

Recycling of Glass Recovered via Bottle Bill and Single Stream Programs

Connecticut DEEP Solid Waste Advisory Committee Meeting

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Hartford, CT
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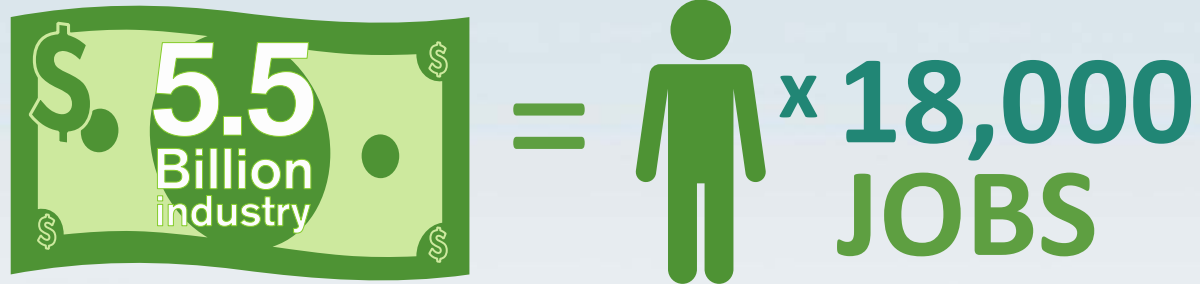


Glass... 100% and endlessly recyclable

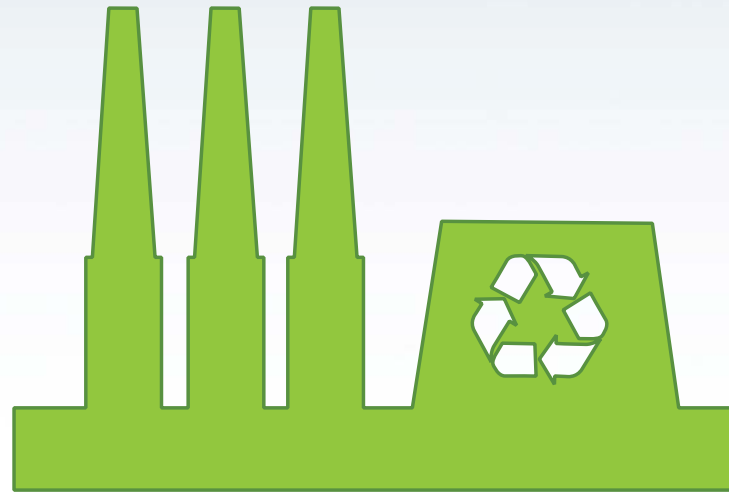
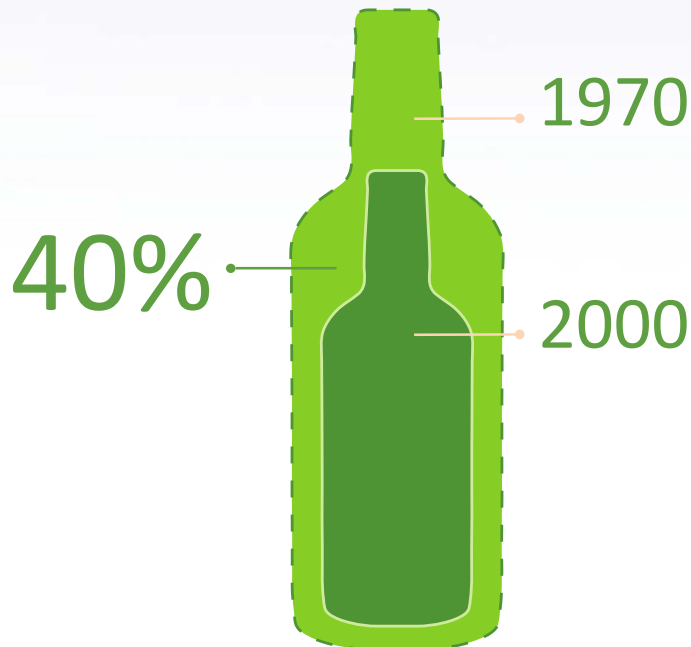


