

# Caribbean Recycling Summit

Puerto Rico Recycling Partnership & U.S Virgin Island Recycling Partnership

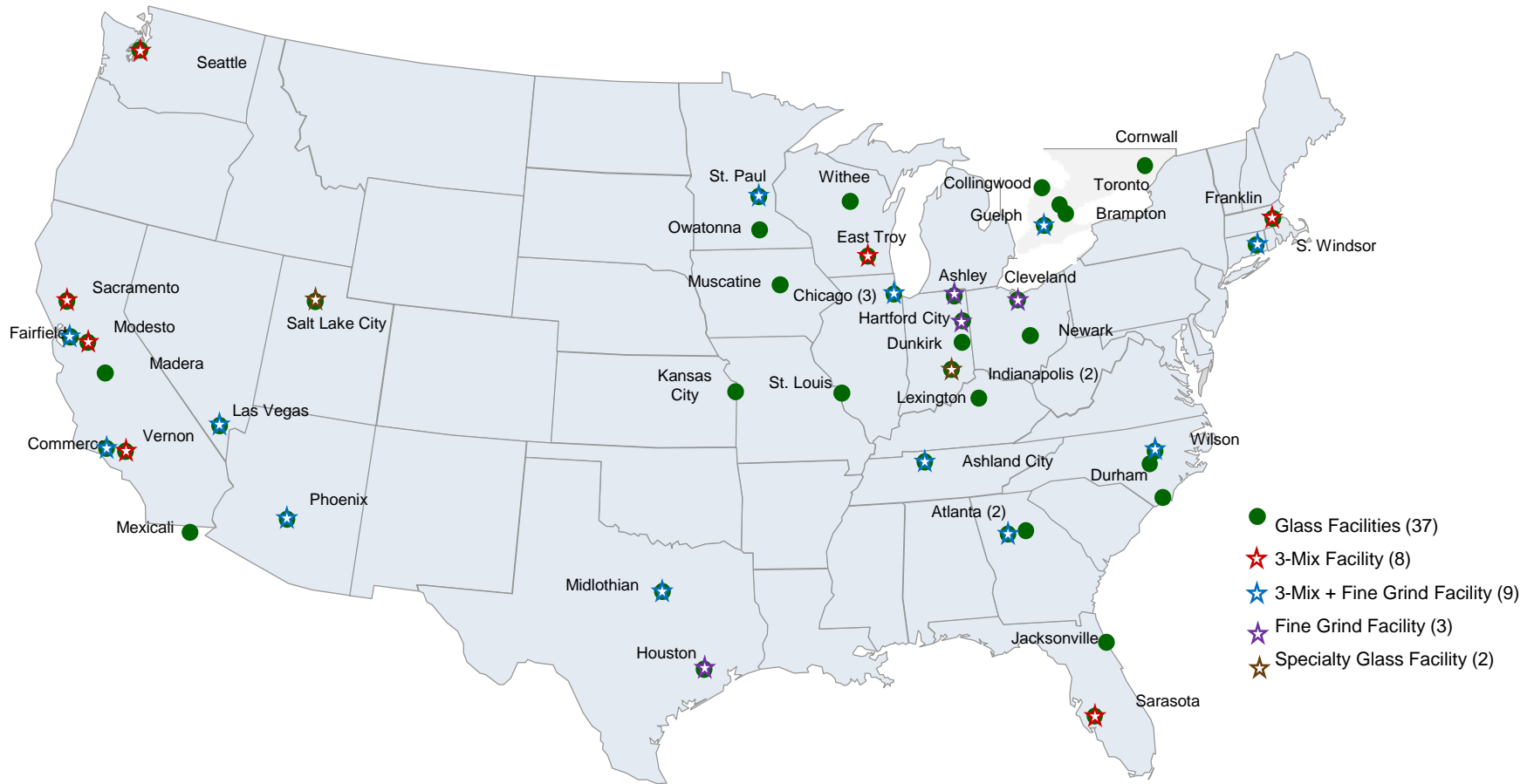
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December 2016



# Strategic Materials Footprint

SMI has the Largest Network of Glass Recycling Plants in North America – the facilities are strategically located near our customers allowing for lower shipping costs and better service



- Established in 1896, SMI is the largest glass recycler in the U.S.
- Operates 39 glass recycling plants across North America
- Recycling over 2.5 million inbound tons of glass each year
- A top ten plastics processor

# What We Do – Products Using Recycled Glass

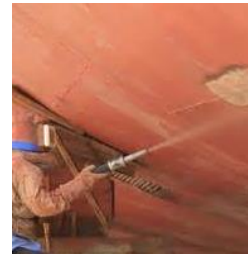


SMI takes in various raw feedstock that has **up to 50% organics & 30,000 PPM ceramic**

and cleans final product to **.15% -.25% organics & less than 40 PPM of ceramic** to meet customer specifications.

