

BuildingEnergy Boston

Food Waste For Energy Production



U.S FOOD WASTE

Did you know?

- 30-40% is wasted
- Valued at \$165 billion annually
- Rotting food in landfills releases greenhouse gases

Source: NRDC

CLIMATE  CENTRAL

Photo from [Climate Central](#)

FOOD WASTE CONSUMES:



21%

OF ALL FRESH WATER



19%

OF ALL FERTILIZER



18%

OF CROPLAND



21%

OF LANDFILL VOLUME

Threshold: 1 ton of food/week

Massachusetts

BANS

FOOD WASTE



[Image Source: BioCycle](#)

ORGANICS WASTE BAN

- Encourage and improve food waste to energy infrastructure
- Encourage clean energy
- Reduce organics in landfill >> Reduce methane
- Produce energy and soil amendment
- Promote economic development and job creation



ORGANICS WASTE BAN

- Included in 2010 Solid Waste Master Plan
- Remove commercial food scraps from the waste stream
- Provide education, and technical assistance through RecyclingWorks in MA
- Encourage donation to feed people in need



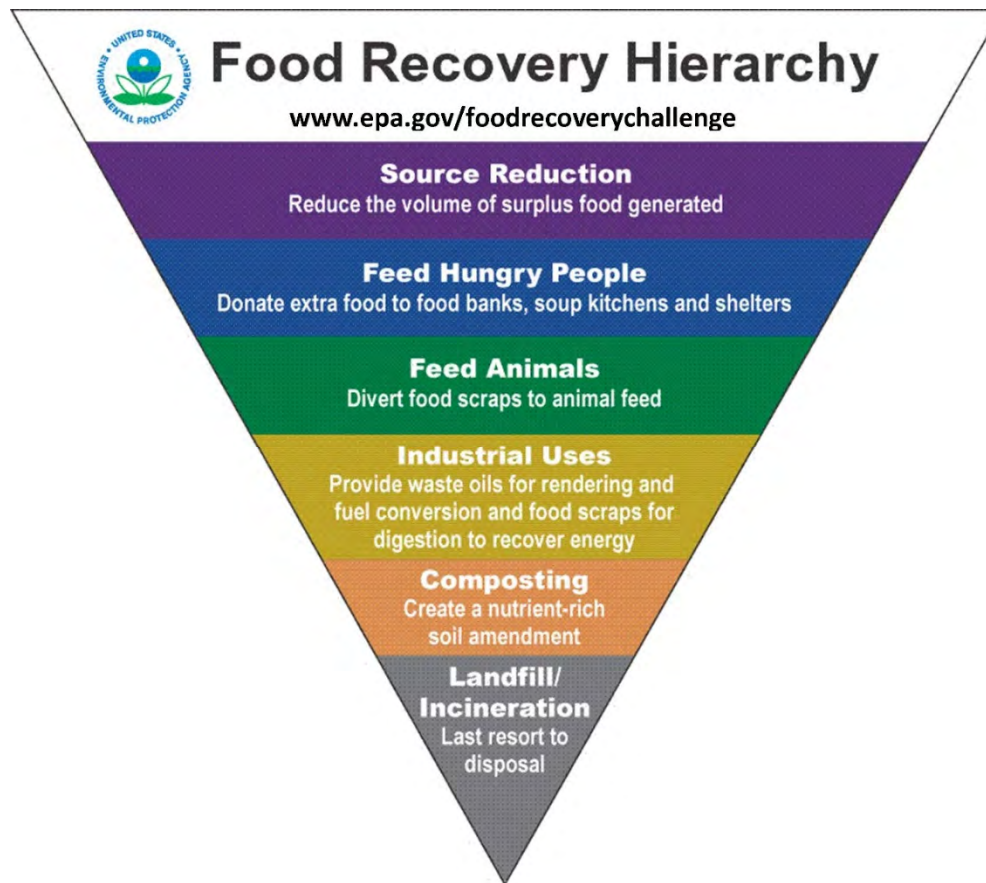
FREE ASSISTANCE FOR BUSINESSES & INSTITUTIONS



