



Disposers: An Alternative for Sustainable Organic Waste Management?

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Welcome, Intro & A Little Admin

Our Moderator:

- **Peter Houstle** - MRN Executive Director
-

Coming June 21-22 - MRN/SWANA-Mid-Atlantic Annual Conference

Admin

- *Post questions in chat box on left hand side of screen*
- *Recording & PDF will be posted on MRN website*

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Convergence of Megatrends

Organics Diversion

- **Landfill Bans**

- *Commercial Organics*

- States

- MA, RI, CT, VT, CA
 - Bans in FL, MD, MN & NJ *Projected Soon*

- Cities

- Austin, TX
 - New York, NY
 - Portland, OR
 - San Francisco, CA
 - Seattle, WA



- **Food Waste Reduction Goals**

- 50% by 2030
U.S. EPA & Dept. of Agriculture

- **“Reduction” vs. Management of “Unavoidable” Food Waste**



Resource Recovery

- **Wastewater Treatment Plant**

- **Water Resource Recovery Facility**

- “Utility of the Future”

- Clean Water, Energy & Fertilizer

- **Codigestion**

- Energy Independence



Convergence of Megatrends

- **No Silver Bullet**
- **Multiple Alternatives & Solutions to Achieve Diversion Goals**
- **Anaerobic Digestion of Organics**
 - “...three times less greenhouse gas emissions than composting.”
Julia Levin, Executive Director of Bioenergy Association of California
- **Disposers Present in 52% of All U.S. Homes**
- **Not All WRRFs are the Same**
 - ~14,000 Publicly Owned Treatment Works (POTW)
 - 1,271 with Anaerobic Digestion (Water Environment Federation)
 - <10% of All POTWs **~50% of All U.S. Wastewater Flows**
 - 85% Use Biogas
 - 270 Produce Electricity
 - <http://www.resourcerecoverydata.org/biogasdata.php>

“More than 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) ↓ CO₂
- Sustainable Food Waste Evaluation (2012) ↓ \$
- Impacts to Wastewater Treatment (2013) ↓

Municipal Projects to Demonstrate Efficacy of Disposers

Philadelphia, Tacoma, Milwaukee, Boston and Chicago



<http://bit.ly/1qJAUXZ>



“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**

Myths & Misconceptions

#1 - Water Use

- Review of 10 Studies
 - Five Concluded Negligible or Statistically Insignificant Amount
 - Avg. of Remaining Five Studies
 - 5 L/household
 - ~1% Total Usage
 - About a Single Toilet Flush
- 13L **Less** per household (DeOreo, 2011)



#2 - Electricity Use

- 3-4 kwh/year
- ~\$0.50/year



#3 - Overloading of Treatment Plants

- Incremental Load **Measureable & Manageable**
20 g/capita · day of BOD & TSS
Biochemical Oxygen Demand & Total Suspended Solids
Only 20-30% Higher Where Grinders Are Used



Myths & Misconceptions

#4 - Clogged Plumbing & Sewers

- Designed to Comply with American Society of Sanitary Engineering Standard #1008
 - 100% of Particles < 0.5”
 - *Most Particles 1/8” – 1/4”*
- Food Waste is 70-90% Water
- Proper Use
 - Turn On Water, Turn On Disposer, Add Food Waste, Let Water Run After Grinding



<http://bit.ly/1RVT4zK>

#5- Fats, Oils and Greases (FOG)

- FOG Should Not Be Poured in Disposers, **or Sinks & Toilets**
- FOG Deposits Found in Sewers Around the Globe, Including Where Disposers are Virtually Non-Existent
- **Less** Deposits with Disposers
- “Calcium Soaps”



New Reports & Recent Developments

Food Waste Disposers Now Part of the Discussion



“A Roadmap to Reduce U.S. Food Waste by 20 Percent”

- Rethink Food Waste Through Economics and Data
- Investment of \$18B
- Net Societal Economic Value \$100B
- 27 Solutions
 - Prevention (12)
 - Recovery (7)
 - Recycling (8)
- Disposers Encouraged in Cities with Water Resource Recovery Facilities Utilizing Anaerobic Digestion



“Can We Have Our Cake and Compost Too?”

