Composting Paper-Based Food Packaging From Vermont's Only Town-Wide Curbside Food Waste Collection Program

Presentation to Focal Point 2016
Paper-Based Food Packaging and Serviceware
University of Wisconsin-Stevens Point
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WINDHAM SOLID WASTE MANAGEMENT DISTRICT

- Recycling services for 20 member towns in south east Vermont
- 10 transfer stations
- 9 unstaffed 24-7 drop off areas
- Two roll-off trucks to collect roll-off containers of commingled containers, paper, OCC
- Own and operate 6,000 ton per year dual stream MRF
Windham Solid Waste Management District
Closed landfill to host 5 MW solar facility
Brattleboro, Vermont

Population 12,000
Vermont Universal Recycling law

- Phased mandates for larger food scrap generators
  - 2014 for generators > 104 tons/yr.
  - 2015 for generators > 52 tons/yr.
  - 2016 for generators > 26 tons/yr.
  - 2017 for generators > 18 tons/yr.

PAYT statewide

2020 - Full ban
Brattleboro Curbside Food Scrap & Soiled/Biodegradable Paper Collection

- 2013 pilot with 150 households
- 2014 offered town wide - 4.5 tons/week
- 2015 Pay-as-you-throw starts - 9.5 tons/week
- 2016 - Every other week trash collection starts
- 2016 – Over 2,000 households generate 12 tons/week
CURBSIDE TRASH/RECYCLING

• Every other week curbside collection of trash by packer truck
• $3.00 for 33-gallon bag & $2.00 for 13-gallon bag
• Weekly curbside collection of dual stream recyclables
• Weekly curbside collection of food scraps/soiled paper
• No charge for recyclables or organics collection-covered by Town service
• Over 2,000 VOLUNTEER residences participate in curbside organics collection
• Spring and fall yardwaste collection
• Town sells 13 and 23 gallon totes for organics for $10 and $13
• Other containers for organics allowed with locking lid
**YES COMPOST!**

### Food Scraps
- Bread/Rolls/Crackers
- Rice/Pasta/Beans
- Egg Shells
- Cheese/Dairy Products
- Cooked or Raw Meats, Fish & Shellfish (Including Bones)
- Fruits & Vegetables
- Tea Bags
- Coffee Grounds & Filters
- Cooking Oils & Fats
- Kitty Litter & Pet Waste
- Garden Weeds

### Non-Recyclable Paper & Cardboard
- Used Tissues & Paper Towels
- Milk/Juice Cartons
- Soiled or Waxed Cardboard
- Damp/Wet Paper
- Soiled or Waxed Paper
- Paper Plates & Cups
- Cardboard Egg Cartons
- Frozen Food Containers
- Sugar or Flour Bags (with out plastic liners)

**DO NOT COMPOST!**

- Plastic Bags, Plastic Wrappers, Liquids, Aluminum Foil, Plastic Utensils, Trash, Metal, Glass and Styrofoam

*Do Not recycle leaves, grass and brush in C.O.W. dumpsters.*
23 GALLON TOTE SSO
Curbside Compost Container Ski Jump Logo
COMMINGLED CONTAINERS
SSO COLLECTION
PAPER AND CARDBOARD COLLECTION
Weighing Organics Bins
Weighing PAYT Bags
ONE LOCATION TIPPING

- Side load recycling truck has commingled containers in front compartment (compacted)
- Paper and cardboard in middle compartment
- SSO in back compartment
- Truck weighs in at WSWMD scale
- Tips organics on compost pad
- Weighs again
- Tips paper/cardboard in MRF
- Weighs again
- Tips commingled containers in MRF
- Leaves facility for another load
TIPPING SSO
TIP PAPER/OCC
COMMINGLED CONTAINERS
COMPOST RECEIVING AREA
Wood Chips and Sawdust Cost
$3/Cubic Yard
Mixing Food Scraps and Carbon
Curbside SSO Load
Biodegradable Packaging in SSO
Biodegradable Film Plastic Bags
Cellulose Clamshell
Diligent Spout Removal
Plastic Film Liner Screened From Compost Pile
Plastic Contamination
Film Plastic From Packaging in Compost Pile
Cellulose Gone But Plastic Remains
CONTAMINATION FROM FROZEN FOODS DEPARTMENT
WEEKLY COMPOST PILES
Track and Monitor Piles Based on Weekly Batches
Compost Pile Temperature Monitoring
Compost Screen
Compost Screening
Plastic Residual Screened From Compost
Final Compost Product
Wide Range of Biodegradable Packaging Accepted

- Biodegradable polymer bags for food scraps
- Biodegradable clamshells for take-out food
- Paper products
- Milk and juice containers
- Egg cartons
- Sugar/flour bags
Financial Advantages of Including Packaging in Compost

