PARTNERSHIP GLASS RECYCLING OPPORTUNITIES IN THE SOUTHEAST

Recycle Florida Today & SWANA FL
8:30 am-10 am

Moderator:
Marissa Segundo, APR, LEED GA
RRS
The Glass Recycling Coalition was founded in 2016, collaborating across the value chain to strengthen glass recycling. Since then, we have made the following achievements in partnership with our members:

<table>
<thead>
<tr>
<th>EDUCATION</th>
<th>OUTREACH</th>
<th>MEMBERS</th>
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</thead>
<tbody>
<tr>
<td>50+ Best Practices</td>
<td>46,000+ GlassRecycles.org webpage views</td>
<td>37 Members</td>
</tr>
<tr>
<td>800+ Webinar Attendees: 8 webinars</td>
<td>550+ Surveyed-Annual Glass Recycling Survey Respondents</td>
<td>5 Government Advisory Members</td>
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<tr>
<td>850+ Webinar video views</td>
<td>55+ Industry conference speaking opportunities</td>
<td>3 Advisory Members</td>
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<tr>
<td>400+ Users of Glass Recycling Decision-Making Tool</td>
<td>7 Regional Workshops</td>
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<td></td>
<td>20+ Industry Media Articles</td>
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<td></td>
<td>500+ Glass Champions Database</td>
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GRC RESOURCES

Glass Outreach
- Glass Talking Points
- Speaker’s Bureau
- Webinars
- Regional workshops

Tools
- Interactive Glass Map
- Decision Making Tool
- Case Studies
- Glass Champions Newsletter
GRC RESOURCES

TALKING POINTS FOR GLASS CHAMPIONS

1. Communication is a key to the glass recycling coalition. Make sure everyone understands the coalition’s goals and how each person can contribute.

2. Glass recycling helps to preserve the environment and reduce waste by recycling glass, which can have a positive impact on the environment. It also helps to create new jobs and promote economic growth.

3. The coalition needs everyone to be involved to make a difference. By working together, we can create a more sustainable future for ourselves and future generations.

4.玻璃 recycling is not only good for the environment, but it is also a great opportunity for local economies. By recycling glass, we can create new jobs and promote economic growth.

5. Everyone can do their part to help the coalition. By recycling glass, we can create a more sustainable future for ourselves and future generations.

6. Glass recycling is not only good for the environment, but it is also a great opportunity for local economies. By recycling glass, we can create new jobs and promote economic growth.

7. The coalition needs everyone to be involved to make a difference. By working together, we can create a more sustainable future for ourselves and future generations.
GRAB YOUR PHONE
TIME FOR A POLL!

HOW IT WORKS:
Step 1: Compose a new text message
Step 2: Enter 37607 as the recipient
Step 3: In the message type recycle123
Step 4: YOU’RE IN THE POLL!!!
Using just one-word how would you describe glass recycling in Florida?
Got Glass?

Glass Recycling

Joe Meierhoff, Regional Sourcing Manager
Strategic Materials Inc.
Strategic Materials

Markets Served

We are the largest glass recycler in North America, with nearly 50 plants.

With over 100 years of experience, we are a recycling market leader for glass and plastics.

The markets we serve with our recycled glass helps to reduce manufacturing costs and improve sustainability.

We recycle nearly 3 million tons of glass a year into a variety of applications.
Strategic Materials

Footprint

Nearly 50 facilities in North America
We recycle nearly **3 million tons of glass** a year into a variety of raw materials for manufacturing applications.

**Recycled glass demand** is more than current supply in the container glass and fiberglass insulation industries.
Why Glass?

Environmental Benefits

Glass is a sustainable, versatile, cost-saving material.

Glass can be recycled forever.

One 6-pack of recycled beer bottles produces enough fiberglass insulation to fill a standard wall cavity.

Recycling glass takes 30% less energy to produce glass from raw virgin materials.

