



RECYCLING: FACING THE ISSUES AT HAND, FORCES THAT BE, AND TAKING A REGENERATIVE APPROACH

WA. Recycling Stakeholders Meeting Markets Presentation

M. Timpane

April, 2019

All Rights Reserved RRS



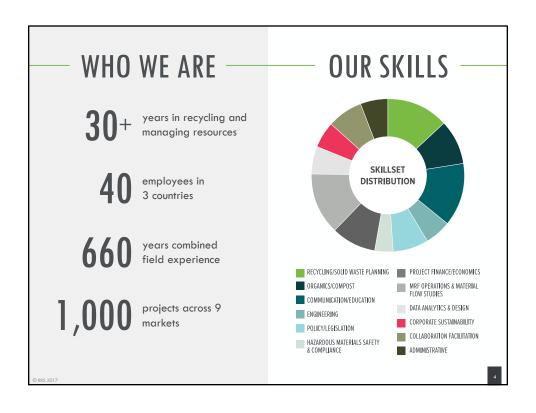
AGENDA

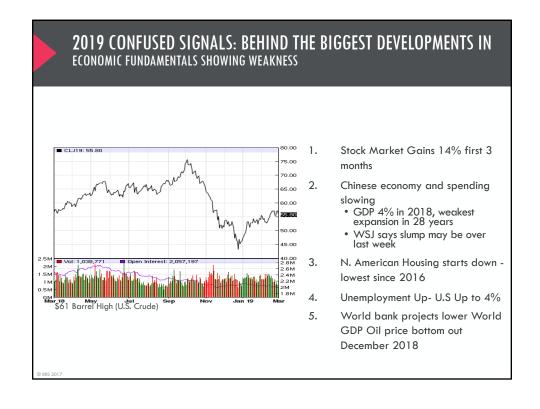
Welcome & Introductory Comments

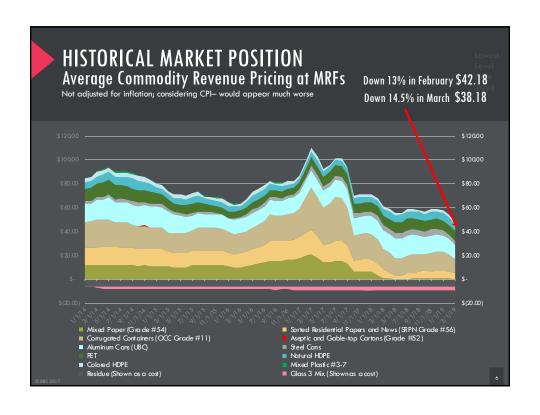
- 1. Commodities
- 2. China Commentary
- 3. Other Industry Stressors
- 4. Commentary
- 5. Questions

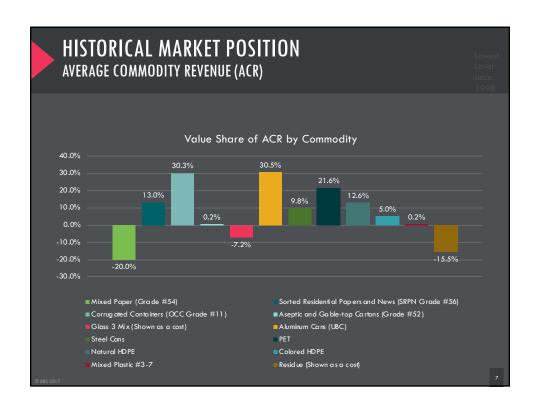
,





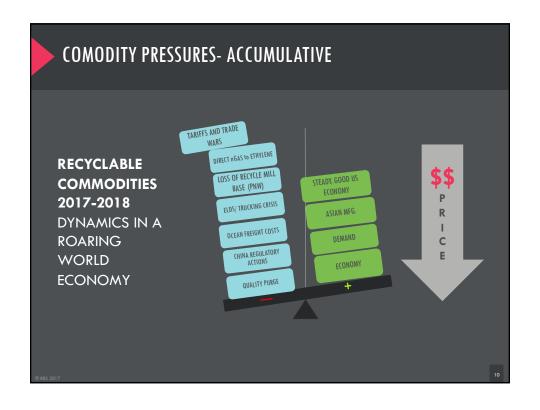














RECOVERED PAPER DYNAMICS

- 1.OCC- Guardian of MRF paper- Compression, softening demand, relationship to mixed paper
- 2.SRPN- rider of the trends
- 3. Mixed Paper- Oversupply driving continued MRF- commodity slump