Glass Container Industry: Overview

Glass Container Industry

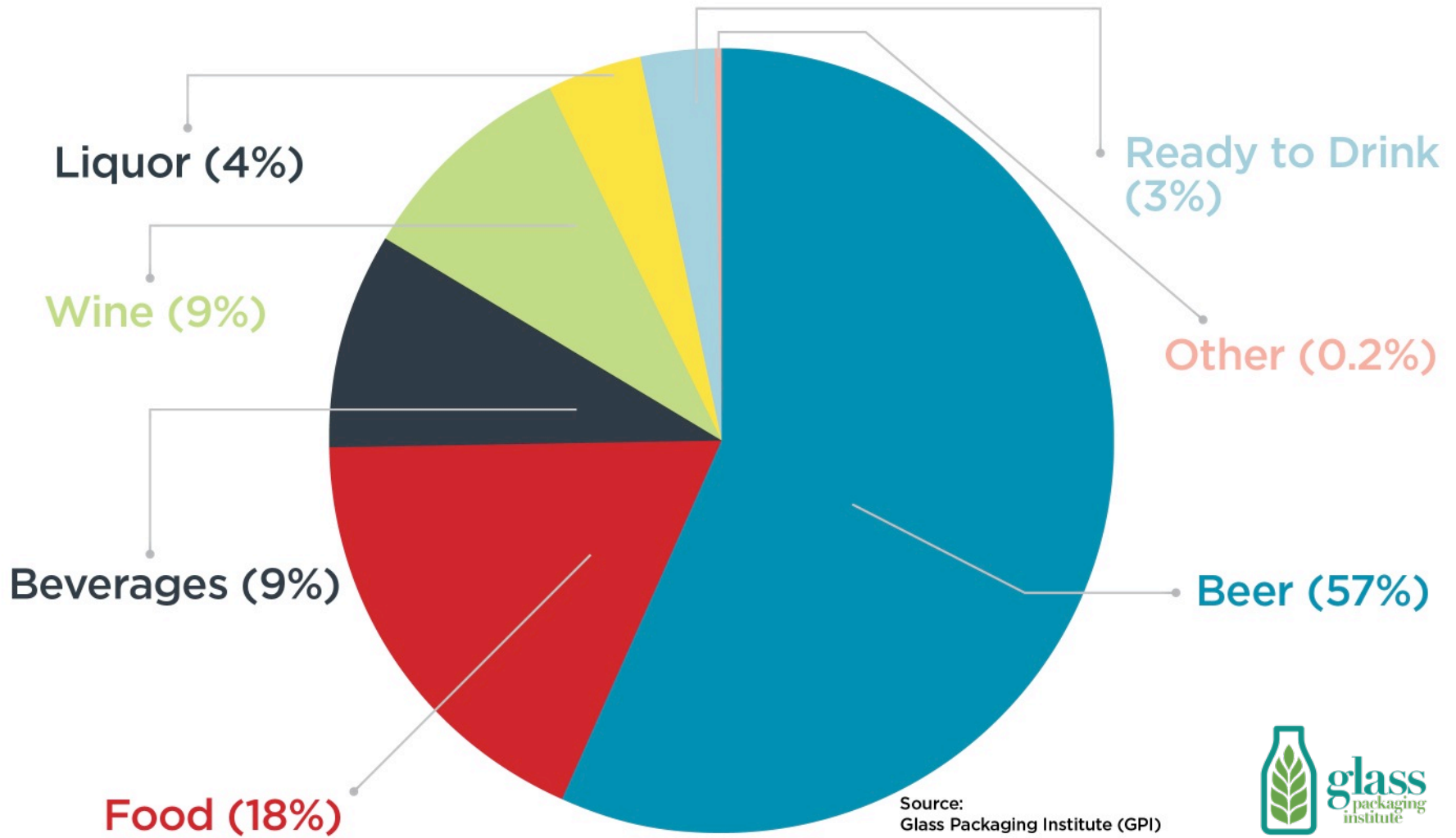


Glass Bottles reduced in weight



- U.S. glass container manufacturers operate 45 plants in 22 states
- Annual \$5.5 billion industry
- Approximately 28 billion glass containers manufactured in 2015

2015 U.S. Glass Container Shipments by Category



Why Glass Container Recycling Counts

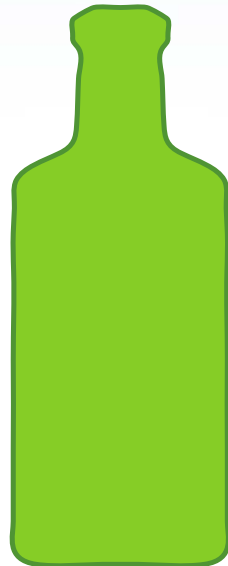
Benefits Glass Manufacturers & Environment

Energy and GHG
emissions reduced by
1/3 per ton
for every ton
of recycled glass used

100% and endlessly recyclable



can be substituted for up to
95% of raw materials



Helps Communities Meet Recycling Goals



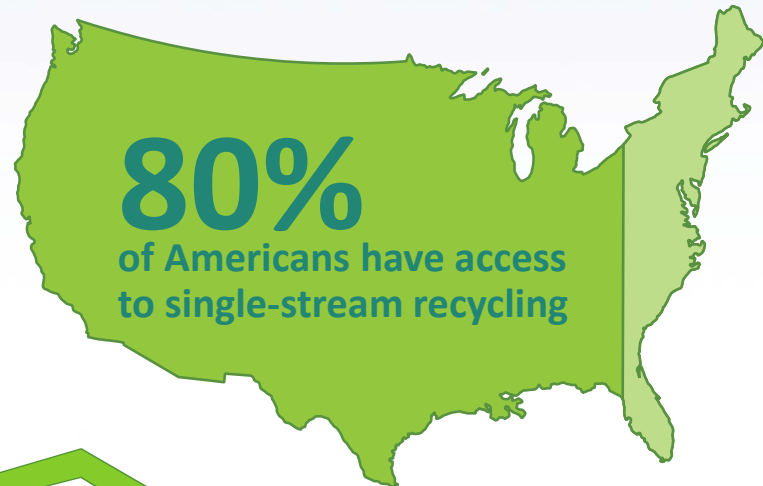
Glass bottles and jars represent up to

25%

of the total weight of the recycling stream



It costs less than 15¢ per person per pick up to recycle glass at the curb



ZERO

Waste recycling goals cannot be achieved without glass

Consumers Want To Recycle Glass Containers



91%

of consumers say that recycling is an important part of conserving natural resources

