

TN RECYCLES



INVEST IN
SUSTAINABLE
GROWTH



CREATE
JOBS



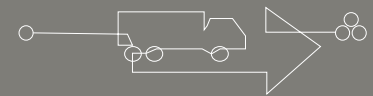
REDUCE
DISPOSAL



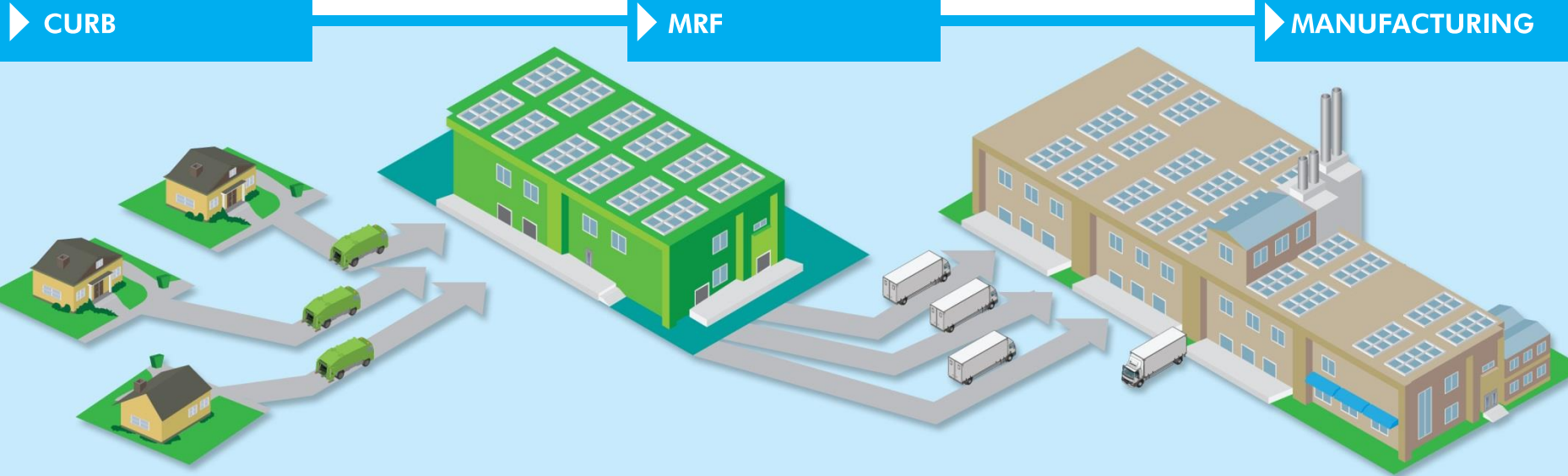
CAPTURE
VALUE



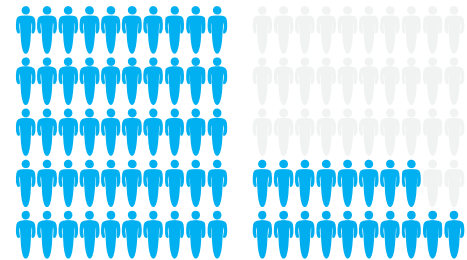
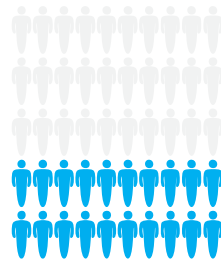
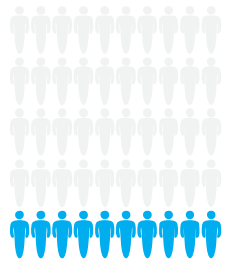
REALIZED
POTENTIAL



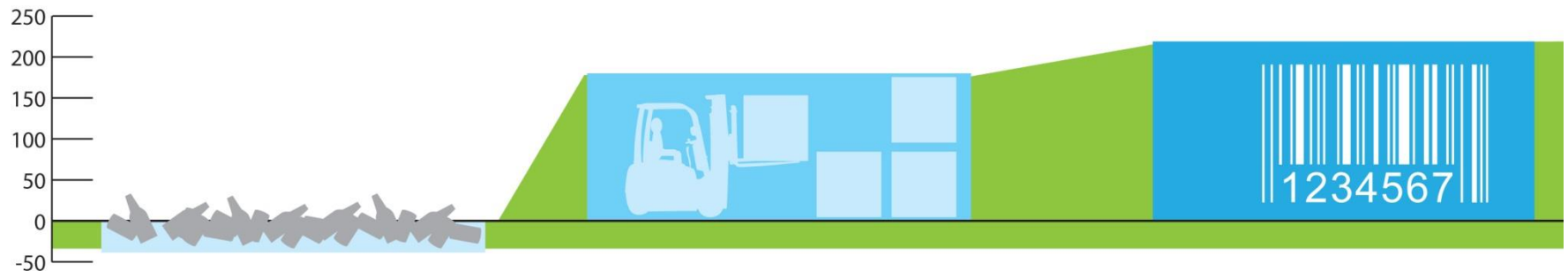
Lifecycle of Material in Tennessee's Recycling Economy



JOBS



MATERIAL COST/VALUE



URBAN w/ CURBSIDE & DROP-OFF

POPULATION

601,122

HOUSEHOLDS

242,474

CITY of NASHVILLE

SERVICE

curbside: City households w/ access to carts: 140,000
service once monthly
95 gallon roll-carts

drop-off: 13 drop-off sites and 3 convenience centers



ACCEPTED

All paper & boxes (including cartons)
All plastic bottles and containers (including tubs, lids, and plastic trays)
All metal and aluminum cans
Glass bottles and jars can be recycled at drop-off sites and convenience centers only.