11

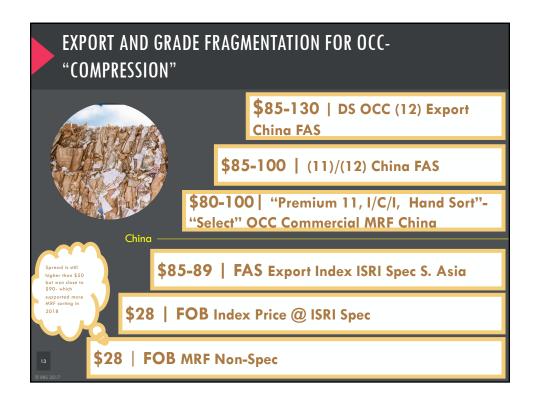
OCC- MP SUBSTITUTION DYNAMICS "COMPRESSION"



For most of 2018 MP pricing was at \$0/T or lower

- OCC was over \$75 net/T
- \$75-90 spread allowed substitution of grade- MP consumption in U.S. up 4.4% (RISI)
- Trade off- lower yield, more contamination, higher cleaning cost
- Poster Company- Pratt (no PNW influence)
- Accelerated long-term decline of OCC beginning in Oct. 2017

Today's compressed low price does not allow substitution

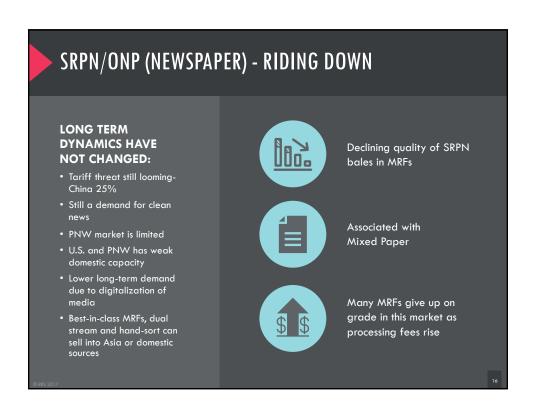


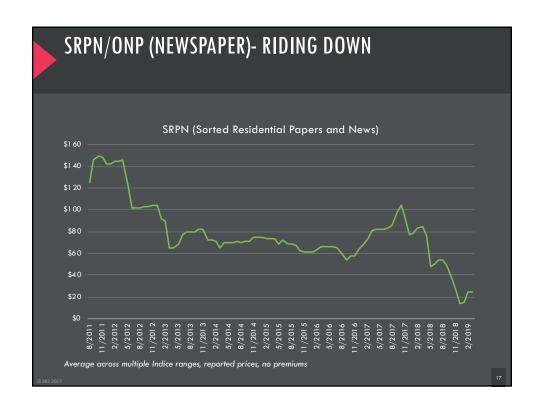


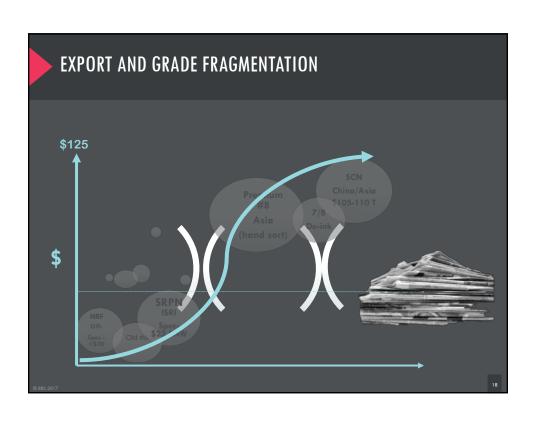
PREMIUM PRICING VS. INDICES-"COMPRESSION"