Conserves natural resources and landfill space.
The market for recycled glass in the South East Region is strong, over 2300 people employed by nine companies in eight locations in 4 state region make over $3.3 billion of products with recycled glass: fiberglass insulation, new food grade glass containers, abrasive media, and reflective beads.¹

End Market Companies Operating in region:


9 companies; 13 locations; 2386 local jobs; $3.3B Revenues

¹ Reference: SERDC http://www.serdc.org/maps
Glass Future

Collections:

- Single stream – curbside collections
- Glass drop offs & convenience sites
- Private collectors serving multifamily and commercial establishments
Glass Future

First we must “Single Stream” Better
• Educate residents through social media or website about what is acceptable to recycle
• Improve or develop regular maintenance practices for MRF equipment
• Invest in new or upgrade equipment
• Utilize Strategic Materials glass handling & processing expertise
• Improve quality at the source
• Higher quality reduces logistics costs, reduces disposal costs and increases volume of glass recycled
Best Practices
What works well

• Containers, deployment
  • Easy to recognize, branded containers, well marked labels
  • Creating local partnerships, community involvement, and awareness

• Small, independent collectors – job stimulus
  • Developing to address underserved markets

• Aggregation Site / Collection Hub
  • Create a centralized collection spot within the state from collectors to drop off materials. Transport them in bulk to our glass processing facility.
Supplier Services

When you work with Strategic Materials, our experts can work with you and your waste hauler to assess your operations and develop areas of improvement such as:

- New site construction suggestions to maximize value
- Quality improvement suggestions to maximize value
- Handling suggestions (i.e. spotted equipment, containers)
- Improvement financing
- Training
Glass is Viable

Recycling glass is viable and should continue to be a part of all recycling programs.

Glass never wears out. Demand for recycled glass products exceeds available supply!
Thank You
Thank You

Primary Contact, your Regional Sourcing Manager:

Joe Meierhoff 651-955-7338
jmeierhoff@strategicmaterials.com

Our toll-free supplier hotline is 1-844-256-8985 or suppliers@strategicmaterials.com.
- Monday through Friday, 7:00am - 4:00pm CST
- Voicemails are typically returned within 24 hours.

Other Notable Contacts:

Laura Hennemann | Director of Marketing
281-638-6469
lhennemann@strategicmaterials.com

Facebook.com/strategicmaterials
Twitter.com/stratmaterials
LinkedIn.com/strategicmaterials
Instagram.com/strategicmaterials
What part of the supply chain should be responsible for quality?

- End market/Manufacturers: 24%
- Hauler: 16%
- Processor/MRF: 8%
- Local Government: 0%
- Resident/commercial businesses: 16%
- Brands: 0%
- All of the Above: 76%
THE USE OF GLASS CULLET IN FIBER GLASS INSULATION

SWANA FL/RFT Orlando, Florida
January 28, 2020
Angus E. Crane
North American Insulation Manufacturers Association
WHO IS NAIMA?

- The North American Insulation Manufacturers Association ("NAIMA") is the trade association for North American manufacturers of fiber glass and rock and slag wool (mineral wool) insulation
- NAIMA promotes the energy savings and energy efficiency achieved through the use of fiber glass and mineral wool insulation
FIBER GLASS INSULATION

INGREDIENTS

• Soda Ash
• Borax
• Glass Cullet (35-65 percent)
• Limestone
• Sand
• Coating/Binder (not all products)
Typical Glass, Rock & Slag Insulation Wool Products

- Batts
- Duct Board
- Pipe
- Loosefill
- Original Equipment Manufacturer
- Acoustic & Ceiling Tile
Respiratory protection is not recommended for batt installation because exposures are well below 1 f/cc
Respiratory protection is not recommended for batt installation because exposures are well below 1 f/cc
Respiratory protection is not recommended for board installation because exposures are well below 1 f/cc.
Glass Cullet Supply Issues

- Waste management companies often:
  - Find collecting glass unprofitable
  - Attempt to re-write their contracts with local governments by demanding that glass collection be removed from the contract
  - Suggest/state there is not a market for glass cullet
  - NAIMA is actively stepping in to set the record straight
Since 1992, NAIMA has conducted an annual survey of member companies to determine the volume of glass cullet used by NAIMA’s members.

Glass cullet numbers are collected for both U.S. and Canadian fiber glass insulation companies.

This presentation focuses on glass cullet used in North America.

Specific focus will also be on the southeastern portion of the United States.
Recycling Data Summary

• The most recent survey showed that in 2018, NAIMA member companies in the United States and Canada used more than 2.6 billion pounds of recycled glass.

• The data showed that in 2018, facilities in the United States used more than 2.2 billion pounds of recycled glass.

• The data for Canadian facilities showed that in 2018, 381 million pounds of recycled glass was used in the production of fiber glass insulation products.

• Since 1992, when NAIMA started collecting recycling data, 61.8 billion pounds of recycled material have been diverted from the waste stream.

