



BURNS  MCDONNELL

 Circular Matters



RECYCLING MARKET
Development Plan

October 2021



Presentation Overview



1. **Project Introduction**
2. **Methodology**
3. **Recycled Tons & Recycling Rate**
4. **Recycled Material Value & Quality**
5. **Estimated Amount of Recyclable Materials that Could be Recycled, but are Disposed**
6. **The Statewide Economic Impacts of Recycling**
7. **RMDP Strategy Development Approach**
8. **Supply & Demand of Recyclable Material Feedstocks**
9. **Barriers & Opportunities to Increase Recycling**
10. **Infrastructure Needs & Gaps Assessment**
11. **Market Development Tools & Mechanisms**
12. **Texas Recycling Market Development Strategy**



Project Introduction



Plan Background

- ▶ In 2019, the 86th Texas Legislature passed Senate Bill 649, which directed the Texas Commission on Environmental Quality (TCEQ) to develop a plan to stimulate increased use of recycled material feedstock
- ▶ The *Recycling Market Development Plan* (RMDP) meets the requirements of the law by building on the efforts of prior recycling studies and providing information on the following:
 - Current recycling efforts and availability of feedstock recyclable materials
 - Economic benefits and the potential economic benefits to be gained by recycling materials that are not being recycled
 - Potential feedstock consumers
 - Institutional, financial, administrative, and physical recommendations for state and local governments to increase the use of recyclable material feedstocks

Project Team



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



Circular Matters



SB 649 Support



TCEQ Municipal Solid Waste Management and Resource Recovery Advisory Council (MSWRRAC)

Stakeholder Engagement for TX RMDP



RMDP Survey
June 1 – August 31, 2020



Stakeholder Forums
October 25-27, 2020

- Typical Recyclable
- Organics
- C&D
- Other/Hard-to-Recycle



In-Depth Interviews

- Industry groups
- Texas businesses
- State agencies
- COGs and local gov't

Recycling Industry Committee

- ▶ Aluminum Association
- ▶ American Beverage Association
- ▶ American Forest & Paper Association (AF&PA)
- ▶ AMERIPEN
- ▶ Carton Council
- ▶ Construction & Demolition Recycling Association (CDRA)
- ▶ Environmental Protection Agency (EPA)- Reg. 6
- ▶ Glass Packaging Institute (GPI)
- ▶ Governor's Office of Economic Development and Tourism
- ▶ Institute of Scrap Recycling Industries (ISRI)
- ▶ ISRI Tires/Rubber Division
- ▶ Keep Texas Recycling (KTR)
- ▶ National Association for PET Container Resources (NAPCOR)
- ▶ National Waste & Recycling Association- TX Chapter (NWRA)
- ▶ North American Hazardous Materials Management Association (NAHMMA)
- ▶ Office of Rep. Thompson (ex-officio)
- ▶ Office of Senator Zaffirini (ex-officio)
- ▶ Plastics Industry Association
- ▶ Solid Waste Association of North American - Lone Star Chapter (TxSWANA)
- ▶ STAR Business Council
- ▶ STAR Texas Compost Council
- ▶ TCEQ MSWRRAC
- ▶ Texas Association of Business (TAB)
- ▶ Texas Association of Manufacturers (TAM)
- ▶ Texas Association of Regional Councils (TARC)
- ▶ Texas Chemical Council (TCC)
- ▶ Texas Retailers Association (TRA)
- ▶ The Association of Plastic Recyclers
- ▶ The Recycling Partnership



Key Definitions

Recycling Definition

Texas Health and Safety Code Section 361.421(8)

“ Process by which materials that have served their intended use or are scrapped, discarded, used, surplus, or obsolete are collected, separated, or processed and returned to use in the form of raw materials in the production of new products. Recycling includes:

- A. the composting process if the compost material is put to beneficial reuse as defined by the commission
- B. the application to land, as organic fertilizer, of processed sludge or biosolids from municipal wastewater treatment plants and other organic matter resulting from poultry, dairy, livestock, or other agricultural operations
- C. the conversion of post-use polymers and recoverable feedstocks through pyrolysis or gasification

MSW Definition

Texas Health and Safety Code definition of MSW found in Section 361.003(20)

“ Solid waste resulting from or incidental to municipal, community, commercial, institutional, and recreational activities, and includes garbage, rubbish, ashes, street cleanings, dead animals, abandoned automobiles, and other solid waste other than industrial solid waste.

Industrial Waste Definition

Title 30 Texas Administrative Code Section 335

“ Solid waste resulting from or incidental to any process of industry or manufacturing, or mining or agricultural operation

RMDP Excluded the Following Methods to Divert Material from Disposal

- ▶ Source reduction activities like purchasing products with less packaging or home composting
- ▶ Refurbishment or reuse of products for the originally intended use, such as consumer electronics or clothing
- ▶ Combustion of materials for energy
- ▶ Land reclamation or beneficial use projects using tire shreds or bales
- ▶ Disposal or on-site use of material at a landfill for road stabilization or alternative daily cover

Material Categories

TYPICAL RECYCLABLES

Glass

Containers, Other Glass

Metals¹

Ferrous, Non-Ferrous

Paper

Old Corrugated Containers, Sorted Office Paper, Mixed Paper, Other Paper

Plastics

PET #1, HDPE #2, Plastics #3-7, Film Plastics, Other Plastics

ORGANIC MATERIALS

Biosolids (i.e., sludge)

Food & Beverage Materials

Yard Trimmings, Brush & Green Waste

OTHER MATERIALS

Construction and Demolition (C&D) Materials

Electronic Materials

Batteries

Textiles

Tires

Paint

Other

¹Excludes scrap metals recycled by entities defined in Section 1956.001 Occupations Code

Scrap Metals and the RMDP

- ▶ SB 649 excludes “ferrous or nonferrous metals recycled by a metal recycling entity as defined by Section 1956.001, Occupations Code” from the list of recyclable materials to be addressed in the RMDP
- ▶ RMDP recycling tonnages and recycling rates include an estimate of scrap metal recycling to represent the total MSW and industrial recycling activity in the state. This also allows rates to be compared to prior statewide recycling estimates
- ▶ Consistent with the scrap metal facility exemption in SB 649 and to reflect the strong nature of existing recycling markets, scrap metals recycling was excluded from the market development recommendations



Methodology

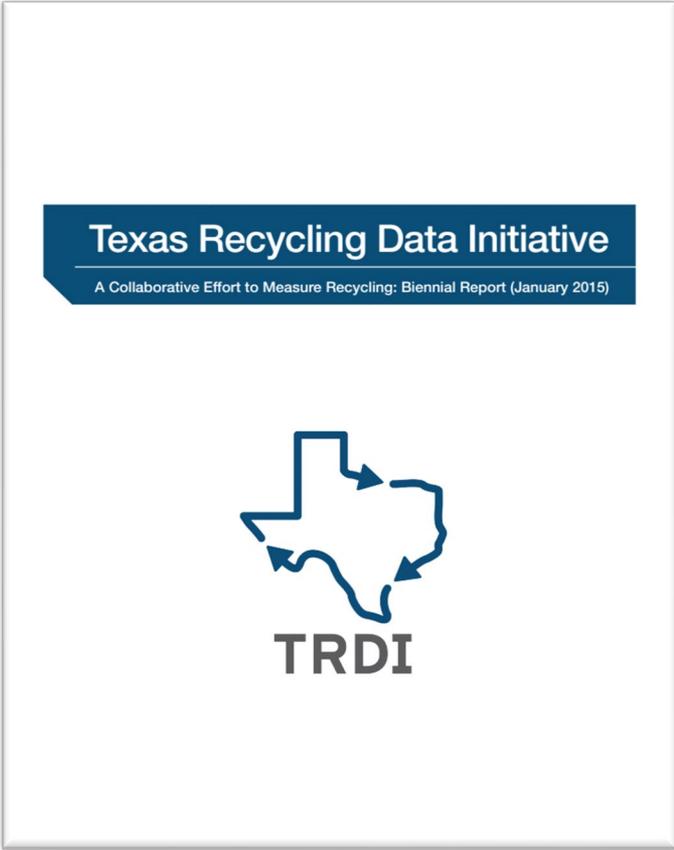


Building on Prior Studies

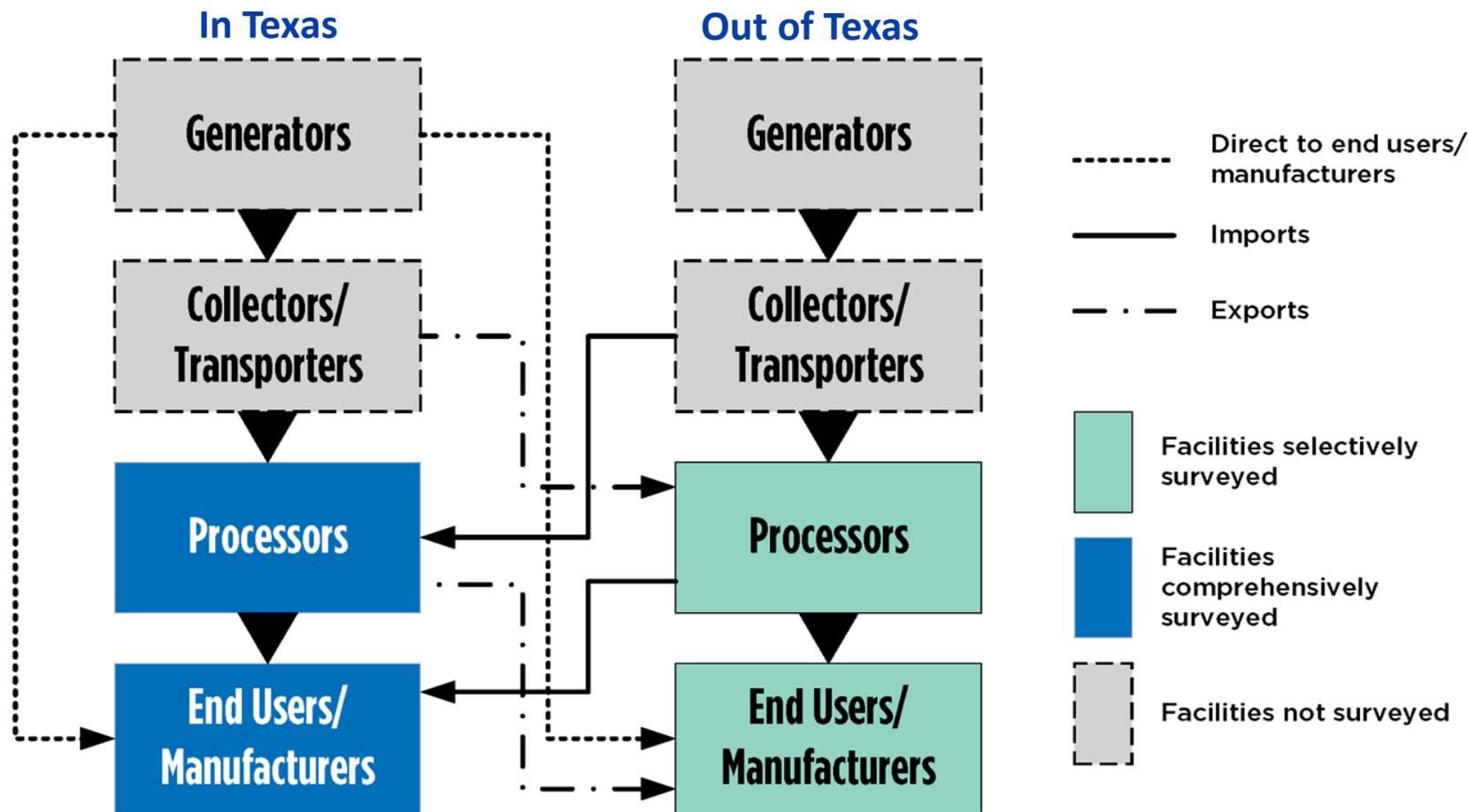
Study on the Economic Impacts of Recycling (SEIR)