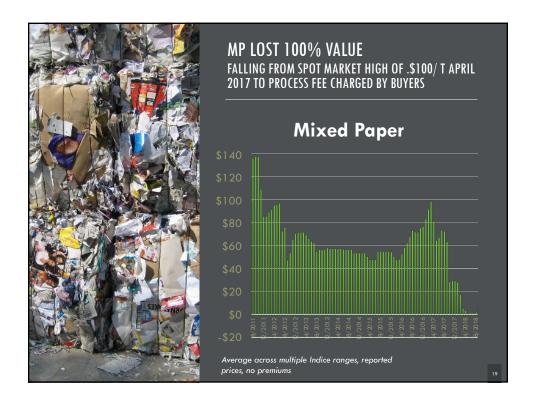
- Many paper grades traditionally trade over index pricing sheets (i.e. Fastmarkets, CIF, Paper Stock, Recyclingmarkets.net)
- Competitive World Market. Trades well over the index, especially where local mills exist
- 2018- est. PNW premium was as much as \$35 over, especially export
- Now lucky to have movement, let alone any premium
- · Ramifications for MRF Contracts

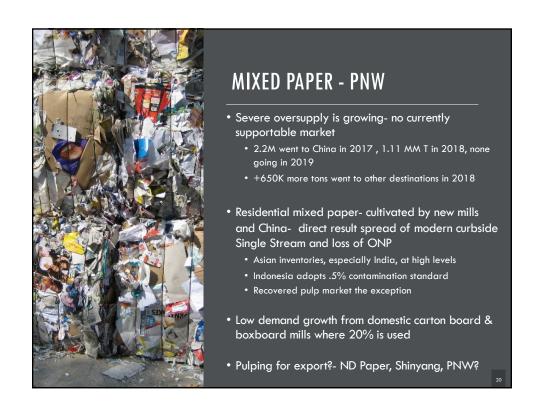












NEW ANNOUNCED RECYCLED FIBER CAPACITY- PNW

Company	Project Type	Time Frame	Capacity (MT per year)	Recycled Inputs
Bio Pappel / McKinley Paper CO, Port Angeles	Re-open and Conversion to Containerboard	Q3 2019	250,000	OCC, RMP
Large Washington regional mill	Considering pulping line	12-16 Months	Unknown	RMP? Other Bulk and specialty
Berkeley International, Reno, NV	New Molded Fiber Plant	Q4 2019	Unknown	OCC

- · Help may be coming but probably not 2019
- PNW needs mill capacity to offset China loss for MP
- Slow investment activity to start 2019 after red hot 2018
- No more China Activity, Fairmont (2019), Maine (2019), Wisconsin (2020) ND Paper; Kentucky Shinyang (2020)
- \$9.1 billion (USD) Mill related M&A in 2018 > 2016 & 2017 combined



GP JUNO PROJECT TOLEDO, OREGON MILL EARLY 2020

- Targets IC paper–rich waste (MSW)
- Built from 3- year pilot
- Mission- extract fiber from MSW waste- input to mill's existing pulper
- Removes coatings (polycoat) and food residues
- Counter intuitive- GP feels only way to get fiber in 10 years. P&W disappearing.







STEEL CAN (TIN) BALE/BUNDLE

Outlook on Steel- Mixed Bag, Economy-related

Steel Scrap is down by 15% YOY

- Price slightly up in March- Spot \$130MT
- Global steel demand growth 3.9%, NAFTA countries lower- 1.1%
- China Demand is slowing- makes 49% of total world output
- · Uncertainty in trade