FACILITY

Waste Management, Inc. Recycling
DISTANCE TO RECYCLING FACILITY: Nashville, in-town

COLLECTED

tons collected curb & drop-off

20,069

166

pounds per household

AVAILABLE

tons of focus materials disposed

110,000

MOVING FORWARD

Increase access and collection frequency

50% of available focus material from residential sector means 55,000 tons of added diversion



RURAL w/ CURBSIDE

POPULATION

11,195

HOUSEHOLDS

5,071

★
LEWISBURG

SERVICE

curbside: Households w/ access to curbside: 4,000
weekly service
35 gallon roll-carts

drop-off: n/a



ACCEPTED

Plastic, tin, and aluminum containers (including plastic tubs & lids)
Anything that tears paper products (including paperback books)

FACILITY

Marshall County Solid Waste
DISTANCE TO RECYCLING FACILITY: Lewisburg, in-town

COLLECTED

tons collected curb & drop-off

485

pounds per
household

1,229

AVAILABLE

tons of focus materials disposed

1,010

MOVING FORWARD

Add to the list of accepted materials & increase collection cart size

670 additional tons per year will get them to the 750 lbs/household diversion level



RURAL w/ DROP-OFF

POPULATION

18,020

HOUSEHOLDS

8,760

FENTRESS COUNTY

SERVICE

curbside: County operated collection for flattened OCC and other bagged recyclables from businesses.

drop-off: Drop-off Convenience Centers for residents



ACCEPTED

Cardboard, newspaper, magazines, mixed paper (no cartons)
Aluminum and steel cans
#1 - #7 plastics
Glass bottles and jars

FACILITY

Fentress County Recycling Center

DISTANCE TO RECYCLING FACILITY: Jamestown, in-town
Sell sorted & baled plastic and paper to RockTenn - Knoxville, 90 miles

COLLECTED*

tons collected curb & drop-off

719

pounds per household

3,150

AVAILABLE

tons of focus materials disposed

1,550

* includes residential and commercial tonnage collected by Fentress County

MOVING FORWARD

Integrate collection programs (residents/businesses/schools)

Compact or transfer dual or single stream material for delivery to processor

Use time saved from processing efficiencies for coordination of collection programs and education



SUBURBAN w/ CITYWIDE CURBSIDE

POPULATION

40,123

HOUSEHOLDS

13,703



GERMANTOWN

SERVICE

curbside: Households w/ access to curbside: 4,000
weekly service
35 gallon roll-carts

drop-off: n/a



ACCEPTED

Newspaper, magazines, junk mail, phone books, office paper,
catalogs, corrugated cardboard containers, boxboard
Glass containers
All narrow neck plastic bottles and tops
Metal food cans without lids, aluminum beverage cans, and
foil clean of food

FACILITY

Marshall County Solid Waste
DISTANCE TO RECYCLING FACILITY: Lewisburg, in-town

COLLECTED

tons collected curb & drop-off

2,679

391

pounds per
household

AVAILABLE

tons of focus materials disposed

8,500

MOVING FORWARD



Offer larger carts (95 gallon option), and expand the list of materials accepted at curbside

Education campaign centered on growing diversion, offer an incentive program such as RecycleBank as a cornerstone for education efforts.

SUBURBAN W/ SUBSCRIPTION CURBSIDE

POPULATION

21,259

HOUSEHOLDS

9,996

CITY of EAST RIDGE



SERVICE

curbside: Households w/ access to carts in 2012: 1,791
service every other week
95 gallon roll-carts

drop-off: n/a



ACCEPTED

All paper & boxes (including cartons & paperback books)
All plastic bottles and containers (including tubs, lids, and plastic trays)
All metal and aluminum cans, glass bottles and jars, and plastic bags