Texas Recycling Data Initiative (TRDI)



Survey Focused on Processors and End Users/Manufacturers



Additional Survey Points

- ▶ Focused on recycling processors and end users
- ▶ Voluntary online survey via Re-TRAC Connect
- ▶ Addressed business sensitive information in a confidentiality plan, accompanied by a non-disclosure agreement
- ▶ Open June 1 – August 31, 2020
- ▶ Included questions to minimize double counting and to account for imports and exports
- ▶ Used data from supplemental sources
- ▶ All communications virtual due to COVID-19

Points to Consider When Comparing Statewide Recycling Rate and Economic Data

- ▶ Several 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 RMDP'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	<i>Recycling Market Development Plan Approach</i>	Approach for Some Other Statewide Studies
Definition of Recycling	<p>Developed a methodology based on collecting data on municipal solid waste (MSW) and industrial waste as defined in Texas statute.</p> <p>Defined recycling consistent with Texas Health and Safety Code §361.421(8) to include typical recyclables, composting, land application of biosolids/sludge, and pyrolysis of post-use polymers; and to exclude source reduction, energy recovery, and reuse.</p>	<p>Other states may include reuse, energy recovery, certain source reduction activities, other conversion technologies or non-MSW material.</p>
Voluntary or Mandatory	<p>Approach was strictly voluntary.</p>	<p>States that mandate local agencies and certain businesses to submit recycling data may have a higher response rate.</p>
Double Counting	<p>Systematically focused on specific points in the material value chain to minimize double counting.</p>	<p>While some states take a similar approach, other approaches may not address double counting.</p>

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

Issue	<i>Recycling Market Development Plan Approach</i>	<i>Approach for Some Other Statewide Studies</i>
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.
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 industrial streams.	Some states count certain high-volume industrial materials such as metals, pre-consumer paper or plastic manufacturing scrap.



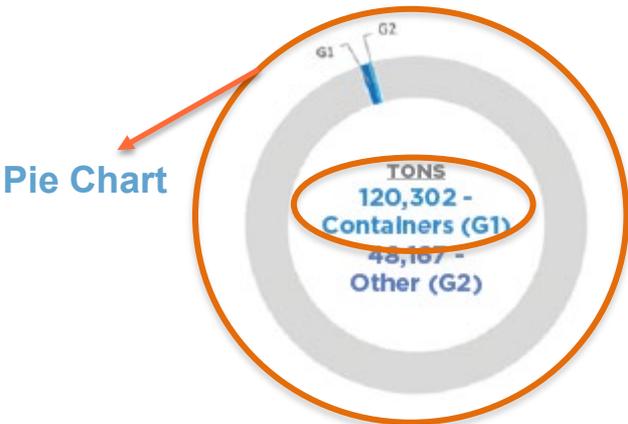
Recycled Tons & Recycling Rate



Recycled Tons and Recycling Rate Overview

- ▶ Individual material summary example
- ▶ Material by material response
- ▶ Summary of survey results for all categories, including comparison to 2015 SEIR survey
- ▶ Recycling rate calculation

Material Summary Example: Glass (Section 3.4)



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 facilities (secondary processors), and end

Survey Data: 168,469 tons (Survey Tons)

Facilities Responding (Responsive Facilities)

- 35 total facilities
- 23 MRFs
- 7 landfills and transfer/collection stations
- 5 end-use facilities, including glass beneficiation and end product manufacturing facilities

The Project Team obtained data from entities representing 23 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 and/or secondary processors in 2019. Of the 168,469 total tons, 120,302 tons are glass containers, and the remaining 48,167 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 SEIR (Comparison to SEIR Results)

The RMDP result for recycled glass is 2 percent higher than the 2015 SEIR result of 165,527 tons. The Project Team believes the result reflects a relatively flat glass recycling market and follows recent national trends in stagnant or decreasing glass packaging recycling tonnages.³

Comparison to
2015 SEIR:

- ▲ Increased
- Unchanged
- ▼ Decreased
- N/A Not Available

Material by Material Results

Material	Facilities Responding	Confidence	Supplemental Data?
Glass	35 ▼	■ Strong	
Metals - Ferrous	75 ▼	■ Moderate Plus	✓
Metals - Non-Ferrous	75 ▼	■ Moderate Plus	✓
Paper	67 ▼	■ Moderate Plus	
Plastic	57 ■	▲ Strong	✓
Biosolids	6 ▲	■ Strong	✓
Food and Beverage Materials	27 ▲	▼ Moderate	
Yard Trimmings, Brush, and Green Waste	98 ▼	■ Moderate Plus	
Construction and Demolition Materials	43 ▲	■ Moderate Plus	
Electronic Materials	13 ▼	■ Moderate	✓
Batteries	5 N/A	N/A Moderate Plus	✓
Paint	3 N/A	N/A Strong	✓
Textiles	2 ■	■ Moderate	✓
Tires	- N/A	■ Strong	✓

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

	Material	2015 SEIR
Typical Recyclables	Glass	165,527
	Metals – Ferrous ¹	447,207
	Metals – Non-Ferrous ¹	196,383
	Paper	2,212,562
	Plastics	107,851
Organic Materials	Biosolids	357,116
	Food and Beverage Materials	100,470
	Yard Trimmings, Brush, and Green Waste	2,289,542
Other Materials	Construction and Demolition Materials	3,136,727
	Electronic Material	42,725
	Batteries	440
	Paint ²	2,306
	Textiles	16,507
	Tires	69,474
Uncategorized³		27,932
TOTAL		9,172,769

Material Recycled from Industrial Sources (Tons) (Table 3-4)

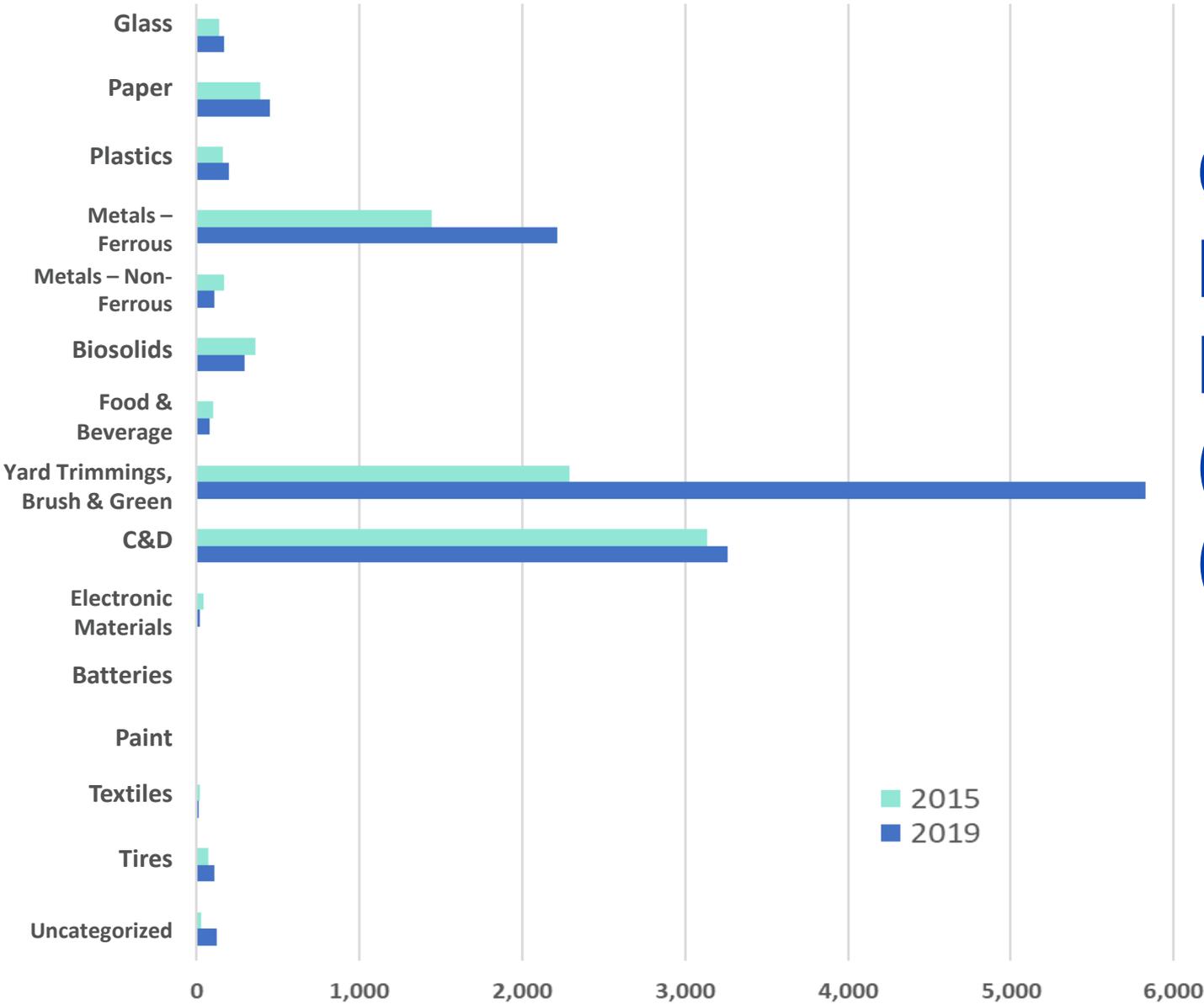
	Material	2019 RMDP
Typical Recyclables	Glass	27,350
	Metals - Ferrous	5,776,436
	Metals - Non-Ferrous	564,882
	Paper - Cardboard	112,266
	Paper - Mixed Paper	28,326
	Paper - Office Paper	19,297
	Paper - Other	42,049
	Plastics - PET (#1)	2,160
	Plastics - HDPE (#2)	1,523
	Plastics - Film	515
Organic Materials	Crop Residue and Manures	3,370
TOTAL		6,914,320

Industrial Recycling & Manufacturing Activity (Table 3-3)

Manufacturing Subsector	Data Obtained
Paper and Paperboard Manufacture	✓
Pulp and Cellulose Product Manufacture	✓
Glass Container Manufacture	✓
Fiberglass Manufacture	✓
Composting/Mulching	✓
Plastic Product Manufacture	✓
Chemical Recycling	✓
Metal Manufacture	✓

In Thousands

0 1,000 2,000 3,000 4,000 5,000 6,000



**Comparing
MSW
Results
(Tons)
(Figure 1-1)**

2015
2019

In Thousands

0 1,000 2,000 3,000 4,000 5,000 6,000

Recycling Rate Overview

- ▶ Used disposal data reported by landfills in TCEQ reporting process
- ▶ Consider the following when comparing to other states:
 - Refer to “Points to Consider When Comparing Statewide Recycling Rate and Economic Data” (see Table 1-1 on slides 18-19)
 - Economic factors (e.g., cost of disposal)
 - Regulatory factors

MSW Recycling Rate Calculation

$$\text{Total Recycled} / (\text{Total Recycled} + \text{Total Disposed}) \\ = \% \text{ Recycling Rate}$$

2
0
1
5

$$9,171,707 \text{ tons} / (9,171,707 \text{ tons} + 31,049,545 \text{ tons}) \\ = 22.7\% \text{ Recycling Rate}$$

2
0
1
9

$$12,911,034 \text{ tons} / (12,911,034 \text{ tons} + 34,099,350 \text{ tons}) \\ = 27.5\% \text{ Recycling Rate}$$



Recycled Material Value & Quality



Estimated Annual Gross Value of Recycled MSW Material in Texas (2019) (Table 5-1)

Recycled Material	Annual Tonnage	Rounded Value	Basis
TYPICAL RECYCLABLES			
Glass	168,469	\$10,950,000	\$65/ton
Metals – Ferrous	522,971	\$61,710,000	\$118/ton
Metals – Non-Ferrous	177,446	\$210,100,000	\$1,184/ton
Paper	2,214,232	\$166,000,000	\$75/ton
Plastics	98,450	\$85,730,000	\$871/ton
ORGANICS	5,906,435	\$267,560,000	\$30/CY for compost
C&D MATERIALS	3,259,909	\$19,560,000	\$6/ton
Total	12,347,912	\$821,610,000	

