



WHAT HAPPENS AFTER 75% RECYCLING GOAL?



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- 5+ Years of Solid Waste Experience
- Landfill Design, Landfill Permitting, LFG Systems, LFGTE Systems, Groundwater Remediation and Environmental Compliance



75% RECYCLING GOAL BY 2020

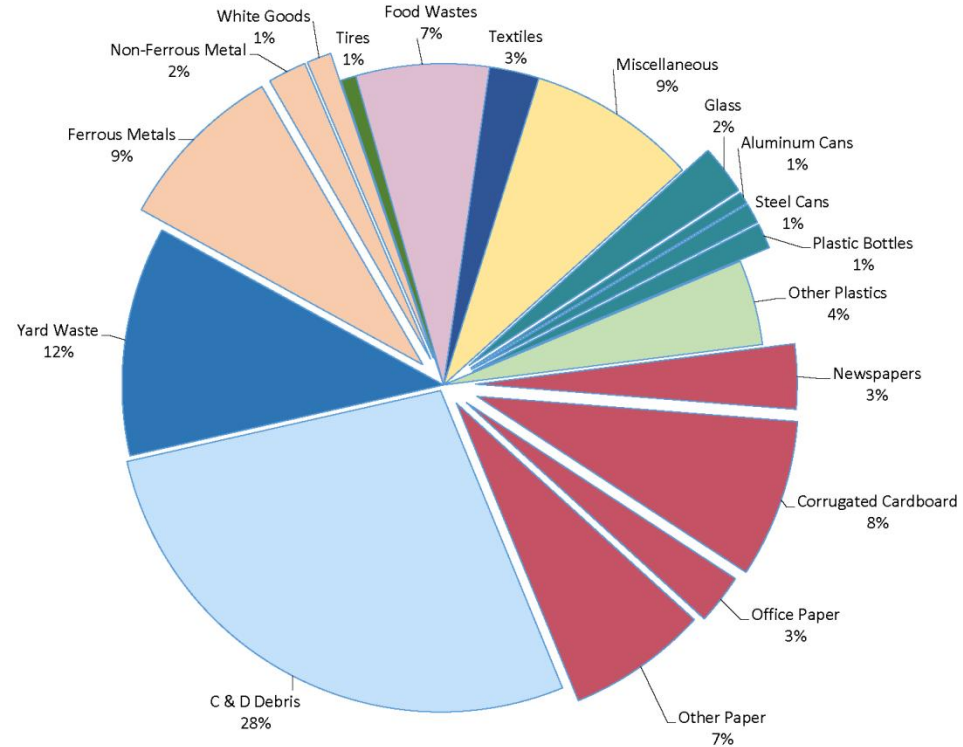
- In 2008, the State of Florida established a new statewide recycling goal of 75% to be achieved by the year 2020
- Goal includes traditional Recycling plus Recycling Credits for Renewable Energy
 - “Recycling” means any process by which solid waste, or materials that would otherwise become solid waste, are collected, separated, or processed and reused or returned to use in the form of raw materials or products
 - Recycling Goal also allows Recycling Credits for Renewable Energy Production from Waste to Energy and LFG to Energy
- Some other State Examples: CA - 75% Recycling by 2020; and NYC - Zero to Landfill by 2030

FL WASTE COMPOSITION

- Big Contributors:
 - C&D Debris at 28%
 - Paper & Cardboard at 21%
 - Yard Waste at 12%
 - Metals at 12%
 - Food Waste at 7%