• NAIMA tracks the use of pre- and post-consumer glass cullet.
NAIMA Recycling Survey Responses

Pounds of Glass

<table>
<thead>
<tr>
<th>Year</th>
<th>Lbs of Glass</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>600,849,000</td>
</tr>
<tr>
<td>1993</td>
<td>718,249,000</td>
</tr>
<tr>
<td>1994</td>
<td>897,537,000</td>
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<tr>
<td>1995</td>
<td>936,311,000</td>
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<tr>
<td>1996</td>
<td>1,027,595,000</td>
</tr>
<tr>
<td>1997</td>
<td>937,288,000</td>
</tr>
<tr>
<td>1998</td>
<td>989,568,000</td>
</tr>
<tr>
<td>1999</td>
<td>1,044,587,000</td>
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<tr>
<td>2000</td>
<td>1,203,863,661</td>
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<tr>
<td>2001</td>
<td>1,079,784,119</td>
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<tr>
<td>2002</td>
<td>1,115,822,845</td>
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<td>1,142,622,670</td>
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<td>2004</td>
<td>1,512,092,639</td>
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<td>2006</td>
<td>1,708,021,893</td>
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<td>2007</td>
<td>1,793,901,250</td>
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<td>2008</td>
<td>1,590,912,003</td>
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<tr>
<td>2009</td>
<td>1,470,390,240</td>
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<tr>
<td>2010</td>
<td>1,665,277,304</td>
</tr>
<tr>
<td>2011</td>
<td>1,862,459,057</td>
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<tr>
<td>2012</td>
<td>1,874,522,926</td>
</tr>
<tr>
<td>2013</td>
<td>1,985,597,368</td>
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<tr>
<td>2014</td>
<td>2,093,108,691</td>
</tr>
<tr>
<td>2015</td>
<td>2,139,599,142</td>
</tr>
<tr>
<td>2016</td>
<td>2,240,085,136</td>
</tr>
<tr>
<td>2017</td>
<td>2,486,496,404</td>
</tr>
<tr>
<td>2018</td>
<td>2,572,448,315</td>
</tr>
<tr>
<td>Total</td>
<td>40,448,028,445</td>
</tr>
</tbody>
</table>
Southeast Region Glass Cullet Use:

- 2017 – 437,677,495 pounds of glass cullet used in the Southeastern United States
- The yearly average of these plants would be approximately 413,709,912 million pounds
- These combined operations employ 950 workers
- These combined operations provide 3,080 indirect employment opportunities throughout the Southeast
Fiber Glass Plants in the Southeast United States

• Fiber Glass Plants in Georgia
  • Owens Corning – Fairburn, Georgia
  • Johns Manville – Winder, Georgia
  • CertainTeed – Athens, Georgia

• Other Plants in the Southeast
  • Knauf – Lanett, Alabama
  • Owens Corning – Lakeland, Florida

• Some of these operations are represented by the Glass, Potters, and Molders Union and the United Steel Workers Union

• The Georgia plants employ approximately 760 workers

• These plants provide approximately 2,700 indirect employment opportunities in the State of Georgia, some of which are in the cullet industry
The Story of Gwinnett County Georgia

• Waste management companies persuaded Gwinnett County to remove glass from the recycling stream; the county was told there was not a market for glass cullet in Georgia

• Georgia Glass Cullet Use:
  • 2017 – 285,483,495 million pounds of glass cullet used in Georgia
  • The yearly average of these plants would be approximately 278,808,912 million pounds
  • Most Georgia manufacturers could use more glass cullet
  • In addition to the Georgia plants, other fiber glass insulation plants operate near the Georgia border in Alabama – Knauf Insulation, and Lakeland, Florida – Owens Corning
Recycling Data Summary

- Fiber glass insulation is the second largest user of glass cullet
- Fiber glass insulation is the largest user of glass cullet in Georgia
- Fiber glass insulation manufacturers are the highest users of mixed bottle cullet (a mix of flint, amber, and green) and, as such, are responsible for recycling more of this material than any other source
Benefits of Glass Cullet

- By using glass cullet, raw materials (sand, soda ash, etc.) use will be reduced
- Energy in producing the raw materials will be decreased
- The life of the furnaces will increase up to 30 percent due to decreased melting temperatures and a less corrosive batch
- Reports have shown that compared to 100 percent raw materials, using 30 percent glass cullet reduces silica use by 60 percent, soda ash by 40 percent, and saves 10 percent in energy costs
Sustainable Benefits of Insulation

Insulation makes buildings more energy efficient.

Insulation keeps buildings cool in the summer and warm in the winter.

Energy efficient buildings save money and lower utility bills.