• Significantly increases total diversion of solid waste from landfill disposal
• Saves residents money by not putting in $3 PAYT bags
• Saves town and businesses money by paying lower tip fee at compost facility ($65/ton vs $105/ton for landfill)
• Organics are the only recyclable material that is processed and re-used locally
Composting Biodegradable Paper Products

• A source of available carbon that is needed by bacteria that live and work (non-union!) in compost piles
• Reduces need for other carbon sources by 50%
• Insufficient structure of paper to provide bulking agent
• Get paid for that paper carbon source in tip fee
• Absorbs liquid in kitchen counter container, curbside carts, collection truck, and regulated leachate at compost pad
• Reduces odor
Composting Advantages of Biodegradable Polymer Bags

- User friendly with kitchen counter top containers
- Liners for curbside organics carts/containers
- Moisture management
- Odor control
- Pest control
- Overall aesthetics improved
Disadvantages of Biodegradable Packaging in Compost Operation

• False claims of “compostable” and “biodegradable” lead to inorganic contamination in compost

• Confusion by public as to what is acceptable invites more contamination

• Increases amount and cost for residue disposal

• In Vermont, and some other states biodegradable film manufactured from GMO corn can not be certified as organic
Compost Product Quality

- Screened to 3/8 inch
- Tested and complies with Vermont regulations for heavy metals, fecal coliform, and salmonella
- Sold wholesale for $20 per cubic yard to three area garden centers
- Garden centers sell compost for $40 per cubic yard
- WSWMD sells 30 pound bags of compost for $5 per bag
- Compost donated to schools and community gardens
- Branded compost product as “Brattlegrow Compost”
On-Going Problem with Film Plastic Contaminants

- Creates blowing litter at compost site
- Makes compost site look “trashy”
- Traps compost inside non-biodegradable plastic, increasing weight of residuals, cost of landfill disposal, and loss of product
- Small pieces of film plastic in final compost product
Recommendations for Paper-Based Food Packaging Industry

- Continue to work with BPI on ASTM certification
- Support state efforts that challenge false/misleading claims of biodegradability
- Verify biodegradation in real world operations
- Increase public education in areas offering food waste composting
- Work closely with composters to learn what works and does not work
- Understand that different compost technologies impact rate of biodegradation
Real World Testing of Biodegradable Products

• Retained by ASTM in 1988 to test early forms of biodegradable polymers at biosolids compost facility
• Developed procedure for using nylon laundry bags attached to nylon ropes to retrieve bags on weekly basis
• Documented degradation with photographs
• Conducted a biodegradable lunch at Disney World in 1988
Retained in 2009 by International Paper to Document Degradation of PLA Cups

• Cellulose Biodegradability
• PLA Biodegradability
• ASTM 64000 Composting of PLA Cold Cups
• Backyard Composting of PLA Coated Paper Cups
• Vermicomposting of PLA Coated Paper Cup
• Rotary Drum Composting of PLA Coated Paper Cups and Paper Plates
Backyard Composting: Set Up

After initial loading of leaves and grass clippings, kitchen vegetable scraps were added to the mix weekly.
Backyard Composting: Testing

- Moisture monitoring to maintain at least 55% moisture
- Temperature monitoring showed a range of 65° to 104°
Backyard Composting Results: 2 Weeks
Cold & Hot Cups

Whole cups showing signs of degradation on edges of cups

- Cold cups on the top
- Hot cups on the bottom
Backyard Composting Results
5 Weeks
Cold & Hot Cups
Backyard Composting Results: PLA Separates from Paper and Degrades

After 8 weeks: No hot or cold whole cups or cup chips were visible
Vermicomposting: Set Up

Cold and hot chips loaded into vermicomposting bins

Cold cups buried with red wiggler worms and media

Moisture content of bins kept at 60 to 80 percent
Vermicomposting: 12 Weeks

Whole hot cup remnants

Whole cold cup remnants

Hot cup chip remnants

Cold cup chip remnants
Rotary Drum Composting: Set Up

BW Organics Model 408

Food waste delivery from a supermarket
Rotary Drum Composting: Trials

Whole hot and cold cups, as well as shredded cup chips were loaded

Whole hot and cold cups, loaded into the bio-mixer with wood chips and food waste
Rotary Drum Composting Results: Four Day Retention

- Six cups were completely disintegrated
- Cups that remained may have been in a portion of the drum with lower temperatures
- Cup paperboard is separating from PLA layer
Biodegradable Kitty Litter Liner Testing
2015
Litter-2-U Compost Test

- Wood chip absorbant material
- PLA film liner
- Biodegradable string for closing bag
- Fits standard kitty litter container
- Put into curbside compost container
- Degrades in compost pile
Litter-2-U With Cat Feces
Placing in Compost Pile
Weekly Retrieval and Inspection
Biodegraded in 4 Weeks
Thank You and Keep Your Sense of Humus!

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