FACILITY

RockTenn

DISTANCE TO RECYCLING FACILITY: Chattanooga, 7 miles

COLLECTED

tons collected curb & drop-off

79

pounds per household

AVAILABLE

tons of focus materials disposed

395

5,700

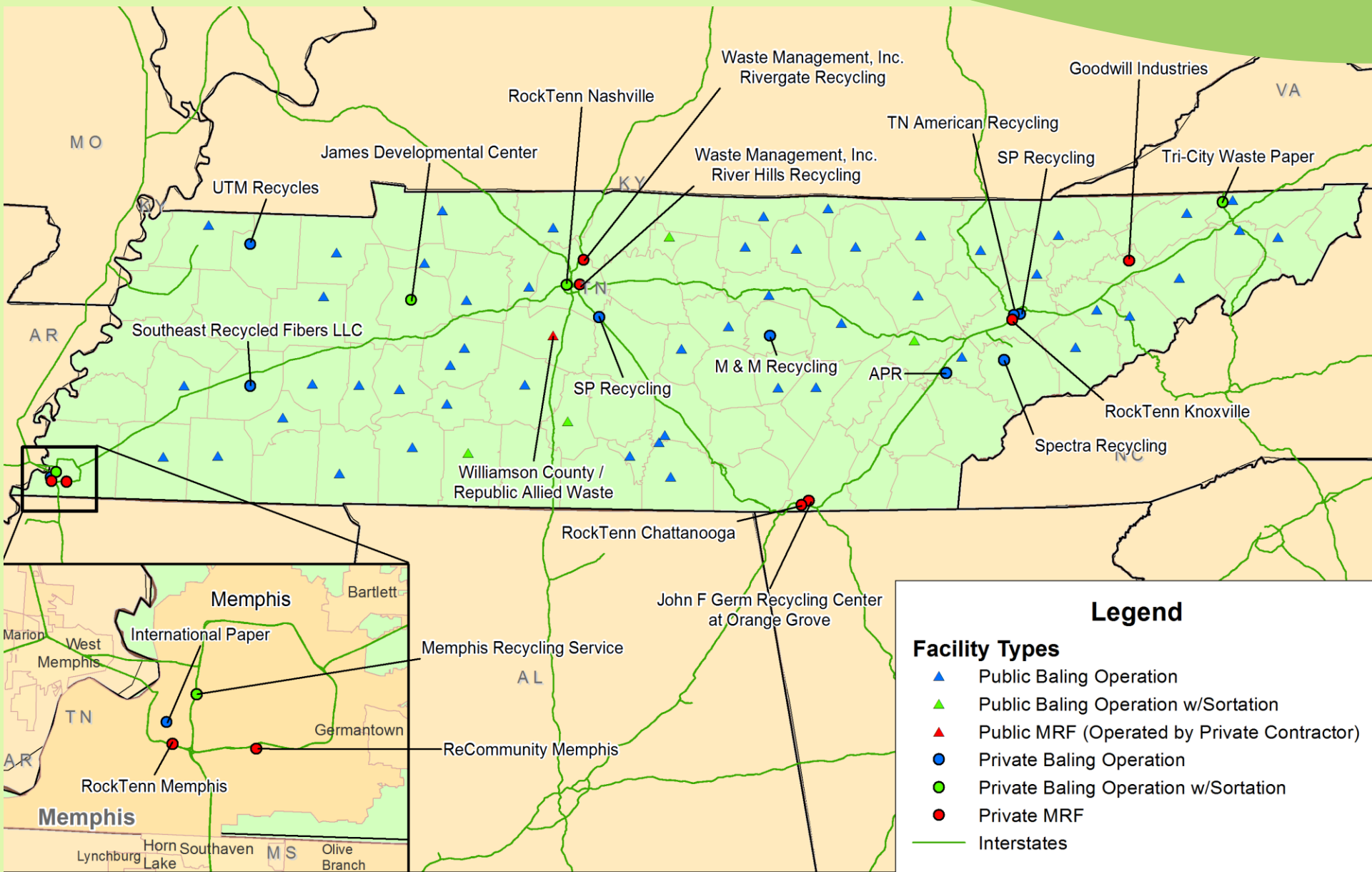
MOVING FORWARD

Increase access

Invest in carts and collection infrastructure for all households and the City could see an increase in recovery from 79 lbs/household to over 400 lbs/household



TENNESSEE MRF MAP



TENNESSEE PROCESSING INFRASTRUCTURE

Facility

Publicly Run Baling

Number of
Facilities in TN

50



OPERATIONAL
CAPABILITIES

Direct baling of
clean source
separated
material

COMMENTS

- ✓ Most county facilities fit this category
- ✓ They use vertical or horizontal balers to manage OCC, ONP, mixed paper, and various plastics
- ✓ This material is typically collected source separated from convenience sites and recycling drop-off locations

TENNESSEE PROCESSING INFRASTRUCTURE

Facility

Publicly Run Baling with Sorting

Number of
Facilities in TN

4



OPERATIONAL
CAPABILITIES

Accept mixed
recyclables,
process and bale
sorted material in
addition to direct
baling source
separated
material

COMMENTS

- ✓ Some counties manage sorting operations, usually with a manual sort line using a conveyor or they provide crude sortation on a tipping floor
- ✓ Most of these operations use a horizontal baler to manage the material they sort

TENNESSEE PROCESSING INFRASTRUCTURE

Facility

**Publicly Owned MRF
Privately Operated**

Number of
Facilities in TN

1



OPERATIONAL
CAPABILITIES

Accept mixed
recyclables,
process material,
then bale clean
commodities for
market

COMMENTS

- ✓ One county owns a recycling facility, with MRF operations provided as a contracted service

TENNESSEE PROCESSING INFRASTRUCTURE

Facility

Privately Run Baling

Number of
Facilities in TN

9



OPERATIONAL
CAPABILITIES

Direct bale only
clean source
separated
material

COMMENTS

- ✓ There are quite a few private baling facilities, these facilities usually source various fiber grades mostly from commercial and industrial clients
- ✓ Some material may be clean source separated material collected from local government convenience sites

TENNESSEE PROCESSING INFRASTRUCTURE

Facility

Privately Run Baling with Sorting

Number of
Facilities in TN

4



OPERATIONAL
CAPABILITIES

Accept some mixed
recyclables,
process and bale
sorted material in
addition to direct
baling source
separated material

COMMENTS

- ✓ Some private baling facilities will accept mixed material, and provide a manual sort using a conveyor, or on the tipping floor
- ✓ These facilities are typically set-up to manage clean loads of material for direct baling, but may provide some sorting for customers that request the management of mixed recyclables