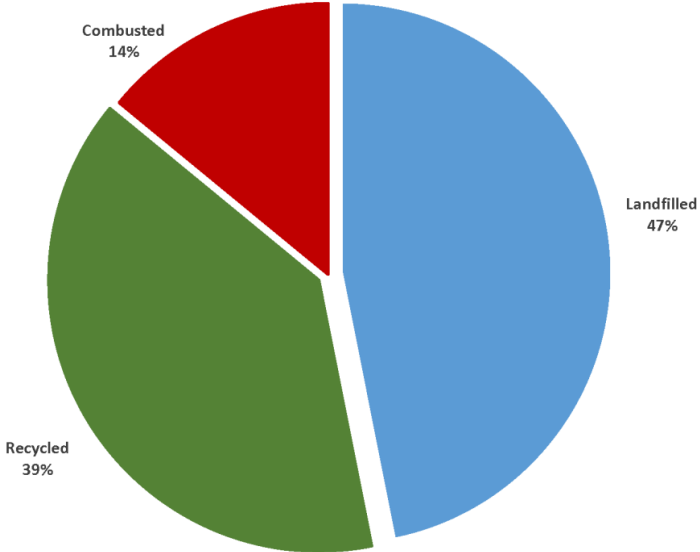
Source: http://www.dep.state.fl.us/waste/categories/recycling/SWreportdata/14_data.htm

Florida Municipal Solid Waste Collected (2014)
(32.2 million tons)

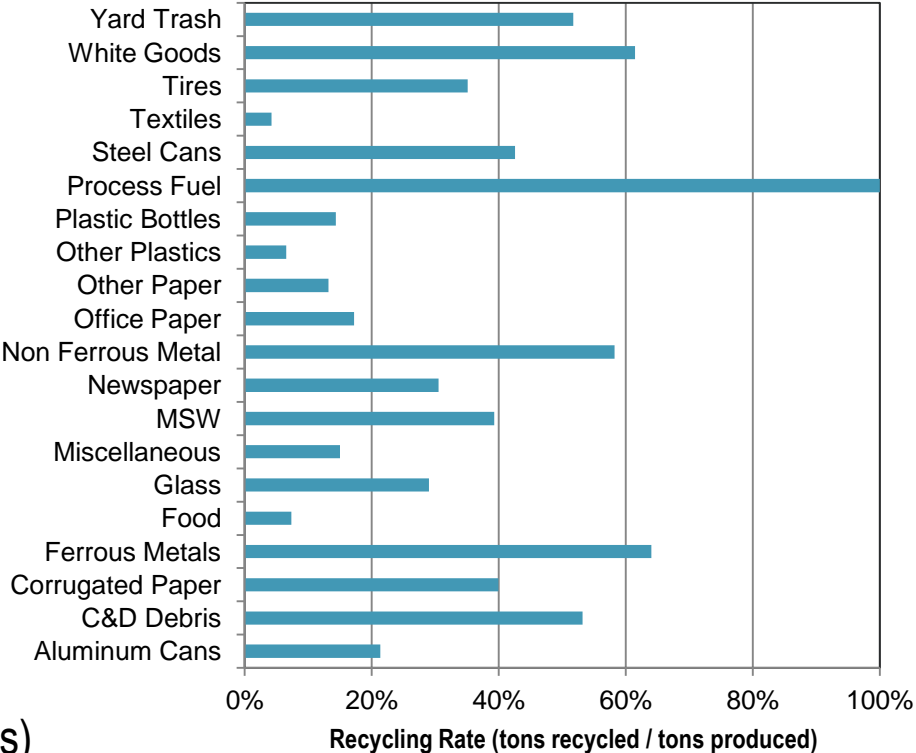


WASTE RECYCLING PRACTICES IN FLORIDA

Florida Municipal Solid Waste Management (2014)



Traditional Recycling Rates in 2014



- 2014 Recycling = 39% (traditional) + 11% (credits) = 50% (total)

AFTER 75% GOAL ACHIEVEMENT – WHAT’S NEXT?

- Now let's look into the future – What happens after 75% recycling goal is achieved?
- Next Steps – path towards Zero Waste?

WHAT DOES ZERO-WASTE MEAN?

- No Waste Produced?
- No Waste Landfilled?
- No Residuals/Ash from WTE Landfilled?
- No Un-Processed Waste Landfilled?

