“Food for Thought”

NACWA 2011 National Pretreatment & Pollution Prevention Workshop

Meeting Pretreatment Challenges, Old & New

Michael Keleman

Lead Environmental Engineer
InSinkErator®

Diversion of Organics

- EU Landfill Directive
- Toronto, Ontario
- California – 50% by 2020
- Austin, TX – Zero Waste
- Philadelphia - Greenworks

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Energy Independence at WWTPs

- WW contains 10x the energy needed for treatment
- WWTPs account for ~30% of municipal electrical demands
- ~50% of energy from anaerobic digestion
- ~25% more from codigestion of food waste and FOG
- Only 3% of US WWTPs with Anaerobic Digestion

  - *60% of all wastewater flows*
- Many facilities have organic capacity in their digesters

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The Food Waste Disposer – "Feedstock Preparation Device"

- Disposers Divert Organics From Landfills to WWTPs to Produce Energy and Fertilizer
- Food Waste is 70-80% Water
- Majority of BOD and Solids Removed During Primary Clarification
- Food Waste Produces 3x as Much Biogas as Sewage Sludge
- Higher Volatile Solids Reduction
- High Carbon to Nitrogen Ratio - Beneficial for Nutrient Removal

Life Cycle Assessment of Systems for the Management & Disposal of Food Waste

- Two-year Project
  - CDM (Engineering)
  - PE Americas (ISO LCA Protocol)

Baseline
- Landfill (2 Types)
- Waste-to-Energy (Incineration)
- Sophisticated Composting System

Disposer
- Wastewater Treatment (8 Types)

- Comprehensive Analysis of Potential Environmental Impacts in Areas of:
  - Global Warming Potential, Eutrophication, Acidification, Smog Potential, and Primary Energy Demand
- Peer Reviewed
- Scope Included Food Waste Disposer Unit Manufacturing, Transport, Use & Disposal

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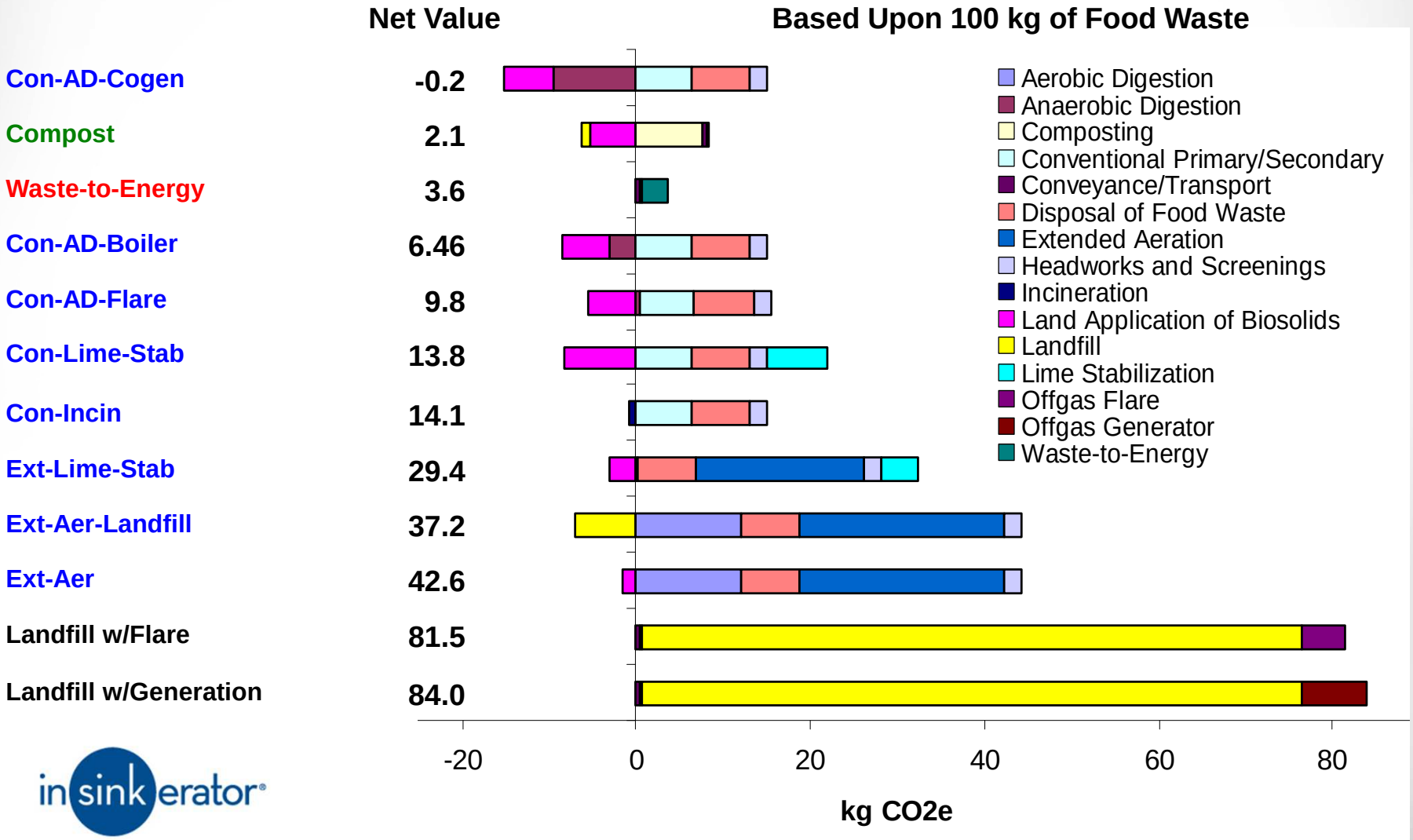
Global Warming Potential – kg CO_2e