TENNESSEE PROCESSING INFRASTRUCTURE

Facility

Privately Owned and Operated MRF's

Number of
Facilities in TN

8



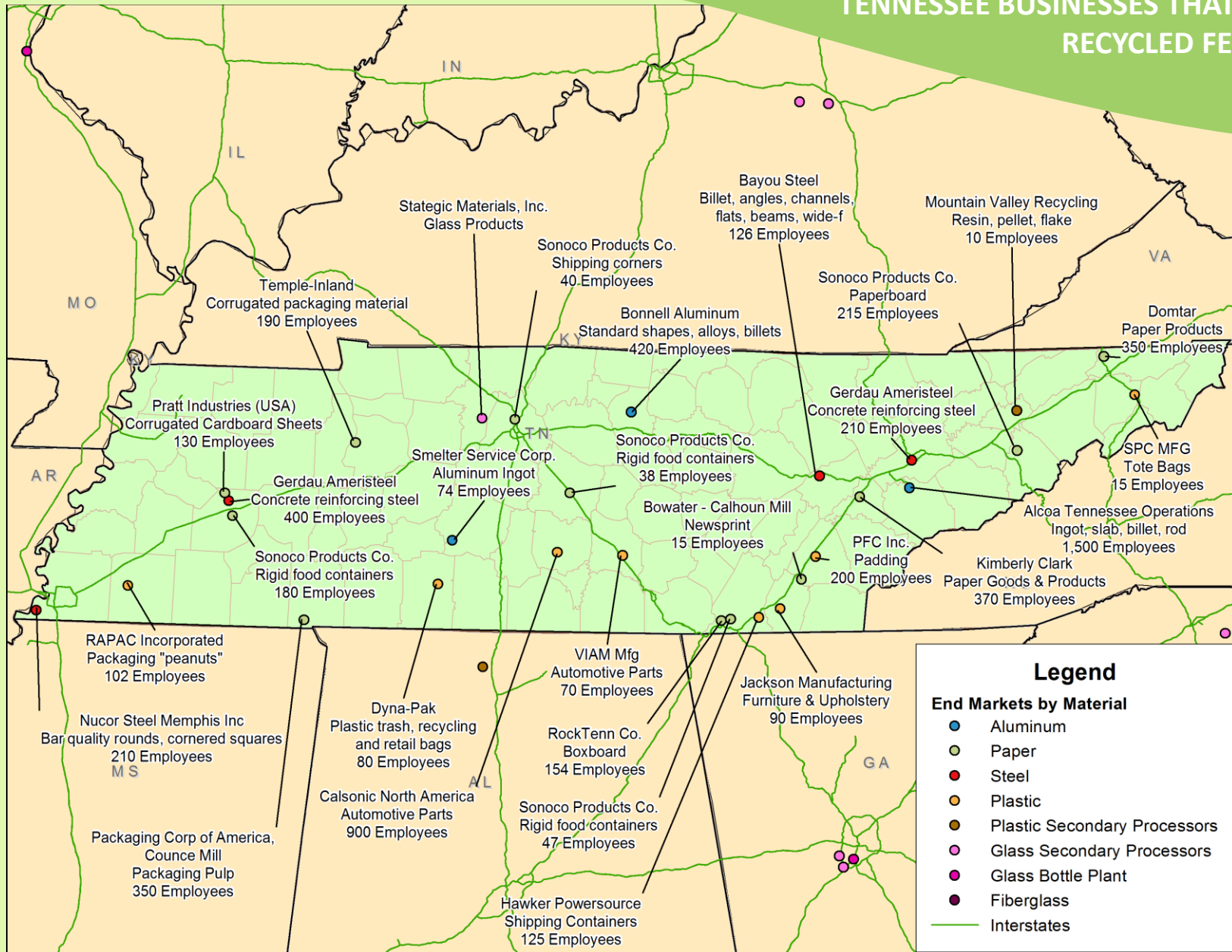
OPERATIONAL
CAPABILITIES

Accept mixed
recyclables,
process material,
then bale clean
commodities for
market

