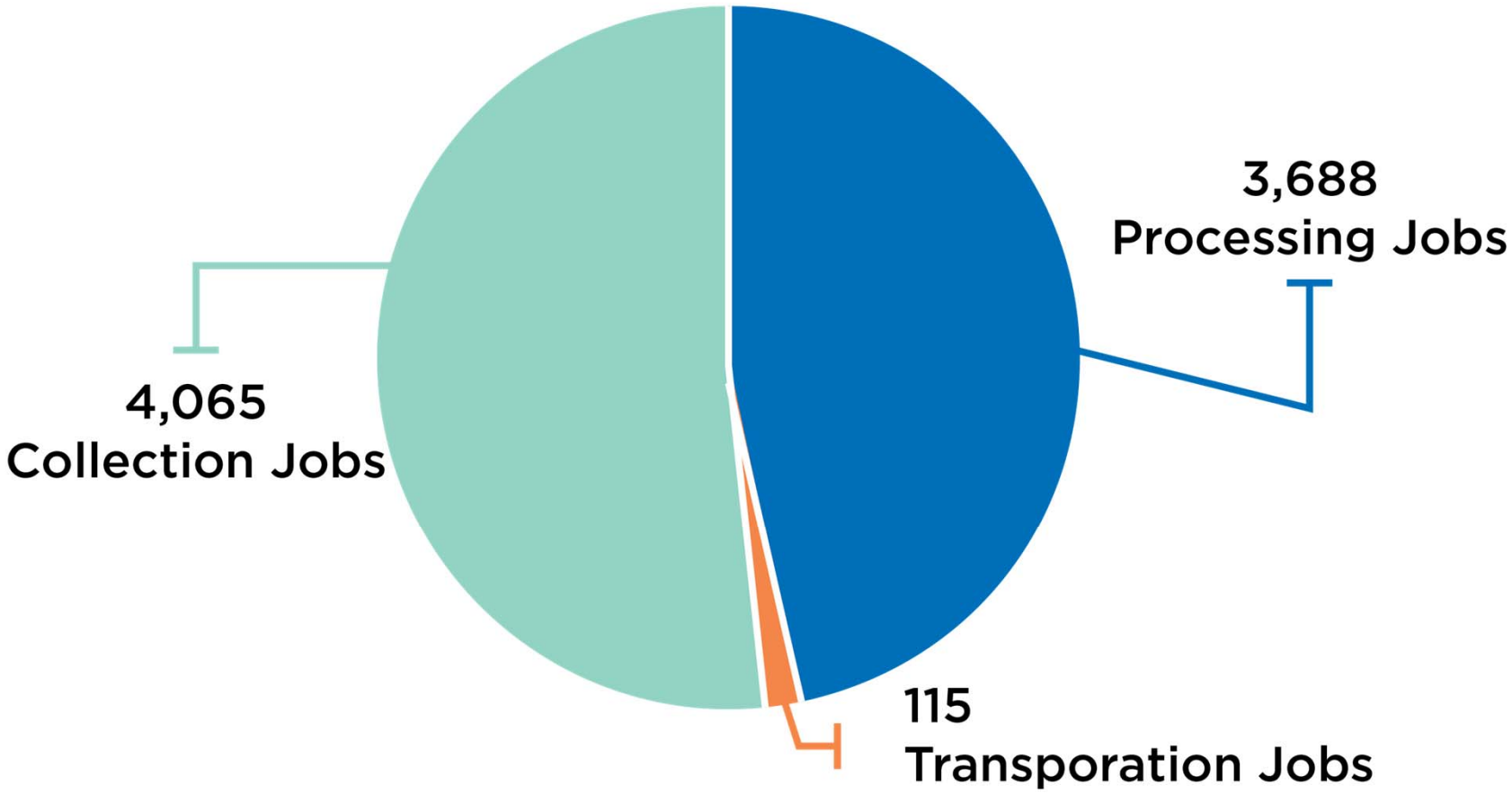
- program description
- example of applicability
- website