A pound of fiber glass insulation saves 12 times as much energy in its first year in place as the energy used to produce it.

Reduced energy consumption translates into reduction of air pollutants.

Therefore, installation of insulation reduces air pollutants.

The Harvard School of Public Health has published studies that show specific correlation between insulation and reduction of greenhouse gases.

The same study concludes that insulation’s reduction of emissions greatly improves public health.
Owens Corning/Ripple Partnership
Ripple Glass’s footprint stretches across the Midwest. It also has drop-off centers in Missouri, Arkansas, Iowa and Nebraska. Ripple Glass also recycles commercial glass from restaurants, bars and casinos. Recycling glass has a handful of benefits: Glass doesn’t degrade as it’s recycled.

In fact, 10 percent of the glass collected by Ripple Glass gets made into Boulevard bottles. The other 90 percent travels down an alley and around the corner from the Ripple Glass plant to Owens Corning. Owens Corning then makes fiber glass insulation out of it.
• Supply is not always consistent
• Contaminants in glass cullet can wreak havoc with the manufacturing process
• Paper and plastic labels, caps, cork, and other debris
• Cullet sometimes results in additional pollutants
  • NOx
  • Chromium
  • VOCs
Never Intentionally Add

- Cathode Ray Tubes (CRTs)
- Microwave ovens
- Television screens or components
- Computer screens
- Other electronics
- Antimony Trioxide
- Pyrex
- Florescent tubes
Allowable Contamination Levels

- 0 – 0.2% Max. Organics
- 0 – 0.2% Max. Inorganics
- 0 – 0.1% Mirror Glass
- 0.1 – 0.3% Max. Magnetic
- 0.005 – 0.01% Nonmagnetic Metals
- 0 – 0.05% Leaded Oxide
- Trace Elements Only – Elemental Heavy Metal Glass
- 0.0 – 0.2% Refractories
Glass Cullet Market

Fiber glass could use a much higher recycled content if it were available. Clean cullet is the issue. Fiber glass insulation manufacturers are committed to the use of glass cullet.

Glass cullet is defined as glass product or portions of product usually suitable for addition to raw batch. ASTM C162-05 (2015). NAIMA has further identified the parameters for glass cullet acceptable for use in the manufacture of fiber glass insulation.
Advocacy on Behalf of Glass Recycling

- Testimony and written comments before City of Houston
  - These joints efforts were successful
- State of Georgia
  - Fiber glass insulation is the largest user of cullet in Georgia
  - Participation in Georgia Recycling Coalition forum was an important educational tool
- City of Fayetteville, Arkansas
  - Again, joint efforts were successful in preserving City’s curbside collection program
- State of Massachusetts
  - Support for bottle bill
References


Contact
Angus E. Crane
North American Insulation Manufacturers Association
11 Canal Center Plaza, #103
Alexandria, VA 22314
(703) 684-5670
www.insulationinstitute.org
Glass Container Manufacturing & Recycling Overview

Scott DeFife
President
Glass Packaging Institute (GPI)
Glass Recycling Coalition Leadership
Glass Recycling Foundation Board
Glass Packaging Institute (GPI)

- 5 manufacturing member companies
- 27 supplier member companies

Glass Bottles reduced in weight

1970

40%

2000

16,500 JOBS*

- U.S. glass container manufacturers operate 45 plants in 22 states
- Approximately 27 billion glass containers manufactured in 2018

* Hourly and glass company workforce employment, supplier company employment not included.
WHY RECYCLE GLASS?

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

91% of consumers want to recycle glass. Cities can’t accomplish with zero-waste goals without it.
WHY RECYCLE GLASS?

32% on average recycled glass in new glass containers

2.1 MILLION tons of recycled glass used annual to make new bottles and jars

60% is used for new containers or insulation
Consumers Want To Recycle Glass Containers

- 91% of consumers say that recycling is an important part of conserving natural resources.
- 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: 2017 National Poll by SurveyUSA
Southeast Region: FL and GA

Legend

Current GPI Members
- Ardagh Glass
- Gallo Glass Co.
- O-I
- Rocky Mountain Bottle Co.
- Strategic Materials, Inc.
- Glass Manufacturers
- Glass Recycling Processors
- Fiberglass Plants
Partnerships to Improve MRF Glass Quality

2016 & 2017 Public/Private Partnership in North Carolina

❖ Support two MRFs to improve glass recycling & recovery
  ▪ American Recycling of Western NC (Greater Asheville area)
  ▪ Sonoco (Raleigh)