- An Analysis of Organic Waste Diversion in New York City”

- Citizens Budget Commission (Feb 2016)
- Finances and Services of New York State & New York City
- Suggests Utilizing Disposers and Excess Wastewater Treatment Capacity in the Bronx & Brooklyn
- Potential Net Savings of \$3.7M





The Food Waste Disposer as a Municipal Tool for Waste Diversion



An Evaluation in Five Cities

Project Overview by InSinkErator®



This presentation is based on an InSinkErator-sponsored review of 432 households over a three-year period and is provided for general informational and promotional purposes. Municipalities that are considering alternative waste diversion solutions are encouraged to consult with a qualified waste professional to analyze and consider all potential options.

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Introduction

From 2012 to 2015, InSinkErator® initiated partnerships with five major cities across the United States in order to assess the viability of using food waste disposers as a municipal tool to help manage food waste and accomplish what is known as “resource recovery”.



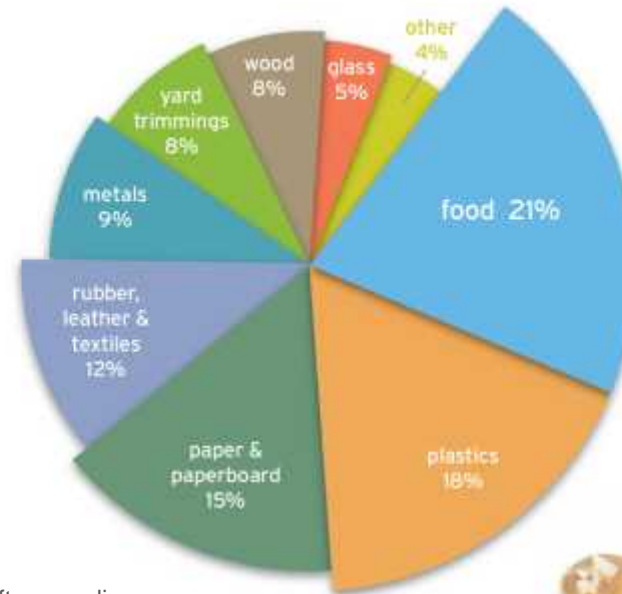
An Evaluation in Five Cities
Project Overview by InSinkErator®

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Background

- According to the U.S. Environmental Protection Agency, food waste makes up the largest percentage of landfill waste; 35 million tons are discarded each year.¹
- Food waste disposers are installed in about half of all U.S. homes.
- This study was conducted to determine the effectiveness of disposers in helping reduce the volume of solid waste collected, hauled and disposed.

2013 Composition of Municipal Solid Waste Discarded in the U.S. (EPA 2015)*



*After recycling and composting

1 - U.S. EPA. 2015. "Advancing Sustainable Materials Management: 2013 Fact Sheet." http://www.epa.gov/osw/nonhaz/municipal/pubs/2013_advncng_smm_fs.pdf



Project Description

- Each of the five cities was chosen because it shared the goal of diverting organics from the solid waste stream and increasing resource recovery at their wastewater treatment plants.
- A diverse sample of households was used, ranging from a 48-unit apartment building in Boston, to an urban neighborhood in Milwaukee.
- For statistical reliability, a goal of 90 participants in each neighborhood was set; the minimum was set at 70 households.

See actual numbers at right.

Selected Cities & Neighborhoods

City	Neighborhood	Participating Households
Philadelphia, PA	Point Breeze & West Oak Lane	173
Tacoma, WA	Wapato Lake	63
Milwaukee, WI	Burnham Park	96
Boston, MA	Thomas Atkins Apartments	48
Chicago, IL	Maple Park	52

Project Description



- InSinkErator provided and installed complimentary food waste disposers to households not previously equipped with disposers.
- The amount of food waste discarded into the trash by each of those households was measured before and a few months after disposer installation.

The Project Steps:



An Evaluation in Five Cities

Project Overview by InSinkErator®

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Results – Potential Environmental Impacts

- Measurements showed that disposer use significantly reduced the volume of food waste thrown into the trash.
- Estimated amount of food waste processed by disposers was 1.4 to 4.1 pounds per household per week.

Totals are shown at right.

Weekly Household Waste Generation



Results – Potential Impacts

- Waste consultants concluded that on average, after the use of disposers, food waste in the trash was reduced by about 30% or about one third.*
- At that rate, after a 3-year period of disposer use, about a full year's worth of food waste could be kept out of landfills.

Average Number of Bags Set Out Pre- vs. Post-Installation



30%

Approximate reduction of total food waste volume in the trash with disposer use.*

*Reductions were calculated by measuring the food waste in the garbage. The actual amount of food waste processed by disposers not available.