Public-Private Partnerships: Describes multiple models to increase recycling without the full financial risk falling on either the local government or the private business

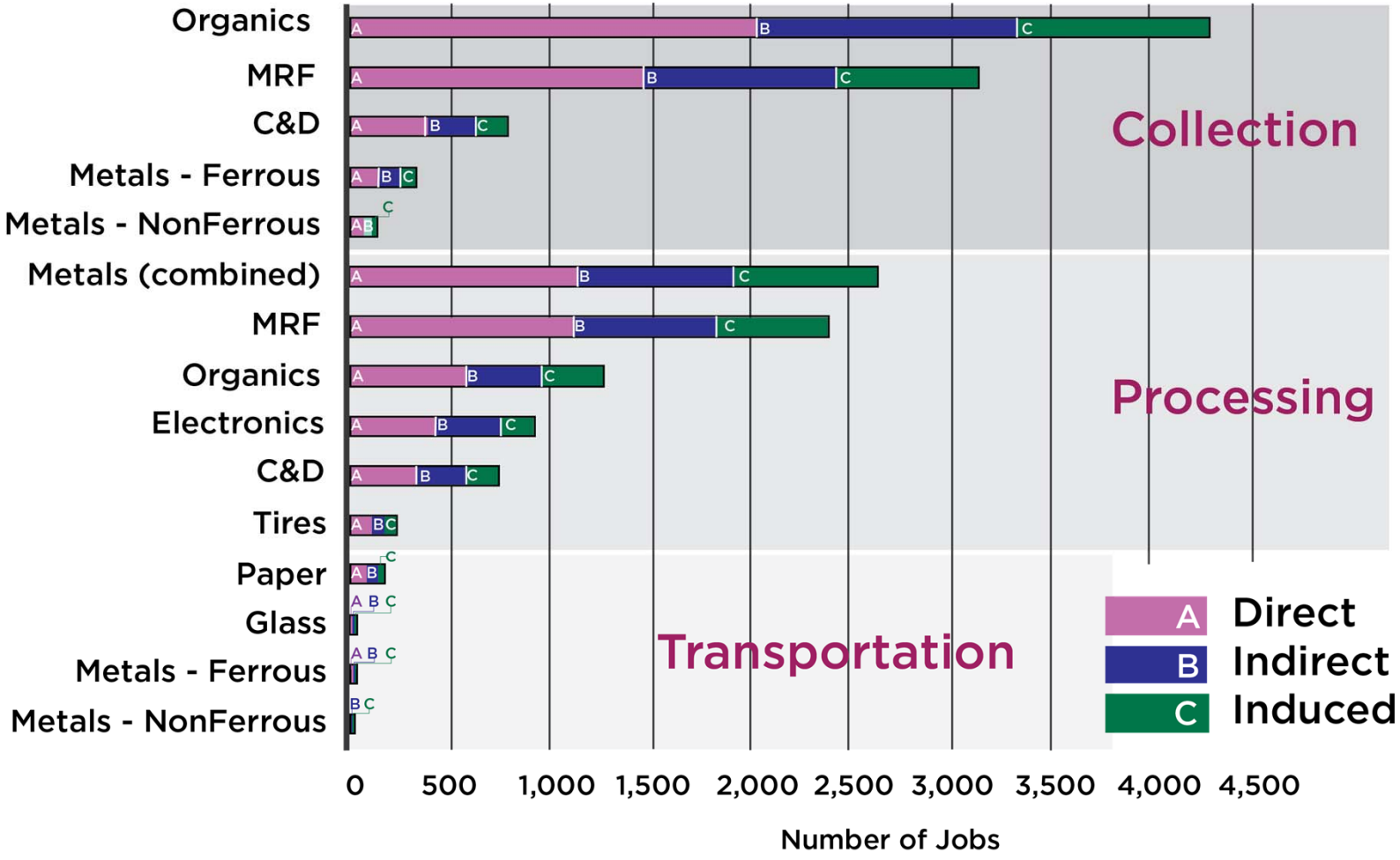


The Statewide Economic Impacts of Recycling