2015 SEIR: 8,656,269 tons and \$702,222,000 in gross value

Average Contamination Rate by Recyclable Material (Table 3-2)

Material	Contamination Rate	
	Average	Range
Single Stream Materials	22.4%	10% - 60%
C&D Materials	1.0%	-

2015 SEIR Average Single Stream Contamination Rate: 18.3%

Estimated Annual Gross Value of Recycled Industrial Material in Texas (2019) (Table 5-2)

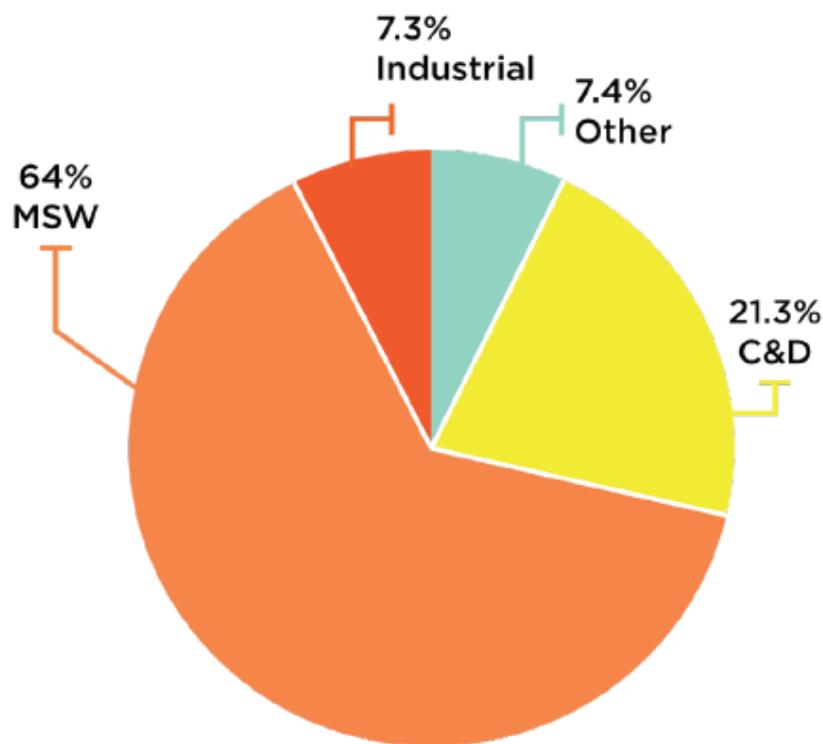
Recycled Material	Annual Tonnage	Rounded Value	Basis
TYPICAL RECYCLABLES			
Glass	27,350	\$1,780,000	\$65/ton
Metals – Ferrous	5,776,436	\$681,620,000	\$118/ton
Metals – Non-Ferrous	564,882	\$668,820,000	\$1,184/ton
Paper	201,938	\$15,150,000	\$75/ton
Plastics	7,568	\$4,550,000	\$601/ton
ORGANICS	336,146	\$15,230,000	\$30/CY for compost
Total	6,914,320	\$1,387,150,000	



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

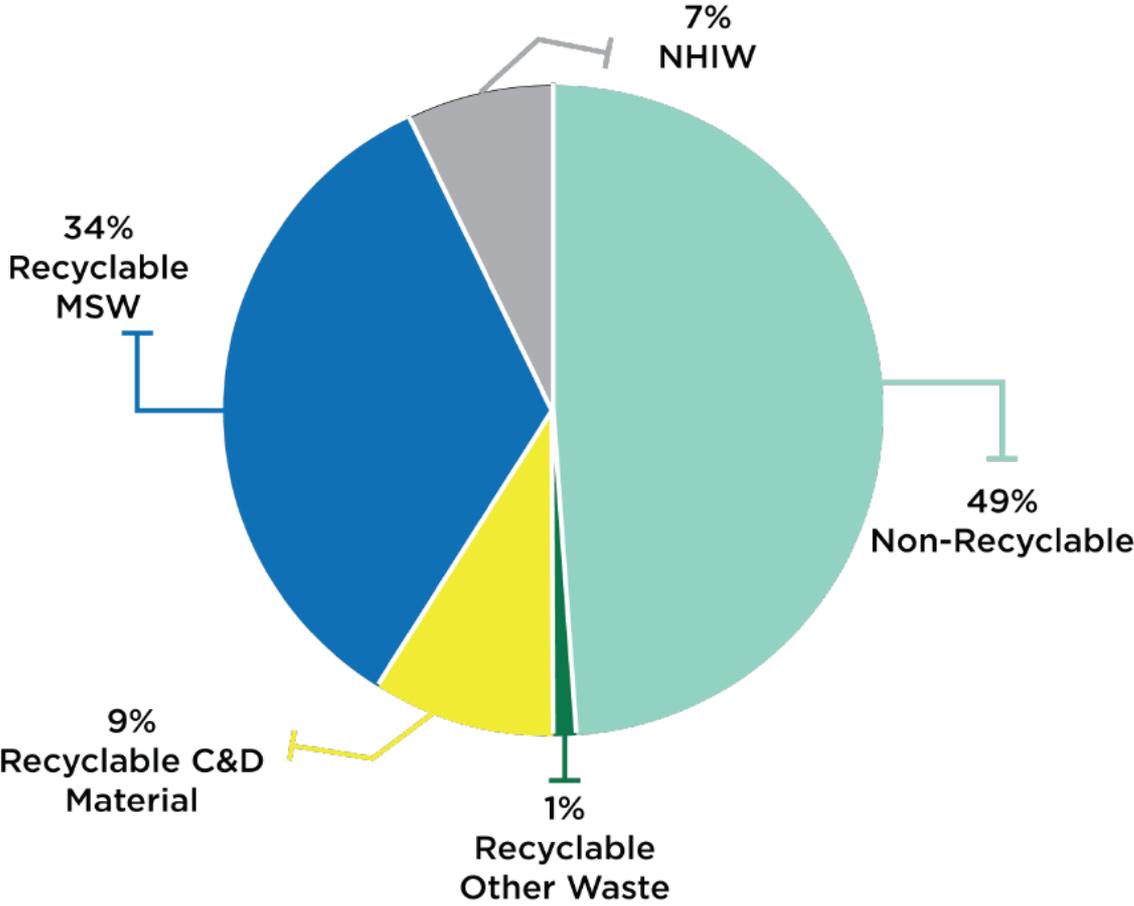
Approach

- ▶ In 2019, an estimated 36,536,957 tons of solid waste, including recyclable material, was generated in-state and disposed in Texas MSW landfills
- ▶ 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 4-1)

Aggregate Composition by Waste Type by Recyclable or Non-recyclable (2019) (Figure 4-5)



Aggregate Composition of Disposed Material by Waste Type by Recyclable Material Category (2019) (Table 4-6)

Waste Type	Recyclable Material Category	Total Tonnage Disposed	Assumed Recovery Rate		
			20%	40%	60%
MSW	Glass	908,487	181,697	363,395	545,092
	Metals –Ferrous	433,491	86,698	173,396	260,095
	Metals –Non-Ferrous	283,481	56,696	113,392	170,089
	Paper	4,022,213	804,443	1,608,885	2,413,328
	Plastics	1,051,013	210,203	420,405	630,608
	Organic Materials	5,073,825	1,014,765	2,029,530	3,044,295
	Clean/Unpainted C&D Aggregates	13,882	2,776	5,553	8,329
	Other	534,903	106,981	213,961	320,942
	Subtotal	12,321,295	2,464,259	4,928,517	7,392,778
C&D Materials	Concrete/Cement	2,215,302	443,060	886,121	1,329,181
	Paper	458,606	91,721	183,442	275,164
	Ferrous	388,649	77,730	155,460	233,189
	Brush	256,509	51,302	102,604	153,905
	Subtotal	3,319,066	663,813	1,327,627	1,991,439
Other	Brush	291,287	58,257	116,515	174,772
	Tires	67,896	13,579	27,158	40,738
	Subtotal	359,183	71,836	143,673	215,510
TOTAL		15,999,544	3,199,908	6,399,817	9,599,727

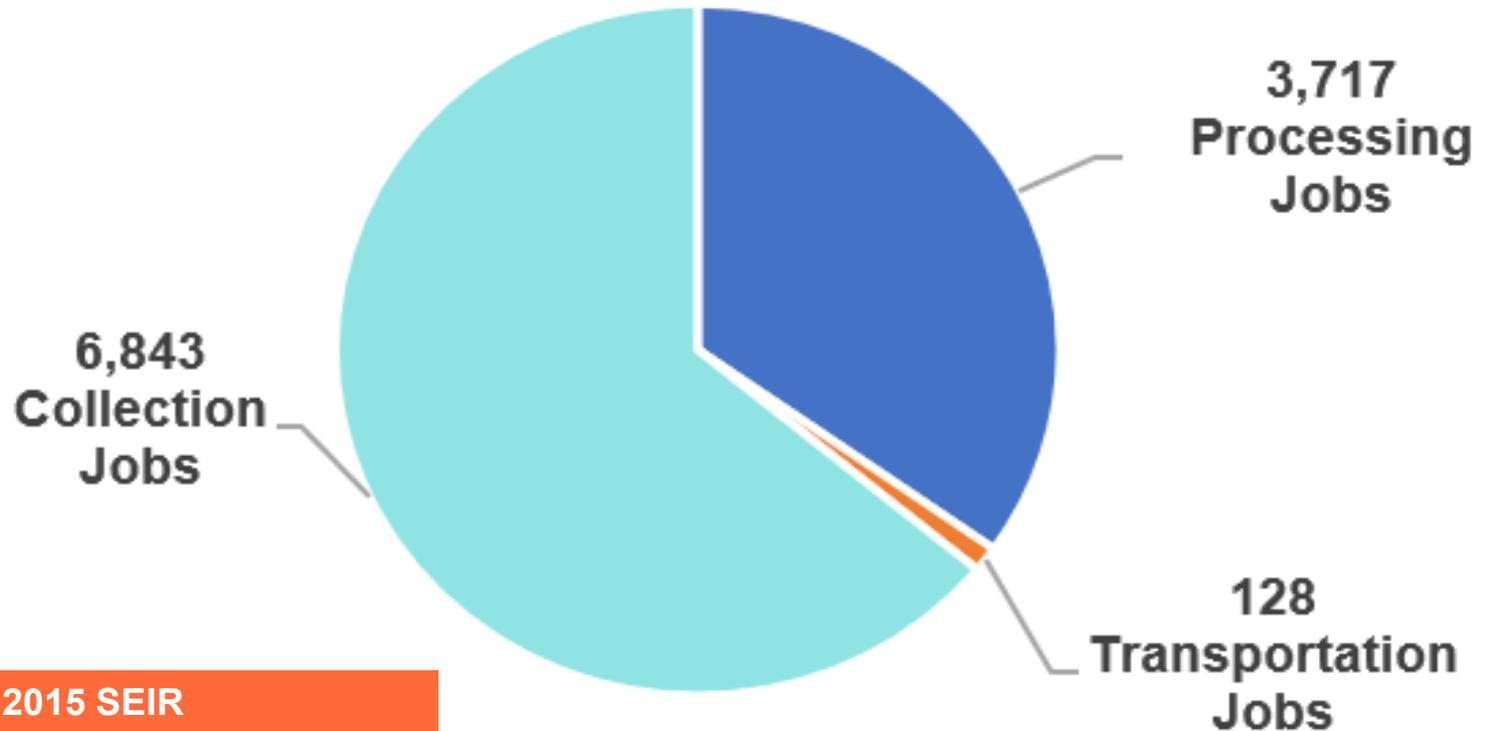


The Statewide Economic Impacts of Recycling

Approach

- ▶ Used an IMPLAN input-output model, which estimated direct, indirect, and induced impacts of the State’s recycling industry
- ▶ Incorporated the findings from the RMDP survey into the IMPLAN model’s assumptions
- ▶ When necessary, supplemented survey data with employment and wage data from federal agencies and Burns & McDonnell
- ▶ The model’s output included estimates of generated employment, labor income, regional output, and state and local tax revenue
- ▶ In addition, economic impacts for three “what if” scenarios were estimated based on 20, 40, and 60 percent increases in the quantity of recycling