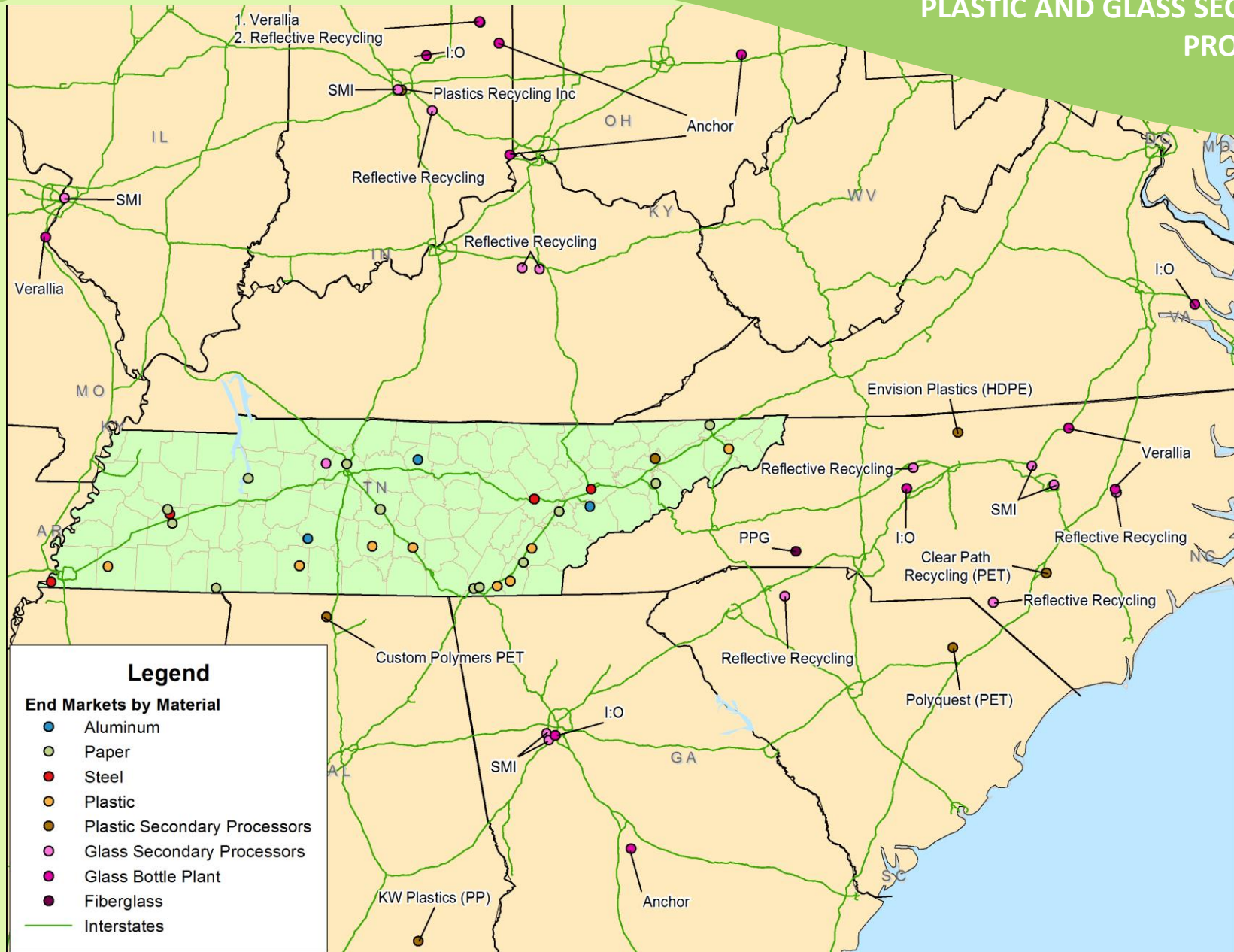
COMMENTS

- ✓ There are a handful of larger capacity recycling facilities that are designed to accept mixed recyclables
- ✓ These facilities are classified as dual-stream or single-stream MRF's.

LOCAL END MARKETS TENNESSEE BUSINESSES THAT RELY ON RECYCLED FEEDSTOCK



REGIONAL END MARKETS PLASTIC AND GLASS SECONDARY PROCESSORS



End User

ALCOA TN OPERATIONS

ALCOA, TN

EMPLOYEES **1500**



TYPE Aluminum cans

AMOUNT At least 175,000 Tons/year

Distance range for sourcing supply:
Domestic & International



Purchase price:

Market price, currently \$.88/lb*

Product manufactured:

Rigid Container Sheet (RCS). Used to make new aluminum cans.

Product value:

Price range for RCS is in the \$1.50 to \$3.00/lb range (FOB sellers dock)*

COMMENTS

The Alcoa, TN plant is the largest aluminum can sheet mill in the world. This mill produces ~90% recycled content rigid container sheet. Alcoa closed their East Tennessee smelter in 2009. They no longer make aluminum from ore since the smelter shut down and currently alternatively use recycled feedstock. Alcoa sources material both domestically and internationally to meet mill demand.

It is estimated that 2.3 billion cans were used in the state of TN in 2008. At a count of about 34 cans per pound it works out to 67.6 million lbs. of aluminum cans consumed and available for recycling per year in TN, or 33,800 tons.

**Annual municipal recovery
in TN of aluminum cans:**

2,570
TONS

End User

ROCKTENN CORRUGATED SHEET PLANT
CHATTANOOGA, TN

EMPLOYEES **154**



TYPE OCC, DLK

AMOUNT 56,000 Tons/year

Distance range for sourcing supply: Supplied by 7 RockTenn mills producing linerboard and corrugating medium across Southeast



Purchase price:

Market price, currently about \$500/ton (corrugating medium), and \$750/ton (linerboard)*

Product manufactured:

Corrugated Cardboard Sheet
70 to 80 million square feet produced per month.

Product value:

\$0.1 to \$0.2/sq ft (about \$2,000/ton)*

COMMENTS

RockTenn is one of North America's leading producers of corrugated and consumer packaging and recycling solutions. Based in Norcross, Ga., they employ approximately 26,000 people and operate more than 240 facilities in the United States, Canada, Mexico, Chile, Argentina and China.

RockTenn is vertically integrated and has many assets located in TN, including MRF's, mills, sheet plants and converting facilities. The Chattanooga corrugated sheet plant produced a record 93 million sq feet of corrugated sheet in Oct 2012.

**Annual municipal recovery
in TN of OCC:**

Est. **70,000**
TONS

End User

VICAM (VIAM MANUFACTURING)

MANCHESTER, TN

EMPLOYEES 70



TYPE PET

AMOUNT Capacity of 5,475 Tons/year

Distance range for sourcing supply:
AL, SC, Japan



Purchase price:

clean, clear PET bottle resin (flake or pellet)
market price, currently \$.70 - \$.89/lb*

Product manufactured:

PET Staple Fiber

Product value:

Current market value range = \$2 to \$3/kg, or
\$0.90 to \$1.36/lb.