RecyclingWorks MA is funded by MassDEP, delivered under
contract by the Center for EcoTechnology

recyclingworksma.com

OUR APPROACH TO ADDRESSING WASTED FOOD



FOOD WASTE ESTIMATOR

<https://recyclingworksma.com/food-waste-estimation-guide/>

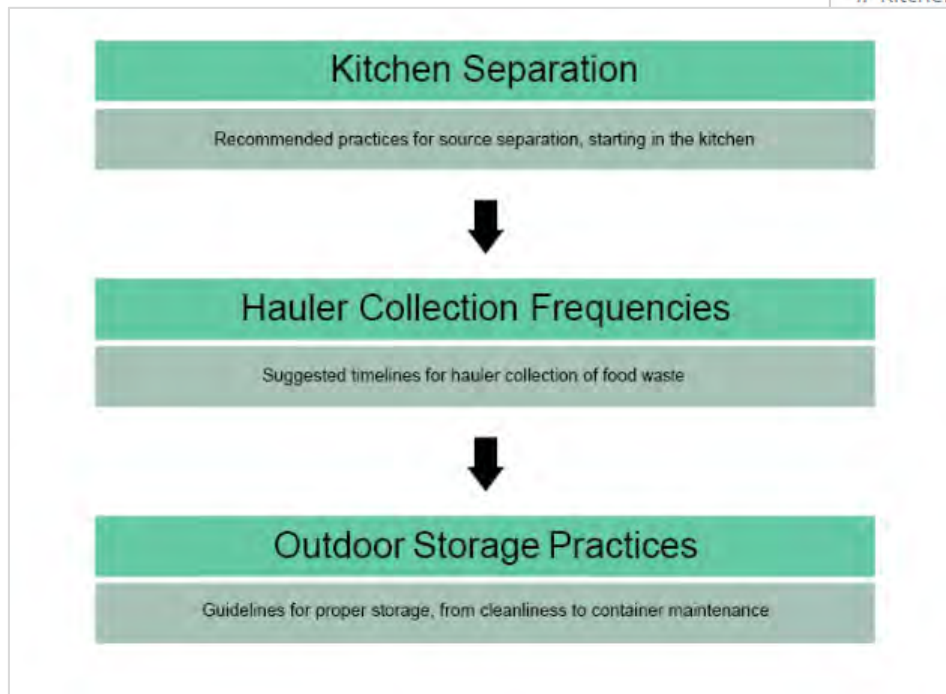
Restaurants

Note: RecyclingWorks now breaks out all forms of estimating food waste by the NAICS code definition for limited and full-service restaurants. Limited-Service Restaurants (**NAICS 722211**) are defined as “establishments primarily engaged in providing food services ... where patrons generally order or select items and pay before eating.” Full-Service Restaurants (**NAICS 722511**) are defined as “establishments primarily engaged in providing food services to patrons who order and are served while seated ... and pay after eating. Actual food waste generation rates within each of these categories can vary widely. Factors such as whether your establishment prepares food from scratch, offers buffet-style dining, or has mostly patrons that eat-in can contribute to higher amounts of food waste. Take into account your restaurant’s operations when considering which metric to use.

	Average Measurement		Material
Meals served [Full-Service]	1	lbs/meal	Food waste
Meals served [Limited-Service]	0.5	lbs/meal	Food waste
Employees [Full-Service]	3,000	lbs/employee/year	Food waste
Employees [Limited-Service]	2,200	lbs/employee/year	Food waste
Disposed Waste [Full-Service]	66	% of disposed waste by weight	Food waste
Disposed Waste [Limited-Service]	51	% of disposed waste by weight	Food waste

SOURCE SEPARATION GUIDANCE

<https://recyclingworksma.com/>



I. Kitchen Separation

Separation of food scraps starts in kitchens and dish rooms. Recommended back of the house practices are as follows:

Food scraps should be collected in dedicated receptacles (bowls, buckets and barrels) in the same area as trash is typically collected.

Containers should be leak proof (impervious) and covered when not in continuous use, or when full. They must be intended only for the purpose of food scraps collection and clearly marked.

