## nirs

# CONNECTICUT RESIDENTIAL RECYCLING ECONOMIC STUDY 

FINAL REPORT

## RRS recycle.com

Managing change
in a resource-
constrained world.


WASTE RECOVERY

## since I986

## CONNECTICUT RESIDENTIAL RECYCLING ECONOMICS STUDY

Pecycler Recycle PROJECT GOAL

Quantify the Economic Impact of Residential Recycling in Connecticut


## WHY DO A RECYCLING ECONOMIC INFORMATION STUDY?

Measurement provides an understanding of the economic contribution of residential recycling in Connecticut
The recycling industry:

- Creates local jobs
- Feeds critical end markets
- Motivates new technology developments
- Contributes to the state's tax revenue and total economic output


## METHODOLOGY

## RECYCLING ECONOMIC INFORMATION STUDY PROCESS

Define Recycling
Activities and
Materials

Identify Relevant Industries in CT

Collect Data

Perform Economic Contribution Analysis with IMPLAN

## MATERIALS INCLUDED IN STUDY



Residential
Blue Bin


Bottle Deposit


Residentially
Focused
Stewardship

# INDUSTRIES RELATED TO RESIDENTIAL RECYCLING IN CONNECTICUT 

## Industry Description

Paper (except newsprint) mills
Paperboard mills
Nonferrous and aluminum metal foundries and die-casting foundries

All other converted paper product manufacturing Industrial machinery and equipment merchant wholesalers

Plastics material and resin manufacturing
Recyclable material merchant wholesalers
Other pressed and blown glass and glassware manufacturing
Supermarkets and other grocery (except convenience) stores
Glass product manufacturing made of purchased glass
Steel product manufacturing and nonferrous metal smelting
Environmental consulting services

Iron foundries and Steel investment foundries
Solid waste collections and materials recovery facility*

## OUT OF SCOPE ACTIVITIES AND MATERIALS

The following activities, sectors, and associated recycling materials are out of scope and are not included in the study:

- Recycling Related:
- Commercial, institutional, and industrial recycling through MRFs
- Business to Business Recycling
- Organics
- Recovered C\&D
- Scrap Yards
- Reuse Activities:
- Thrift stores
- C\&D reuse
- Refurbishment/Remanufacturing:
- Electronics refurbishment

> Including additional activities, sectors, and materials would increase the calculated economic contribution of recycling in
> Connecticut.

## PREPARING DATA FOR IMPLAN ECONOMIC MODEL INPUT



## FINAL IMPLAN INPUT DATA EXAMPLE

- 43\% of Paperboard mills estimated to directly involve recycling - $40 \%$ of that $43 \%$ is estimated to directly relate to residential material

$$
43 \% * 40 \%=17 \%
$$

of Paperboard mills activity is related to residential recycling

## ECONOMIC CONTRIBUTION ANALYSIS PERFORMED WITH IMPLAN

The leading input-output economic model that uses a variety of data sources including Bureau of Labor Statistics, Bureau of Economic Analysis, and the Census Bureau to compile the model's economic datasets.

# IMPL^N <br> MAKE AN IMPACT. 

## MEASURE DIRECT, INDIRECT, AND INDUCED EFFECTS



Direct Effects are the initial effects to a local industry or industries due to the activity or policy being analyzed


Indirect Effects are the effects stemming from business to business purchases in the supply chain taking place in the region


Induced Effects are the effects in the region stemming from household spending of labor income, after removal of taxes, savings, and commuters

STUDY RESULTS

## TOTAL ECONOMIC CONTRIBUTION OF RESIDENTIAL RECYCLING IN CONNECTICUT

| 4,900 | $\$ 383 \mathrm{M}$ | $\$ 642 \mathrm{M}$ | $\$ 1,159 \mathrm{M}$ |
| :---: | :---: | :---: | :---: |
| Direct, | Total Labor <br>  <br> Induced Jobs | Total Value <br> Add | Total <br> Economic <br> Output |

## TOTAL ECONOMIC CONTRIBUTION OF RESIDENTIAL RECYCLING IN CONNECTICUT



## COMPONENTS OF RESIDENTIAL RECYCLING ECONOMIC TOTAL OUTPUT

Municipal Recycling
Administration, 4\%


## PERCENT OF CONNECTICUT'S TOTAL ECONOMIC OUTPUT

CT's Largest Single Industry


## TAX CONTRIBUTIONS TO TOTAL ECONOMIC OUTPUT OF THE RESIDENTIAL RECYCLING INDUSTRY IN CONNECTICUT

| Impact | Sub County <br> General | Sub County <br> Special <br> Districts | State | Federal | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Direct | $\$ 14.0 \mathrm{M}$ | $\$ 0.2 \mathrm{M}$ | $\$ 17.4 \mathrm{M}$ | $\$ 49.1 \mathrm{M}$ | $\$ 80.8 \mathrm{M}$ |
| Indirect | $\$ 4.9 \mathrm{M}$ | $\$ 0.1 \mathrm{M}$ | $\$ 6.3 \mathrm{M}$ | $\$ 18.1 \mathrm{M}$ | $\$ 29.3 \mathrm{M}$ |
| Induced | $\$ 7.2 \mathrm{M}$ | $\$ 0.1 \mathrm{M}$ | $\$ 7.5 \mathrm{M}$ | $\$ 16.8 \mathrm{M}$ | $\$ 31.6 \mathrm{M}$ |
| Total | $\$ 26.1 \mathrm{M}$ | $\$ 0.4 \mathrm{M}$ | $\$ 31.2 \mathrm{M}$ | $\$ 84.0 \mathrm{M}$ | $\$ 141.8 \mathrm{M}$ |

## NEXT STEPS - RESEARCH



Factor in the environmental benefits of recycling along with the economic


Capture impacts of all recycling activities in Connecticut


Measure Regional Impact of Connecticut's recycling in the Northeast

## POTENTIAL TO GROW



Total economic contribution of residential recycling in Connecticut is
\$1.16B at current recycling levels


391 K tons of mixed residential recyclables are in the trash, recovering them would create jobs and add value to the state's economy