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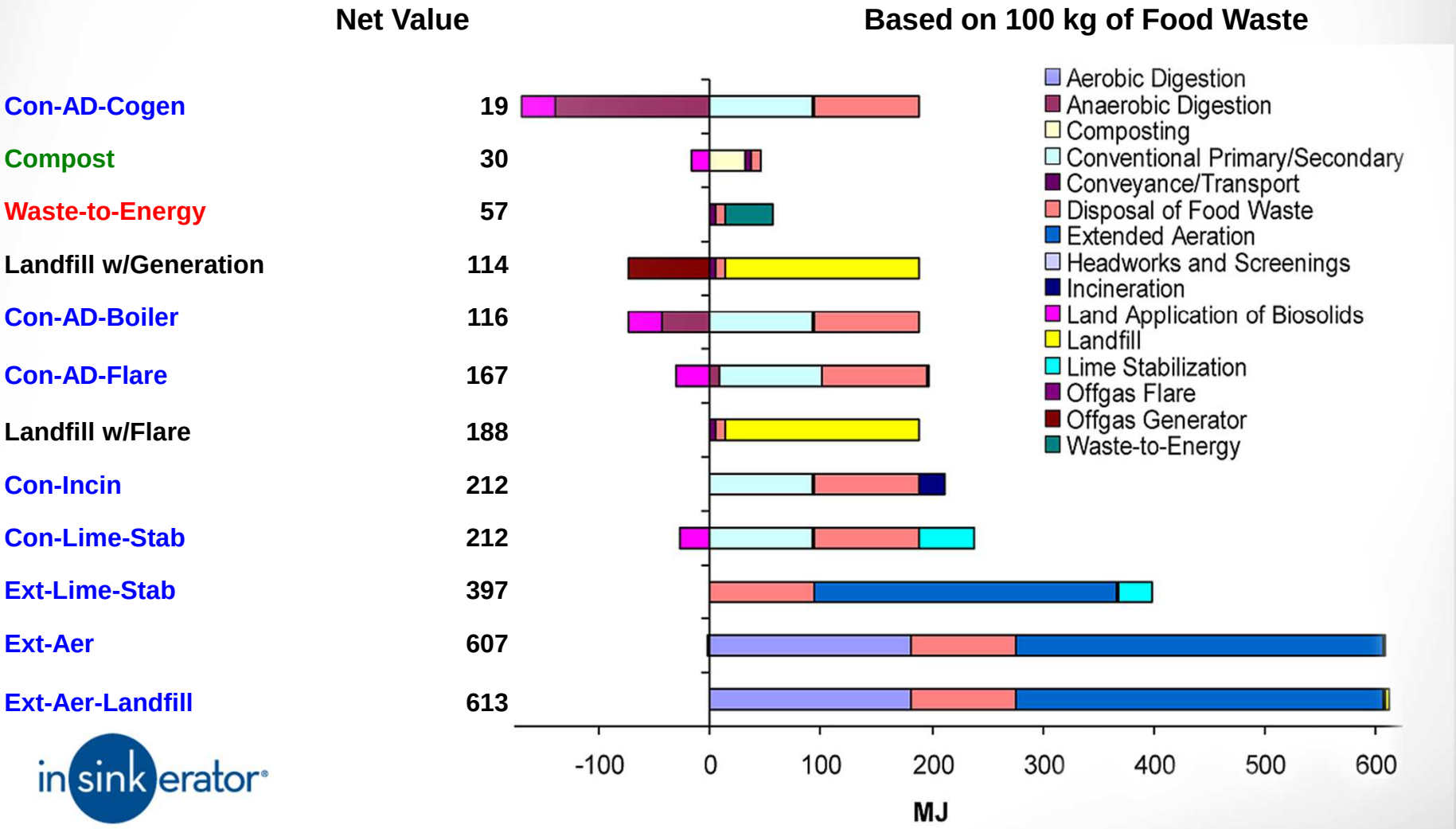
Primary Energy Demand - MJ