DEFINITION OF “ZERO-WASTE”

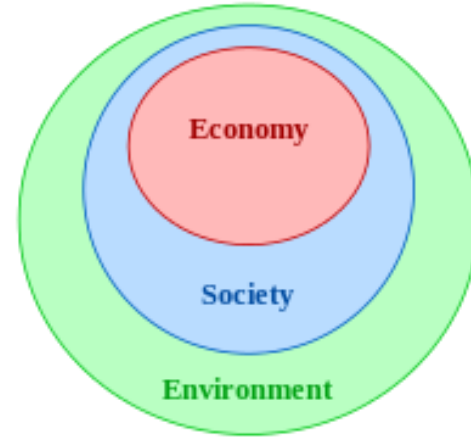
Idealistic

- Zero Waste - “...zero waste will eliminate all discharges to land, water, or air that are a threat to planetary, human, animal, or plant health.” ZWIA, USZWBC, and GAIA
- Zero Waste to Landfill – “Zero waste is when absolutely no trash or other types of solid waste generated in a business or home are sent to a landfill.” Green Plus
- Zero Unprocessed Waste to Landfill - This definition allows for disposal of ash, residuals from advanced processing, and other “hard to recycle” materials only after all recycling and diversion is accomplished.
- Zero Waste provides guiding principles for continually working towards eliminating wastes. *Snow, W. & Dickinson J. (2001).*
- “Zero waste is more of a goal or ideal rather than a hard target.” *Spiegelman, H. (2006).*
- “Zero Waste is primarily a political and marketing term.”

Cynical

HOW DO WE GO FROM 75% TO ZERO WASTE

- Decide Zero Waste Definition that entertains three tiers of Sustainability
- Possible steps towards achieving Zero Waste Goal:
 - Assess and Reform Existing Recycling Program;
 - Public Outreach & Policies; and
 - Developing Comprehensive Waste Management Plan: Future of Recycling Processes and Technologies



RECYCLING PROGRAM REFORMS

- **Assess & reform existing recycling program by addressing such challenges as:**
 - Maximize capturing of "large %" waste categories
 - Selectively identify & target other recyclable categories
 - Explore possibility of making the program more financially sustainable:
 - Develop US based market for recyclables?
 - Address problematic materials: Glass, high moisture recycled paper?
 - Fully understanding your waste composition before developing a program
 - Tailored recycling program BMPs – Different population density locations have different sustainable solutions

