

SWANA Evergreen Chapter NW Regional Symposium

New Waste Handling Technologies
US Recycle Markets


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Topics

- Sustainability
- Macro Market Trends
- Trends in Materials
- Market Drivers
- Perspective
- Market Response
- Technology
- System Design
- Questions

Sustainability

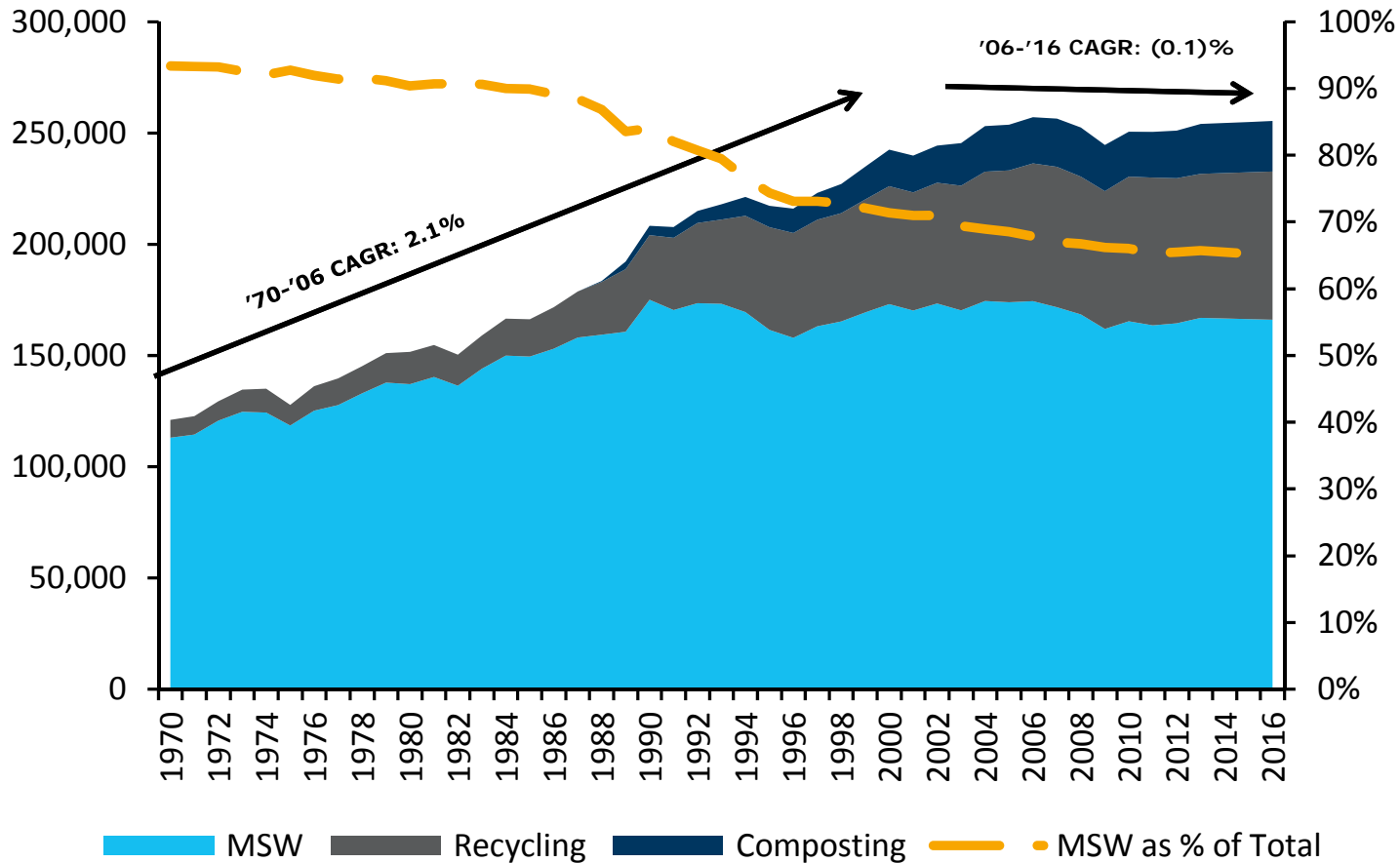
Elements of Sustainability	Sustainability Goals
Operations	 <p>Reduce our OSHA recordable rates by 7% on a YOY basis to 2018, from a 2014 baseline</p> <p>Add an additional 150,000 tons per year or more of recycling capability by 2018</p> <p>Develop at least two landfill gas-to-energy projects per year through 2018</p> <p>Reduce absolute fleet emissions from our direct operational impacts by 3% by 2018</p>
Materials Management	
Communities	
Safety	
People	

"We believe we have a responsibility to regenerate our planet with the materials we are entrusted to handle every day by driving increased recycling, generating renewable energy, and helping our customers be more resourceful."