Recycling Direct Employment (2019)

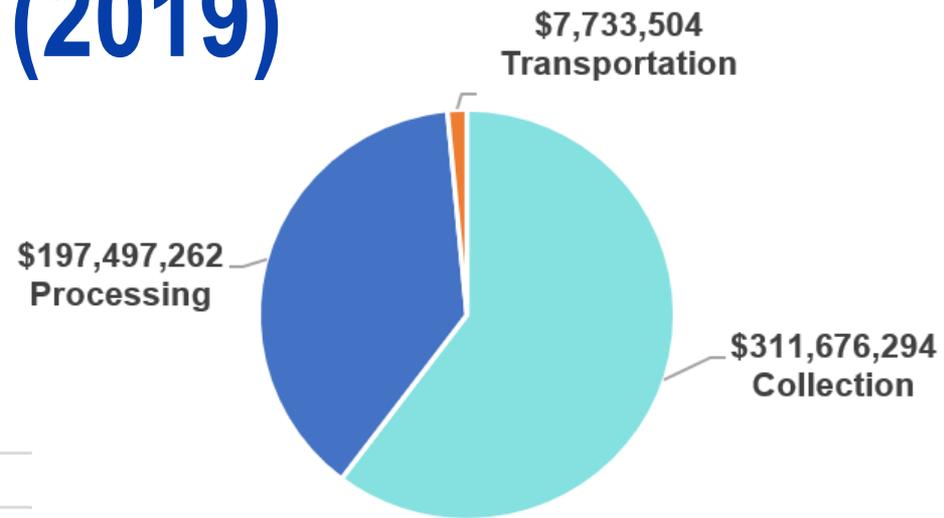


2015 SEIR Employment

Collection Jobs	4,065
Processing Jobs	3,688
Transportation Jobs	115

Estimated Wages and Benefits in the Recycling Industry (2019)

AVERAGE ANNUAL WAGES AND BENEFITS IN TEXAS



ESTIMATED TOTAL ANNUAL STATEWIDE PAYROLL

2015 SEIR Statewide Payroll	
Collection	\$160,383,865
Processing	\$172,896,184
Transportation	\$5,329,560

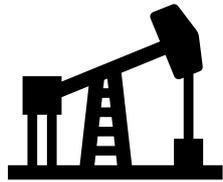
Summary of Total Economic Impact of Recycling on the Texas Economy (Table 8-6)

Measure	Direct	Indirect	Induced	Total	2015 SEIR
Employment	10,688	6,651	5,571	22,910	17,037
Labor Income	\$530,138,619	\$438,691,364	\$291,138,384	\$1,259,968,367	\$856,988,630
Value Added	\$1,168,883,317	\$670,826,952	\$505,151,582	\$2,344,861,851	\$1,627,661,083
Output	\$2,675,693,086	\$1,253,442,126	\$899,740,454	\$4,828,875,666	\$3,376,757,500

Output Increased 43% compared to 2015 SEIR

Impacts of Recycling on the Texas Economy

With more than \$4.8 billion of economic output and 22,910 jobs, Texas' recycling sector is similar in size to:



Petroleum Refining

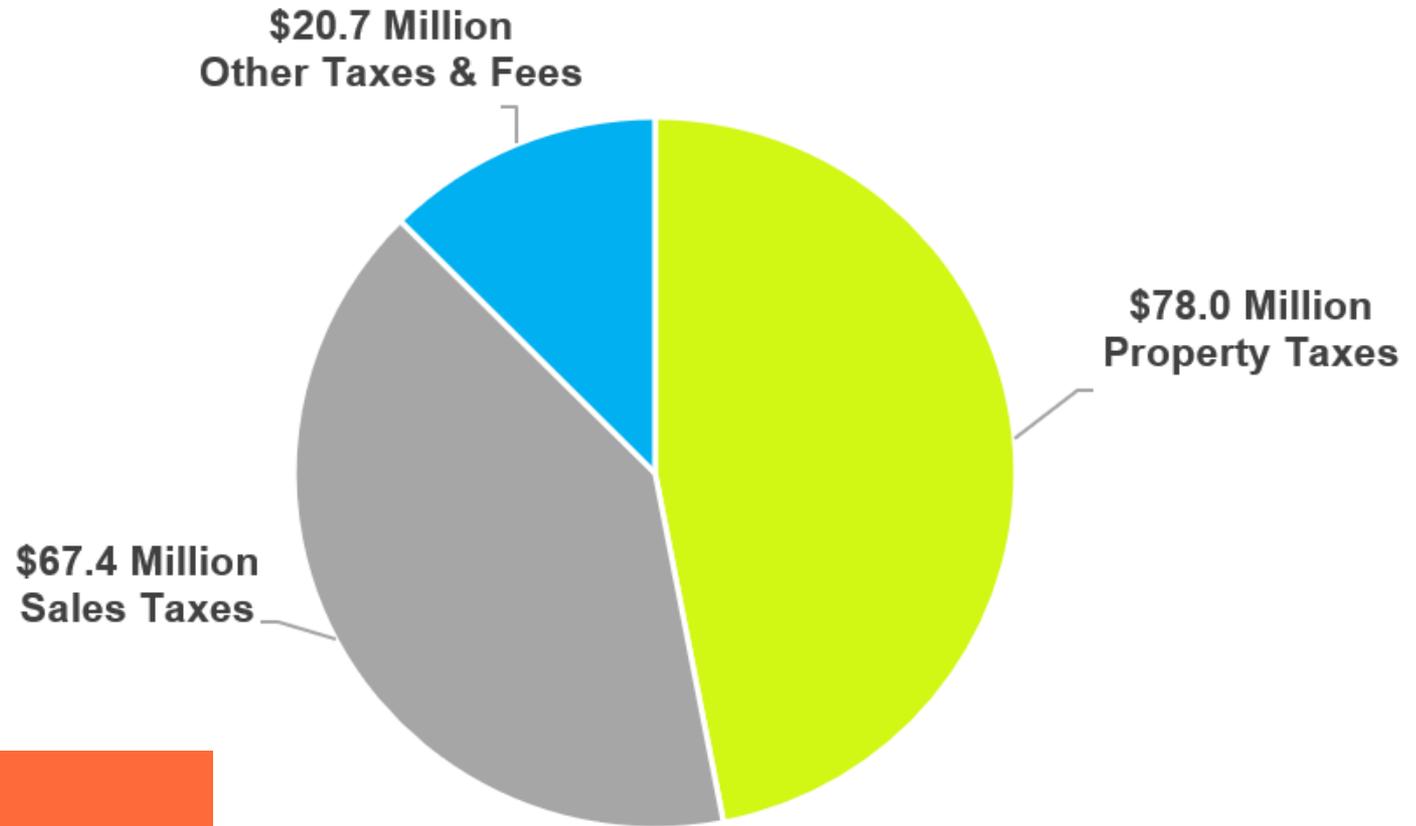
22,976



Furniture Manufacturing

23,399

Estimated Fiscal Impacts of Recycling (2019)



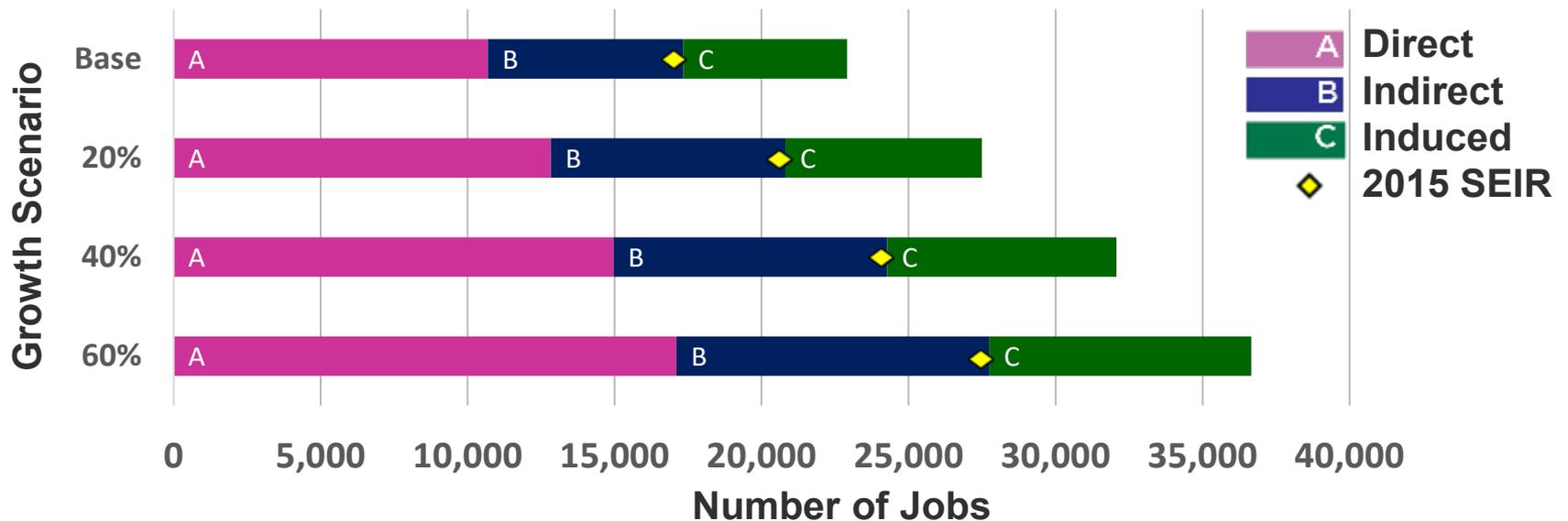
**STATE AND LOCAL TAX REVENUES GENERATED
BY RECYCLING**

2015 SEIR Fiscal Impact

Sales Tax	\$101 Million
Property Tax	\$72 Million
Other Taxes & Fees	\$21 Million

Recycling Growth Scenarios

Direct Employment (2019)



EMPLOYMENT BY RECYCLING GROWTH SCENARIO

Jobs Created and Feedstock Needed per 100 jobs, by Sector (Table 6-13)

Material	Additional Direct Jobs	Total Jobs Created	Additional Recycled Feedstock Needed	Percent Increase in Recycled Feedstock Needed
Ferrous Metals	100	203	155,845	30%
Plastics	100	273	950,250	1,784%
Glass	100	288	24,985	13%
Paper	100	438	155,173	12%
Non-ferrous Metals	100	629	173,471	98%

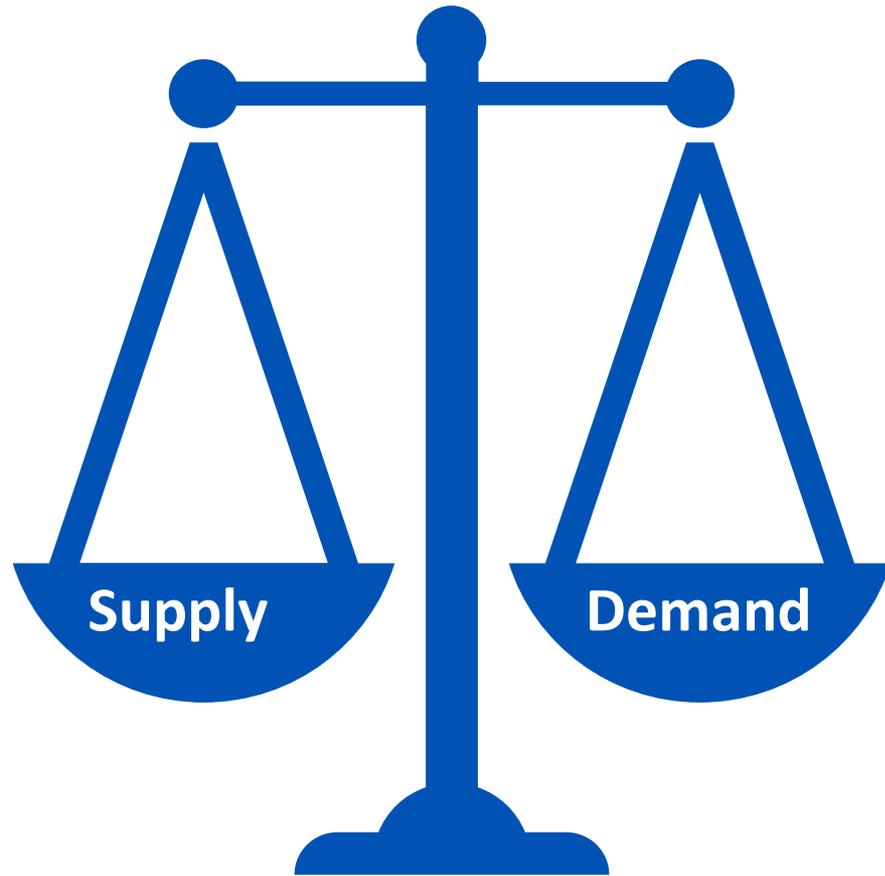


RMDP Strategy Development Approach



What is Recycling Market Development?