Results – Potential Economic & Environmental Impacts

Each of the selected cities employed anaerobic digestion when the project was initiated. The potential effect of increased disposer use on methane production and greenhouse gas production was also estimated.

- The study measured the potential increase in methane production as a result of diverting food scraps from landfills to waste water treatment facilities.
- The study also estimated the potential impact of disposers on helping reduce the amount of greenhouse gases created by decomposing food waste at landfills.

Potential Environmental Implications of Citywide Use

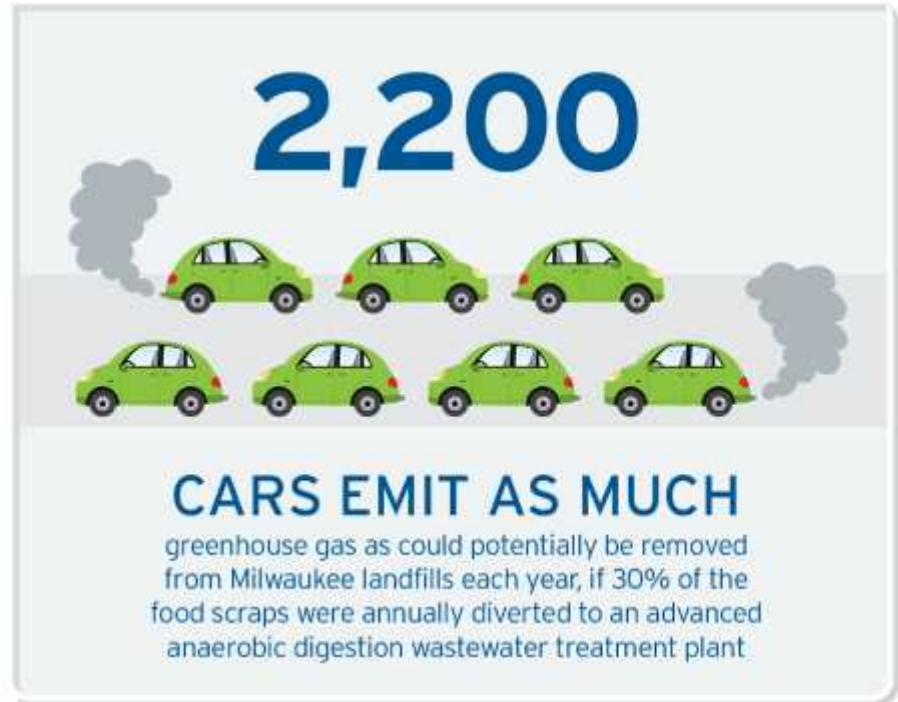
	Food waste diverted per household (pounds/week)	Total number of households citywide	Current disposer adoption rate	Potential mass of food waste diverted (tons) per year	Current solid waste management system	Reduction of greenhouse gas emissions (MT of CO ₂ e per year)	Additional methane production (ML per year)
Philadelphia	1.4	580,017	49%	21,113	waste-to-energy	290	2,332
Tacoma	1.9	78,447	67%	3,875	landfill	4,770	428
Milwaukee	3.2	440,000	52%	36,608	landfill	10,600	4,040
Boston	4.1	890,000	55%	94,874	33% landfill & 67% WTE	11,900	10,479
Chicago	NA	1,028,746	34%	NA	landfill	NA	NA

InSinkErator has not determined if citywide use is feasible. Potential adoption rates should be considered when viewing this report.

Results – Potential Economic & Environmental Impacts

Using Milwaukee as an example, the study demonstrated the following potential environmental benefits of disposers:

- Utilizing food waste disposers to divert 36,600 tons of food scraps to the Milwaukee wastewater plant would result in the reduction of approximately 10,600 metric tons of greenhouse gas emissions.
- That's equivalent to removing 2,200 cars from the road for one year.
- The biogas generated when those food scraps are processed through the Milwaukee facility's anaerobic digester could potentially produce enough electricity to power 1,290 homes per year, using GHG equivalencies by the USEPA.



Results – Potential Economic & Environmental Impacts

Philadelphia households that had a new food waste disposer installed decreased food scraps discarded by approximately one-third. If all Philadelphia households used disposers, potential benefits could include:



Resident Satisfaction & Quality of Life

Participants were overwhelmingly happy with their complimentary disposers and reported that disposer use had a **very positive impact on their lives**.