## RRS

# QUESTIONS? KATE MAGUIRE 

CONSULTANT
630.606.6054

KMAGUIRE@RECYCLE.COM

## RRS

## APPENDIX: DETAILED METHODOLOGY

## KEY INPUT FOR IMPLAN MODEL

Proportion of Employment directly related to residential recycling in Connecticut

## CORE DATA SOURCES USED FOR MODEL INPUT



1. IMPLAN \& U.S. Business Census provides total employment numbers by industry sector NAICS

2. Survey effort to determine proportion of Census employment is related to all recycling activity

3. Review of Connecticut recycling data to determine proportion of recycling related to residential recycling activity, excluding commercial

## DETAILED METHODOLOGY STEPS TO PREPARE MODEL INPUT

1. Literature Review of Previous Recycling Economic Studies
2. Identifying relevant activities
3. Determining relevant industry sectors
4. Translating industry sectors to Connecticut Companies
5. Municipal and Private Sector Survey Effort
6. Supplemental Research
7. IMPLAN model input preparation

- Proportion of industry directly related to recycling
- Proportion of industry directly related to residential recycling

8. Sensitivity Analysis

## STEP 1: LITERATURE REVIEW OF PREVIOUS RECYCLING ECONOMIC STUDIES

Prior to performing the analysis, RRS reviewed the published methodology incorporated by three statewide reports and one regional report to ensure the methodology followed for this study aligned with previous studies. The four reports are:

ENVIRON International Corporation for the Colorado Department of Public Health and Environment. Economic Study of Recycling in Colorado. November 17, 2014. SAIC for the Houston-Galveston Area Council. The Economic Contribution of the Recycling Industry to the Houston-Galveston Region. May 2013.
Valentine, David, and Ann Ulmer. Missouri Recycling Economic Information Study MOREIS. Prepared by the University of Missouri Institute of Public Policy for the Environmental Improvement and Energy Resources Authority. January 20, 2005.
The National Recycling Coalition in association with R.W. Beck, Inc. for the Florida Department of Environmental Protection. Florida Recycling Economic Information Study. June 2000.

## STEP 2: IDENTIFYING RELEVANT ACTIVITIES AND INDUSTRIES

| Activity | Description | Example |
| :---: | :---: | :---: |
| Collection | Curbside recycling, bottle redemptions, and materials covered by Connecticut's product stewardship program that residents participate in. | - Municipal or private sector operated curbside recycling collection <br> - Mixed recycling drop-off <br> - Bottle redemption centers <br> - Paint, mattress, and electronics recycling drop-off |
| Processing | Any facility that performs sorting, cleaning, consolidating, treating, disassembling, or densifying of recyclables. | - Material recovery facilities (MRFs) <br> - Bottle deposit primary processing <br> - Electronics or matress dismantling |
| Reclaiming | Converts material into final product or raw material for first-stage manufacturing. | - Plastic reclaimer that further sorts, washes, and flakes plastic bales from MRFs. |
| First-Stage Manufacturing | Production of commodities containing material from processed or reclaimed material. | - Production of plastic preforms, sheets, rolls or flake <br> - Production of metal billet or ingot <br> - Production of paper and paperboard. |
| Supporting Activities | Research, equipment development and sales, consulting, engineering, brokering, and exchange services. | - Consulting services to support education and outreach or collections <br> - MRF equipment development and sales <br> - Marketable recycled commodity brokering |



## STEP 2: IDENTIFYING RELEVANT ACTIVITIES AND INDUSTRIES

- First-stage manufacturers using recycling content in their process are included in this study
- Manufacturing stages beyond first-stage manufacturing are not included because once material moves beyond first-stage manufacturing the material competes with virgin material and is often indistinguishable. At this point the loop in recycling is closed.


## EXAMPLE SUPPLY CHAIN DIAGRAM: CURBSIDE PLASTIC BOTTLES AND JUGS



## STEP 3: DETERMINING RELEVANT INDUSTRY SECTORS

- North American Industry Classification System (NAICS): 2-to-6digit codes that are used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.
- IMPLAN economic model data is also based around U.S. Census data and NAICS codes


## STEP 3: DETERMINING RELEVANT INDUSTRY SECTORS

| Industry Description | NAICS Codes | IMPLAN Model Code |
| :---: | :---: | :---: |
| Paper (except newsprint) mills | 322121 | 145 |
| Paperboard mills | 322130 | 146 |
| All other converted paper product manufacturing | 322299 | 151 |
| Plastics material and resin manufacturing | 325211 | 164 |
| Other pressed and blown glass and glassware manufacturing | 327212 | 200 |
| Glass product manufacturing made of purchased glass | 327215 | 202 |
| Steel product manufacturing and nonferrous metal smelting | 331110 | 215 |
| Iron foundries and Steel investment foundries | 331511,331512 | 227 |
| Nonferrous and aluminum metal foundries and die-casting foundries | $331523,331524,331529$ | 228 |
| Other commercial equipment merchant wholesalers | 423440 | 393 |
| Industrial machinery and equipment merchant wholesalers | 423830 | 295 |
| Recyclable material merchant wholesalers | 423930 | 296 |
| Supermarkets and other grocery (except convenience) stores | 445110 | 406 |
| Environmental consulting services | 541620 | 463 |
| Solid waste collections and materials recovery facility* | 562111,562920 | 479 |
| Municipal Recycling Administration | 561110 | 470 |

## STEP 4: TRANSLATING INDUSTRY SECTORS TO CONNECTICUT COMPANIES

- Using the relevant NAICS codes an online search was completed to find as many relevant companies as possible in CT. Searches included:
- Website identifying contract companies in Connecticut by NAICS code
- General web search by NAICS code
- General web search by NAICS industry description
- Once companies were identified, a brief website review was completed to ensure only first stage manufacturing companies within Connecticut were included


## RHS

## STEP 5: PUBLIC AND PRIVATE SECTOR SURVEY EFFORT

## STEP 5 SURVEYING EFFORT: WHY CONDUCT SURVEYS?

- Surveys provided total employment and estimated proportion of employment focused on recycling for relevant industries
- This data was a key input in the economic model