Americans want to recycle glass

90%

say that it is important to recycle materials rather than sending them to the landfill.

95%

of those who live in a community which recycles glass say glass should continue to be collected by recyclers.

91%

say finding ways to avoid wasting our natural resources is important.

Glass is made from natural resources



sand



soda ash

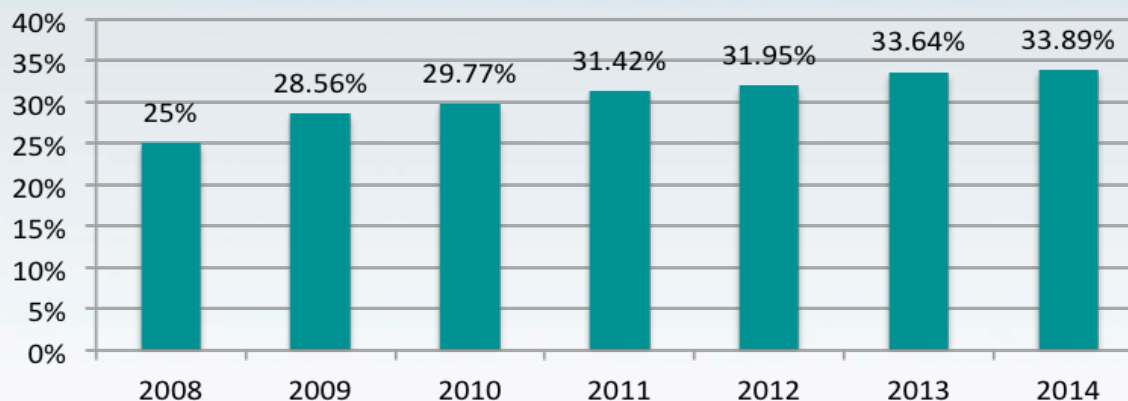


limestone

*Source:
2016 national poll by SurveyUSA

Glass Container Recycling Facts

Glass Container Industry Average Cullet Use (Dec.2008 – Dec. 2014)



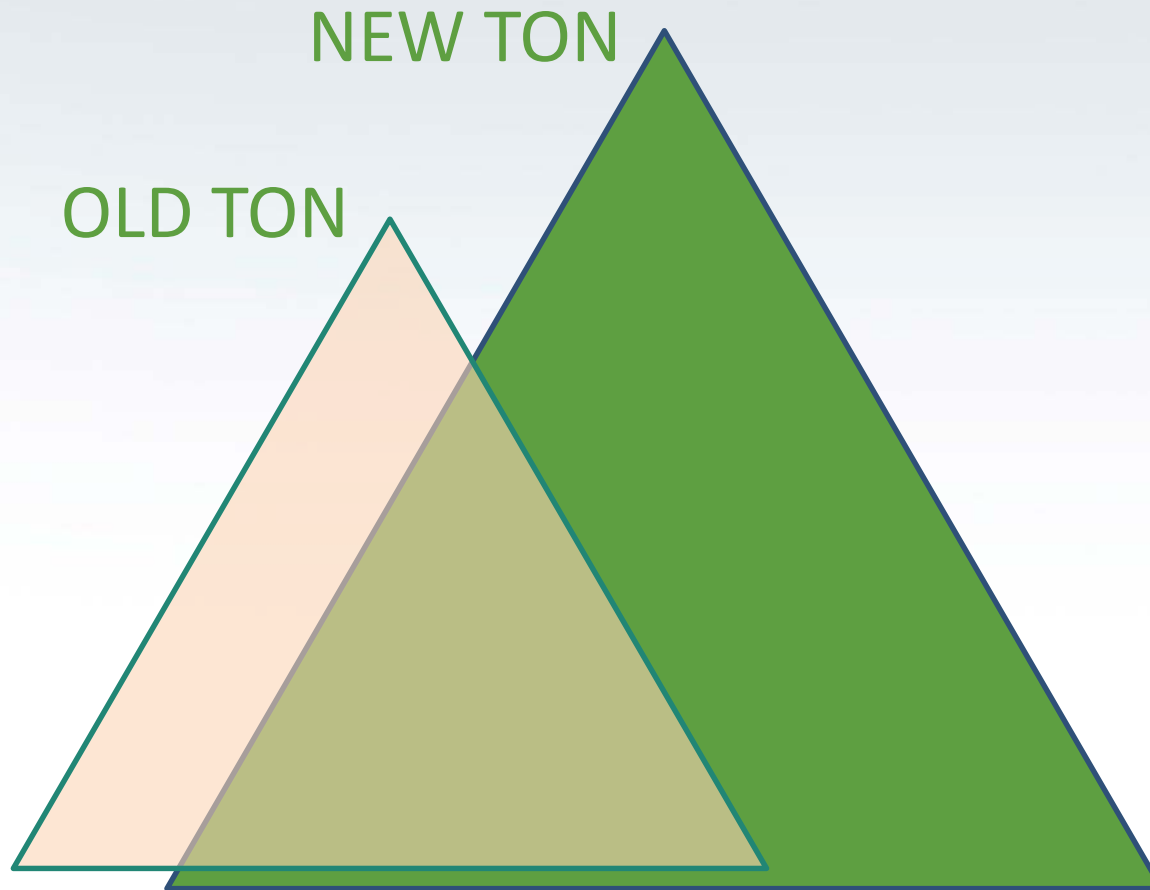
Recycled content for glass bottles and jars increasing = strong industry demand