Defined actions to enhance the economic vitality of the recycling and reuse industries



Recycling Market Development Includes Demand Pull Strategies

DEMAND PULL STRATEGIES



**GROW DEMAND FOR RECYCLABLE
MATERIALS & RECYCLED-CONTENT
PRODUCTS**

Recycling Market Development Includes Supply Push Strategies

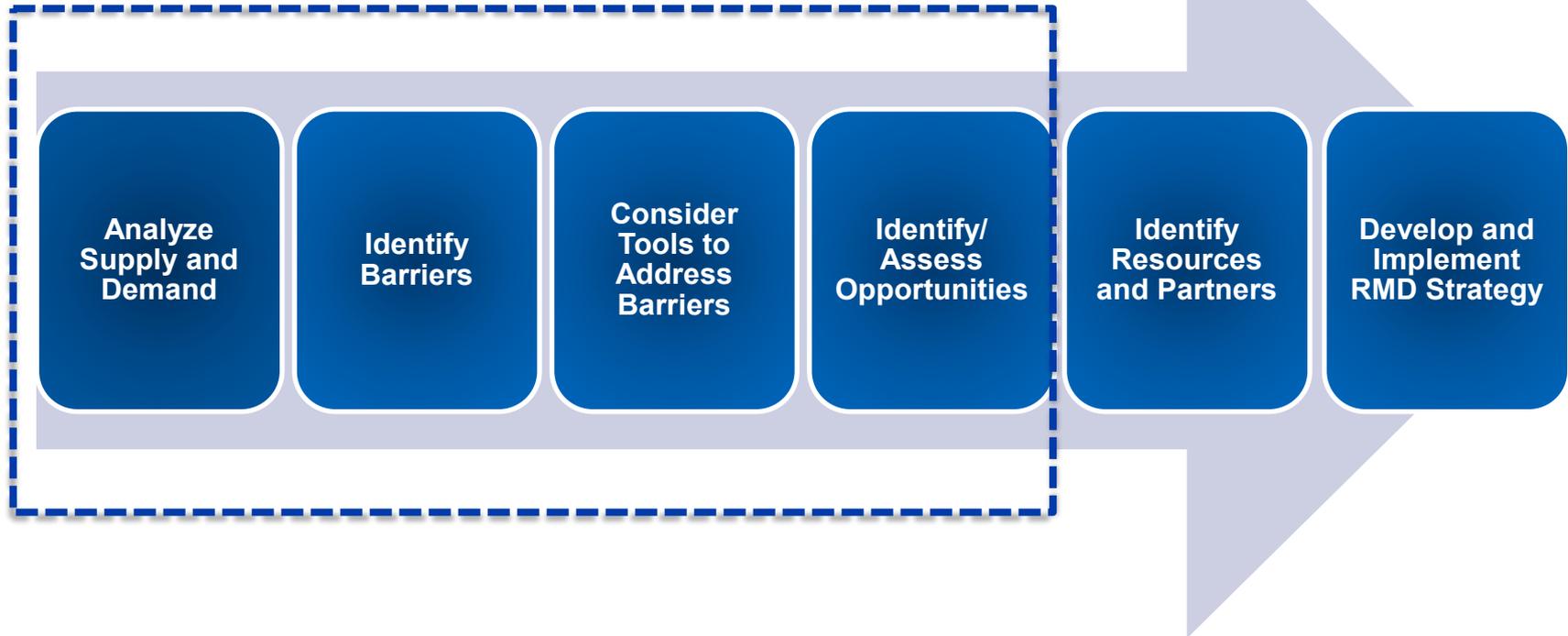
SUPPLY PUSH STRATEGIES



- INCREASE TONNAGE
- IMPROVE QUALITY
- ENHANCE RELIABILITY
- ENHANCE AFFORDABILITY

A Systematic Approach to Recycling Market Development

RMDP Sections 7.0 through 9.0





Supply & Demand of Recyclable Material Feedstocks



Approach

- ▶ Summarized annual recycling and generation figures to understand the nature of existing and potential material supply
- ▶ Examined state, national, and international market trends to understand demand potential for Texas-generated material
- ▶ Considered location and capacity of existing and planned processors and manufacturers
- ▶ Compared supply and demand to understand relationship, identify barriers, and inform recommendations

Structure of Supply and Demand Analysis

- ▶ A broad description of the recycling systems in Texas
- ▶ An overview of national, regional, and state material flows and markets
- ▶ A summary of the nature of material supply
- ▶ A summary of the demand for Texas-generated material
- ▶ A supply and demand comparison

Supply and Demand Results Example: Typical Recyclables (Table 7-21)

Supply > Demand	Supply = Demand	Supply < Demand
<ul style="list-style-type: none"> ▪ Cartons & Other Polycoat Containers 		<ul style="list-style-type: none"> ▪ Corrugated Cardboard ▪ Sorted Office Paper ▪ Other Paper ▪ Newspaper
<ul style="list-style-type: none"> ▪ Low Grade PET (Thermoform, Black) ▪ Colored HDPE ▪ Other Film ▪ Plastics #3 - #7 		<ul style="list-style-type: none"> ▪ High-Quality PET ▪ Natural HDPE ▪ Clean Clear Film
<ul style="list-style-type: none"> ▪ Mixed Non-Ferrous 	<ul style="list-style-type: none"> ▪ Industrial Scrap 	<ul style="list-style-type: none"> ▪ Bulky Metals ▪ Aluminum Cans
<ul style="list-style-type: none"> ▪ Glass (Rural Areas) 		<ul style="list-style-type: none"> ▪ Glass



Barriers & Opportunities to Increase Recycling



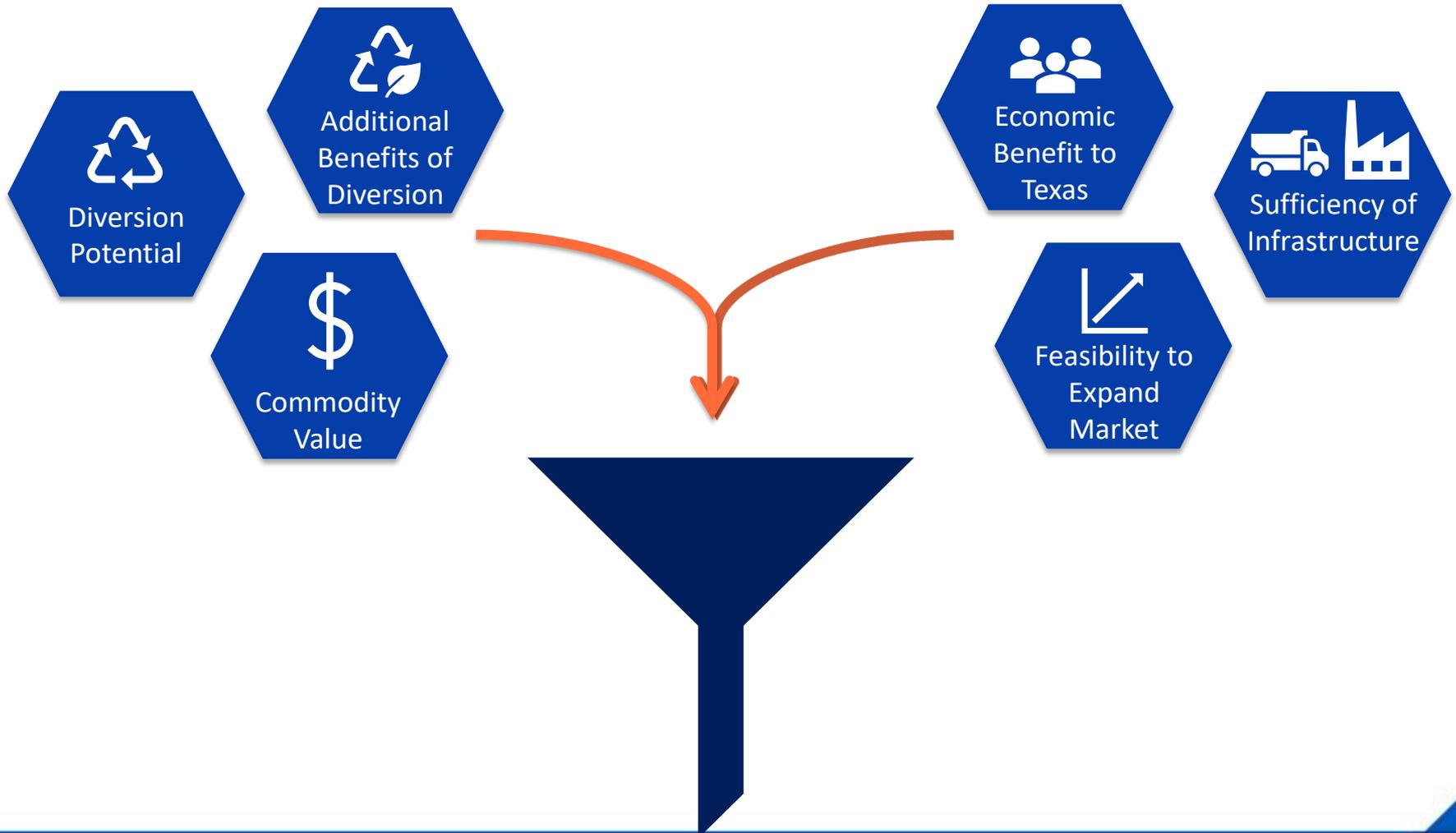
Approach

- ▶ Identified barriers based on market trends, survey results, stakeholder forums, interviews, and additional research
- ▶ Catalogued supply-related, demand-related, and economic barriers for each material type
- ▶ Evaluated gaps in Texas' recycling infrastructure by material type

Major Barriers Identified

- ▶ Contamination
- ▶ Competition with low-cost alternatives to recycling
- ▶ Low participation where programs are accessible
- ▶ Inconvenient/limited access to recycling opportunities
- ▶ Lack of / inadequate secondary processing
- ▶ Costly to transport relative to value
- ▶ Low value / inadequate demand
- ▶ Lack of equipment
- ▶ Challenges obtaining / retaining / training employees
- ▶ Other

Considerations for Prioritizing Barriers & Materials



Primary Barriers by Material: Typical Recyclables (Table 8-10)