## STEP 5 SURVEYING EFFORTS: WHO WAS CONTACTED?

- All Connecticut Municipalities \& Authorities
- All Material Recovery Facilities and Private Haulers and Stewardship Program Provides

- Identified End Markets


## STEP 5 SURVEYING EFFORT: MUNICIPAL SURVEY

How solid waste collection services are provided

- Municipal Hauling
- Private Sector Contract or Open Market Hauling

Number of Employees Focused on Direct Recycling Activities

- Collections
- Transfer Station Operations
- Drop-Off Stations

Number of Employees Focused on Recycling
Administrative Support

- Recycling education and outreach
- Contract management
- Other recycling administrative staff work


## STEP 5 SURVEYING EFFORT: MUNICIPAL SURVEY RESPONSE RATE

77 municipalities responded covering
$4: \%$ of Connecticut's population

## STEP 5 SURVEVING EFFORT: SUMMARY RESULTS OF THE CONNECTICUT MUNICIPAL SURVEY



Have Paid Staff
Related to Recycling


Provide
Municipal Recycling
Collection Services

493

Estimated Municipal Staff Directly
Related to
Recycling
Collection

209

Estimated Municipal Recycling Related
Administration

## STEP 5 SURVEYING EFFORT: PRIVATE SECTOR SURVEY

## Industry Identification

- Self identifaction of relavent NAICS code


## Identification of Recycling Activities

- Collection
- Processing
- Reclaiming
- First-stage manufacturing
- Supporting Activities

Number of Employees Directly Related to Recycling

- What proportion of total employment is focused specifically on recycling activities


## STEP 5 SURVEYING EFFORT: PRIVATE SECTOR SURVEY RESPONDENTS

- 4 Material Recovery Facilities
- 2 Large Haulers
- 1 Stewardship Operators
- Very low response rate for Connecticut end markets


## STEP 6: SUPPLEMENTAL RESEARCH

- Supplemental research was performed due to gaps in needed data after the surveying effort.
- Supplemental Research Included
- Literature Review of previous IMPLAN economic studies on recycling Ex: Houston, Texas, Colorado, Missouri, Florida, Michigan
- Connecticut specific material recovery facility data
- Industry reports - Ex: Steel Recycled Content White Paper November 2009
- RRS expert industry knowledge


## RRS

## STEP 7: IMPLAN MODEL INPUT PREPARATION

## STEP 7 IMPLAN MODEL INPUT PREPARATION: PROPORTION OF INDUSTRY EMPLOYMENT RELATED TO RECYCLING

| Industry Description | Estimated Average Percent of Employment Related to Recycling | Percent Related to Recycling Source |
| :---: | :---: | :---: |
| Paper (except newsprint) mills | 43\% | R.W. Beck Florida Economic Study 2000 |
| Paperboard mills | 43\% | R.W. Beck Florida Economic Study 2000 |
| All other converted paper product manufacturing | 100\% | Environ Economic Study of Recycling in Colorado 2014 |
| Plastics material and resin manufacturing | 12\% | Closed Loop Partners 2019 Report |
| Other pressed and blown glass and glassware manufacturing | 70\% | Range Around Environ Economic Study of Recycling in Colorado 2014 |
| Glass product manufacturing made of purchased glass | 70\% | Range Around Environ Economic Study of Recycling in Colorado 2014 |
| Steel product manufacturing and nonferrous metal smelting | 55\% | Steel Recycled Content White Paper November 2009 |
| Iron foundries and Steel investment foundries | 68\% | Range Around Environ Economic Study of Recycling in Colorado 2014 |
| Nonferrous and aluminum metal foundries and die-casting foundries | 68\% | Range Around Environ Economic Study of Recycling in Colorado 2014 |
| Other commercial equipment merchant wholesalers | 21\% | Tomra Bottle Deposit Study |
| Industrial machinery and equipment merchant wholesalers | 0.1\% | RRS Industry Knowledge |
| Recyclable material merchant wholesalers | 100\% | Environ Economic Study of Recycling in Colorado 2014 |
| Supermarkets and other grocery (except convenience) stores | 1\% | Tomra Bottle Deposit Study |
| Environmental consulting services | 1\% | RRS Industry Knowledge |
| Solid waste collections and materials recovery facility* | 56\% | RecycleCT Municipal and Business Survey |
| Municipal Recycling Administration | 100\% | RecycleCT Municipal and Business Survey |

# STEP 7 IMPLAN MODEL INPUT PREPARATION: PROPORTION OF INDUSTRY EMPLOYMENT RELATED TO RESIDENTIAL RECYCLING 

| Residentially Focused Proportion | Industries | Data Source |
| :---: | :---: | :---: |
| 40\% | - Paper (except newsprint) mills <br> - Paperboard mills <br> - All other converted paper product manufacturing <br> - Plastic material and resin manufacturing <br> - Industrial machinery and equipment merchant wholesalers <br> - Recyclable material merchant wholesalers <br> - Environmental consulting services <br> - Material recovery facilities | - CT MRF tonnage data breakdown of residential versus commercial incoming stream |
| 60\% | - Other pressed and blown glass and glassware manufacturing <br> - Glass product manufacturing made of purchased glass | - CT MRF tonnage data source sited above plus additional residential recycling through bottle deposit program |
| 20\% | - Steel product manufacturing and nonferrous metal smelting <br> - Iron foundries and steel investment foundries <br> - Nonferrous and aluminum metal foundries and die-casting foundries | - CT MRF tonnage data source sited above minus industrial focus on scrap metal recycling |
| 100\% | - Other commercial equipment merchant wholesalers (TOMRA) <br> - Bottle deposit returns at supermarkets and grocery <br> - Municipal recycling administration | - Industry input entirely focused on CT Bottle Deposit |
| 60\% | - Solid waste collections and Materials recovery facility (combined in IMPLAN) | - Survey response data |



## STEP 8 SENSITIVITY ANALYSIS: WHY THIS STEP?

When the supplemental research found more than one recycling employment proportion data point for an industry, the sensitivity analysis allowed RRS to understand the impact different values had on the IMPLAN economic analysis output