**Annual municipal recovery
in TN of PET Bottles:**

Est. **3800**
TONS

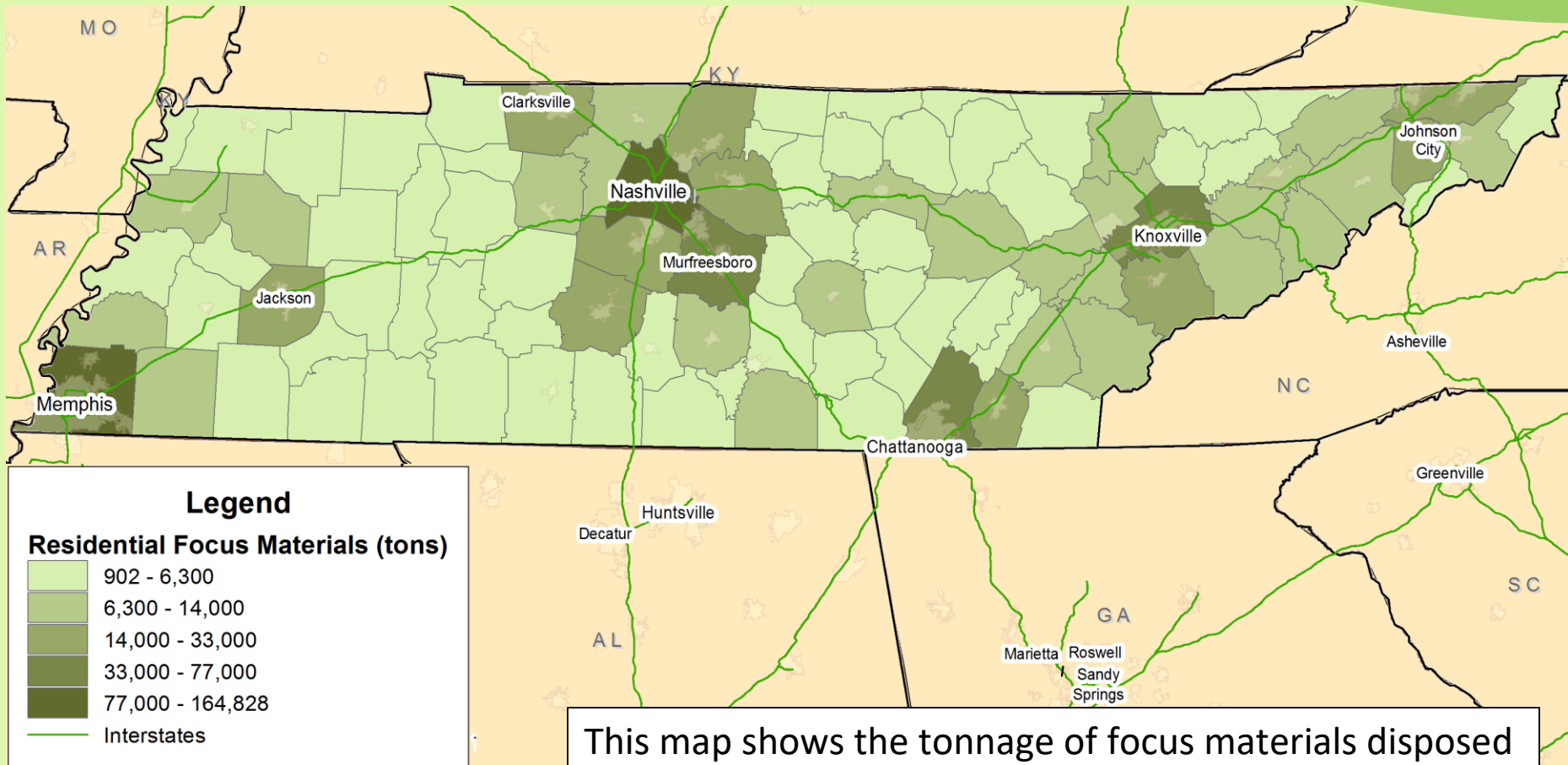
COMMENTS

The company is a newly formed subsidiary of leading nonwoven materials producer Japan Vilene Company (JVC) managed by VIAM Manufacturing and utilize technology developed by Oyama Chemical. VICAM invested \$32 million to build a facility for the production of a polyester-based carpet fiber and opened in March 2012. This investment will produce 70 new jobs at full capacity.

VICAM's new Manchester facility produces polyethylene terephthalate (PET) staple carpet fiber by recycling PET clear bottles, using Oyama Chemical's fiber technology. The carpet fiber will then be used in headliner, seat backs and door panels in the automotive industry.

The plant is located on a 12-acre site that houses a 44,000 square foot facility with the capability for future expansion of 120,000 square feet. Future expansion plans include supplying PET staple carpet fiber to VIAM Manufacturing in their manufacture of automotive floor mats. As a producer of high quality, custom design floor, trunk and cargo mats, VIAM is a supplier for many of the big automotive companies, including Nissan North America, Inc.