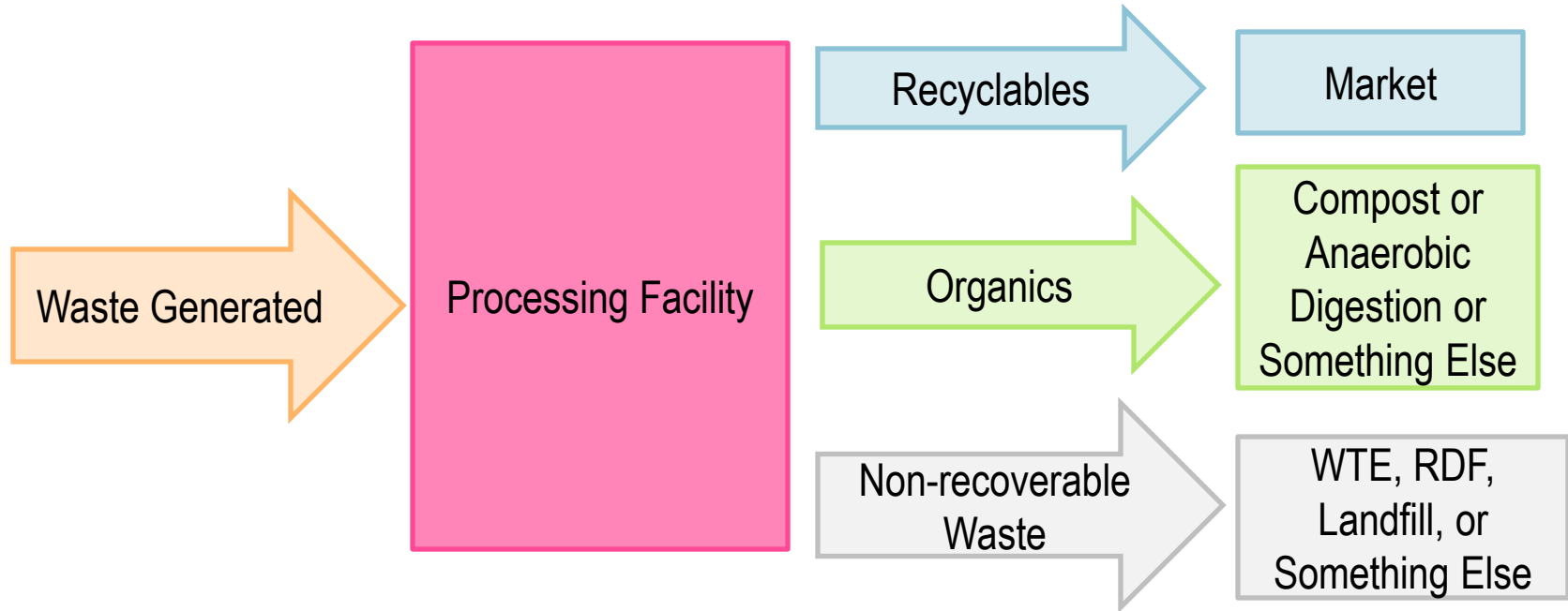
PUBLIC OUTREACH & POLICIES

- Implementation of programs to educate all stakeholders:
 - Waste generator (residential or commercial)
 - Waste collection entities
 - Waste processing entities
 - Coordination between three entities

- Zero Waste Policies
 - “New rules”
 - Disposal bans
 - Mandatory recycling
 - Comprehensive outreach and technical assistance

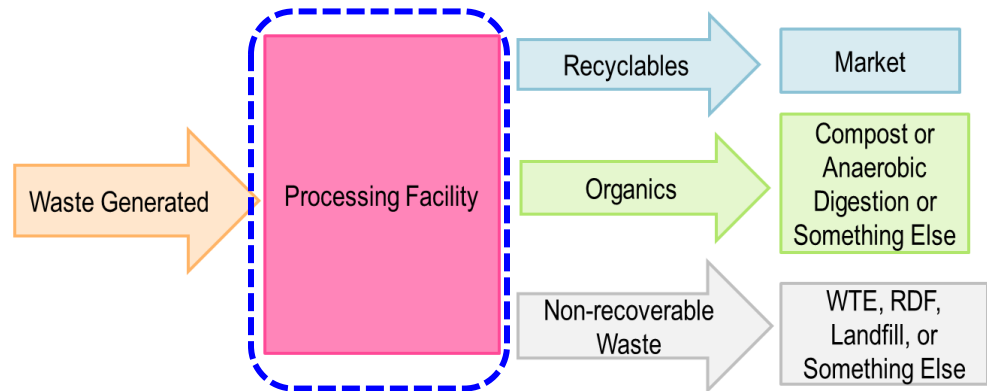
FUTURE RECYCLING – PROCESSES & TECHNOLOGIES