Color from mixed to 90-95% pure depending on end market

We have a 99.52% nationwide acceptance rate from our customers





# Value Stream – Bottle Inbound

Highly Contaminated / Low(negative) Value to Better Quality / Increasing Value



Single stream with high levels of NGR (non-glass residue)



Single stream with high levels of undersize



Well processed Single stream or Dual stream



Deposit / drop off center glass Whole bottle mix

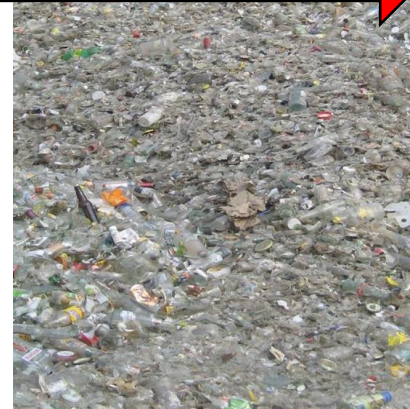
Low Residue / Color Separated / Higher Value to Best Value



Deposit / Drop off center Amber



Deposit / Drop off center Flint with some color



Deposit / Drop off center Purer Flint

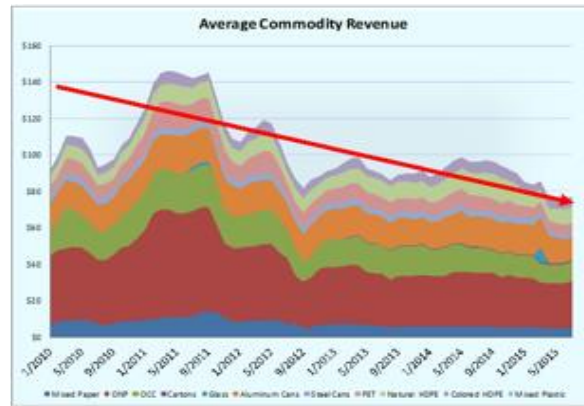
## Value Drivers for Glass Supply

- NGR (Trash Contamination)
- Size (Larger is Better)
- Color Purity / End Market

# Single Stream Glass from MRF's



Requires high capital cost to install optical sortation  
(approx. \$5-10 Million)



Value of all recyclables or Contract  
type effect glass' perception



Make End Markets Quality requirements very  
difficult to meet or exceed

# Single Stream Glass from MRF's should

3-MIX Single Stream Specification			
Criteria	Description	Examples	Target
NGR	Non-Glass-Residual found in municipal recycling program	Paper, Plastic, Aluminum, steel	10% Maximum
U/S	Undersize Glass particles < 3/8" (or < 1/8" *)	Mixed color glass particles	12% Maximum
Ceramics	Broken bits of household ceramic	Dinner plates, mugs, cups	.01% Maximum
Color	Flint, Amber, Green(s) & other	Food containers, beer bottles, wine/ soda bottles	See above table in Definition
Moisture	Excessive water mixed with glass**	Rain, snow, ice	5% Maximum
Excluded Waste	Other, possibly hazardous waste	CRT, radioactive, medical waste, heavy metals, etc.	0% (Zero) see 'Excluded Waste' Definition

include a specification from City/County .....

Today most don't



DB Report #104 Mixed Glass - Summary by Supplier by Plant									
Date Range:		2013-06-01 - 2014-05-31							
1002 Atlanta-CP		1002							
		RATING	%+3/8	%-3/8	%NGR	Load Tons	Usable Tons		
	Supplier#1	77	77%	8%	15%	11750.64	9047.89		
	Supplier#2	77	77%	17%	6%	2627.90	2023.48		
	Supplier#3	77	77%	12%	11%	1615.80	1244.17		
MI/CSS	Supplier#4	74	74%	12%	13%	6833.37	5056.69		
MI/COLR	Supplier#5	71	74%	20%	7%	6593.42	4879.13		
	Supplier#6	71	72%	19%	6%	5214.65	3754.69		
	Supplier#7	72	72%	16%	11%	4446.45	3201.44		
	Supplier#8	71	71%	10%	19%	4681.33	3323.74		
	Supplier#9	69	70%	20%	10%	3145.73	2202.01		
MI/CSS	Supplier#10	70	68%	21%	11%	15591.48	10602.21		
	Supplier#11	68	68%	16%	16%	4947.63	3364.39		
MI/CSS	Supplier#12	68	68%	16%	16%	3705.97	1161.36		
MI/COLR	Supplier#13	74	68%	1798%	-1787%	2346.34	1595.51		

be inspected by glass recycler on every load inbound and share results with MRF and Gov't entity paying for service