DISPOSAL RATES AND RECOVERY OPPORTUNITIES



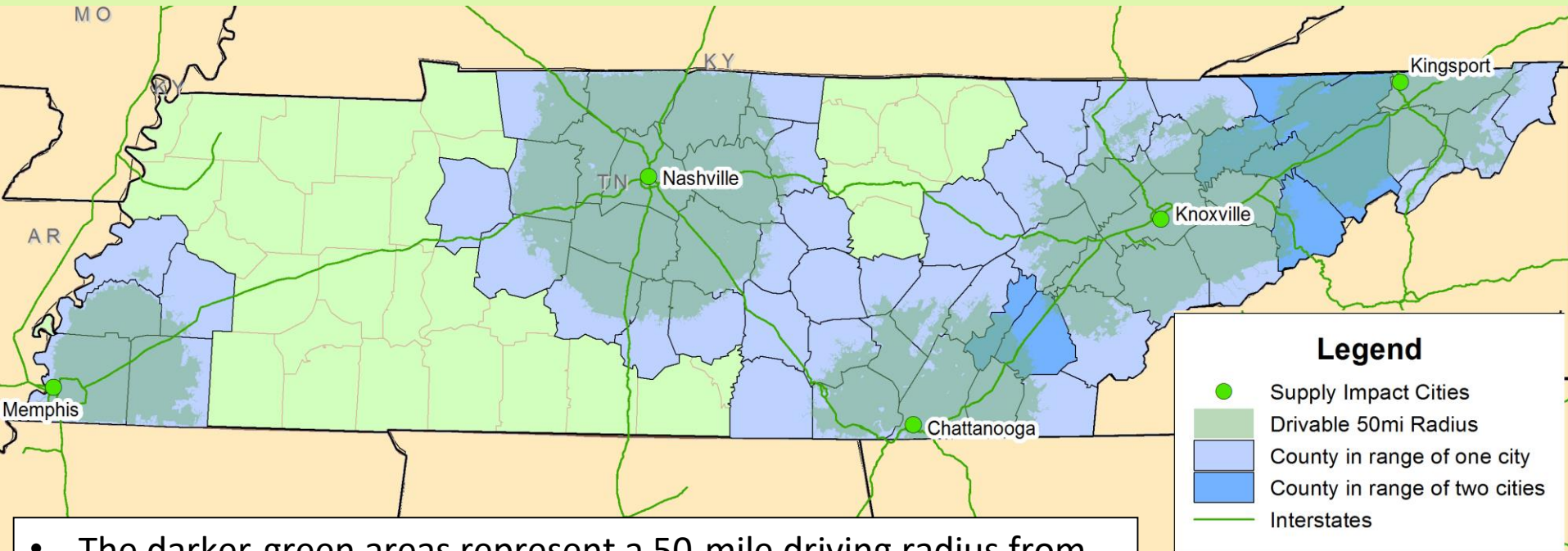
This map shows the tonnage of focus materials disposed county-by-county in the residential waste stream.

VALUE OF FOCUS MATERIAL IN THE RESIDENTIAL WASTE STREAM

Focus Material	Regional Average (1-year) \$/lb	% of Disposed Waste (state average)	Market Value
Aluminum Cans (Sorted, Baled \$/lb)	\$0.764	0.90%	\$51,482,500
Glass (Mixed)	\$0	4%	\$0
Paper (Soft Mixed Paper)	\$0.043	14%	\$29,743,100
Paper (OCC)	\$0.064	6%	\$24,275,700
Paper (Newsprint)	\$0.029	7%	\$9,861,700
Plastics (PET price)	\$0.273	3.1% (#1 & #2 bottles)	\$61,111,200
Steel Cans (Sorted, Loose Price)	\$0.041	1.70%	\$3,854,600
Total		36.4%	\$180,328,800

Annual residential disposal of 3.3 million tons was converted to pounds. This equals **6.6 billion lbs/year** of residential disposal. The pricing data was calculated using \$/lb averages for 2012. Pricing Data was accessed through *Recycling Data Management Announced Recovered Material Prices*.

TARGETED AREAS OF SUPPLY IMPACT



- The darker-green areas represent a 50-mile driving radius from each population center (titled “supply impact cities”). The light blue counties are the counties that touch the 50-mile driving radius. Dark blue counties are in a 50 mile range of two cities.

TARGETED AREAS OF SUPPLY IMPACT

Targeted Locations	TN counties touching 50-mile driving radius	# of Households	Additional Supply Available (tons)*
Chattanooga, Kingsport, Knoxville, Memphis, Nashville	67 counties	2,391,890	483,140

*based on the recovery of 50% of the focus material in the residential waste stream



ECONOMIC DEVELOPMENT IMPACT

PER 10,000 TONS OF ADDITIONAL DIVERSION – SINGLE STREAM

CAPITAL INVESTMENT

Collection Trucks	\$281,250
Carts	\$500,000
MRF Infrastructure	<u>\$400,000</u>
	\$1,181,250

MARKET EFFICIENCIES

Avoided Disposal	\$350,000
Material Value	<u>\$1,510,200</u>
	\$1,860,200

JOBS

Material Collection	10
MRF Operations	10
Plastic Manufacturing	9
Glass Manufacturing	4
Paper Mills	10
Recycling-Based Manufacturers	<u>25</u>
	68

Collection trucks: 10 @ \$225,000 each = \$2.25 million. Initial investment amortized over 8 years.

Carts: @ \$50/95 gallon cart, estimated 50,000 carts needed per 10,000 tons, amortized over 5 years.