Prioritization Key: High Priority ● Medium Priority ◐ Low Priority ○	Contamination	Competition with Low-Cost Alternatives to Recycling	Low Participation Where Programs are Accessible	Inconvenient/Limited Access to Recycling Opportunities	Lack of or Inadequate Secondary Processing	Costly to Transport Relative to Value	Low Value/Inadequate Demand	Lack of Equipment	Challenges Obtaining, Retaining, Training Employees	Other
Plastics #3-7 and Other Plastics	●	●	●	◐	●	●	●	◐	○	
Glass	●	●	●	◐	●	●	○	◐	○	
Film Plastics	●	●	●	●			◐	◐		
PET	●	●	●	◐		○	○	◐	○	
HDPE	●	●	●	◐			◐	○	○	
Paper	●	●	●	◐		◐		◐	○	
Non-Ferrous Metals	●	●	●	◐				◐	○	
Ferrous Metals	●	●	●	◐					○	

Primary Barriers by Material: Organics

(Table 8-10 continued)

Prioritization Key: High Priority ● Medium Priority ◐ Low Priority ○	Contamination	Competition with Low-Cost Alternatives to Recycling	Low Participation Where Programs are Accessible	Inconvenient/Limited Access to Recycling Opportunities	Lack of or Inadequate Secondary Processing	Costly to Transport Relative to Value	Low Value/Inadequate Demand	Lack of Equipment	Challenges Obtaining, Retaining, Training Employees	Other
Food Waste	●	●	●	●		◐	●	◐	○	
Yard Trimmings	●	●	○			◐	●	◐	○	
Biosolids						◐	●	◐	○	◐
Other						◐	●	◐	○	◐

Primary Barriers by Material: C&D Materials (Table 8-10 continued)

Prioritization Key: High Priority ● Medium Priority ◐ Low Priority ○	Contamination	Competition with Low-Cost Alternatives to Recycling	Low Participation Where Programs are Accessible	Inconvenient/Limited Access to Recycling Opportunities	Lack of or Inadequate Secondary Processing	Costly to Transport Relative to Value	Low Value/Inadequate Demand	Lack of Equipment	Challenges Obtaining, Retaining, Training Employees	Other
Mixed C&D	◐	●				◐		◐	○	○
Concrete, Asphalt, Brick	◐	●				◐		◐	○	○
Wood	◐	●				◐	◐	○		
Asphalt Shingles	◐	●				◐	●		○	
Gypsum	◐	●				◐	●		○	

Primary Barriers by Material: Other Materials

(Table 8-10 continued)

Material	Prioritization Key:									
	Contamination	Competition with Low-Cost Alternatives to Recycling	Low Participation Where Programs are Accessible	Inconvenient/Limited Access to Recycling Opportunities	Lack of or Inadequate Secondary Processing	Costly to Transport Relative to Value	Low Value/Inadequate Demand	Lack of Equipment	Challenges Obtaining, Retaining, Training Employees	Other
Tires	●	●	◐			◐	◐			●
Textiles		●	●	●			●			
Batteries		●	●		●	◐	◐			
Electronics		●	◐				◐		○	◐
Paint		●	○		○	◐	●			

High-Priority Cross-Material Barriers

BARRIER							
CONTAMINATION	✓	✓	✓	✓			
ACCESS FOR RURAL AND MULTI-FAMILY RESIDENTS	✓	✓	✓				
LACK OF PARTICIPATION	✓	✓	✓				
COSTLY TO TRANSPORT RELATIVE TO VALUE (FOR SOME MATERIALS)	✓ Glass		✓				
LOW-COST ALTERNATIVES TO RECYCLING	✓	✓	✓	✓	✓	✓	✓
RELUCTANCE OF END MARKETS TO PAY FOR SOME MATERIALS	✓ Some	✓					
LACK OF ADEQUATE MARKETS FOR TX-MADE PRODUCTS				✓	✓		

High-Priority Materials

HIGH PRIORITY



PLASTIC #3-7



GLASS



FILM PLASTICS



FOOD WASTE



TIRES



TEXTILES

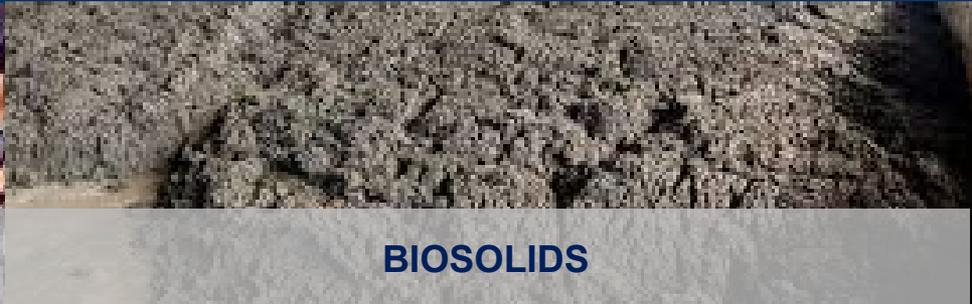


Medium-Priority Materials

MEDIUM PRIORITY



MEDIUM PRIORITY (LONG-TERM)



The background of the slide is a collage of images. On the left, there is a close-up of a person's hand holding a white plastic container. The rest of the background is filled with stacks of tires, some in sharp focus and others blurred. A solid blue horizontal banner is positioned across the middle of the image, containing the title text in white.

Infrastructure Needs and Gaps Assessment

Infrastructure Needs Example: Typical Recyclables (Table 8-7)

Material	Infrastructure Needs Key:			Existing Infrastructure Key:	
	High			Weak	
	Moderate			Moderate	
	Low			Strong	
Level of Infrastructure Need				Overall Sufficiency of Existing Infrastructure	
Collection	Processing	End-Use			
OCC					
Mixed Paper					
HDPE					
PET					
Plastics #3-7					
Film Plastics					
Ferrous Metals					
Non-Ferrous Metals					
Glass					

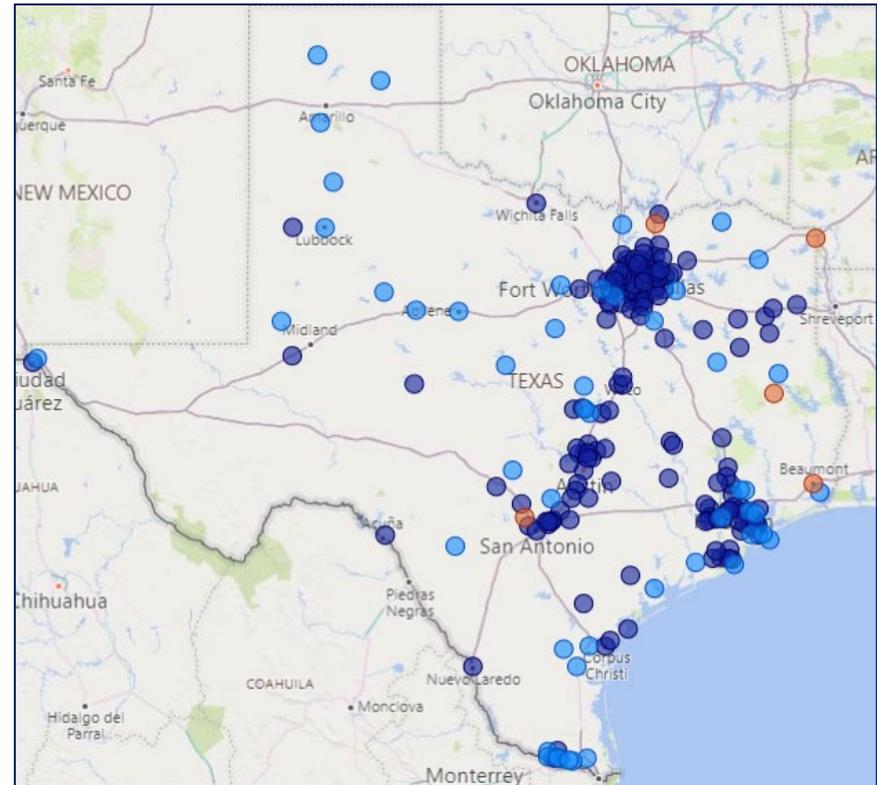
Collection and Transportation Needs

RURAL NEEDS

- EXPAND COLLECTION SYSTEMS
- COST-EFFECTIVE TRANSPORTATION OPTIONS

STATEWIDE NEEDS

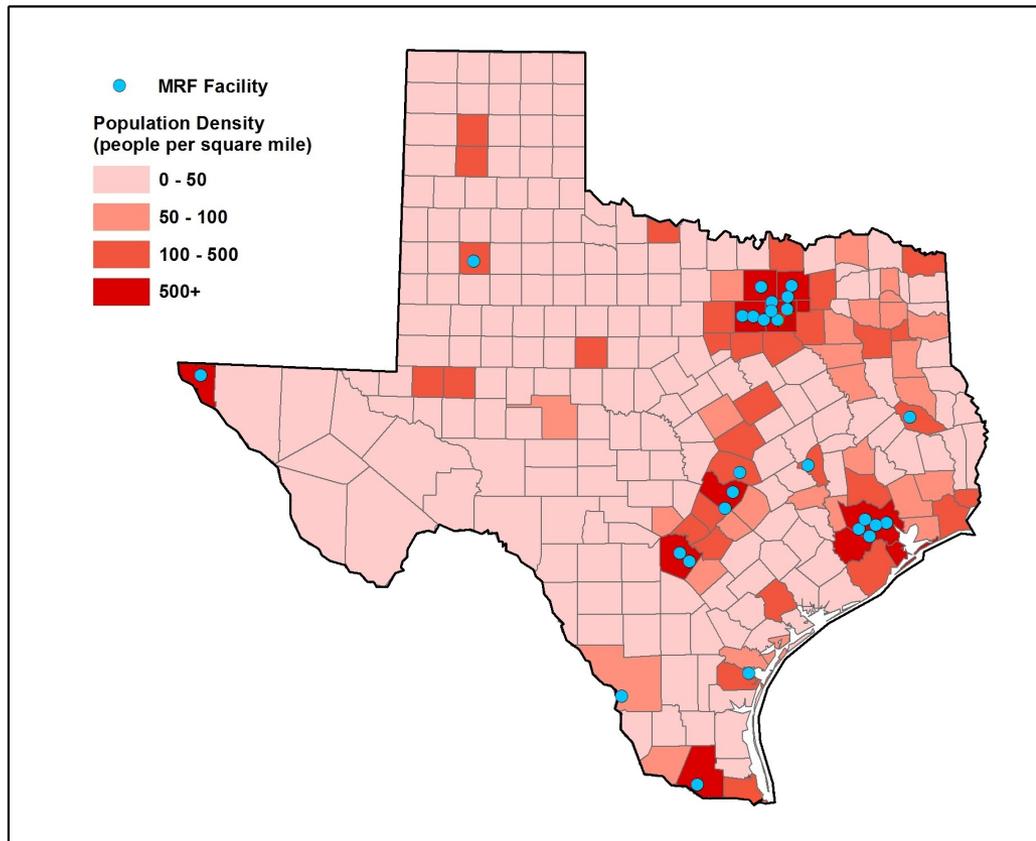
- RESIDENTIAL FILM
- FOOD WASTE
- RESIDENTIAL TEXTILES
- NON-CAN FERROUS METAL



Recycling Collection Program:

- Curbside
- Drop-Off Only
- Suspended

MRF Infrastructure Needs



EXPAND MRF CAPACITY

UP TO
15
NEW MRFS*



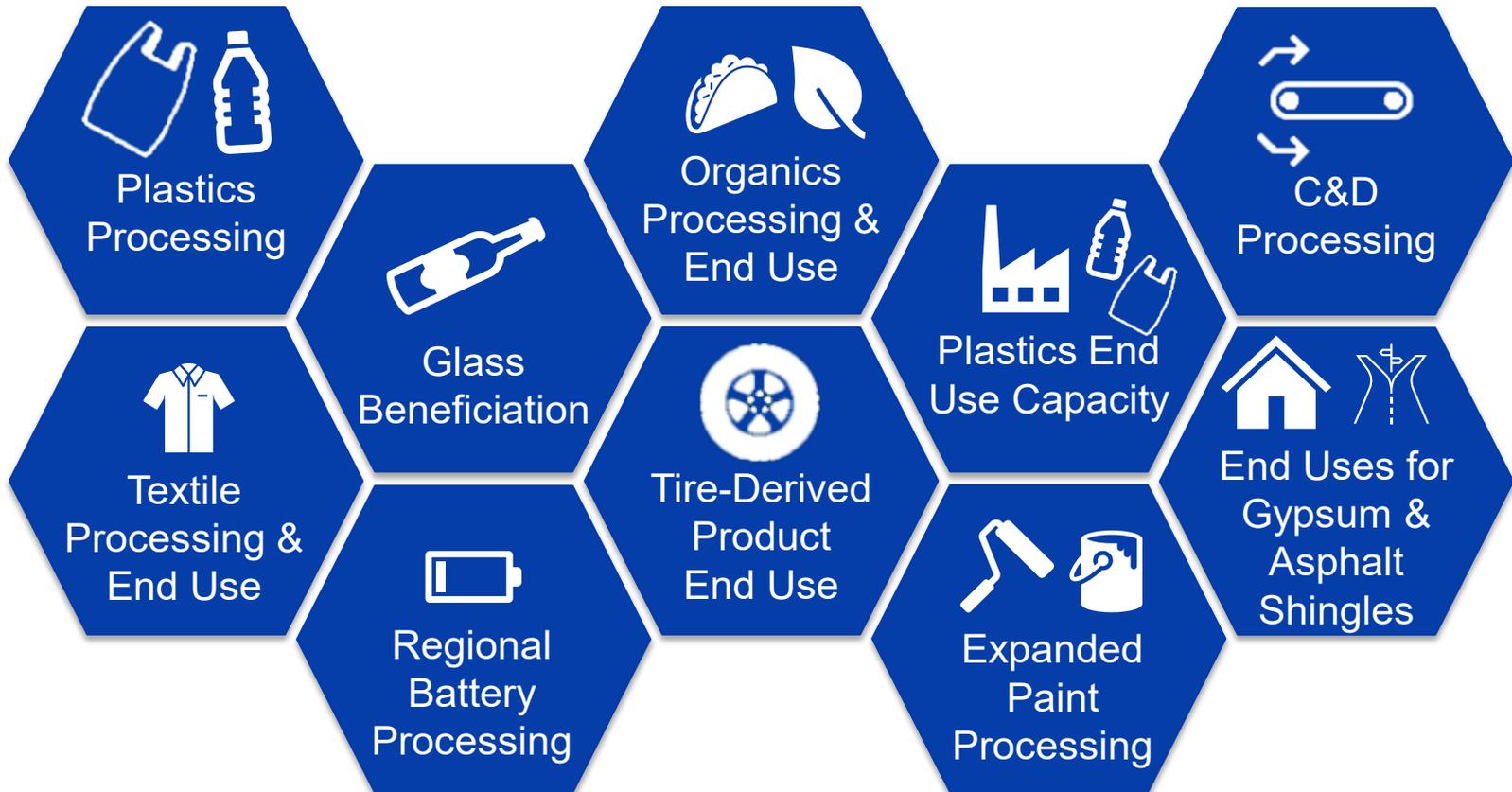
HUB AND
SPOKE

**Based on a 20% increase in recycling statewide*

ENHANCE MRF CAPABILITIES

- PRODUCE CLEANER BALES
- CAPTURE LOW-VOLUME MATERIALS
- REMOVE NEW MATERIALS & CONTAMINANTS

Other Processing & End-Use Needs





Market Development Tools & Mechanisms

Approach

- ▶ Evaluated 43 tools and mechanisms, across 5 categories:
 - Information, facilitation, and technical assistance
 - Preferential procurement
 - Financial assistance
 - Financial and other incentive/disincentives
 - Policies
- ▶ Developed detailed summary resource on each tool/mechanism and its use to address priority barriers
- ▶ Determined appropriate tools/mechanisms and key programs of work for Texas based on priority barriers in both urban and rural areas of the state.

Determining Appropriate Solutions

**Needs
Based**

**Integrated
Approach**

**Appropriate
Scale**

**Right Tool
for the Job**

Recommended Tools & Mechanisms

Example: Contamination (Table 9-1)

	Barrier	Information, Facilitation & Technical Assistance	Financial Assistance	Policies
<p>High-Priority Barrier</p> <p>Contamination</p> <p><u>High Priority</u> Typical Recyclables Film Plastic</p> <p><u>Medium Priority</u> C&D Materials</p> <p>Affected Materials (high and medium priority)</p>	<ul style="list-style-type: none"> • Recycle Right Campaign • Harmonization Guidance • Contamination Reduction Guidance • Clear Labeling and Signage 	<ul style="list-style-type: none"> • Equipment/ Recycling Market Development Grants and Loans <p>Tools/Mechanisms</p>	<ul style="list-style-type: none"> • Harmonization Policy and Setout Requirements 	

Tools & Mechanisms Summary Example (Sections 9.4 & 9.5)

Tools and Mechanisms to Address Competition with Low-Cost Alternatives to Recycling
Material Priority/Categories Addressed: High Priority: Typical Recyclables, Tires, Textiles, C&D Materials

Category

D - Financial Incentives/Disincentives

Tax Credits or Exemptions. Lowering the cost associated with recycling operations is one means of “leveling the playing field” with respect to disposal. Some state governments provide tax credits or tax exemptions for recycling-related business enterprises. Examples include sales and/or property tax exemptions on recycling equipment and property tax credits.

Rebates and Incentive Payments. Some jurisdictions provide permit fee waivers and/or disposal fee waivers for recycling facilities. Additional incentives such as material rebates and incentive payments can be used to encourage recycling businesses to locate in the state or for a manufacturer to switch from virgin feedstock.

Disposal Surcharges. Raising the cost of disposal through disposal surcharges (or in Texas’s case, increasing the current state-level disposal surcharge on MSW) also helps recycling to be more cost competitive. This approach is being recommended by The Recycling Partnership’s Circular Economy Accelerator (see Figure 9-1 for list of members) as both a means of “leveling the playing field” as well as generating funding to support local recycling programs. As shown in Figure 9-2, about half of U.S. states have a statewide per-ton disposal fee, ranging from \$0.13 to \$13.00, with an average of \$2.30 per ton and a median value of \$1.06. The per-ton disposal fee in Texas is \$0.94 per ton, which is below the national median and average. Two states have a percentage fee on waste disposal services. Minnesota has a 9 percent fee for residential and a 17 percent fee for commercial and self-haul and Iowa charges sales tax of 6 percent on solid waste and sludge collection and disposal services, along with a per-ton disposal fee. In some states, local governments are also authorized to charge a local solid waste disposal fee.

FIGURE 9-1: THE RECYCLING PARTNERSHIP’S CIRCULAR ECONOMY ACCELERATOR MEMBERS



Priority Barrier and Affected Materials

Applicable Tools and Mechanisms

FIGURE 9-2: STATE-LEVEL MSW DISPOSAL SURCHARGES IN THE U.S. (2016)



Source: Circular Matters

External Links to Reports, Example Policies, etc.

For more information:

- Circular Economy Accelerator Policy Whitepaper: https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2020/09/Policy-Whitepaper-9.30.2020.pdf

Analysis and Case Studies

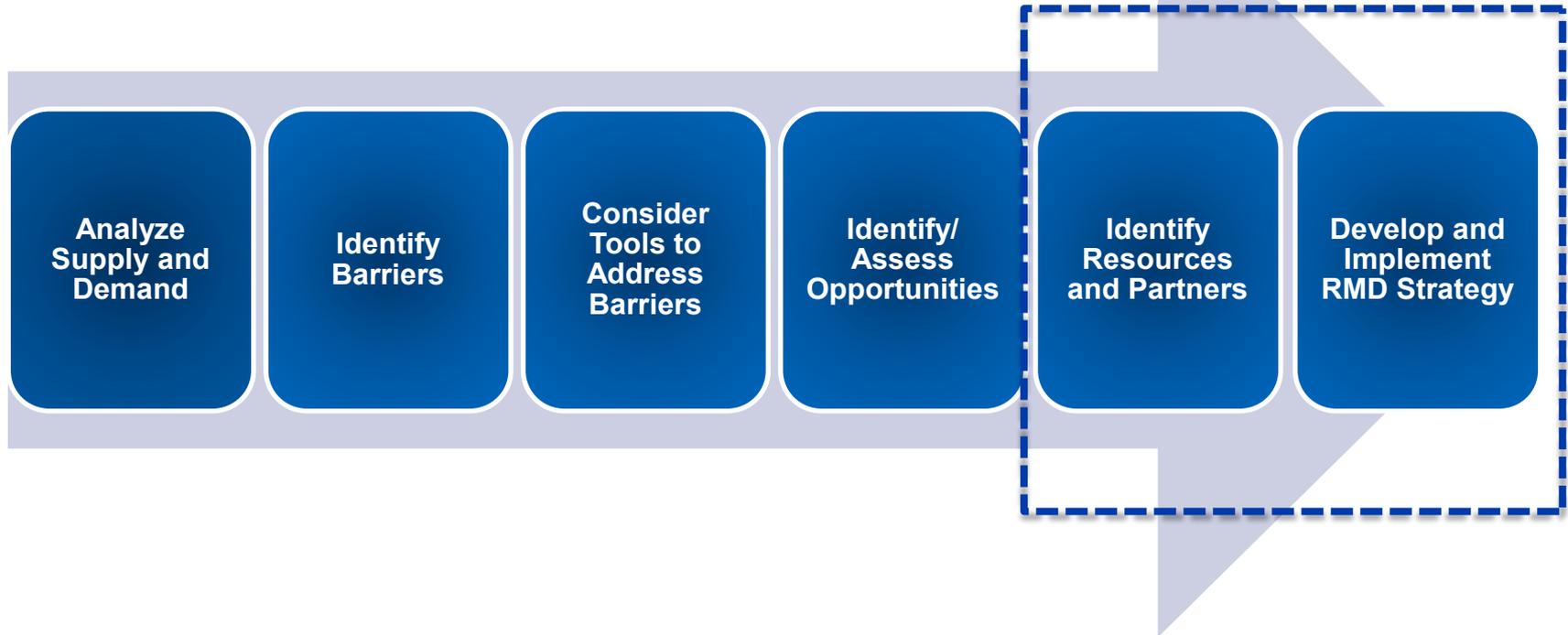


Texas Recycling Market Development Strategy



A Systematic Approach to Recycling Market Development

RMDP Section 10.0



Developing the Strategy for Texas

**INFORMATION, FACILITATION
& TECHNICAL ASSISTANCE**

**PREFERENTIAL
PROCUREMENT**

FINANCIAL ASSISTANCE

**FINANCIAL AND OTHER
INCENTIVES/DISINCENTIVES**

POLICIES

- ▶ The recommended strategy is to overcome the priority barriers through targeted programs of work
- ▶ Programs of work are aligned to the categories of tools and mechanisms to be implemented

Information, Facilitation & Technical Assistance



DISSEMINATION OF INFORMATION ON HOW TO RECYCLE CORRECTLY AND REDUCE CONTAMINATION



FACILITATION OF REGIONAL COOPERATION, HARMONIZATION AND INFORMATION EXCHANGE



RESEARCH AND TECHNICAL ASSISTANCE, R&D, DEMONSTRATION PROJECTS, AND GENERATOR MAPPING



ASSISTANCE AND SUPPORT FOR FEEDSTOCK CONVERSION RESEARCH

Preferential Procurement



PROMOTION OF TEXAS-MADE RECYCLED-CONTENT PRODUCTS



ENHANCEMENT OF THE RECYCLED-CONTENT PRODUCT DIRECTORY



SUPPORT OF EXISTING COOPERATIVE CONTRACTING WORK



REFRESH THE STATE PREFERENTIAL PROCUREMENT PROGRAM

Financial Assistance



DEVELOPMENT OF GRANTS AND/OR LOANS



FUNDING VIA PAY-AS-YOU-THROW (PAYT)