- **Recycling rates*:**
 - 41% of beer and soft drink bottles
 - 34% of wine and liquor bottles
 - 34.1% of all glass containers
 - 10 states with refund programs average 63% glass container recycling; other states average roughly 24%



Glass Container Recycling: Challenges

Packaging Evolution & Recycling



Glass is now a quarter of Single Stream volume in non-deposit states

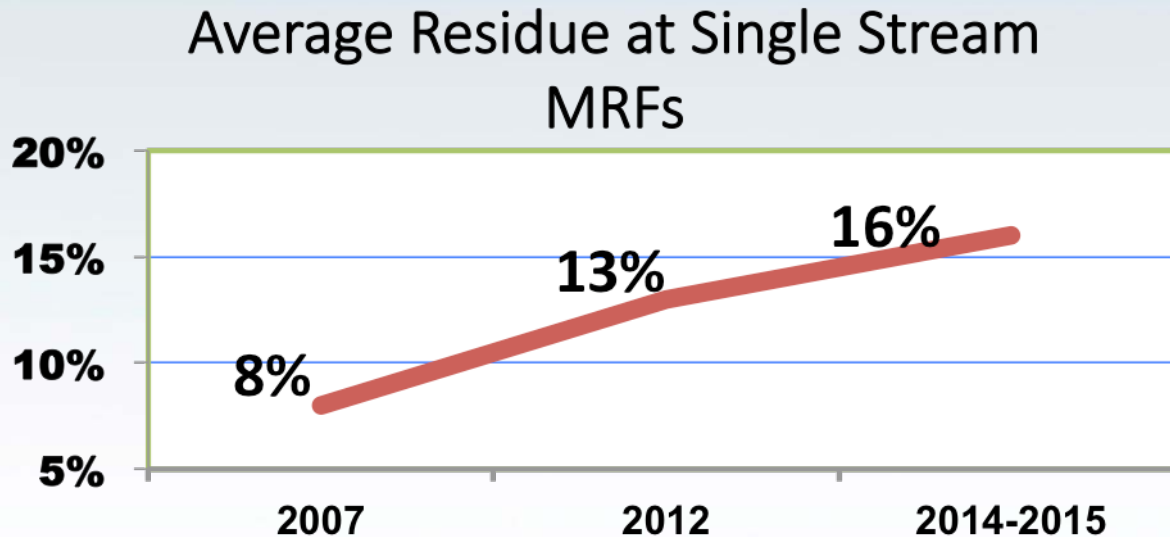
Lighter, less mass

More units per ton

More Types
of Material

More Materials
with Less Value

Increased Residue At MRFs

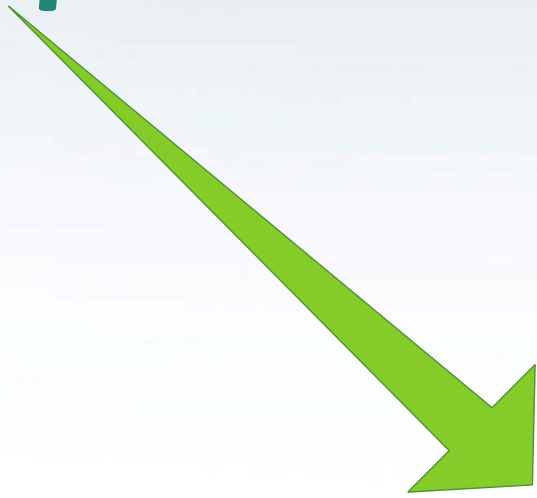


- Increased contamination of inbound supply
- As fiber decreases, glass is growing % of recycling stream
- SS MRFs initially designed to “remove” glass, not sort it

Sources: 2007 Comparative Study on Public vs. Private MRFs, 2012 GAA study on Wisconsin-Area MRFs, ISRI Moore Presentation April 2015