## STEP 7 IMPLAN MODEL INPUT PREPARATION: PROPORTION OF INDUSTRY EMPLOYMENT RELATED TO RECYCLING

| Industry Description | Estimated Average Percent of Employment Related to Recycling Industry in Connecticut | Why the Range |
| :---: | :---: | :---: |
| Paper (except newsprint) mills | 31 to 57\% | U.S. Census provides an employment range for sector |
| Paperboard mills | 43\% | R.W. Beck Florida Economic Study 2000 |
| All other converted paper product manufacturing | 100\% | Environ Economic Study of Recycling in Colorado 2014 |
| Plastics material and resin manufacturing | 8-12\% | Closed Loop Partners 2019 Report and MO 2005 Report |
| Other pressed and blown glass and glassware manufacturing | 45\% - 95\% | Range Around Environ Economic Study of Recycling in Colorado 2014 and RRS Industry Knowledge |
| Glass product manufacturing made of purchased glass | 45\% - 95\% | Range Around Environ Economic Study of Recycling in Colorado 2014 and RRS Industry Knowledge |
| Steel product manufacturing and nonferrous metal smelting | 30\% - 80\% | Range Around Colorado 2014 and Steel Recycled Content White Paper November 2009 |
| Iron foundries and Steel investment foundries | 45\%-90\% | Range Around Environ Economic Study of Recycling in Colorado 2014 and RRS Industry Knowledge |
| Nonferrous and aluminum metal foundries and die-casting foundries | 45\%-90\% | Range Around Environ Economic Study of Recycling in Colorado 2014 and RRS Industry Knowledge |
| Other commercial equipment merchant wholesalers | 21\% | Tomra Bottle Deposit Study |
| Industrial machinery and equipment merchant wholesalers | 0.1\% | RRS Industry Knowledge |
| Recyclable material merchant wholesalers | 100\% | Environ Economic Study of Recycling in Colorado 2014 |
| Supermarkets and other grocery (except convenience) stores | 1\% | Tomra Bottle Deposit Study |
| Environmental consulting services | 1\% | RRS Industry Knowledge |
| Solid waste collections and materials recovery facility* | 56\% | RecycleCT Municipal and Business Survey |
| Municipal Recycling Administration | 100\% | RecycleCT Municipal and Business Survey |

## STEP 7 IMPLAN MODEL INPUT PREPARATION: PROPORTION OF INDUSTRY EMPLOYMENT RELATED TO RESIDENTIAL RECYCLING

| Residentially Focused Proportion | Industries | Data Source |
| :---: | :---: | :---: |
| 35-45\% | - Paper (except newsprint) mills <br> - Paperboard mills <br> - All other converted paper product manufacturing <br> - Plastic material and resin manufacturing <br> - Industrial machinery and equipment merchant wholesalers <br> - Recyclable material merchant wholesalers <br> - Environmental consulting services <br> - Material recovery facilities | - CT MRF tonnage data breakdown of residential versus commercial incoming stream |
| 55-65\% | - Other pressed and blown glass and glassware manufacturing <br> - Glass product manufacturing made of purchased glass | - CT MRF tonnage data source sited above plus additional residential recycling through bottle deposit program |
| 15-25\% | - Steel product manufacturing and nonferrous metal smelting <br> - Iron foundries and steel investment foundries <br> - Nonferrous and aluminum metal foundries and die-casting foundries | - CT MRF tonnage data source sited above minus industrial focus on scrap metal recycling |
| 100\% | - Other commercial equipment merchant wholesalers (TOMRA) <br> - Bottle deposit returns at supermarkets and grocery <br> - Municipal recycling administration | - Industry input entirely focused on CT Bottle Deposit |
| 55-65\% | - Solid waste collections and Materials recovery facility (combined in IMPLAN) | - Survey response data |

## POTENTIAL RANGE IN ECONOMIC RESULTS

|  | Employment | Labor Income | Value Added | Output |
| :--- | :--- | :--- | :--- | :--- |
| Direct | 2,200 to 3,000 | $\$ 186-258 \mathrm{M}$ | $\$ 320-\$ 436 \mathrm{M}$ | $\$ 589-\$ 864$ |
| Indirect | 900 to 1,300 | $\$ 70-\$ 100 \mathrm{M}$ | $\$ 106-\$ 152 \mathrm{M}$ | $\$ 180-\$ 260$ |
| Induced | 1,000 to 1,400 | $\$ 63-\$ 88 \mathrm{M}$ | $\$ 113-\$ 157 \mathrm{M}$ | $\$ 177-\$ 247$ |
| Total | 4,100 to 5,600 | $\$ 320-\$ 446 \mathrm{M}$ | $\$ 538-\$ 745 \mathrm{M}$ | $\$ 947-\$ 1,371$ |

All previous results tables have provided the average of the high and low range presented here