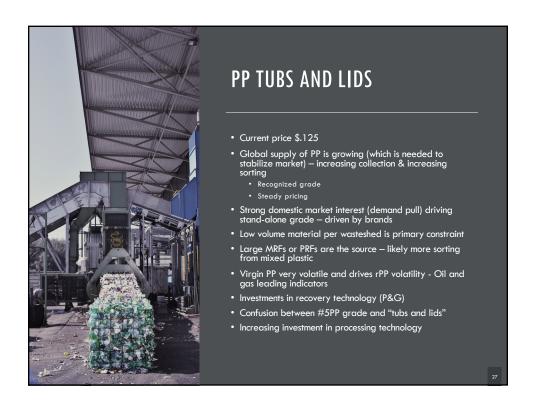
Steel Cans

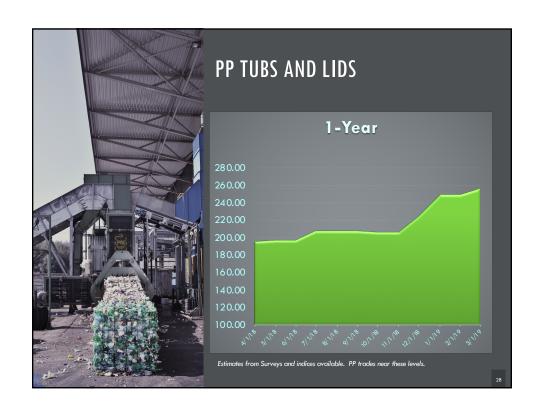
- 70% recycled
- Index scrap price also down 21.2% YOY
- Canned goods continues to grow CAGR 3.8%



HDPE NOTES

- NHDPE pricing down 22% in last two months to \$.31/#
- Colored HDPE hovers at \$.15/#
- Capacity in PNW and domestically good
- Capacity exists in North America to absorb additional supply
- Increasing virgin PE supply (3.6+ mil tpy and growing) - natural gas as cheap input
- Demand highly seasonal for both virgin and recycled
- Virgin resin demand will increase with increased demand for scrap sub from China
- Long Term Uncertainty related to Virgin PE Supply and Demand issues
- Increasing export demand for virgin resin will keep pace (5 million tons by 2020)
- CHDPE is more susceptible than NHDPE







- 1. New Announcements- North American capacity for sorting #3-#7 plastics
 - A. Merlin/Peninsula (California)
 - B. EFS (West Coast)
 - C. Revolve Recycling (Utah)
- 2. Most investments driven by demand for PE and PP
- 3. PP market pricing holding steady; demand strong



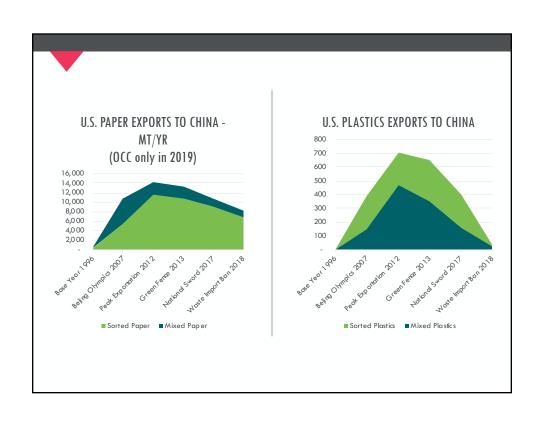
3-COLOR MIXED CONTAINER GLASS

- Market in PNW steady, glass is recycled
- Was not an issue until loss in other commodity revenue
- 3-mix pricing has decreased over time. As a average over four years pricing has moved from -\$3 per ton to -\$20 per ton.
- · Good value chain but thin- SMI, OI major players.
- There is little competition in beneficiating and capital scale efficiency requires dense urban demographics
- · Renewed interest in deposits
- Fiberglass facilities increase use with economic expansion
- There is an upper limit on cullet as a commodity, negative
- Mindset of Beverage producers could change outcome
- Pozzolon cement regulatory structure could help smaller markets



Exports bound for China- Political/Environmental will trump economics

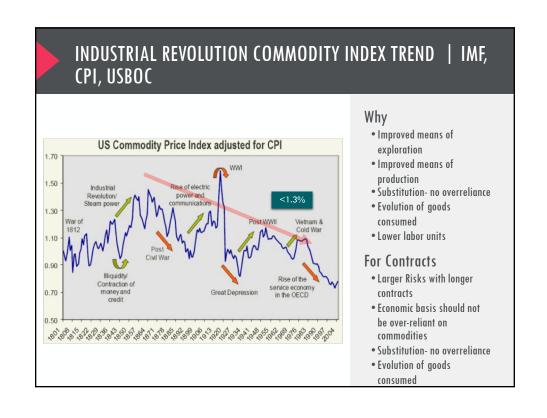
- China slow down due to economic demand affecting price of imported clean bulk grades
- Desptie slowdown, domestic bulk grades through the roofreports from \$350-500 for Sino domestic MP & OCC
- Sino subsidiaries competing directly for #12 store-bought OCC, bypassing U.S. packers
- China plans to implements total import recovered material ban (2020). No reason to doubt intent
- Import finished paper from Canada, U.S. east Asia (will not help Chinese mills but will help converters and brands)
- Chinese building pulp units cost for pulper and dryer \$190M CAN for 400 MT/Day system (SERC 2019, Moore)
- U.S. Announced Mills with increased pulp/board production- Nine Dragon pulpers in WI and ME; Shanying in KY- close to 1 MM metric tons. ME in late Fall.
- East Asia- Still selling to China after re-sorting.