Commodity Value Decline

\$125 Per ton
in 2011



\$67 Per ton
in 2015

=

1 billion loss per year



Beverage Container Recycling Refund Programs

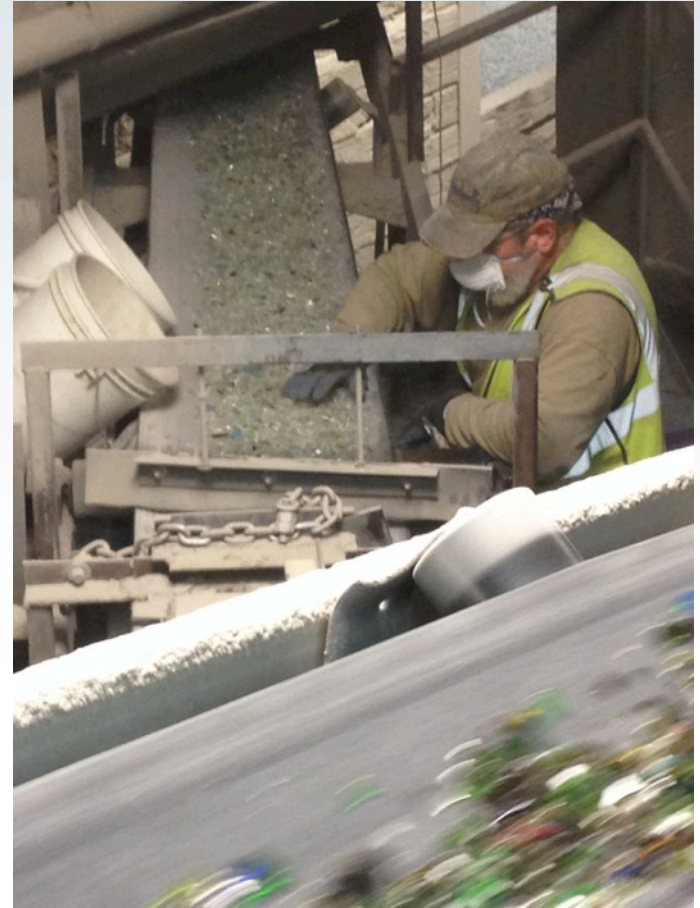
- Supply 65-80% of recycled glass used to make new glass bottles and jars
- Connecticut Redemption Rate – nearly 57% (almost double the national avg.)
- Results in reduced contamination for all recyclables collected



CT - Glass Single Stream Recycling

The Process

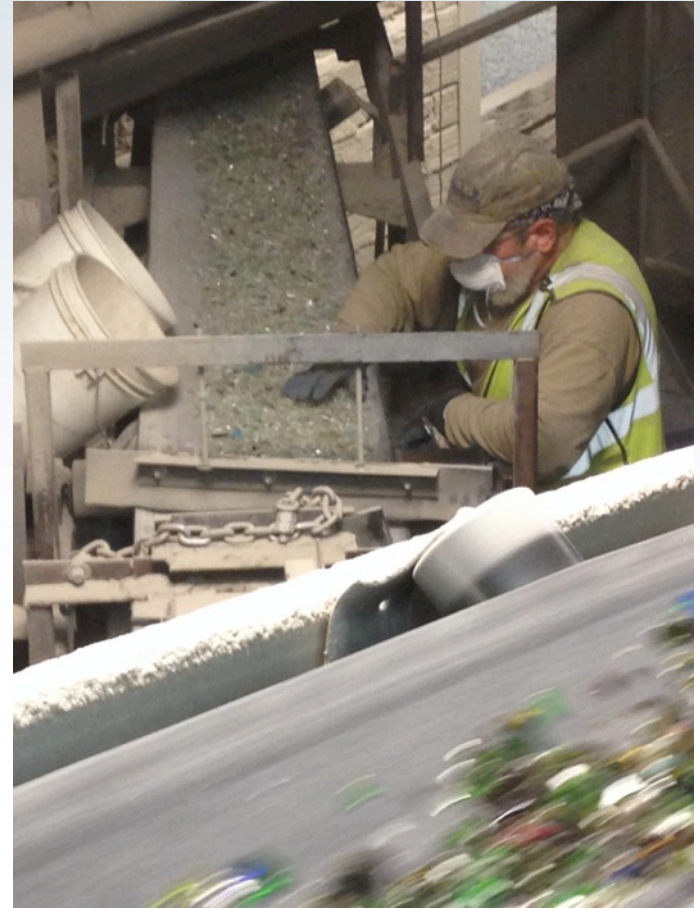
- Glass from CT SS MRF transported to SMI Rhode Island plant for pre-processing
- Glass then sent to Franklin, MA SMI plant, run through optical sorting line creating 2 streams, amber glass and clear/green mix (fleen)
- Amber cullet is blended with bottle bill material for container industry.