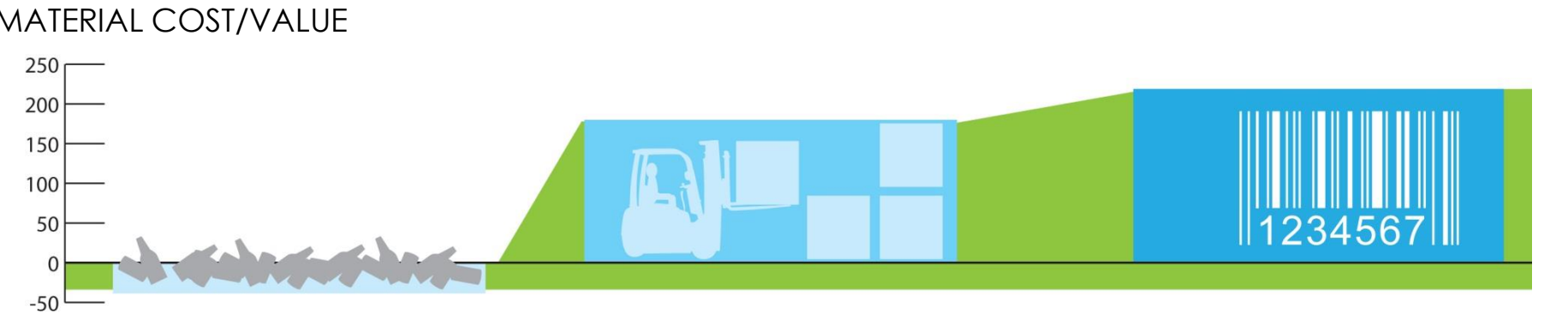
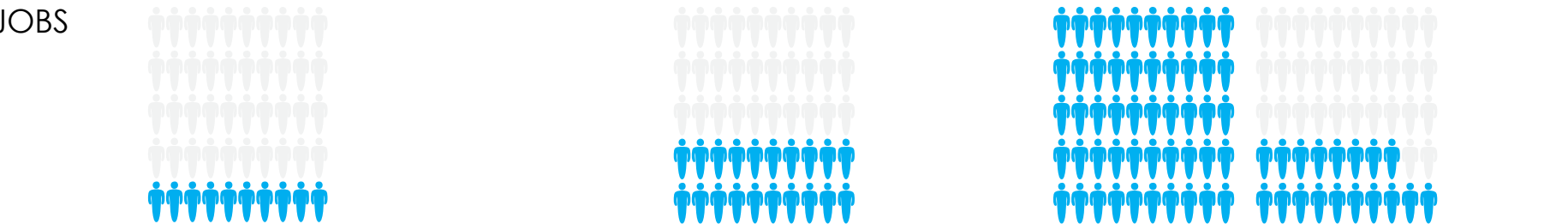
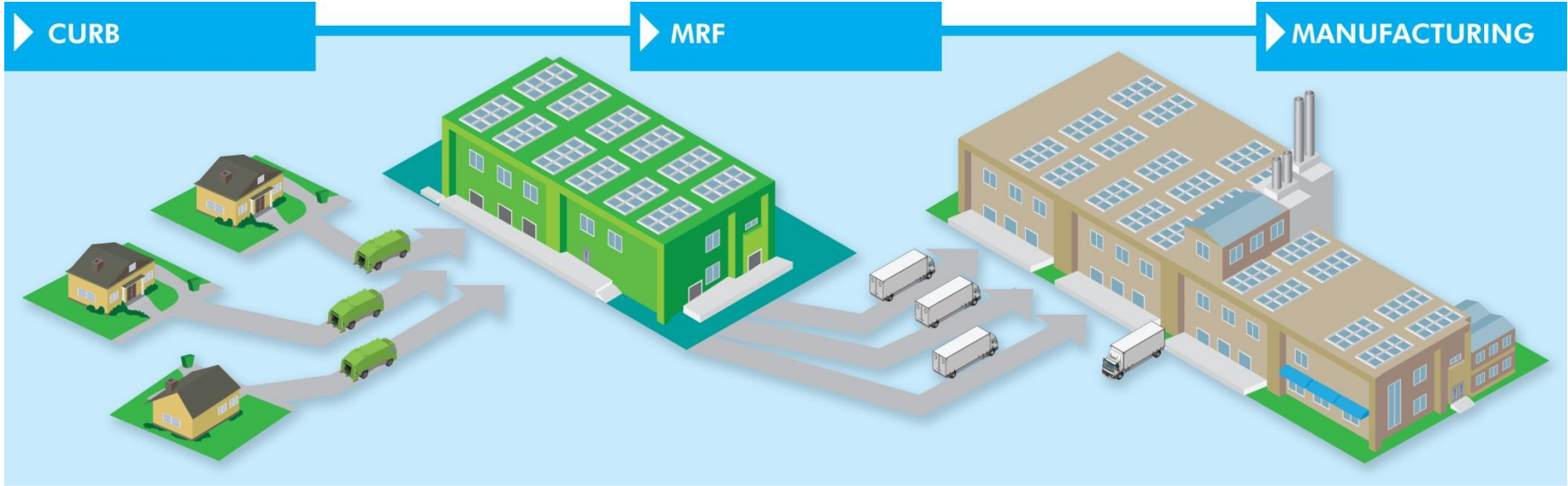
MRF Infrastructure: Building amortized over 20 years, equipment over 10.

Avoided Disposal: Residential disposal cost estimate based on \$35/ton tipping fee.

Material Value: total value based on % of material mix for 10,000 tons, based on % composition from material value chart.

Jobs data from Institute for Local Self Reliance (jobs per 10,000 TPY) – based on single stream mix.

Lifecycle of Material in Tennessee's Recycling Economy



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REDUCE
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