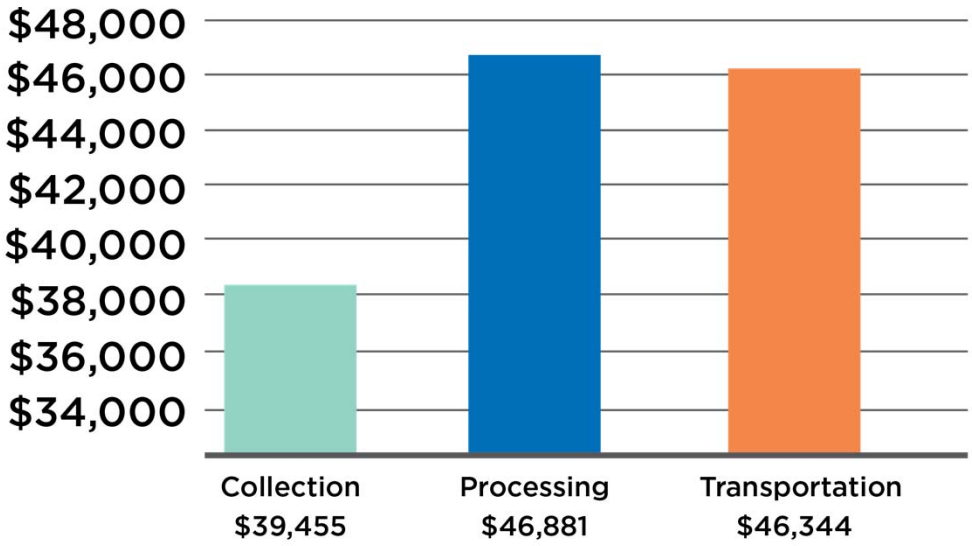
Recycling Direct Employment (2015)



Estimated Employment by Material and Activity (2015)

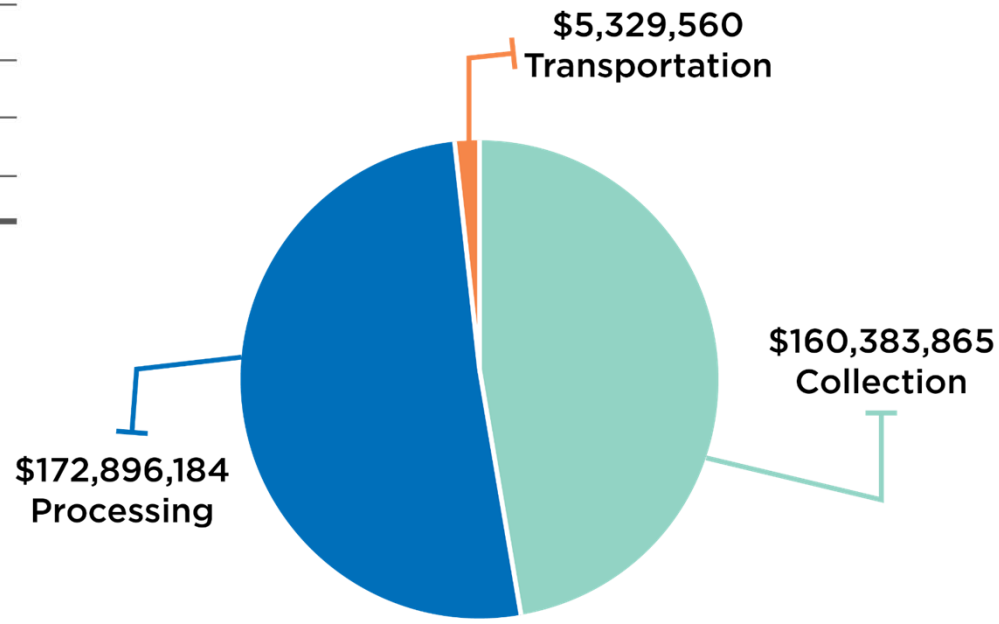


Estimated Wages and Benefits in the Recycling Industry (2015)