❖ MRFs leveraged funding with NC DEQ and Glass Packaging Institute (GPI) grants, along with significant company investment

❖ Market proximity: Nearby glass processing and manufacturing plants

❖ Result - Strategic & targeted investments work!
North Carolina - Grant Investments & Modifications

✓ Moved glass sorting equipment to MRF front end
✓ Installed glass breaker screens
✓ Installed 3-deck OCC screen
✓ Glass bunker storage
North Carolina Grant Results

- 5%-9% increase in tons glass recovered
- Lower contamination & higher revenue for glass received
- Additional cost savings from moving glass sorting & cleaning equipment to front end of MRF
- Reduced wear and tear on rubber discs, fiber separation screens and other MRF equipment

“We have experienced a 50 percent increase in overall throughput following the installation of equipment because we don’t have to stop for manual cleaning or maintenance.”
—Ron Moore, owner of American Recycling of Western North Carolina

“We the project has met its goals, and the glass system flows much better.”
—Patrick McDonald, plant manager at Sonoco Recycling of Raleigh
GLASS DROP-OFF LOCATIONS

- 4251 Eisenhower Ave.
- 3224 Colvin St.
- S Royal St. & Jones Point Park
- Tower Ct. & South Whiting St.

For more information | Español | 中文 | alexandriava.gov/Recycling
YES!

- Empty & Rinse
- Labels - OK
- All Colors of Glass - OK
- Metal Caps & Lids - OK

NO!

- Do Not Bag Glass
- No Plastic Liners
- No Plastic Bags or Plastic Wrap (return to retail)
- No Lamps or Bulbs (use Household Hazardous Waste Center at 3224 Colvin St.)
- No Misc Glass: Ceramics, Porcelain, Mirrors, Windows, Pyrex, or Glass Sheets
- No Food or Liquid (empty and rinse)
Community Resources
Glass Recycling Coalition

❖ Resources for Program Managers
❖ Webinars & regional workshops with featuring best practices.
❖ Identification for Interventions
❖ Tracking & assisting communities with glass recycling issues.
❖ MRF Glass Certification Program (NEW)
❖ Advisory & Glass Champion Network (Connecting with Local Governments)
❖ Local/regional solutions for glass recycling
MRF GLASS RECYCLING CERTIFICATION

- Articles published in technical journals and on-line
- Measures effective glass cleaning
- Valuable to MRFs bidding municipal contracts
- Launched October 2019
MRF GLASS RECYCLING CERTIFICATION

Two Step Process:
1. Online Application Form:
2. MRF Sample Testing:

MRF Glass Certification

Thank you for your interest in the Glass Recycling Coalition's Facility Certification Program. The below instructions will help you determine your eligibility for this program. The application is per MRF facility not by company. The company-specific information will not be shared with companies with a financial or competitive interest in this information. The final certification will appear as a certification level: Gold, Silver, and Bronze.

The name and photo associated with your Google account will be recorded when you upload files and submit this form. Visit [http://glassrecycles.org](http://glassrecycles.org) for more information.

* Required

Email address *

Your email

Sampling Process:

Glass Recycling Coalition

Measuring Glass Purity Instructns:

To apply for the MRF Glass Clean-Up Certification, GRC asks applicants to take in-house samples of the glass you capture in your MRF at various times of the day. Follow the Sampling Process steps on the next page, then take a photo of your sample to upload with your MRF Certification Application or email the photo to info@glassrecycles.org. An independent, non-competing panel of judges will score your glass samples along with the results of the MRF Glass Survey.

Supplies needed:
- 3/8” Mesh Testing Tube
- Personal protective equipment (PPE) [e.g., hat, gloves, glasses]
- Empty 10, 5 or container
- Three 10-pound samples of glass

Sample Photo

Glass Recycling Coalition

MRF Glass Clean-Up Certification Program

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Glass Recycling Coalition

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MRF GLASS CERTIFICATION:
Glass Recycling Foundation (GRF)

Purpose: Identification & Targeted Investments to Improve Glass Recycling Stream

❖ Grant & Complimentary Funding Opportunities
❖ Initial investments from glass manufacturing, fiberglass and brand companies
❖ Additional information to be announced in Q1 2020
Thank You

Questions?

Follow Up & Contact Information:

Glass Packaging Institute (GPI)
Scott DeFife
dsdefife@gpi.org
703-684-6359
www.gpi.org
What do you feel like are the biggest opportunities for glass recycling in Florida?