Food Scraps Composting
In The United States

Nora Goldstein, BioCycle
GA Environmental Protection Division Workshop
May 6, 2008
PRESENTATION ROADMAP

• MSW Disposal Data — Organics-Rich
• COOL 2012 Campaign — Food Scraps & Methane Link
• The Environmental Benefit Factor
• Proven Collection and Technology/Processing Options
• Residential SSO vs. Residential Mixed Waste Composting
• Commercial SSO Composting — Lots of Tires To Kick
• Battling single bullet phenomenon
• Workshop and campaign launch in San Diego on April 13, 2008
• GrassRoots Recycling Network; BioCycle is media partner; Eco-Cycle, Boulder, Colorado
• Outreach and Education Campaign
• Compostable Organics Out of Landfill by 2012 — emphasize methane generation of organics when in landfill
• Using 20-year time frame, which makes methane 72 times more potent than C02 — versus 100 year time frame and 23 times more potent
• www.cool2012.org
• Turning A Climate Problem Into A Soil SOLUTION!!
• Put organics back in the soil via composting, energy recovery followed by composting, direct land application
• Easy To Be Cool By 2012:
  – Step One: Seize the paper
  – Step Two: Source separate into compostables, recyclables, and garbage
  – Step Three: Feed the soils (“Victory” Gardens)
  – Step Four: Stop creating methane now — keep organics out of the landfill
Give us 5 minutes.
We’ll put your compost site on the map.


Your searchable data base of composting facilities in North America.
Get linked to organics generators and compost buyers today.

findacomposter.com
MSW Landscape:
USEPA 2006 Facts and Figures

Figure 5. Total MSW Generation (by Material), 2006
251 Million Tons (Before Recycling)

- Food Scraps = 12.4%
- Paper = 34%
- Yard Trim = 12.9%
- Wood = 5.5%
- Rubber, leather, and textiles = 7.3%
- Plastics = 11.7%
- Metals = 7.6%
- Glass = 5.3%
- Other = 3.3%
Organics = 27.1%
C&D = 6.0%
Paper = 38.7%

2005 State of Georgia Data
Food Waste = 13.4%
Other Paper = 10.7%
Corrugated = 14%
Food waste = 12.4%
Yard waste = 3.0%
Preliminary BioCycle/EEC 2008 State of Garbage In America Data

• Georgia landfilled 12.5 million tons in 2006
• 56 MSW landfills in state
• 3.4 million tons of organics being landfilled (27% in MSW stream)
• 429,202,431 cubic yards of remaining landfill capacity (12 years, and adding capacity)
• State does not report recycling and composting data

WHAT WILL DRIVE FOOD SCRAPS COMPOSTING???
## True Costs Associated with Managing Organic Waste in Region of Niagara, Ontario, Canada (Cdn$$/metric ton)

<table>
<thead>
<tr>
<th>Operations Cost/ton</th>
<th>Compost Green Waste only</th>
<th>Compost Food Waste</th>
<th>Landfill Gas Recovery Flare</th>
<th>LGR Elec.</th>
<th>EFW Low</th>
<th>EFW High</th>
<th>EFW Best case</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.83</td>
<td>81.77</td>
<td>82.93</td>
<td>69.00</td>
<td>102.00</td>
<td>168.00</td>
<td>88.00</td>
<td></td>
</tr>
<tr>
<td>Environ. Benefit/Ton</td>
<td>49.59</td>
<td>49.59</td>
<td>7.79</td>
<td>19.63</td>
<td>25.28</td>
<td>25.28</td>
<td>25.28</td>
</tr>
<tr>
<td>True Cost/ton</td>
<td>(15.76)</td>
<td>32.18</td>
<td>75.14</td>
<td>49.37</td>
<td>76.72</td>
<td>142.72</td>
<td>62.72</td>
</tr>
</tbody>
</table>

Niagara Study Assumptions

- Emissions include particulates, toxics, carcinogens, eutrophication, acidification and ecosystems toxicity
- Net decrease of CO2/annum is almost equivalent for composting and landfilling with flaring, and about 3,000 tons higher with LFG recovery
- Used 50% of monetized value of avoided pollutants as a result of finished compost replacing pesticides and synthetic fertilizer
- At 25% monetized value, compost benefit is $22.67, about $3/ton less than EFW scenarios
- Cost is $59.10/ton for composting food waste, vs. $49.37 with landfill gas recovery
- Substitute of “waste-generated” electricity for natural gas
Where Does the Rain Go?

Source: Sego Jackson, 2001
From: The Nature and Properties of Soils, N. Brady
What Does Compost Do?
From: The Nature and Properties of Soils, N. Brady
Magnified view of disturbed soil

Compost-amended soils mimic undisturbed native soils

Magnified view of native soil

From: Soils for Salmon, City of Seattle/King County, WA
Native Soil

50% evapotranspiration

35% surface water detained/infiltrated

15% surface water runoff

From: Soils for Salmon, City of Seattle/King County, WA
On many sites (here in a Snohomish home remodel) it is more cost effective to till compost into the existing soil. Tilling 2-3 inches of compost into any soil – sand, clay or till – makes planting easier and grows a healthier landscape.