Financial and Other Incentives or Disincentives



DEVELOPMENT OF INCENTIVES/DISINCENTIVES SUCH AS:

- TAX CREDITS & EXEMPTIONS
- DISPOSAL SURCHARGES
- PERMIT FEE WAIVERS
- AWARDS PROGRAMS

Policies



EXPLORE NEW POLICIES SUCH AS:

- **HARMONIZATION POLICY**
- **ADVANCE RECYCLING FEES**
- **DISPOSAL SURCHARGES**
- **INDUSTRY FUNDING MECHANISMS**



REVIEW/REVISION OF STATE REGULATIONS AS NEEDED



PROMOTION OR ENACTMENT OF LOCAL GOVERNMENT POLICIES SUCH AS:

- **PAYT PROGRAMS**
- **SETOUT REQUIREMENTS**
- **MANDATORY SERVICE PROVISIONS**
- **FOOD WASTE DIVERSION MANDATES**

Approach to Identifying Resources & Partners

- ▶ Evaluated current and potential roles in implementing the recycling market development strategy for:
 - 10 state agencies and similar entities
 - Local government
 - State, regional and national organizations
- ▶ Developed institutional and administrative recommendations to implement the recycling market development strategy
- ▶ Recommendations follow 6 key principles to effectively manage recycling market development efforts, and address funding needs

Approach to Determining Potential Roles

- ▶ Identified mission of agency/organization
- ▶ Identified activities of agency including those that pertain to recycling market development
- ▶ Identified broad capabilities of agency
- ▶ Conducted interviews (when possible)
- ▶ Determined potential roles and responsibilities for implementing plan elements across the programs of work

Entities with Potential Roles

State and Regional Agencies & Entities



Local Governments

Other Organizations & Entities



Potential Role Example: TCEQ

Information, Facilitation, and Technical Assistance

- ▶ Promote recycling participation and how to recycle properly, and institute a statewide Buy Recycled campaign
- ▶ Provide guidance on harmonization and recycling container labeling and signage
- ▶ Develop and share information on best practice approaches to local policy development
- ▶ Provide information on the results of research and demonstration projects about the use of recyclable materials and products through TCEQ's website and via webinars
- ▶ Host additional commodity-specific webinars and workshops
- ▶ Oversee future recycling market development and economic impact studies as appropriate
- ▶ Include discussion of recycling market development in relevant TCEQ annual reports and associated plans

Potential Role Example: TCEQ (Cont'd)

Preferential Procurement

- ▶ Promote increased procurement of recycled-content products, particularly for products manufactured in Texas from Texas-generated recyclable materials or compost
- ▶ Work with the Comptroller's Statewide Procurement Division to track and analyze data on preferred product purchases among state agencies and track purchasing behavior over time
- ▶ Serve as the lead for the State as a participant in the Association of Plastics Recyclers' Government Recycling Demand Champions Program. Alternatively, the Comptroller's Statewide Procurement Division could be the lead agency for this program
- ▶ Develop and maintain an online expo/catalog of Texas-made recycled-content products to aid such product manufacturers in marketing their products statewide and beyond

Potential Role Example: TCEQ (Cont'd)

Financial Assistance

- ▶ Target a portion of the State's Regional Solid Waste Grants Program funds distributed to the COGs for addressing recycling market development barriers and opportunities in each region

Financial and Other Incentives/Disincentives

- ▶ Create an awards category for recycling market development initiatives as part of TCEQ's Texas Environmental Excellence Awards program

Potential Role Example: TCEQ (Cont'd)

Policies

- ▶ Assess data gaps and determine whether policy is needed to obtain additional data and information that would be of value in recycling market development efforts
- ▶ Form committee of industry experts and TCEQ staff to review and revise relevant regulations for those materials for which stakeholders indicated potential state permitting/regulatory challenges
- ▶ Participate in the evaluation and possible development of state policy mechanisms to provide the funding and increased producer responsibility needed to address key recycling and recycling market development barriers and opportunities

Principles for Effective Implementation

RECOMMENDATIONS

1

ESTABLISH TEXAS RECYCLING MARKET DEVELOPMENT CENTER (TxRMDC)

2

APPOINT A DIVERSE RECYCLING MARKET DEVELOPMENT BOARD

3

ENGAGE THE PRIVATE SECTOR TO SAVE SCARCE STATE RESOURCES

4

APPROPRIATELY STAFF THE TxRMDC FOR SUCCESS

5

COLLECT CURRENT & ACCURATE MARKET INTELLIGENCE

6

MONITOR IMPLEMENTATION EFFORTS AND ADJUST AS NEEDED

Principle #1. The lead entity guiding market development is determined and its roles and relationships with other key departments and organizations are defined.

- ▶ **Recommendation:** Establish a Texas Recycling Market Development Center (TxRMDC) within one of the state universities – possibly set up as a 501(c)(3) affiliate.



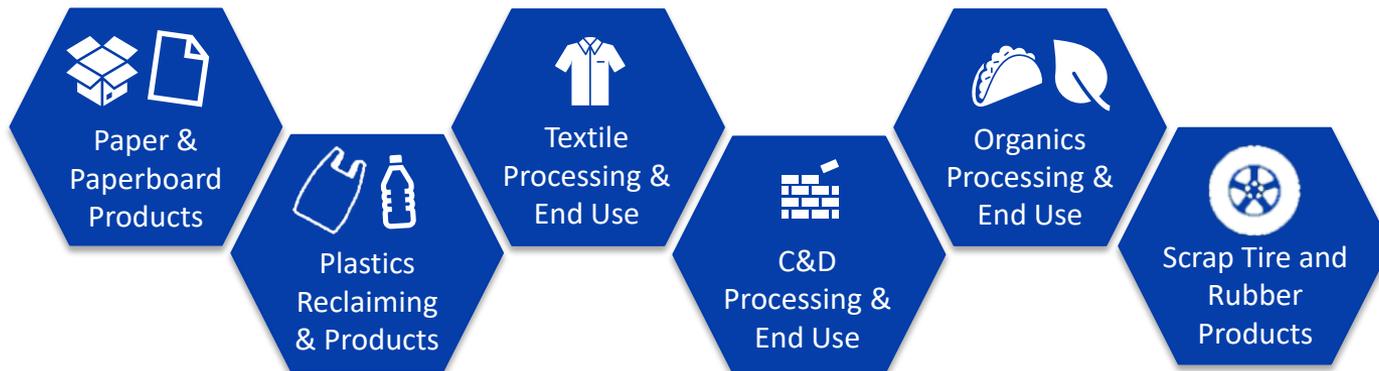
Principle #2. Coordination exists among major players in the recycling market development system.

- ▶ **Recommendation:** Appoint a Recycling Market Development Board to assist with coordinating multi-organizational efforts. The Board could be comprised of 17 members:



Principle #3. The skills, knowledge, and resources of the private sector are leveraged to achieve the public goal of solving market development barriers.

- **Recommendation:** Engage private sector in collaboration and partnership opportunities. Proposed board representation includes industry representatives for target materials.



Principle #4. Implementation of strategies is well managed and appropriately staffed.

- ▶ **Recommendation:** Fund at least two full-time positions to initially staff the TxRMDC. One advantage to housing the TxRMDC within a Texas university to access to other human and organizations resources as well as student interns to assist with program and project execution.

Principle #5. Current, accurate market intelligence and assessment is key to making good decisions and monitoring progress.

- ▶ **Recommendation:** Collect and support studies to obtain valuable data, including recycling quantities, composition, and contamination rates
- ▶ **Recommendation:** Comptroller's statewide procurement division and other state agencies track recycled-content purchases and recycled-content products manufactured in Texas

Principle #6. Implementation efforts are monitored regularly to determine their appropriateness and effectiveness and adjusted as needed.

- ▶ **Recommendation:** Obtain key information from processors and manufacturers in the state to understand successes and address any program challenges



Funding Texas Market Development Efforts

“PORTFOLIO” APPROACH



INSTITUTE PAY-AS-YOU-THROW (PAYT) USER FEE SYSTEMS AT THE LOCAL LEVEL



ESTABLISH PUBLIC-PRIVATE PARTNERSHIPS AND PURSUE GRANT FUNDING



ESTABLISH ADVANCE RECYCLING FEES FOR TIRES, ELECTRONICS & PAINT



INCREASE STATE DISPOSAL FEE



ESTABLISH ONE OR MORE INDUSTRY FUNDING MECHANISMS



INVESTIGATE PASSAGE OF BEVERAGE CONTAINER DEPOSIT LEGISLATION

Expand Existing Funding Mechanisms

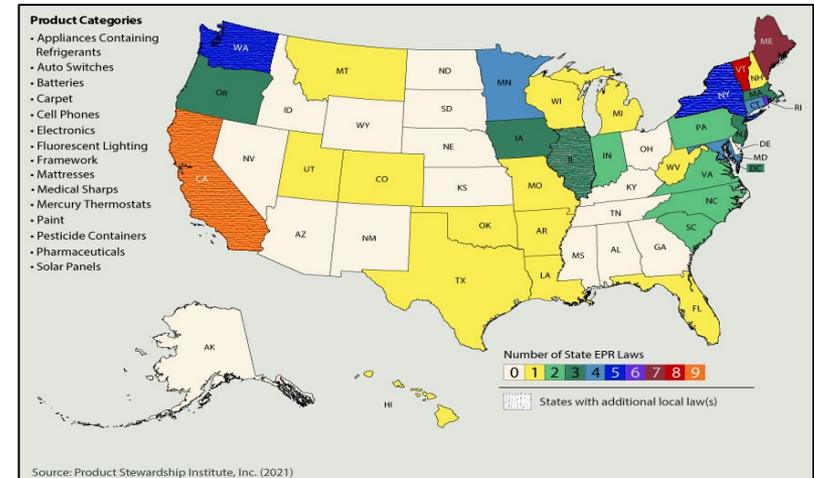
Establish Advance Recycling Fees for Tires, Electronics & Paint: Provide funding for recycling and/or safe disposal, and can minimize illegal dumping thereby freeing funds for recycling infrastructure and market development investment

Increase State Disposal Fee: Fees average \$2.30/ton in the U.S. with current fee in Texas at \$0.94/ton.

Increase of Per-Ton Fee	Estimated Increase in Total Revenues
Increase to \$1.50 per ton	\$20.6 million
Increase to \$2.00 per ton	\$39.0 million
Increase to \$2.25 per ton	\$48.2 million
Increase to \$2.50 per ton	\$57.4 million

Industry Funding Mechanisms

Packaging Fees Paid by Industry: Per-unit fees paid for by the consumer brand companies to close the gaps in infrastructure and education.



Extended Producer Responsibility: Mandatory product stewardship requiring product manufacturers to be responsible for the end-of-life management of its product and/or packaging.

The RMDP Report

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5	VALUE OF MATERIALS RECYCLED AND DISPOSED
6	THE STATEWIDE ECONOMIC IMPACTS OF RECYCLING
7	SUPPLY AND DEMAND ANALYSIS
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9	RECYCLING MARKET DEVELOPMENT STRATEGIES FOR STATE AND LOCAL GOVERNMENTS
10	RECOMMENDATIONS FOR IMPLEMENTING THE RECYCLING MARKET DEVELOPMENT STRATEGY

APPENDICES

A	DEFINITIONS
B	CONFIDENTIALITY PLAN
C	FACILITY DIRECTORY
D	STAKEHOLDER FORUM SUMMARY
E	SUMMARY TABLE OF STRATEGIES

- ▶ RMDP Report is designed as a tool and resource for strategy implementation
- ▶ The *Recycling Market Development Plan* report will be available online at: TXrecyclingstudy.org



Public Education Campaign

- ▶ Public education campaign with Take Care of Texas
- ▶ Topics are based on the needs and priorities identified through the survey and market development plan process
- ▶ Topics to include:
 - Statewide recycling activity
 - Reducing contamination
 - Recyclable materials and uses
 - Case studies of processors and end-users
 - Economic benefits of recycling
 - and more...



Questions



RECYCLING MARKET Development Plan

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