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Summary of Results

- Global Warming Potential of Wastewater/Disposer Option Lower Than Landfilling
- “Ideal” Wastewater Treatment Option Has Lowest GWP and Primary Energy Demand of All Options
- “Ideal” Wastewater Option Net Energy Gain for Municipalities
- Environmental Impacts Very Small for All Options
- Cogeneration has NO_x Implications
  - Acidification, Eutrophication and Smog Potential

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WasteCap Resource Solutions Pilot Project

- September 2008 to October 2009
- MMSD Sampled of discharge to MMSD
- Slurry collection, pumping and transportation done by Veolia
- Video inspection of sewers

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COMMUNITY OWNED SINCE 1970
OUTPOST
NATURAL FOODS


WasteCap
Resource Solutions


MMSD
Milwaukee Metropolitan
Sewerage District


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Pilot Project Development

- Divert food scraps from landfill disposal for beneficial utilization in MMSD's anaerobic digesters
- Evaluate three methods of diversion – landfilling, direct to sewer, & slurry tank
- Provide ONF with a more sustainable means of food waste disposal
- Develop an environmentally friendly, sustainable, and cost effective strategy for food waste disposal, expandable throughout the City of Milwaukee and beyond

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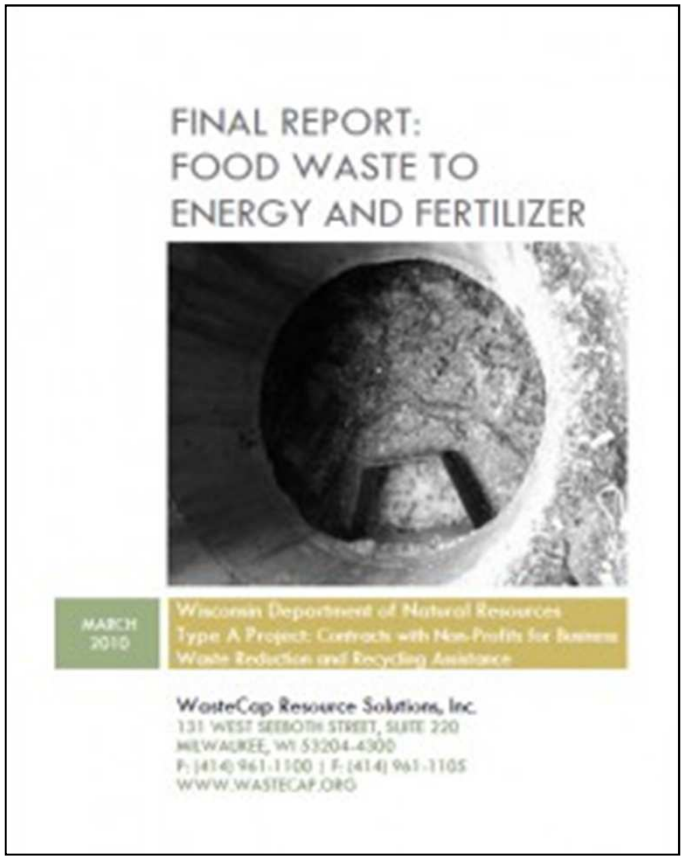
CREST PRECAST
LA CRESCENT, MN
5,000
GALLONS
OUTLET


7
VEOLIA
ENVIRONMENTAL
SERVICES

Final Report – March 2010



http://www.wastecapwi.org/resources/food-waste/

Results – 85% Diversion

10 Year Life Cycle Cost Analysis
(Net Present Value per Ton of Food Waste)

	w/out biogas	w/biogas
Landfill	$42.83	$42.83
Direct to Sewer	$38.64	$2.84
Slurry Tank	$40.68	-$13.61

Conclusions

- Disposers provide viable option for diverting food scraps on a commercial scale
- Pumping & hauling highest potential value for biogas
- Slurry tank needs design modification to improve solids content

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“Sustainable Food Waste Management”

- WERF Targeted Collaborative Research
- Five Management Systems

  - Landfill, Composting, WWTP/Sewers, WWTP/Trucks, Mixed MRF
- Environmental & Economic Impacts
- Technical Advisory Committee Comments

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Ongoing Research & Knowledge Gaps

- Estrogen Transformation
- FOG – Calcium Soaps
- Settleability – Primary Clarification
  - 61% of BOD & 90% of TSS
- Organics Degradation in Sewers
  - Surahammar Sweden - Evans
- Food Waste as a Carbon Source

	Carbon	Nitrogen	Phosphorus
Typical Wastewater	22	6	1
Optimum Treatment	100	5	1
Food Waste	176	10	1

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