– Donald W. Slager, President & CEO, Republic Services 2015 Sustainability Report

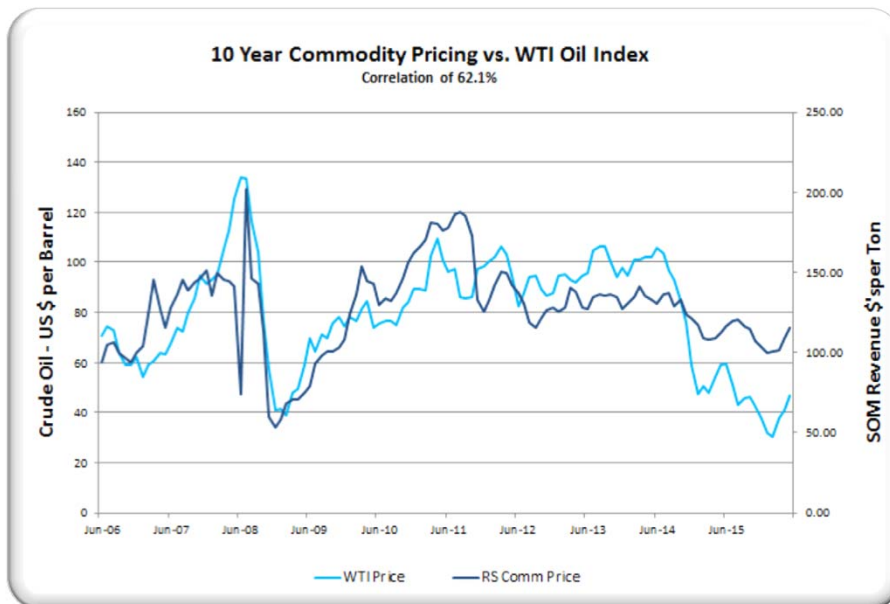
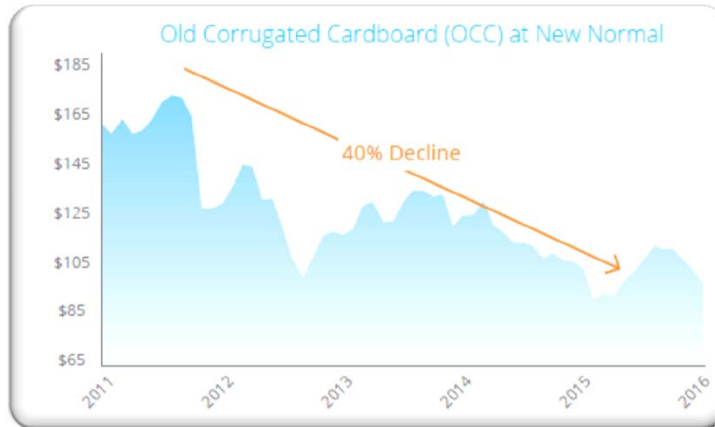
Macro Market Trends

Evolving Ton



Recycling and organics growing faster than disposal, with most customers demanding recycling

Trends in Markets



- Glass has negative value in most markets, unless supported by subsidies
- Corugated Cardboard has decreased in price per ton for last 5 years
- End markets impacted by global slow-downs

Trends in Material

Trends



Implications

Material no longer in circulation
18M tons in 2000 → ~2M in 2015

Lighter-weight and limited end markets
HDPE → off-spec PET

Lighter-weight and flexible packaging
not recyclable
Tin can → copolymer pouch

Waste minimization increasing pressure on total waste and recycling tons

Lightweighting of Material



Lightweighting requires processing of more material to yield a ton of marketable commodity

1. Pulp & Paper Weekly, Official Board Markets, 2016

3. International Bottled Water Association. Retrieved from <http://www.bottledwater.org/>

Market Drivers

- Economy
- Legislation
 - Extended Producer Responsibility
 - Material Bans
 - Mandated Diversion
- Municipal Contracts/Franchises
- Customer Behavior
 - Technology
 - Consumer Preference
- Package Design
- Conversion Technology
 - Non-scale
 - Slow to Market

Dynamic with multiple parameters

Market Perspective – 1 Year Ago

- Recovered fiber currently at 8-yr lows
- Recovered resins (plastic) near all-time lows
- Glass value chain broken (depressed energy); limited end-market geographies
- Municipalities dropping programs and/or particular grades (glass)
- Industrial metals near 10-yr lows
- WTI at 10-yr low
- Strong US dollar
- Continued weakness in Europe and slowing Chinese economy

End of 5 year trough

Market Perspective – Today

- Recovered fiber near all-time highs, especially domestic
- Slight improvement in resin grades
- Mixed resin market very limited
- Glass remains challenging
- Municipalities dropping programs and/or particular grades (glass)
- WTI in low to mid-range
- Weakening US dollar
- Europe improving and Chinese speeding