Satisfaction of Project Participants:
"Are you satisfied with how the disposer works?"

Responses by City	Philadelphia	Tacoma	Chicago	Milwaukee
Very Satisfied	92%	90%	79%	93%
Somewhat Satisfied	7%	10%	16%	4%
Somewhat Dissatisfied	1%	0%	11%	4%
Very Dissatisfied	0%	0%	5%	0%

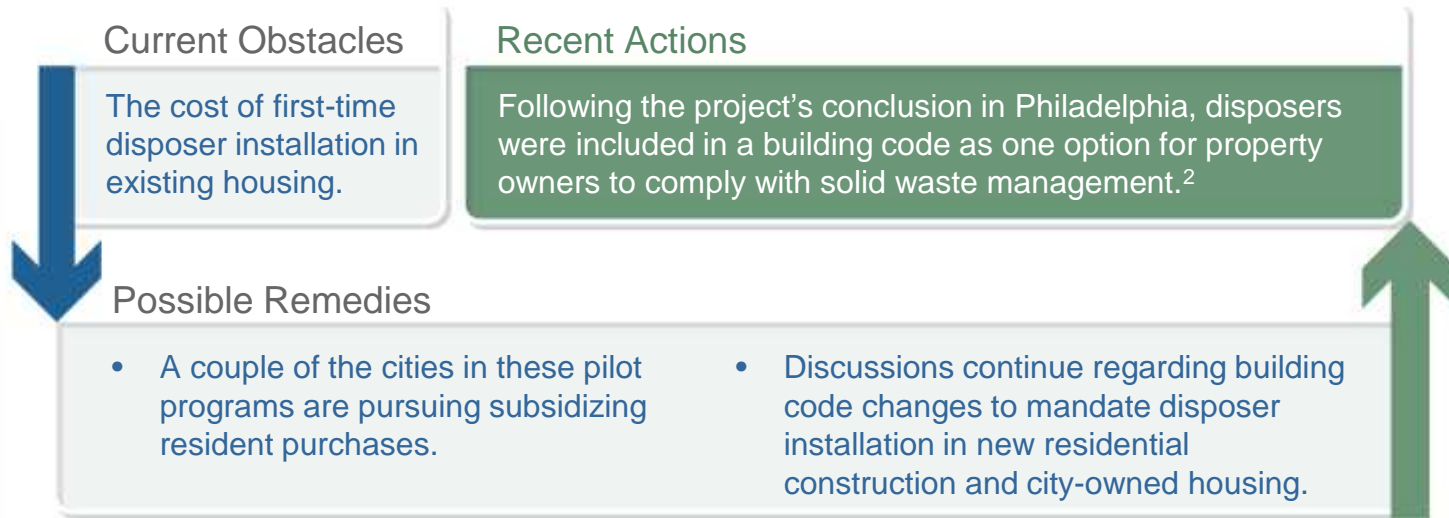


Benefits of Disposer Use:
"What was the best part of having a disposer?"

Responses by City	Philadelphia	Tacoma	Chicago
Less trash	68%	68%	68%
Cleaner kitchen	55%	65%	21%
Less smells in kitchen	62%	60%	47%
Fewer bugs or pests	42%	38%	5%
Got me to recycle more	30%	25%	42%
Improved value of my home	27%	35%	16%
None	0%	0%	5%
Other	4%	3%	0%

Conclusion & Outlook

Disposers were well received by residents and could be considered a valid municipal tool that can efficiently dispose of food waste and may also serve as an aid to resource recovery of renewable energy and fertilizer at capable plants.



2 - City of Philadelphia. 2015. The Philadelphia Code - PM-308.3.1 Garbage facilities. American Legal Publishing Corporation. [http://www.amlegal.com/nxt/gateway.dll/Pennsylvania/philadelphia_pa/title4thephiladelphiabuildingconstructiosubcodepmthephiladelphiapropertymaintena/chapter3generalrequirements0?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:philadelphia_pa\\$sanc=JD_PM-308.3.1](http://www.amlegal.com/nxt/gateway.dll/Pennsylvania/philadelphia_pa/title4thephiladelphiabuildingconstructiosubcodepmthephiladelphiapropertymaintena/chapter3generalrequirements0?f=templates$fn=default.htm$3.0$vid=amlegal:philadelphia_pa$sanc=JD_PM-308.3.1)

Summary



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**Participants received a free disposer and installation from InSinkErator. Calculations are for illustrative purposes only.



Thank you!

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