AN EXAMPLE SCENARIO IS SHOWN BELOW



WASTE PROCESSING FACILITY

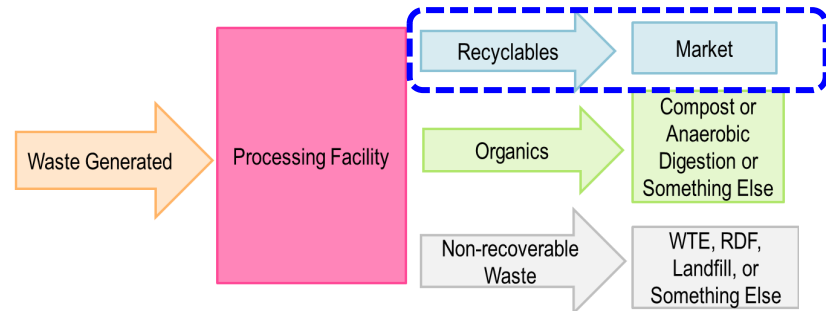
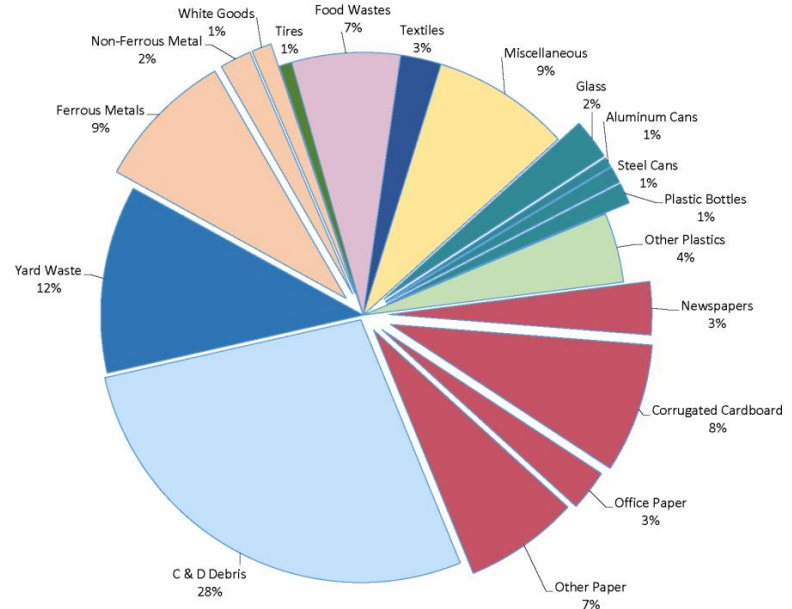
- Mixed Waste Processing Facility for MSW
 - Multi-step process that combines multiple stages of mechanical and manual separation
- C&D Processing Facility for C&D Waste



RECYCLABLES

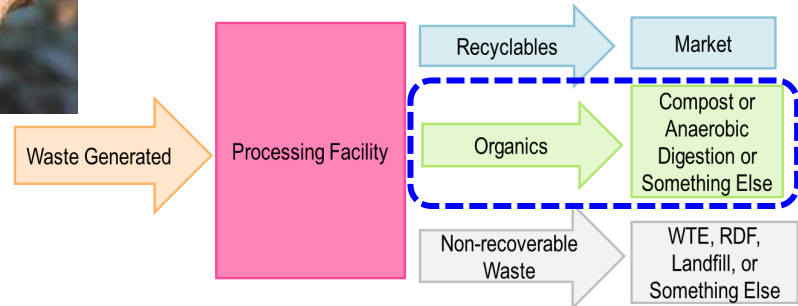
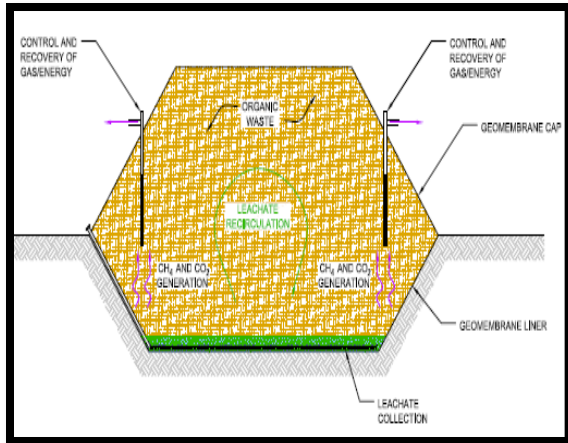
- Comprehensive recycling programs
 - C&D Debris (28% of total waste)
 - Metals (14% of total waste)
 - Plastics (5% of total waste)
 - Tires and Glass (3%)
- Potential Recyclables = 50% of total waste
- How?
 - Source Separation
 - Waste Processing Facilities
 - Public Outreach and Policies