- White Noise
 - National Sword
 - NAFTA
 - Trade relations

Mixed signals

Market Reaction

Basic Economics

- Material Characteristics
- Periodic Audits
- Processing Fee
- Revenue Share
- Transport and Disposal

Technology

- A market can deliver a technology, but a technology can not deliver a market
- Technology will not change a market, service design will
- As technologies emerge, an agnostic approach is best
- Current focus includes advanced mechanical coupled with biological treatment

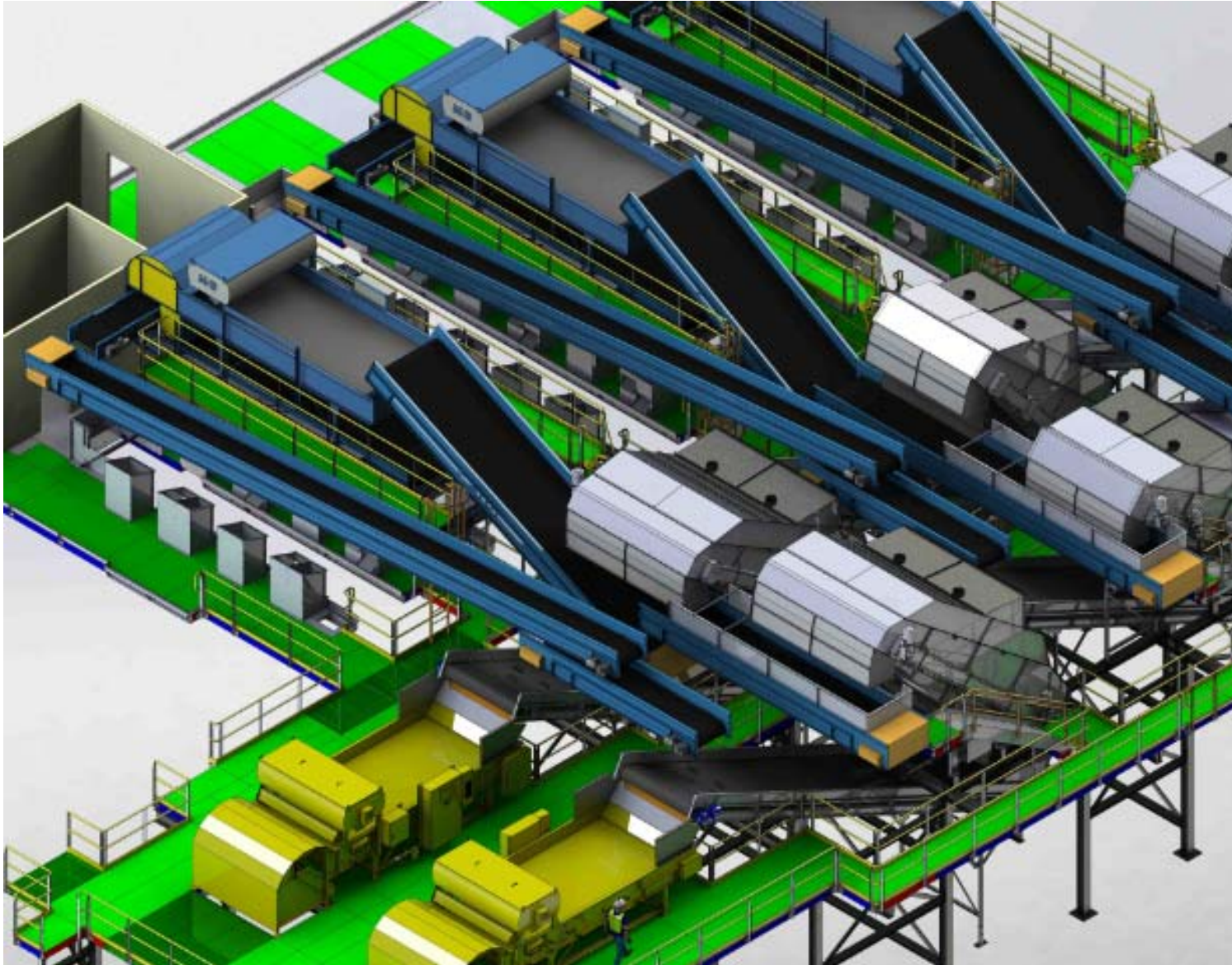
Capital intensity requires anchor tenant

System Design

- Changing material streams require additional flexibility
- Recognition hardware becoming more affordable
- Cognitive software becoming more powerful
- Multiple entities working on “AI” to tune plants real-time
- Progress being made on automated quality control

Expect rapid advancements in processing capabilities

System Design



System Design



Questions?