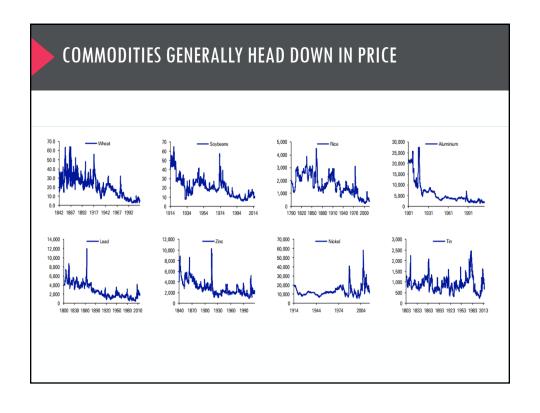


CHINA PAPER EXPORT COMMENTS Bulk represents MRF-YTD U.S. Recovered Paper and Fiber Exports to Mainland mechanically China by Major Grade (metric tons) separated paper Sources: U.S. Census Bureau/U.S. International Trade Commission June Graph- Through September, Old 4,000,000 3,500,000 newspaper ("ONP" or 3,000,000 "SRPN" (Column 4), 2,500,000 and Mixed Paper 2,000,000 1,500,000 (Column 5) were down 1,000,000 2.7 M TPY YOY 500,000 through Sept. Leading Expert Bill Corrugated High-grade Pulp Printed Mixed Other Moore: '500—1M deinking Substitutes Tons LF'd in 2019 ■ Jan-Jul 2017 ■ Jan-Jul 2018 (SERC 2019) Joe Pickard- ISRI



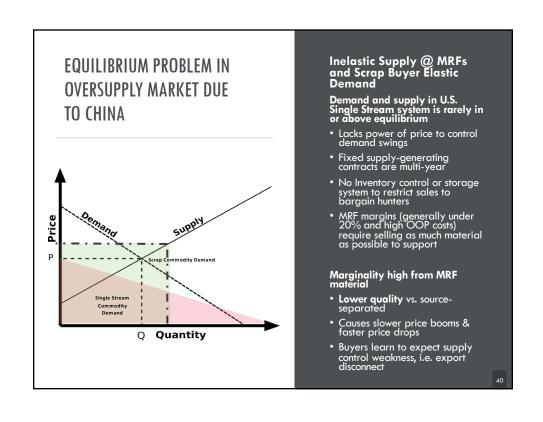




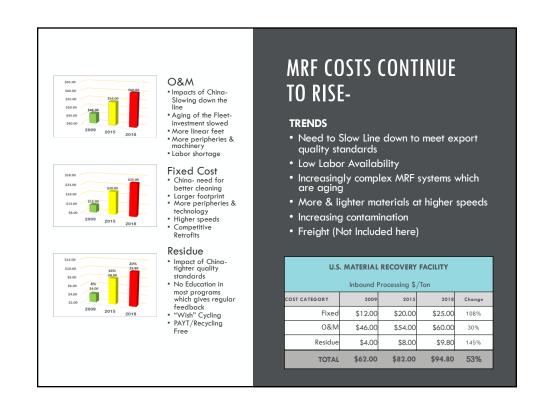


MRF CONFUSION WITH SCRAP BUSINESS MODEL					
SCRAP BUSINESS	MRF CLEANING SERVICE				
Materials Market	Convenience for residential customers				
Buys source separated. Only sorts (upgrades) for price advantage; often receives premiums on the spot market in an arbitrage position	Accepts mixed materials & sorts to clean materials to minimum standards Each contract defines its own standards Acceptable Materials Non-recyclables Measurements and formulas				
Little residue	Expected residue (16-40%) increases with permissiveness Responsibility defined Enforcement				
Uses spot market purchases to regulate risk from contracts	Takes material regardless of ability to sell or price Lessen material risk by insuring services is paid for first				

