Commercial and Institutional Food Waste Management
Trends and Challenges

Michael Keleman
The Food Waste Disposer of Today

- Disposers are in >50% of U.S. Kitchens
- Past: Convenience and Hygiene Benefits
- Present: Viewed as Offering Much More
“More Than an Appliance of Convenience”

- Environmental Tool for Preserving Public Health and Promoting Sustainability
- Myths & Misconceptions of Disposers
  - Water & Electricity Usage
- Focused Research of Knowledge Gaps
  - Life-Cycle Assessment (2011)
  - Sustainable Food Waste Evaluation (2012)
  - Impacts to Wastewater Treatment (2013)
- Municipal Projects to Demonstrate Efficacy of Disposers

  Philadelphia, Tacoma, Milwaukee, Boston and Chicago

“The challenge in the future is how to extract energy from wastewater most efficiently…food waste could be ground up in kitchen food waste grinders and transported to wastewater treatment facilities…”. George Tchobanoglous
Management Alternatives

- Landfilling
- Incineration
- Composting
- Anaerobic Digestion
  - Water Resource Recovery Facilities
  - Wastewater Treatment Plants
    - Via Disposers and Sewers
    - Via Trucks
  - Food Waste as Co-digestion Feedstock
    - Boosts Biogas/Energy
    - Improves Digestion
    - Closes Loop for Nutrient Management

36 million tons food waste to landfills
3% is recovered and recycled
Convergence of Environmental Megatrends

- **Landfill Bans of Organics:** MA, VT, CT, RI, CA
  - Costs
  - Greenhouse Gas Emissions

- **“Water Utility of the Future”**
  - Water Resource Recovery Facilities
  - Clean Water, Energy & Fertilizer

- **Trending:**
  - Corporate Sustainability Reporting
  - Biogas Opportunities Roadmap (August 2014)
  - Climate Action Plan (June 2013)

- **All paths leading to:**
  - Renewable Energy via Anaerobic Digestion
U.S. Food Waste Landscape

250M Tons / Yr. in U.S.

<3% of 36M Tons of Food Recycled!!!

Source: EPA

Food: untapped and impactful!

Levers: legislative bans, societal
U.S. Food Waste Legislation

Organic Landfill Bans & Initiatives

- High landfill tip fee (sets willingness to pay)
- Sustainability valued
- AD infrastructure activity
- Bans becoming reality

Current Organics Bans/Laws mandating Source Separation and Diversion from Landfill

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<thead>
<tr>
<th>Location</th>
<th>Ban/Law</th>
<th>Timing</th>
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<tbody>
<tr>
<td>Austin, TX</td>
<td>Requires multifamily residential/facilities with food-service permits to divert compostable materials</td>
<td>2018 implementation date</td>
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<tr>
<td>Connecticut</td>
<td>Applies to generators of 104 tons annually if within 20 miles of processor</td>
<td>Threshold reduced to 52 tons annually in 2020</td>
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<tr>
<td>Massachusetts</td>
<td>Applies to commercial/industrial operations generating 1 ton or more weekly</td>
<td>Effective October 2014</td>
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<tr>
<td>New York, NY</td>
<td>Applies to restaurants generating 1+ tons weekly</td>
<td>Takes effect July 2015</td>
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<td>Portland, OR</td>
<td>Mandatory composting “on the books” for large generators</td>
<td>Enforcement to be stepped up with more infrastructure</td>
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<td>Rhode Island</td>
<td>Applies to commercial and industrial generators of 104+ tons annually (schools exempted)</td>
<td>Starts in 2016</td>
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<tr>
<td>San Francisco, CA</td>
<td>Municipal regulation mandating recycling of all materials</td>
<td>2009</td>
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Organics Bans/Laws in Development

<table>
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<tr>
<th>Location</th>
<th>Proposed Ban/Law</th>
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<tr>
<td>California</td>
<td>Legislation recently passed California House requiring “large” generators of organic waste to recycle</td>
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<tr>
<td>Florida</td>
<td>Will need to enact organics diversion requirements to meet goal of 75% rate</td>
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<tr>
<td>Maryland</td>
<td>High probability of reintroduction of organics-diversion legislation</td>
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<tr>
<td>New York, NY</td>
<td>Applies to restaurants generating 1+ tons weekly</td>
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<tr>
<td>Minnesota</td>
<td>Recently proposed mandated recycling in populated centers</td>
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<tr>
<td>Seattle, WA</td>
<td>Likelihood of mandatory commercial composting</td>
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Wastewater Trends in the U.S.

- “Water Resource Recovery Facility”
  - Clean Water, Fertilizer and Energy
- **Biosolids Beneficially Reused?**
  - Approximately ~50%
- **Facilities with Anaerobic Digestion?**
  - 8% of US WWTPs, ~50% of US Flows
- **Energy Independence at Utilities**
- **Food Waste = Energy**
  - East Bay Municipal Utility District
    Oakland, California
  - Producing >200% of Energy Demand
Anaerobic Digestion?