AVERAGE ANNUAL WAGES AND BENEFITS IN TEXAS

ESTIMATED TOTAL ANNUAL STATEWIDE PAYROLL



Summary of Total Economic Impact of Recycling on the Texas Economy (Table 8-6)

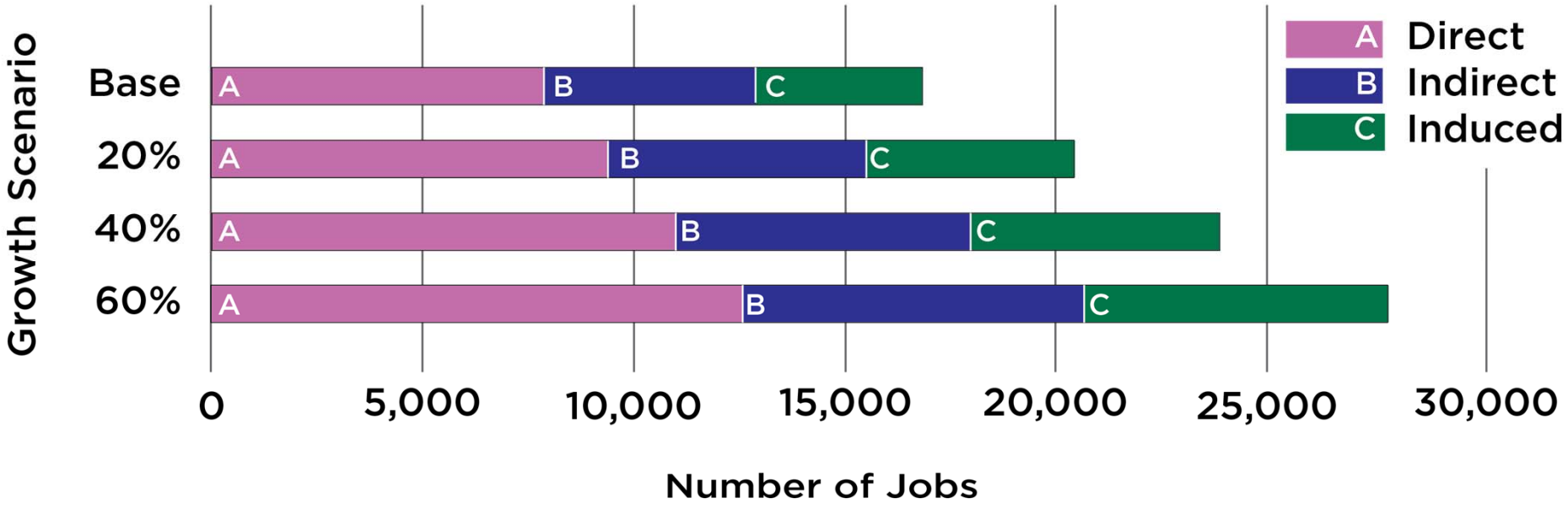
Measure	Direct	Indirect	Induced	Total
Employment	7,868	5,040	4,129	17,037
Labor Income	$342,862,641	$314,883,480	$199,242,509	$856,988,630
Value Added	$793,557,644	$490,200,422	$343,903,017	$1,627,661,083
Output	$1,894,943,170	$875,280,989	$606,533,341	$3,376,757,500

Economic Impacts of Recycling on the Texas Economy

With more than $3.3 billion of economic output and 17,037 jobs, the recycling sector is similar in size to:

	Paper Manufacturing	16,843
	Pipeline Transportation	18,831
	Broadcasting	18,721

Recycling Growth Scenarios
Direct Employment (2015)



EMPLOYMENT BY RECYCLING GROWTH SCENARIO

Interest in Further Information?

- 2018 article in *Resource Recycling*
- Report available at: https://www.tceq.texas.gov/p2/recycle/study-on-the-economic-impacts-of-recycling

Questions

Study on the
ECONOMIC IMPACTS
of RECYCLING

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