Once foundations are in and houses are framed and sided, 14 inches of compost-amended reused soil is placed (to allow for settling to 12-inch finish grade). The compost blend prevents erosion, so work can proceed year-round.

Port Blakely also uses compost-amended soils in park and home landscapes, for a high-end, quality product that sells, and attracts future customers too!
Pythium root rot on creeping bentgrass

No compost

With 20% compost
30% to 65% of water used daily by a family of four is for landscape irrigation.


Combine sewer overflows result in sewage and large volumes of storm water containing pathogens, solids, debris and toxic pollutants being discharged into surface water.

U.S. Environmental Protection Agency, “Report to Congress on Impacts and Control of Combines Sewer Overflows and Sanitary Sewer Overflows”, 2004
ECOSYSTEM SERVICES

- Air
- Water
- Habitat
- Food
- Medicine
- Materials
Food Scraps: What Are We Dealing With?

- By weight, one of the biggest categories in waste composition studies
- Is highly putrescible, i.e., it DOES NOT degrade gracefully
- Food scraps in landfill are greenhouse gas contributor
- Separation, materials handling, collection methods are key to successful diversion
- These feedstocks have high energy value
- Compost has high soil & water value
- Need to design for diversion
2007 BioCycle MSW Composting Data: Source Separated MSW

- Source separated organics that include household organics beyond yard trimmings
- 42 municipalities with SSO programs
  - 17 in California
  - 17 in King County, including Seattle
  - 7 in Minnesota
  - 1 in Michigan
- 10 composting facilities servicing these programs
  - 4 municipally owned
  - 6 privately owned (yard trimmings primary feedstock)
City and County of San Francisco, California

Three-Stream Source Separation
- Residential, commercial and institutional organics diversion
- 150,000 households
- 300-plus tons/day of source separated organics
Norcal Waste Systems’
Jepsen Prairie Organics Composting Facility

Composting System
• Pre-grinding
• Initial composting in Ag-Bag pods
• Windrows
King County, Washington
Cedar Grove Composting
Seattle, WA region
Gore Cover systems
Aerated static piles
Western Lakes Superior Sanitary District, Minnesota
One Million-Plus Households Serviced
Dufferin Transfer Station
Toronto, Ontario
Source Separated Composting — Derbyshire, UK
30,000 MT/year; $6.2 million
Why Residential SSO On West Coast, In Canada?

- West Coast: Year-round green waste generation
- Use of 64- or 90-gallon organics carts
- Commingled (single stream) recyclables
- Can enable automated and co-collection
- Canada: 13-gallon carts
- Reduce frequency of trash collection — weekly organics, biweekly trash
2007 BioCycle MSW Composting Data: Mixed MSW

- Mixed waste composting: 13 plants operating
  - 12 municipally owned, 3 privately operated
  - 1 privately owned
- Tons/day processed:
  - 3 under 50 tpd
  - 5 between 50-100 tpd
  - 3 between 100-200 tpd
  - 2 > 200 tons/day
West Yellowstone, MT
-2,000 cubic yards/year
-50 tpd design
Engineered Compost Systems in-vessel technology
Delaware County, NY
-120 tons/day (35,000 tpy)
-6,700 tons/year of biosolids
-Comporec/S&W Services
IPS/Siemens composting bays
WeCare Environmental
Marlborough, MA

Two Bedminster rotary digesters
Aerated Windrows
100 tpd MSW; 5 biosolids
Mechanical-Biological Treatment — Athens, Greece

300,000 tons/year; $87.7 million
Commercial, Institutional Organics

Separation, Collection And Composting Options
Food Waste Generators
(by percent, after recycling)

- Full Service Restaurants
  - 66% are food scraps
  - 5% “compostable paper”
- Fast Food
  - 52% food scraps
  - 12% “compostable paper”
- Grocery Stores
  - 65% food scraps
  - 6% “compostable paper”
- Large Hotels
  - 44% food scraps
  - 7% “compostable paper”

Source: Cascadia Consulting Group
Grocery Store Installation – Direct To Compactors
Capturing Food Residuals At Portland (OR) Airport Coffee Shop
Designing For Diversion
Compostable Products
Ag Choice, Andover, NJ
Rocky Hill Farms
Saugus, MA
Schematic of EBMUD Food Waste Recycling Process

Patent Pending
Pulp extruded from slurry
Fepro Farms
Cobden, Ontario
Toyota Motor Manufacturing Kentucky, Inc.
Capital Cost: $90,000
Avoided Tip Fees at Incinerator = $250,000
Special Event Diversion
Odor Fundamentals

• Be prepared: If it can stink, it will stink
• Take action: If it does stink, it can be fixed (9 times out of 10)
• Work together: Fix the problem with the public
• Set realistic expectations: Don’t make promises that can’t be kept
Making Projects Happen — Social Aspects