Food scraps should be collected and removed from the kitchen/dish room at the same frequency as trash is removed from these areas.

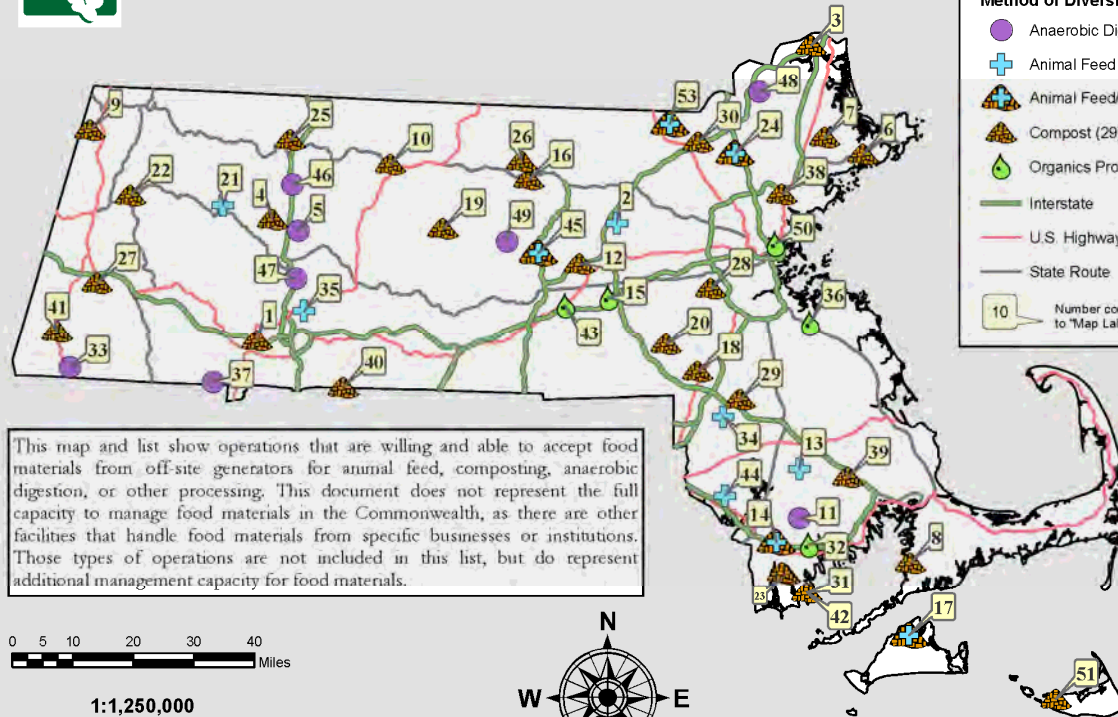
Collection frequency and house practices are dependent on the volume produced. Collection at the same frequency as trash is reasonable for most establishments and seasons; in others, food waste should be collected as often as necessary to keep the area sanitary and to prevent odor, vermin harborage. At a minimum, collection should be every shift. Once collected, food scraps should be taken to a storage area near the trash dumpster/compactor where the hauler will pick up

the material.





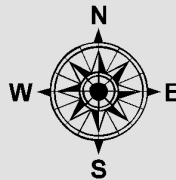
Sites Accepting Diverted Food Material



This map and list show operations that are willing and able to accept food materials from off-site generators for animal feed, composting, anaerobic digestion, or other processing. This document does not represent the full capacity to manage food materials in the Commonwealth, as there are other facilities that handle food materials from specific businesses or institutions. Those types of operations are not included in this list, but do represent additional management capacity for food materials.