TOTAL CONNETICUT ECONOMIC OUTPUT RANGE FOR RESIDENTIAL RECYCLING

## 0.2\%

## nirs

## APPENDIX: DETAILED ECONOMIC RESULTS BY SECTOR

## TOTAL ECONOMIC RESULTS BY INDUSTRY SECTOR

|  | Total Employment | Total Labor Income | Total Value Add | Total Output |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | 377.5 | \$32,1 11 ,000 | \$48,290,000 | \$144,459,000 |
| Paperboard mills | 92.4 | \$7,638,000 | \$11,367,000 | \$33,863,000 |
| All other converted paper product manufacturing | 76.2 | \$6,289,000 | \$8,499,000 | \$20,731,000 |
| Plastics material and resin manufacturing | 97.9 | \$16,318,000 | \$22,063,000 | \$53,285,000 |
| Other pressed and blown glass and glassware manufacturing | 22.6 | \$1,270,000 | \$1,869,000 | \$4,668,000 |
| Glass product manufacturing made of purchased glass | 100.4 | \$6,719,000 | \$9,993,000 | \$22,546,000 |
| Steel product manufacturing and nonferrous metal smelting | 40.6 | \$3,083,000 | \$4,498,000 | \$12,280,000 |
| Iron foundries and Steel investment foundries | 137.1 | \$10,606,000 | \$14,683,000 | \$32,612,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | 50.7 | \$3,550,000 | \$4,727,000 | \$10,628,000 |
| Other commercial equipment merchant wholesalers | 404.7 | \$38,387,000 | \$75,678,000 | \$115,339,000 |
| Industrial machinery and equipment merchant wholesalers | 2.9 | \$244,000 | \$492,000 | \$749,000 |
| Recyclable material merchant wholesalers | 871.3 | \$68,134,000 | \$127,582,000 | \$207,956,000 |
| Supermarkets and other grocery (except convenience) stores | 434.7 | \$19,690,000 | \$29,012,000 | \$47,109,000 |
| Environmental consulting services | 7.0 | \$596,000 | \$665,000 | \$983,000 |
| Solid waste collections and materials recovery facility* | 1,803.1 | \$137,020,000 | \$255,423,000 | \$407,472,000 |
| Municipal Recycling Administration | 351.3 | \$31,422,000 | \$26,988,000 | \$44,451,000 |
| TOTAL | 4,870 | \$383,077,000 | \$641,829,000 | \$1,159,131,000 |

## EMPLOYMENT

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | 126.6 | 149.0 | 101.9 | 377.5 |
| Paperboard mills | 25.7 | 42.2 | 24.5 | 92.4 |
| All other converted paper product manufacturing | 39.1 | 17.2 | 19.9 | 76.2 |
| Plastics material and resin manufacturing | 22.0 | 24.2 | 51.7 | 97.9 |
| Other pressed and blown glass and glassware manufacturing | 12.9 | 5.6 | 4.0 | 22.6 |
| Glass product manufacturing made of purchased glass | 62.0 | 17.0 | 21.4 | 100.4 |
| Steel product manufacturing and nonferrous metal smelting | 21.3 | 9.3 | 10.0 | 40.6 |
| Iron foundries and Steel investment foundries | 78.2 | 24.5 | 34.4 | 137.1 |
| Nonferrous and aluminum metal foundries and die-casting foundries | 29.7 | 9.9 | 11.1 | 50.7 |
| Other commercial equipment merchant wholesalers | 157.6 | 125.6 | 121.4 | 404.7 |
| Industrial machinery and equipment merchant wholesalers | 1.3 | 0.8 | 0.8 | 2.9 |
| Recyclable material merchant wholesalers | 400.0 | 255.8 | 215.5 | 871.3 |
| Supermarkets and other grocery (except convenience) stores | 318.3 | 53.9 | 62.5 | 434.7 |
| Environmental consulting services | 4.4 | 0.8 | 1.9 | 7.0 |
| Solid waste collections and materials recovery facility* | 1064.4 | 305.4 | 433.2 | 1803.1 |
| Municipal Recycling Administration | 208.3 | 44.6 | 98.3 | 351.3 |
| TOTAL | 2,572 | 1,086 | 1,213 | 4,870 |

## LABOR INCOME

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$13,440,000 | \$12,324,000 | \$6,347,000 | \$32,1 11,000 |
| Paperboard mills | \$2,860,000 | \$3,251,000 | \$1,527,000 | \$7,638,000 |
| All other converted paper product manufacturing | \$3,351,000 | \$1,699,000 | \$1,239,000 | \$6,289,000 |
| Plastics material and resin manufacturing | \$10,826,000 | \$2,269,000 | \$3,223,000 | \$16,318,000 |
| Other pressed and blown glass and glassware manufacturing | \$541,000 | \$477,000 | \$252,000 | \$1,270,000 |
| Glass product manufacturing made of purchased glass | \$3,973,000 | \$1,414,000 | \$1,332,000 | \$6,719,000 |
| Steel product manufacturing and nonferrous metal smelting | \$1,667,000 | \$791,000 | \$625,000 | \$3,083,000 |
| Iron foundries and Steel investment foundries | \$6,467,000 | \$1,997,000 | \$2,142,000 | \$10,606,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$2,077,000 | \$780,000 | \$693,000 | \$3,550,000 |
| Other commercial equipment merchant wholesalers | \$20,776,000 | \$10,046,000 | \$7,565,000 | \$38,387,000 |
| Industrial machinery and equipment merchant wholesalers | \$134,000 | \$62,000 | \$48,000 | \$244,000 |
| Recyclable material merchant wholesalers | \$35,491,000 | \$19,216,000 | \$13,427,000 | \$68,134,000 |
| Supermarkets and other grocery (except convenience) stores | \$12,462,000 | \$3,331,000 | \$3,897,000 | \$19,690,000 |
| Environmental consulting services | \$420,000 | \$59,000 | \$117,000 | \$596,000 |
| Solid waste collections and materials recovery facility* | \$85,824,000 | \$24,209,000 | \$26,987,000 | \$137,020,000 |
| Municipal Recycling Administration | \$21,842,000 | \$3,454,000 | \$6,126,000 | \$31,422,000 |
| TOTAL | \$222,151,000 | \$85,379,000 | \$75,547,000 | \$383,077,000 |

## VALUE ADD

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$18,361,000 | \$18,588,000 | \$11,341,000 | \$48,290,000 |
| Paperboard mills | \$3,877,000 | \$4,762,000 | \$2,728,000 | \$11,367,000 |
| All other converted paper product manufacturing | \$3,862,000 | \$2,421,000 | \$2,216,000 | \$8,499,000 |
| Plastics material and resin manufacturing | \$12,410,000 | \$3,934,000 | \$5,719,000 | \$22,063,000 |
| Other pressed and blown glass and glassware manufacturing | \$682,000 | \$738,000 | \$449,000 | \$1,869,000 |
| Glass product manufacturing made of purchased glass | \$5,431,000 | \$2,182,000 | \$2,380,000 | \$9,993,000 |
| Steel product manufacturing and nonferrous metal smelting | \$2,223,000 | \$1,158,000 | \$1,117,000 | \$4,498,000 |
| Iron foundries and Steel investment foundries | \$7,971,000 | \$2,879,000 | \$3,833,000 | \$14,683,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$2,379,000 | \$1,109,000 | \$1,239,000 | \$4,727,000 |
| Other commercial equipment merchant wholesalers | \$47,380,000 | \$14,777,000 | \$13,521,000 | \$75,678,000 |
| Industrial machinery and equipment merchant wholesalers | \$315,000 | \$91,000 | \$86,000 | \$492,000 |
| Recyclable material merchant wholesalers | \$74,463,000 | \$29,123,000 | \$23,996,000 | \$127,582,000 |
| Supermarkets and other grocery (except convenience) stores | \$16,336,000 | \$5,719,000 | \$6,957,000 | \$29,012,000 |
| Environmental consulting services | \$373,000 | \$84,000 | \$208,000 | \$665,000 |
| Solid waste collections and materials recovery facility* | \$170,906,000 | \$36,289,000 | \$48,228,000 | \$255,423,000 |
| Municipal Recycling Administration | \$11,073,000 | \$4,977,000 | \$10,938,000 | \$26,988,000 |
| TOTAL | \$378,042,000 | \$128,831,000 | \$134,956,000 | \$641,829,000 |