- Decomposition Without Oxygen
- Methane Generation
- Organic Material Transformed into Heat, Electricity, CNG & Fertilizer
- Volume Reduction & Waste Stabilization
  - Farms (manure)
  - Wastewater Treatment Plants (sludge)

- NOT “Waste-to-Energy”
  Incineration

- Not In-kitchen “Biodigesters”
  Grey-Water-to-Sewer Equipment
U.S. Anaerobic Digestion Facilities

- 1,200 of 16,000 WWTPs – Sewage Sludge
- 236 Farms – Manure (40+ added in last year)
- 636 Landfills – EPA Landfill Methane Outreach Program

http://www.wrrfdata.org/biogas/
Food Waste Disposers and Codes

- Environmental Perception Varies Across the Country
- Cities / Municipalities Can’t Agree
  - Some Require Disposers
  - Some Discourage or Even Prohibit Disposers
- 2012 Uniform Plumbing Code
  - Food Waste Disposers Shall Not Be Connected to Grease Interceptors
- 2012 International Plumbing Code
  - Solids Interceptors Required Where Disposers are Connected to Grease Interceptors
- City of Philadelphia
  - Disposers Required for Grindable Garbage
- State of Massachusetts
  - Disposers Required in Food Service Establishments with 20 Patrons
Codigestion

- Food waste is collected and transported to a central wastewater treatment facility
- East Bay Municipal Utility District (EBMUD) Oakland, CA
- Gloversville – Johnstown, NY
- Sheboygan, WI
- West Lafayette, IN
- Boston, MA
- Milwaukee, WI
- New York, Los Angeles, Tacoma, Chicago
163 of 1,200 WWTPs Receive Materials from other Facilities

236 Farms - Manage manure (40+ added in last year)

20+ Greenfields – Source Sludge, Food Waste, FOG (all built over last 5 years)
Los Angeles County Sanitation District

- Waste Management Partnership
- Bench Scale Food Waste Characterization in 2012
- Expecting to Double Biogas with 10–12% v/v Food Waste
- Centralized Organic Recycle and Energy (CORe) Program
- Two-Year Demonstration to Process 84 TPD (20,000 Gallons)
- Developed Specification Sheet for Food Waste Slurry
  - Viscosity
  - COD
  - Total Solids
  - Volatile Solids

Joint Water Pollution Control Plant (~280 MGD)
It’s Now Possible to Fuel Your Car From Food Waste!

In 1989 “Back to the Future” predicted our cars would be fueled by Food Waste in 2015...

2014: Columbus, Ohio
Introducing a More Optimal Food Waste Solution

The AD facility captures and converts the methane into renewable resources such as:

- Compressed Natural Gas
- Electricity
- Heat

Grind2Energy grinds food waste quickly and efficiently

A liquid waste hauler transports the slurry to a nearby AD facility

The food waste slurry is transferred to a holding tank
Introducing grind2energy™
Organics Recycling System

Corporate Sustainability

- Compost
- AD
- Landfill Diversion
- Renewable Energy
- Odor/Pests Removal
- Handle Dairy/Meat

ready to take the next step in food scrap recovery?
Anaerobic Digesters Desire Food Waste

- Glycerin
- Fat, Oil, Grease
- Food Waste
- Bio-solids
- Crop Residuals
- Dairy Manure
- Hog Manure

Methane Gas Accelerators!

WWTP Feedstock

Farm Feedstock

Mechanical / Manual Screening

Mix / Grind

Energy Value

- Food Waste Significantly Improves Digester Biogas Output
- Drives Future Investment Attractiveness
- …however, not easy to obtain…

Feedstock Quality is Critical
- Contamination (Metals, Glass) Difficult to Remove Downstream
- Contaminant Free Food Waste Slurry in Demand

G2E Transforms Solid Waste into High-Quality Slurry
The Benefits of grind2energy™
Organics Recycling System

- Makes cleanup and storage easier
- Potential labor and safety benefits
- Improves hygiene by reducing pests, rodents, fruit-flies, and offensive odors
- Less frequent pickups of waste
- Eliminates freezing of outdoor bins in winter
- Sustainability reports available
We Have Some Exciting News

For generators diverting 1 ton of food waste per week from a landfill with Grind2Energy, your facility helps create…

- 84K miles reduced GHG emissions
- 7,280 lbs. of nutrient-rich organic fertilizer
- 4,888 m³ meters³ of methane gas heats a home for 850 days!
- 571 days of electrical energy to power a single-family home

your food scraps can make a difference!
EPA Food Recovery Hierarchy

On-Site Liquefiers, Dehydrators, and Bio-digesters
“Everyone thinks the system is great, except the trash hauler. They went from 2 pickups per week to every 10 days!” – Store Manager

- Whole Foods (Mass.)
- Roundy’s (WI)
- Sendik’s (WI)
- Cleveland Browns
- Cleveland Indians
- Ohio State University
Grind2Energy offered as a complete turn-key solution

**Monthly subscription fee for:**

- Custom spec system and professional install
- Remote tank level monitoring managing all aspects of collection and disposal
- Complete coverage for employee training, repairs, service & maintenance
- Rental model avoids large capital outlay
Thank You!
Visit Us at Booth 3410

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