0 5 10 20 30 40 Miles

1:1,250,000



DATA SOURCES:
- Major Roads: MassDOT OTP, MassGIS, June 2014
- Food Material Diverters: MassDEP BAW, November 2018

Map Updated November 2018
MassDEP, BAW, J Cook

COLLECTION PRACTICES

- Container placement
- Color coding
- Easily accessible and available bins
- Good housekeeping practices



SIGNAGE

Bottles & Cans



EMPTY BEVERAGE CONTAINERS

Aluminum & steel cans,
glass jars & bottles,
plastic bottles & containers



NO

Liquids
Plastic Bags
Tissues/Paper Towels
Styrofoam
Food-Soiled Materials



Food Scraps



COMPOST

All Food Scraps Napkins & Paper Towels

Fruits, vegetables,
dairy, bread, grains,
meat & fish, bones
& shells, eggs



NO

No gloves, plastic, wrappers
Styrofoam, or any
other trash



STAFF TRAINING

- Educate staff on the specifics of their end site, so they understand the how, what, and why of collection
- Monitor collection containers for re-training opportunities
- Empower staff to identify ways to improve program



FOOD WASTE REDUCTION TECHNOLOGY

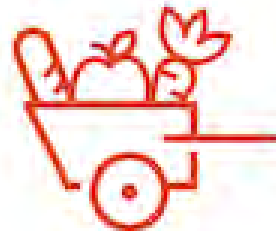


FOOD DONATION




Waste Less, Feed More
www.meansdatabase.com

FOOD
for all



FOOD RESCUE US

BENEFITS OF FOOD WASTE DIVERSION

- 
- A photograph showing a long, neat row of green recycling bins with black wheels, parked in front of a building with blue trim. The bins are arranged in a perspective that recedes into the distance.
- Reduces waste tonnage and may reduce costs
 - Increases recycling because it brings awareness to separation
 - Provides a cleaner waste stream
 - Food waste is utilized for animal feed, soil amendment, or anaerobic digestion

CASE STUDIES

<https://recyclingworksma.com/case-studies/>



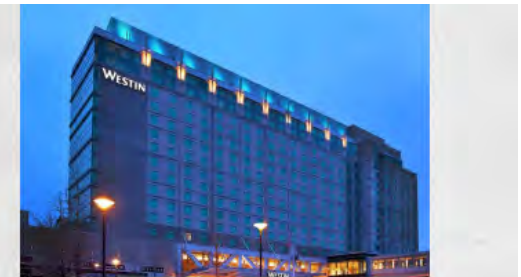
Anthony DiCillo
Executive Chef
Westin Boston Waterfront Hotel



Call our Hotline
1 (888)-254-5525
info@recyclingworksma.com
www.recyclingworksma.com

AT-A-GLANCE:

- The Westin provides single stream recycling in the lobby, common areas,



Hotel Waste Diversion Case Study Westin Boston Waterfront Hotel Boston, MA

The Westin Boston Waterfront Hotel, located in the Seaport District, provides guests with luxurious and convenient accommodations while also supporting the community and the environment with their dedication to operating a sustainable hotel. The hotel implemented successful recycling, food donation, and food scrap diversion programs, and installed a number of environmentally-friendly measures including electric vehicle charging stations, solar powered electronics charging stations, low flow faucets, toilets and shower heads, and high-efficiency lighting. This case study focuses on the comprehensive waste diversion program at The Westin Boston Waterfront Hotel.

QUESTIONS?

Heather Billings

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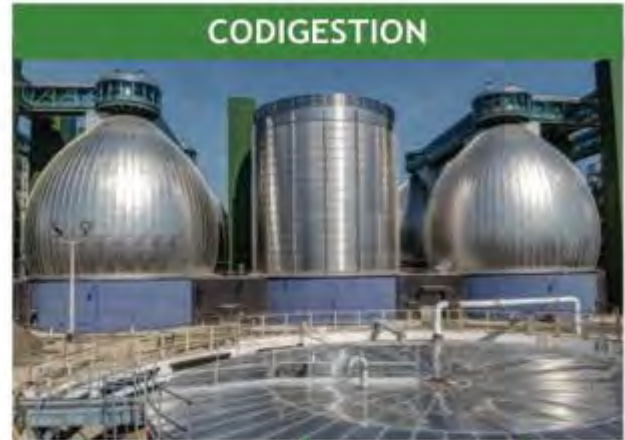
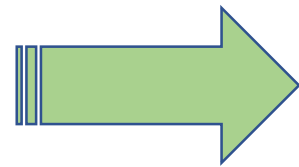
www.recyclingworksma.com