CT - Glass Single Stream Recycling

The Process

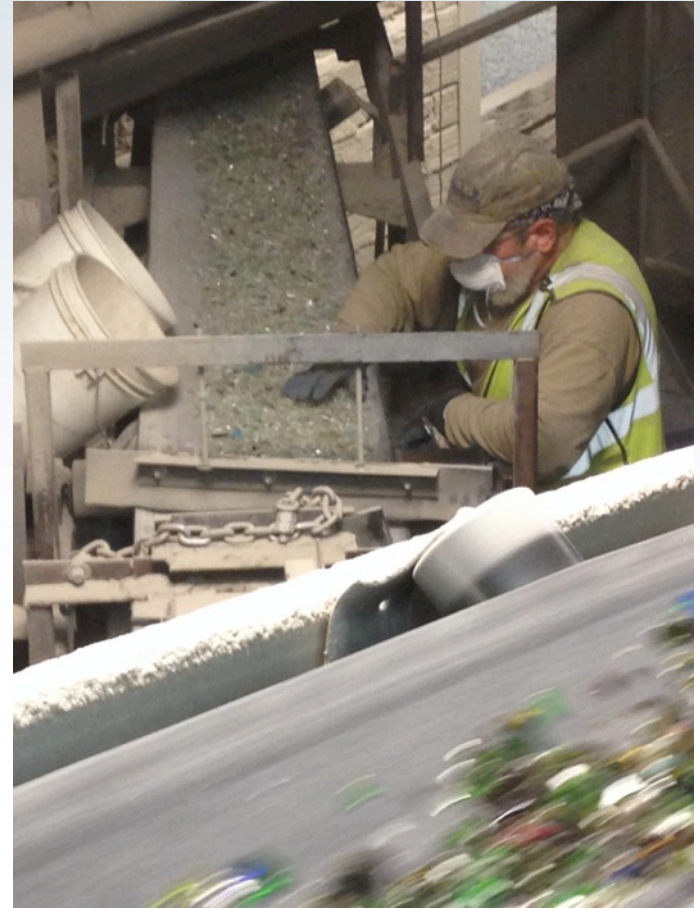
- Fleen shipped to South Windsor and is color sorted into Clear (flint) cullet for a container customer and green for fiberglass
- The better the material, the less that goes to landfills
- Several MRFs have invested in glass cleanup systems to improve the quality of the material coming to SMI.



CT - Glass Single Stream Recycling

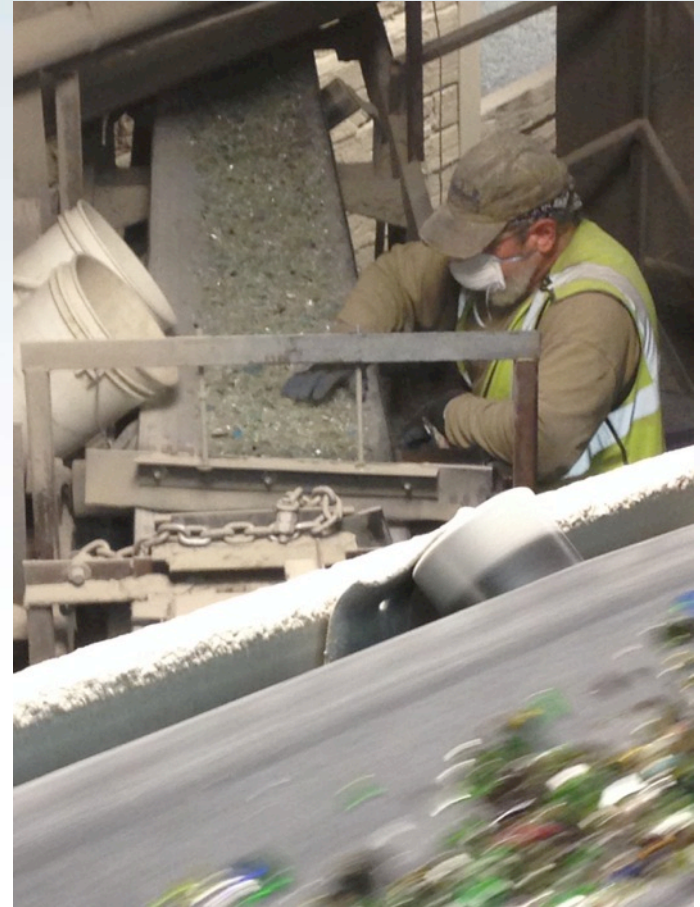
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CT - Glass Single Stream Recycling

- By weight, glass makes up about 18% of the single stream collection system in Connecticut*
- Glass recovery can assist Connecticut reach its 60% diversion by 2024 goal*
- Glass recovery via single stream can be improved:
 - Remove glass early in sorting process
 - Move glass breaker screen up in process
 - Add OCC screen
 - Glass bunker placement