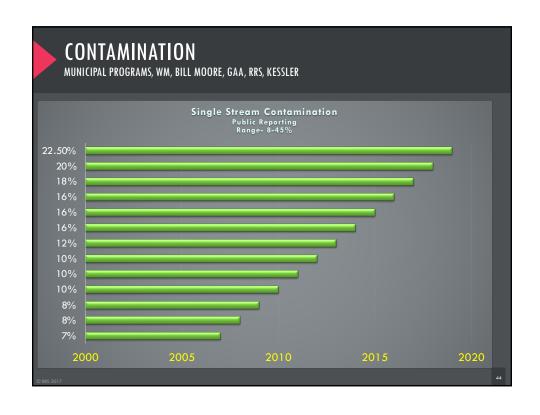




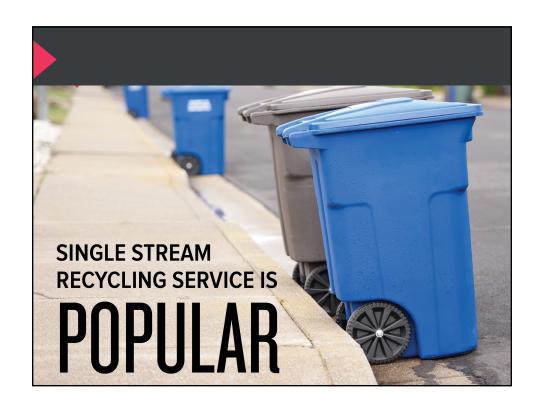
HARD LESSONS TO LEARN ON COMMODITIES 1.3% loss in value per year (with few long-term exceptions) Volatility and marginality of MRF-derived scrap Position of MRFs- Need for constant cash flow due to high operating costs vs. revenue ...and municipalities- fixed budget blues In "current" bust, 20% of MRFs might fail

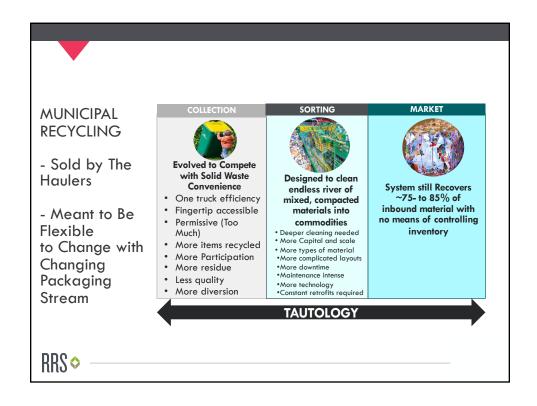


MARCH 2019	DEFICITS AND IMPA	CIS
MATERIAL R	L RUN WEST COAST ECOVERY FACILITY The line line line line line line line lin	Processing Fees- Lower Speeds, higher sorting, lighter material
Category	March 2019	•Boston \$115/T •Fairfield, CT \$75/T
Revenue from Commodities	\$38.18	 Houston 2018- \$87.05/FCC Environmenta Friedman El Paso from \$75 a ton to \$115 So. Florida >\$100/T
Midpoint Cost	\$94.80	
Loss Per Ton	(\$54.38)	Contracts Disputes • Impact of China- tighter quality standards
ROI Requirements	\$24.00	 No Education in most programs which
Tip Fee Required	\$78.38	gives regular feedback = waste composition degradation
Not including market premiums or deposit		Anti- "Wish" Cycling Move away from PAYT/Recycling Free