Today most don't

Undersize											
		0.0%	1.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%
NGR	0.0%	\$ 20.80	\$ 20.56	\$ 19.60	\$ 18.40	\$ 17.20	\$ 16.00	\$ 14.80	\$ 13.60	\$ 12.40	\$ 11.20
	1.0%	\$ 19.60	\$ 19.36	\$ 18.40	\$ 17.20	\$ 16.00	\$ 14.80	\$ 13.60	\$ 12.40	\$ 11.20	\$ 10.00
	5.0%	\$ 14.80	\$ 14.56	\$ 13.60	\$ 12.40	\$ 11.20	\$ 10.00	\$ 8.80	\$ 7.60	\$ 6.40	\$ 5.20
	10.0%	\$ 6.80	\$ 6.56	\$ 5.60	\$ 4.40	\$ 3.20	\$ 2.00	\$ 0.80	\$ (0.40)	\$ (1.60)	\$ (2.80)
	15.0%	\$ 2.80	\$ 2.56	\$ 1.60	\$ 0.40	\$ (0.80)	\$ (2.00)	\$ (3.20)	\$ (4.40)	\$ (5.60)	\$ (6.80)
	20.0%	\$ (3.20)	\$ (3.44)	\$ (4.40)	\$ (5.60)	\$ (6.80)	\$ (8.00)	\$ (9.20)	\$ (10.40)	\$ (11.60)	\$ (12.80)
	25.0%	\$ (9.20)	\$ (9.44)	\$ (10.40)	\$ (11.60)	\$ (12.80)	\$ (14.00)	\$ (15.20)	\$ (16.40)	\$ (17.60)	\$ (18.80)
	30.0%	\$ (16.20)	\$ (16.44)	\$ (17.40)	\$ (18.60)	\$ (19.80)	\$ (21.00)	\$ (22.20)	\$ (23.40)	\$ (24.60)	\$ (25.80)
	35.0%	\$ (23.40)	\$ (23.64)	\$ (24.60)	\$ (25.80)	\$ (27.00)	\$ (28.20)	\$ (29.40)	\$ (30.60)	\$ (31.80)	\$ (33.00)
	40.0%	\$ (31.40)	\$ (31.64)	\$ (32.60)	\$ (33.80)	\$ (35.00)	\$ (36.20)	\$ (37.40)	\$ (38.60)	\$ (39.80)	\$ (41.00)
	45.0%	\$ (37.00)	\$ (37.24)	\$ (38.20)	\$ (39.40)	\$ (40.60)	\$ (41.80)	\$ (43.00)	\$ (44.20)	\$ (45.40)	\$ (46.60)

be adjusted financially every month based on data / Quality and shared with entire supply chain

Today most don't

All Incoming glass is not created equal

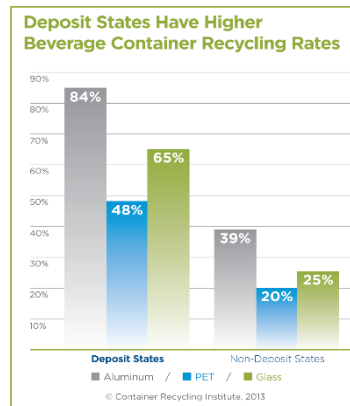
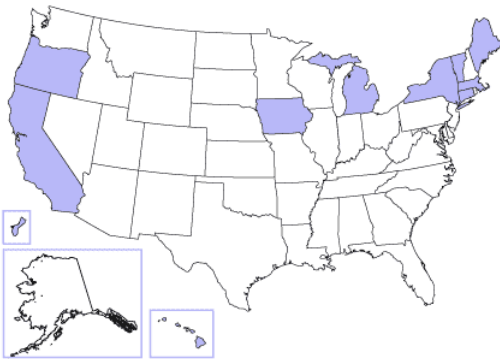


# Deposit & Dual Stream Glass



Deposit and Dual Stream(depending on quality)

Require much less rigorous processing and capital costs are much less



Deposit programs generate high quantities of high quality glass thru a non-municipal system



Is less expensive to produce and end markets place a premium on this type of glass so it can travel further and still meet their economic goals

# Issues unique to Puerto Rico & U.S. Virgin Islands

## Issues

## Countermeasures

<p><b>No Local Container, Fiberglass, or highway bead end markets which would be hard / impossible to create</b></p>	<ul style="list-style-type: none"> <li>• <i>Glass collected must be of highest value to encourage long range shipping</i></li> <li>• <i>ID new markets that could consume glass in Puerto Rico and promote usage thru incentives and fund thru grants, etc..</i></li> </ul>
<p><b>No glass processing capability and / or expertise</b></p>	<p><i>Pick collection program that</i></p> <ul style="list-style-type: none"> <li>• <i>allows for long range shipping</i></li> <li>• <i>encourages investment</i></li> </ul>
<p><b>Mrfs will resist including glass in system</b></p>	<p><i>Either</i></p> <ul style="list-style-type: none"> <li>• <i>Pick alternative collection system</i></li> </ul> <p><i>Or</i></p> <ul style="list-style-type: none"> <li>• <i>Design contract that sets defined quality standards for glass output and pays Mrf on true processing costs and glass market economics (no artificial floors).</i></li> </ul>
<p><b>Glass value is low/negative depending on quality</b></p>	<ul style="list-style-type: none"> <li>• <i>Collection system needs to compare total system economics (eg., Drop off Center costs should be compared to trash collection costs plus landfill</i></li> <li>• <i>Raise landfill fees to promote recycling</i></li> </ul>