*Source: 2015 Connecticut DEEP Waste Characterization Study

Landfilling: Not the Answer



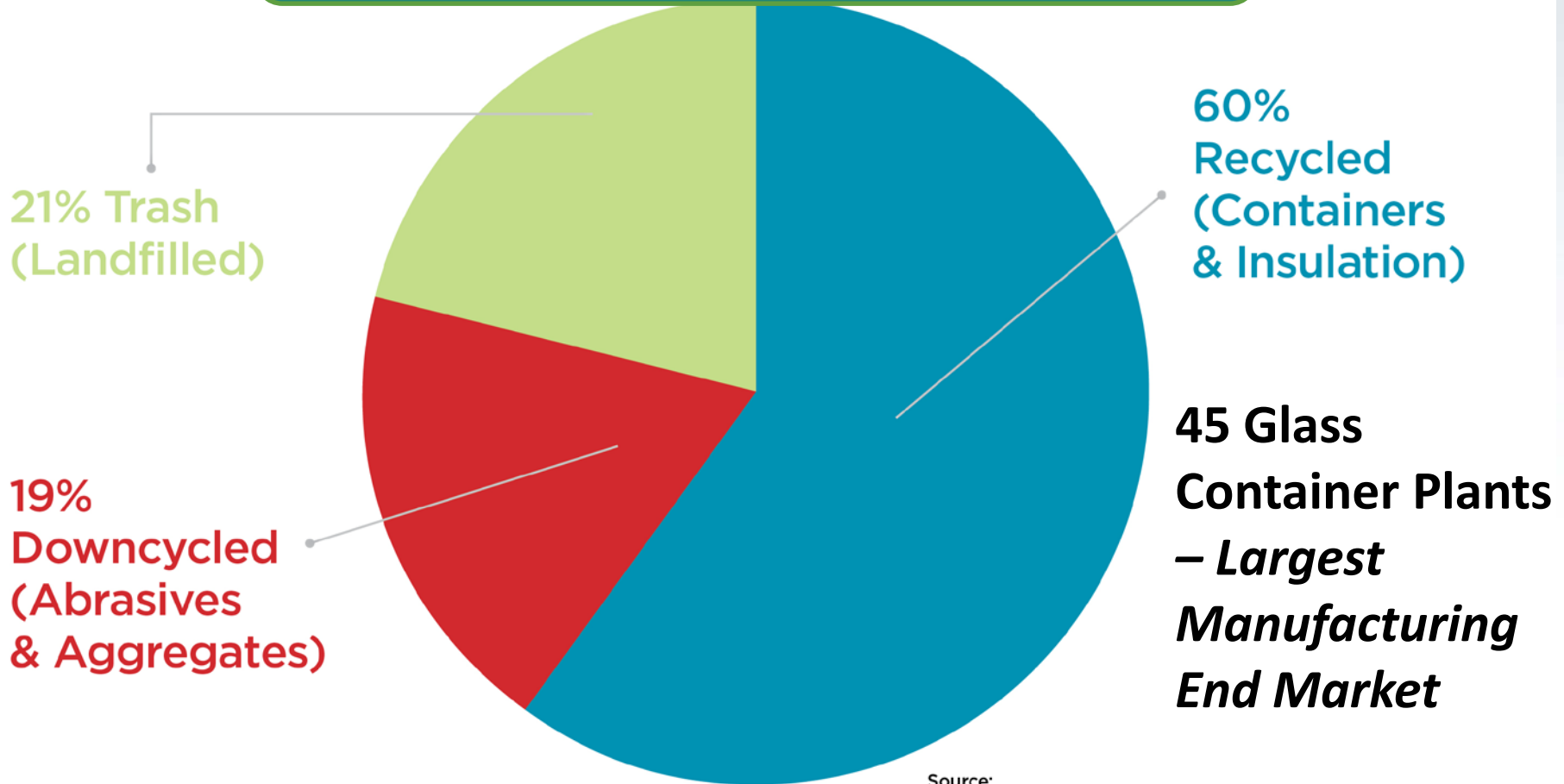
- **Contributes to GHG emissions**
 - Third largest source of U.S. methane emissions (18%)*
- **Cost of tip fees another financial cost to city/municipal**
- **Results in long-term degradation to recycling**
 - Nine states have landfill moratoriums
 - CT has 1 MSW Landfill – ADC is not included as part of state's diversion rate

**Environmental Protection Agency Estimate, 2014 (18.2% of total methane emissions)*

Glass Container Recycling: What are the Markets?

End-Markets for Recovered Glass

Uses for Glass from Single Stream Programs



Source:
Container Recycling Institute

Fiberglass Industry Demand

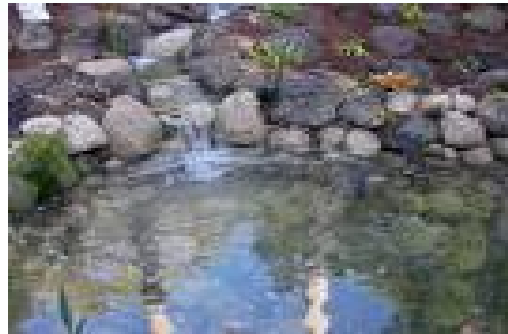
- 36 plants in NA
- Recycled glass a critical manufacturing input
- Purchased about 850,000 tons in 2015