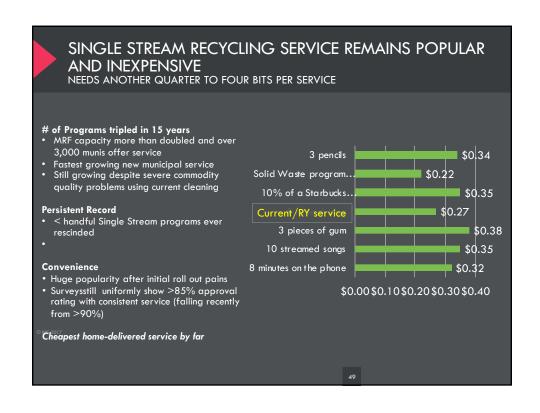


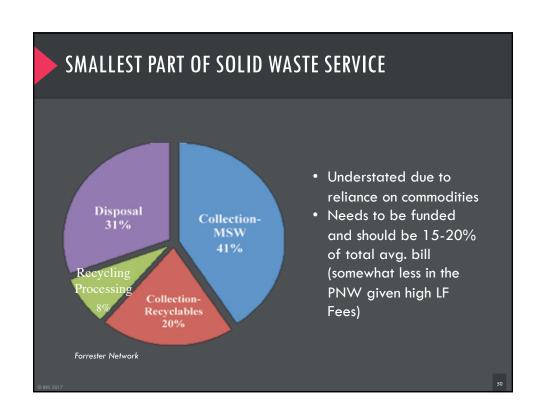




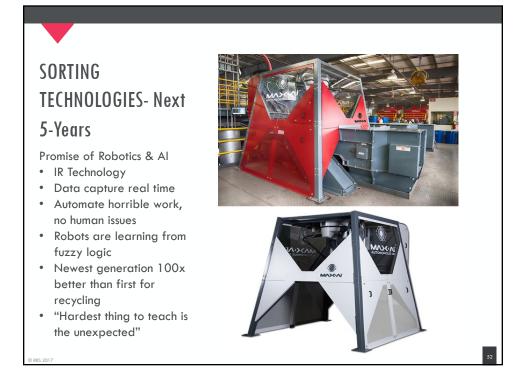




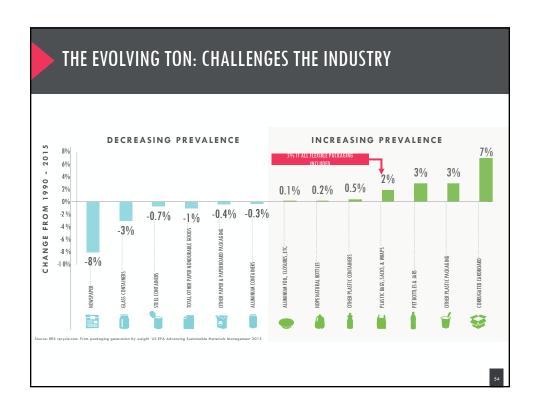
















MIXED WASTE	LANDSCAPE- 2019 UPDATE Update	Remarks
Fiberight- Delayed, no scheduled opening	" schedule for completing the facilityrevised three times(delayed) a full year, town officials voiced their frustrations with mixed messages"; Rumors about what facility will take abound.	\$69 Million. Operations were expected to start up in April 2018
Fulcrum- now 2020	Fulcrum BioEnergy promises \$600M waste-to-fuel project in Gary, Indiana. Sierra BioFuels Plant, located outside of Reno, Nevada, will be closely watched to see if the technology can deliver. Said to be the first of its kind in the nation, the facility is currently projected to open in 2020. The Sierra plant will have annual capacity for approximately 175,000 tons of MSW, with an output of 10.5 million gallons of fuel. BP has signed a 10-year off-take agreement with Fulcrum for that fuel, including distribution through its partner Air BP, and agreed to invest \$30 million.	Pick on poor cities. Promise jobs for garbage and bond commitment. Delays abound.
Montgomery RePower South- Open	Re-boot. Lost in Charleston Co. Lost in Hampton Rds- SPSA: 25-year contract. \$10M investment reported. Reopened Feb 1. Three years since closing the doors of its \$37 million state-of-the-art waste disposal facility, has officially begun recycling again. Repower south	Pick on Poor cities. Promise jobs for garbage and bond commitment. Delays abound. Development cost recoup.
Entsorga	"Bio-HiTech" appears as either spokesperson/new owner in Nov. 2018	MBT system
Continuus	Changed leadership. RDF. Not pelletizing for energy, just RFD, similar to Entsorga	Board business out of the energy business. Viable subsidiary, ReWall. Some potential here in high tip ee