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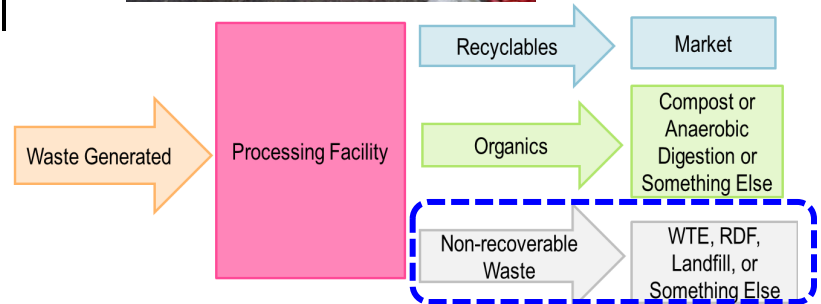
ORGANICS

- Organics (Yard waste, paper and food waste) is 40% of total waste
- Organics Processing Technologies: Composting, Anaerobic Digestion, and Organic Recycling Bio module (ORB)



NON RECOVERABLE WASTE

- Materials that don't have market
 - Composite materials (things stuck to other things)
 - Treated wood
 - Some plastics
 - Diapers
 - Hazardous materials and some electronics
 - Contaminated Recyclables
- Non Recoverable Waste = Over 10% of total waste including miscellaneous waste



WHAT TO DO WITH THE REMAINING MATERIAL

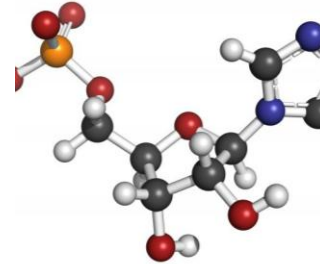
➤ Thermal

- WTE
- RDF
- Pyrolysis
- Gasification
- Plasma Arc Gasification

➤ Chemical

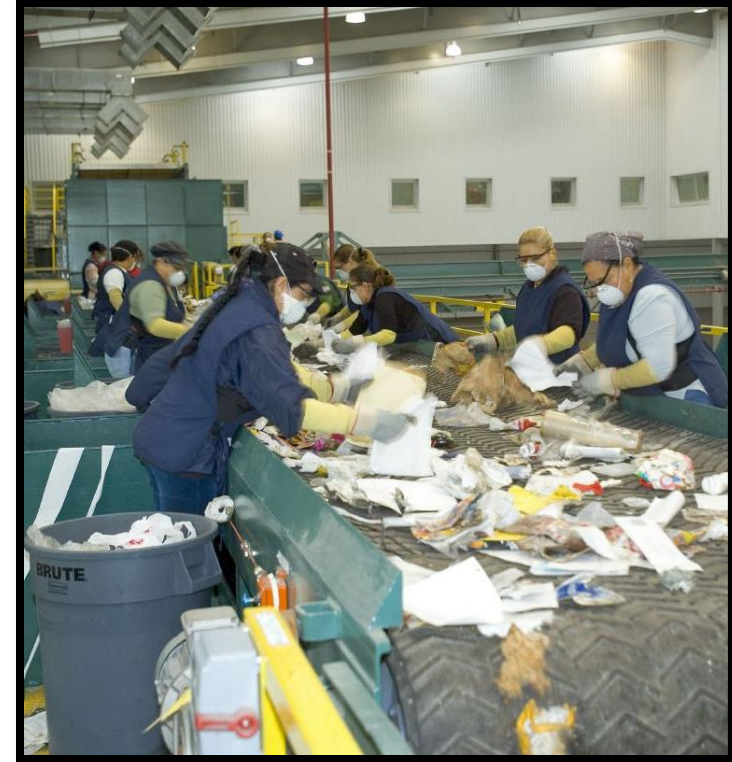
- Waste-to-Fuel

➤ Traditional Landfilling



FINAL THOUGHTS

- The recycling goals after 2020 and processing technology selection should consider three tiers of sustainability
- Assess & reform existing recycling programs
 - Maximize capturing of "large %" waste categories
 - Selectively identify & target other recyclable categories
 - Explore possibility of making recycling more financially sustainable
 - Tailored recycling program BMPs – require networking!
- We need to start thinking about what to expect after 2020



THANK YOU

QUESTION & COMMENTS

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