Secondary Markets



- Roadbed aggregate
- Filtration medium
- Abrasives/sand blasting
- Tiles, landscaping, countertops
- Cement/concrete
- Landfill cover (ADC)



Connecting Suppliers To Markets

Location Type

-  GPI Member Manufacturing Plant
-  Recycled Glass Processing Facilities
-  Fiberglass Manufacturing Facilities

Zipcode / Proximity

Postal code

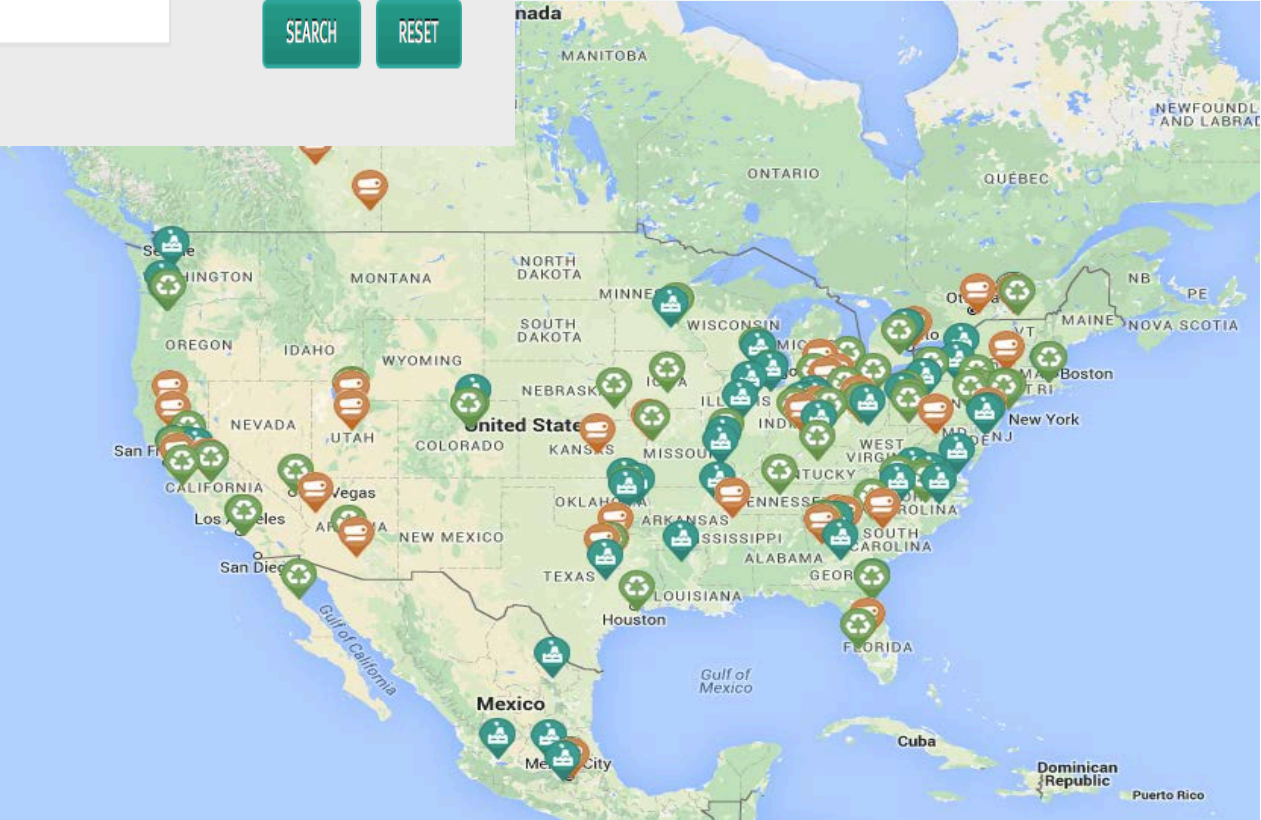
Distance

Miles ▾

State

Show All ▾

www.GPI.org:
Connecting the dots to the
glass recycling chain



Glass Container Recycling: Opportunities & Initiatives

Glass Recycling Coalition

- Consumer brands
- Glass manufacturing
- Waste hauling
- Recycling processors
- Trade organizations



Glass Recycling Coalition: Goals & Activities



Goals:

- Assist municipalities with glass recycling decisions
- Resources & champions
- Best practices & community models

Activities:

- National Webinar
- Targeted Initiatives



Glass MRF Spec

- ISRI voluntary “Glass MRF Spec” in process
- If adopted can provide expectations for supply chain stakeholders



MRF & Collection System Solutions

- **SS MRF Initiatives**
 - Technology changes
 - Best Practices
- **SS w/ glass separated** (e.g., Centre County, PA; Portland, OR)
- **SS w/ resident pay for separate glass collection** (e.g., Momentum in UT & CO)
- **Expanded glass drop-off systems** (e.g., Ripple in MO, KS, NE)
- **Glass drop-off w/ optional business collection** (e.g., Clear Intentions, CO)



THANK YOU!

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