- Comfort zone on the technical and science side
- Social factors often overlooked and misunderstood, e.g. public “relations,” “acceptance”
- Social factors, such as public outrage, can interfere with program management
- Requires investment
Positive Public Acceptance

- Well-run operations following Best Management Practices
- Viewed as beneficial to community and environment
- Communicated well with — and often involved — stakeholders
- Introduced through communication process
- Strong organizational commitment
Negative Public Acceptance

- Minimal or no communication with public potentially impacting
- First encounter with project is negative one, e.g., odor, truck traffic
- Nuisance issues leading to antagonistic public meetings, inadequate communication
- Little or no local knowledge or oversight
- No apparent benefits to anyone but farmer
Key Social Science Factors To Building Public Relationships

- Risk Perceptions
- Outrage Factors
- Risk Communications and Public Participation
- Earning Trust
Risk Perception

The risk assessment equation

HAZARD (something dangerous) + EXPOSURE (there has to be exposure or dose) = RISK
Risk Perception
The risk perception equation

HAZARD (something dangerous)
+ EXPOSURE (there has to be exposure or dose)
+ PERCEPTION (outrage factors)

= RISK (PERCEIVED RISK)

after Sandman, Powell, & Ropeik
Outrage Factors*

HIGH OUTRAGE
Involuntary
Artificial/Industrial
Exotic
Hard to understand
Memorable
Dreaded
Not reversible
Unknowable / Uncertainty
Closed process
Unfair

LOW OUTRAGE
Voluntary
Natural
Familiar
Well understood
Not memorable
Not dreaded
Reversible
Knowable / Well-known
Open process
Fair

* Courtesy of Peter Sandman and Vincent Covello, with interpretation by Mary McDaniel, and Barry Connell.
Traditional Stakeholder Interactions

You and your project

Citizens / Public

Regulatory / Permitting
Positive Public Policies

Did you know that each American throws away an average of 1.3 pounds of food scraps every day? Each year, residents in Ohio generate enough food scraps to pile on a football field over a half mile high! Food scrap waste generated by all households in the United States could be piled on a football field more than 16 miles high.

The top two portions of the U.S. waste stream (paper and yard waste) have been successfully diverted from landfills through recycling and composting efforts, with recovery rates of 50 percent and 62 percent, respectively. Paling in comparison, the food scrap recovery rate is less than three percent.

Across the nation states are exploring ways to reduce pollution and encourage alternative methods of waste management such as recycling. Although some food scrap management programs are being implemented at the local level (universities, business locations, etc.), more can be done to help reduce the need for food scrap disposal.

Ohio EPA has developed this Web site and accompanying brochure to identify resources that you might find helpful when deciding whether to implement programs to address food scraps. There are several options to help address food scraps, including:

- Preventing the generation of food scraps.
- Converting food scraps to animal feed.
- Composting food scraps at home.

U.S. Waste Generation by Category

- Yard trimmings: 12.1%
- Food scraps: 11.7%
- Wood: 9.8%
- Paper: 35.2%
- Plastic: 11.3%
- Rubber, leather, and textiles: 7.4%
- Glass: 5.3%
- Metals: 8.0%
- Other: 3.4%

Source: U.S. EPA
Ohio EPA Rules Index

This site is designed to allow you to access current and pending rules within our program divisions. It will also give access to rule packages which are cross program in nature such as the PTI/P.E. Signature rules, which affect a number of divisions. In addition to links to the individual Ohio EPA programs, the site also has links to outside sites which may be of use to individuals interested in rules or the rule-making process. These sites include the Register of Ohio, which contains all state agency rule proposal packages and the Joint Committee on Agency Rule Review, which is the legislative committee responsible for the review and processing of all state agency rules.

If you would like a hard copy of any of Ohio EPA's rules and regulations, please see the Small Business Assistance Office's "Getting Copies of Ohio EPA's Regulations." All State of Ohio rules and regulations are available online through LAWR. Because the online documents may not be updated as soon as changes are made, we recommend that you follow the links below to see specific rules and regulations by division to ensure that you are referencing the most current version.

If you have any questions regarding the Ohio EPA rule-making process, please feel free to contact Edward Kitchen, Ohio EPA Rules Coordinator, at (614) 644-2782. To receive notification of rule changes, please complete the form below.

Agency-Wide Rule Issues

Industrial Waste Development and Beneficial Use Rule Development

Diesel School Bus Retrofit Grant Rules
- Rule References
- General Program Information

PTI/P.E. Signature Rules

These rules can be found in the applicable program area's rules and laws pages. Please click on the appropriate link below for specific rule references.

- Division of Surface Water
Zero Waste

We're Working Toward Zero Waste!

The Central Vermont Solid Waste Management District has committed to helping its 22 member communities to work toward Zero Waste.

Zero Waste won't eliminate discards. Rather, working toward Zero Waste means that we will strive to capture all of the resources in such products so they can be reused and recycled in this region, instead of wasted by burying them in a landfill or burning them in an incinerator. Reducing waste up front through good product choices is also a critical component of a Zero Waste effort.