|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$92,354,000 | \$34,271,000 | \$17,834,000 | \$144,459,000 |
| Paperboard mills | \$20,808,000 | \$8,764,000 | \$4,291,000 | \$33,863,000 |
| All other converted paper product manufacturing | \$13,023,000 | \$4,223,000 | \$3,485,000 | \$20,731,000 |
| Plastics material and resin manufacturing | \$37,735,000 | \$6,552,000 | \$8,998,000 | \$53,285,000 |
| Other pressed and blown glass and glassware manufacturing | \$2,564,000 | \$1,397,000 | \$707,000 | \$4,668,000 |
| Glass product manufacturing made of purchased glass | \$15,052,000 | \$3,751,000 | \$3,743,000 | \$22,546,000 |
| Steel product manufacturing and nonferrous metal smelting | \$8,365,000 | \$2,159,000 | \$1,756,000 | \$12,280,000 |
| Iron foundries and Steel investment foundries | \$21,079,000 | \$5,505,000 | \$6,028,000 | \$32,612,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$6,764,000 | \$1,915,000 | \$1,949,000 | \$10,628,000 |
| Other commercial equipment merchant wholesalers | \$69,779,000 | \$24,298,000 | \$21,262,000 | \$115,339,000 |
| Industrial machinery and equipment merchant wholesalers | \$463,000 | \$151,000 | \$135,000 | \$749,000 |
| Recyclable material merchant wholesalers | \$121,260,000 | \$48,962,000 | \$37,734,000 | \$207,956,000 |
| Supermarkets and other grocery (except convenience) stores | \$25,644,000 | \$10,524,000 | \$10,941,000 | \$47,109,000 |
| Environmental consulting services | \$522,000 | \$134,000 | \$327,000 | \$983,000 |
| Solid waste collections and materials recovery facility* | \$272,302,000 | \$59,330,000 | \$75,840,000 | \$407,472,000 |
| Municipal Recycling Administration | \$19,218,000 | \$8,032,000 | \$17,201,000 | \$44,451,000 |
| TOTAL | \$726,932,000 | \$219,968,000 | \$212,231,000 | \$1,159,131,000 |

## COMPARISON TO PAST STUDIES

## In Comparison to CERC, the 2020 RRS Study Found:



Total Labor Income

In 201 2, CERC published "The Economic Impact on Connecticut from Recycling Activity" for CT RRA. The results of the 2020 study were compared to those from 201 2. Both studies relied on IMPLAN for their economic modeling. The materials / sectors included in the 2012 research were not published. Thus, the two studies may not be measuring the same activities, making accurate comparison challenging. For example, the 2020 RRS study included deposit material and the stewardship programs, it is unknown if these materials and their associated economic activity were included in 2012.

## PERCENT OF CONNECTICUT'S GROSS STATE PRODUCT (GSP)



## CT GSP <br> \$246.8B in FY 2019 <br> Residential Recycling <br> Alone \$642M

## RRS

## APPENDIX: MUNICIPAL SURVEY QUESTIONS AND RESULTS

## MUNICIPAL SURVEY RESULTS

Does your community/authority have any paid staff directly involved with managing, collecting, contracting, or otherwise overseeing your recycling programs

| Community Size: | 5,000 <br> \& Under | 5,001 <br> to 25,000 | 25,001 <br> to 100,000 | 100,001 <br> $\&$ Up | Total | Percent |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Yes | 11 | 41 | 11 | 3 | 66 | $86 \%$ |
| No | 5 | 3 | 3 | 0 | 11 | $14 \%$ |
| Total | 16 | 44 | 14 | 3 | 77 | $100 \%$ |

## MUNICIPAL SURVEY RESULTS

Does your community/authority staff directly provide solid waste hauling, collection, transfer, or drop-off services?

| Yes - Our staff provides solid waste services to residents. | 2 | 19 | 3 | 2 | 26 | 39\% |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| No- We have a contracted hauler, open market hauling system, or other hauling services. | 9 | 22 | 8 | 1 | 40 | 61\% |
| Total | 11 | 41 | 11 | 3 | 66 | 100\% |

## MUNICIPAL SURVEY RESULTS

About how many fotal staff do you have directly providing solid waste services (drivers, equipment operators, field supervisors, transfer station staff, and/or drop-off staff for all services)?

| Community Size: | 5,000 \& Under | 5,001 to 25,000 | 25,001 to 100,000 | 100,001 \& Up |
| :---: | :---: | :---: | :---: | :---: |
| Total Staff | 2.25 | 5.6 | 9.75 | 60 |

## MUNICIPAL SURVEY RESULTS

About what portion of your total solid waste service staff listed above are directly providing curbside or dropoff collection or transfer of recycling?

| Community Size: | 5,000 \& Under | 5,001 to 25,000 | 25,001 to 100,000 | 100,001 \& Up |
| :---: | :---: | :---: | :---: | :---: |
| Percents | 99 | 61 | 62 | 75 |

## MUNICIPAL SURVEY RESULTS

About how many total administrative staff do you have working on your recycling program planning, outreach, and management?

| Community Size: | 5,000 \& Under | 5,001 to 25,000 | 25,001 to 100,000 | 100,001 \& Up |
| :---: | :---: | :---: | :---: | :---: |
| Total Staff | 1.0 | 1.1 | 1.4 | 3.3 |

## RRS

## APPENDIX: PRIVATE SECTOR SURVEY QUESTIONS

## PRIVATE SECTOR SURVEY QUESTIONS

| Survey Question | Question Structure |
| :---: | :---: |
| Use the dropdown menu to select the NAICS and NAICS description most applicable to your firm or organization in Connecticut. NAICS stands for North America Industry Classification System. | Drop-down list of NAICS codes |
| Does your firm or organization collect, process, reclaim, first-stage manufacture, or provide supporting activities for recycled material on a regular basis in Connecticut? | Yes or No |
| How would you best describe the recycling activities of your firm or business in Connecticut? (Please select all that apply) | Multiple Choice: Collection of recyclables, Processing of recyclables, Reclaiming recyclables, Manufacturing "firststage" products from recycled material, Supporting activities, Other (fill in) |
| To the best of your knowledge where is the recycled material your firm or organization processes or uses sourced from? | Multiple Choice: Residential, Commercial, Mixture of Residential and Commercial |
| If you selected "Mixture of residential and commercial or industrial" above, please provide an estimated breakdown of the mixture as percent. For example $50 \%$ residential and $50 \%$ commercial or industrial. | Fill In |
| What percent of your employees' time at your firm or organization is dedicated to collection, processing, reclamation, first-stage manufacturing, or providing supporting activities for recycling in Connecticut? The percent need not add up to $100 \%$ unless the entire business is dedicated to recycling. For example, if a manufacturer's feedstock is half virgin and half recycled material, then $50 \%$ of the manufacturing process involves recycling. | Fill In |
| What is the average number of employees employed at your firm or organization annually in Connecticut? Average annual number of employees refers to full time or part time employment. For part time workers, enter employment as a fraction of full time employment. For example, a part time employee working 20 hours a week would be 0.5 employment. | Multiple Choice: 0-9, 10-99, 100-199, 200-299, 300399 , or other (fill in) |

## RRS

## APPENDIX: TAX DETAIL ANALYSIS

## TAX: SUB COUNTY GENERAL

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$996,000 | \$922,000 | \$605,000 | \$2,523,000 |
| Paperboard mills | \$239,000 | \$232,000 | \$146,000 | \$617,000 |
| All other converted paper product manufacturing | \$138,000 | \$82,000 | \$118,000 | \$338,000 |
| Plastics material and resin manufacturing | \$698,000 | \$248,000 | \$302,000 | \$1,248,000 |
| Other pressed and blown glass and glassware manufacturing | \$33,000 | \$31,000 | \$24,000 | \$88,000 |
| Glass product manufacturing made of purchased glass | \$177,000 | \$105,000 | \$127,000 | \$409,000 |
| Steel product manufacturing and nonferrous metal smelting | \$102,000 | \$51,000 | \$60,000 | \$213,000 |
| Iron foundries and Steel investment foundries | \$277,000 | \$105,000 | \$205,000 | \$587,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$74,000 | \$37,000 | \$66,000 | \$177,000 |
| Other commercial equipment merchant wholesalers | \$1,629,000 | \$389,000 | \$722,000 | \$2,740,000 |
| Industrial machinery and equipment merchant wholesalers | \$13,000 | \$3,000 | \$5,000 | \$21,000 |
| Recyclable material merchant wholesalers | \$3,526,000 | \$924,000 | \$1,281,000 | \$5,731,000 |
| Supermarkets and other grocery (except convenience) stores | \$1,457,000 | \$252,000 | \$371,000 | \$2,080,000 |
| Environmental consulting services | \$3,000 | \$2,000 | \$11,000 | \$16,000 |
| Solid waste collections and materials recovery facility* | \$4,638,000 | \$1,376,000 | \$2,575,000 | \$8,589,000 |
| Municipal Recycling Administration | \$48,000 | \$133,000 | \$583,000 | \$764,000 |
| TOTAL | \$14,048,000 | \$4,892,000 | \$7,201,000 | \$26,141,000 |

## TAX: SUB COUNTY SPECIAL

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$16,000 | \$15,000 | \$10,000 | \$41,000 |
| Paperboard mills | \$4,000 | \$4,000 | \$2,000 | \$10,000 |
| All other converted paper product manufacturing | \$2,000 | \$1,000 | \$2,000 | \$5,000 |
| Plastics material and resin manufacturing | \$11,000 | \$4,000 | \$5,000 | \$20,000 |
| Other pressed and blown glass and glassware manufacturing | \$1,000 | \$1,000 | \$0 | \$2,000 |
| Glass product manufacturing made of purchased glass | \$3,000 | \$2,000 | \$2,000 | \$7,000 |
| Steel product manufacturing and nonferrous metal smelting | \$2,000 | \$1,000 | \$1,000 | \$4,000 |
| Iron foundries and Steel investment foundries | \$5,000 | \$2,000 | \$3,000 | \$10,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$1,000 | \$1,000 | \$1,000 | \$3,000 |
| Other commercial equipment merchant wholesalers | \$27,000 | \$6,000 | \$12,000 | \$45,000 |
| Industrial machinery and equipment merchant wholesalers | \$0 | \$0 | \$0 | \$0 |
| Recyclable material merchant wholesalers | \$58,000 | \$15,000 | \$21,000 | \$94,000 |
| Supermarkets and other grocery (except convenience) stores | \$24,000 | \$4,000 | \$6,000 | \$34,000 |
| Environmental consulting services | \$0 | \$0 | \$0 | \$0 |
| Solid waste collections and materials recovery facility* | \$76,000 | \$23,000 | \$42,000 | \$141,000 |
| Municipal Recycling Administration | \$1,000 | \$2,000 | \$10,000 | \$13,000 |
| TOTAL | \$231,000 | \$81,000 | \$117,000 | \$429,000 |

## TAX: STATE

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$1,087,000 | \$1,039,000 | \$634,000 | \$2,760,000 |
| Paperboard mills | \$248,000 | \$266,000 | \$152,000 | \$666,000 |
| All other converted paper product manufacturing | \$193,000 | \$114,000 | \$124,000 | \$431,000 |
| Plastics material and resin manufacturing | \$825,000 | \$245,000 | \$318,000 | \$1,388,000 |
| Other pressed and blown glass and glassware manufacturing | \$39,000 | \$37,000 | \$25,000 | \$101,000 |
| Glass product manufacturing made of purchased glass | \$252,000 | \$119,000 | \$133,000 | \$504,000 |
| Steel product manufacturing and nonferrous metal smelting | \$121,000 | \$61,000 | \$62,000 | \$244,000 |
| Iron foundries and Steel investment foundries | \$385,000 | \$139,000 | \$214,000 | \$738,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$112,000 | \$51,000 | \$69,000 | \$232,000 |
| Other commercial equipment merchant wholesalers | \$1,959,000 | \$614,000 | \$756,000 | \$3,329,000 |
| Industrial machinery and equipment merchant wholesalers | \$14,000 | \$4,000 | \$5,000 | \$23,000 |
| Recyclable material merchant wholesalers | \$3,733,000 | \$1,299,000 | \$1,341,000 | \$6,373,000 |
| Supermarkets and other grocery (except convenience) stores | \$1,346,000 | \$290,000 | \$389,000 | \$2,025,000 |
| Environmental consulting services | \$15,000 | \$3,000 | \$12,000 | \$30,000 |
| Solid waste collections and materials recovery facility* | \$6,517,000 | \$1,765,000 | \$2,695,000 | \$10,977,000 |
| Municipal Recycling Administration | \$592,000 | \$210,000 | \$611,000 | \$1,413,000 |
| TOTAL | \$17,438,000 | \$6,256,000 | \$7,540,000 | \$31,234,000 |

## TAX: FEDERAL

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$2,940,000 | \$2,604,000 | \$1,410,000 | \$6,954,000 |
| Paperboard mills | \$627,000 | \$679,000 | \$339,000 | \$1,645,000 |
| All other converted paper product manufacturing | \$720,000 | \$353,000 | \$275,000 | \$1,348,000 |
| Plastics material and resin manufacturing | \$1,934,000 | \$501,000 | \$715,000 | \$3,150,000 |
| Other pressed and blown glass and glassware manufacturing | \$112,000 | \$101,000 | \$56,000 | \$269,000 |
| Glass product manufacturing made of purchased glass | \$862,000 | \$301,000 | \$296,000 | \$1,459,000 |
| Steel product manufacturing and nonferrous metal smelting | \$361,000 | \$166,000 | \$139,000 | \$666,000 |
| Iron foundries and Steel investment foundries | \$1,365,000 | \$420,000 | \$476,000 | \$2,261,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$438,000 | \$162,000 | \$154,000 | \$754,000 |
| Other commercial equipment merchant wholesalers | \$4,940,000 | \$2,127,000 | \$1,680,000 | \$8,747,000 |
| Industrial machinery and equipment merchant wholesalers | \$32,000 | \$13,000 | \$11,000 | \$56,000 |
| Recyclable material merchant wholesalers | \$8,354,000 | \$4,068,000 | \$2,982,000 | \$15,404,000 |
| Supermarkets and other grocery (except convenience) stores | \$2,678,000 | \$725,000 | \$865,000 | \$4,268,000 |
| Environmental consulting services | \$77,000 | \$12,000 | \$26,000 | \$115,000 |
| Solid waste collections and materials recovery facility* | \$19,636,000 | \$5,102,000 | \$5,994,000 | \$30,732,000 |
| Municipal Recycling Administration | \$4,040,000 | \$728,000 | \$1,360,000 | \$6,128,000 |
| TOTAL | \$49,116,000 | \$18,062,000 | \$16,778,000 | \$83,956,000 |

## TAX: TOTAL

|  | Direct | Indirect | Induced | Total |
| :---: | :---: | :---: | :---: | :---: |
| Paper (except newsprint) mills | \$5,039,000 | \$4,581,000 | \$2,659,000 | \$12,279,000 |
| Paperboard mills | \$1,118,000 | \$1,180,000 | \$640,000 | \$2,938,000 |
| All other converted paper product manufacturing | \$1,054,000 | \$550,000 | \$520,000 | \$2,124,000 |
| Plastics material and resin manufacturing | \$3,469,000 | \$998,000 | \$1,340,000 | \$5,807,000 |
| Other pressed and blown glass and glassware manufacturing | \$185,000 | \$170,000 | \$105,000 | \$460,000 |
| Glass product manufacturing made of purchased glass | \$1,294,000 | \$527,000 | \$558,000 | \$2,379,000 |
| Steel product manufacturing and nonferrous metal smelting | \$586,000 | \$279,000 | \$262,000 | \$1,127,000 |
| Iron foundries and Steel investment foundries | \$2,031,000 | \$666,000 | \$899,000 | \$3,596,000 |
| Nonferrous and aluminum metal foundries and die-casting foundries | \$625,000 | \$251,000 | \$291,000 | \$1,167,000 |
| Other commercial equipment merchant wholesalers | \$8,555,000 | \$3,137,000 | \$3,170,000 | \$14,862,000 |
| Industrial machinery and equipment merchant wholesalers | \$59,000 | \$20,000 | \$20,000 | \$99,000 |
| Recyclable material merchant wholesalers | \$15,670,000 | \$6,305,000 | \$5,625,000 | \$27,600,000 |
| Supermarkets and other grocery (except convenience) stores | \$5,506,000 | \$1,271,000 | \$1,631,000 | \$8,408,000 |
| Environmental consulting services | \$95,000 | \$18,000 | \$49,000 | \$162,000 |
| Solid waste collections and materials recovery facility* | \$30,867,000 | \$8,266,000 | \$11,306,000 | \$50,439,000 |
| Municipal Recycling Administration | \$4,680,000 | \$1,072,000 | \$2,564,000 | \$8,316,000 |
| TOTAL | \$80,833,000 | \$29,291,000 | \$31,639,000 | \$141,763,000 |