BUILDINGENERGY BOSTON

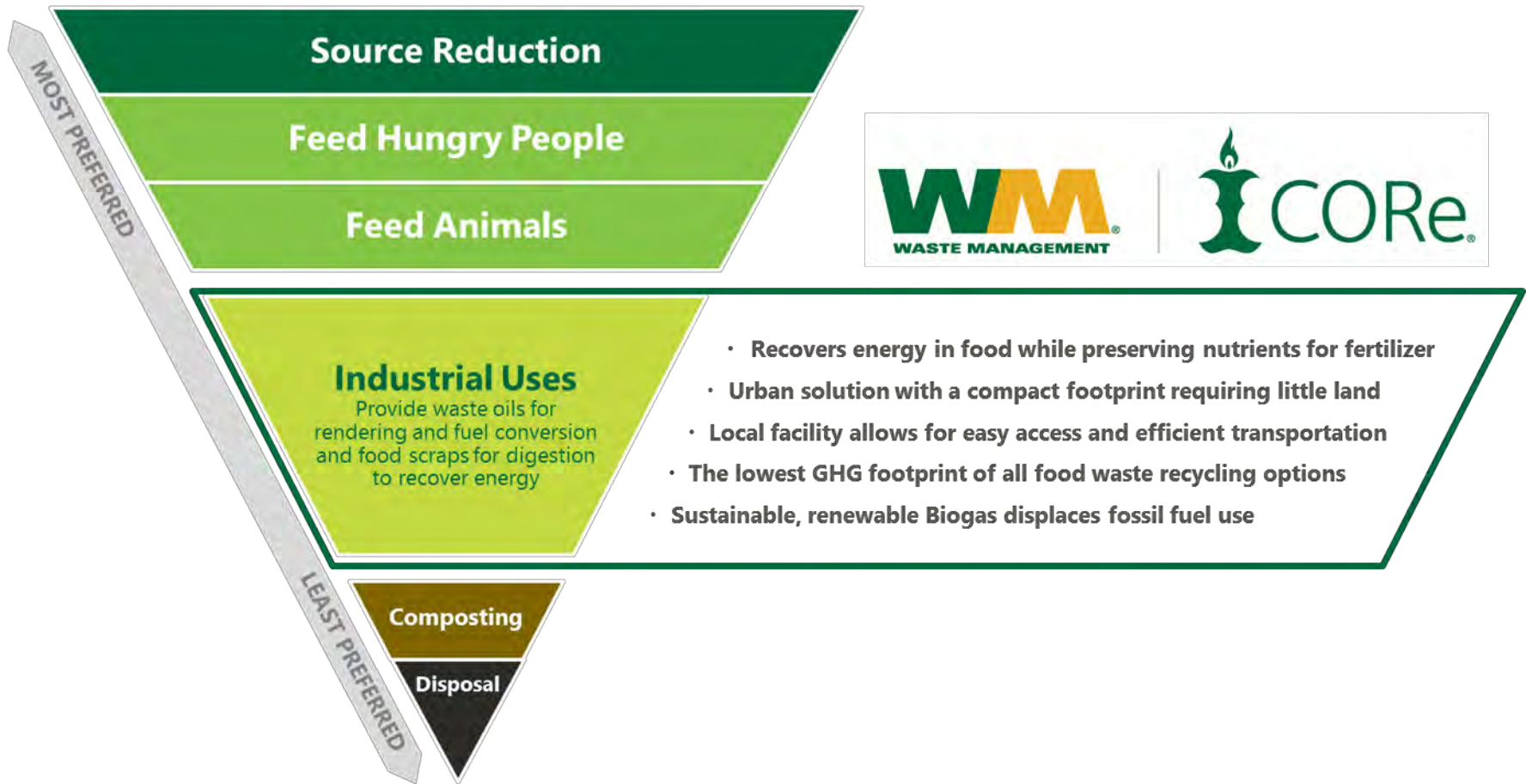
MARCH 14-15, 2019 • WESTIN BOSTON WATERFRONT • NESEA.ORG/BE19

Conference + Trade Show of the Northeast Sustainable Energy Association (NESEA)



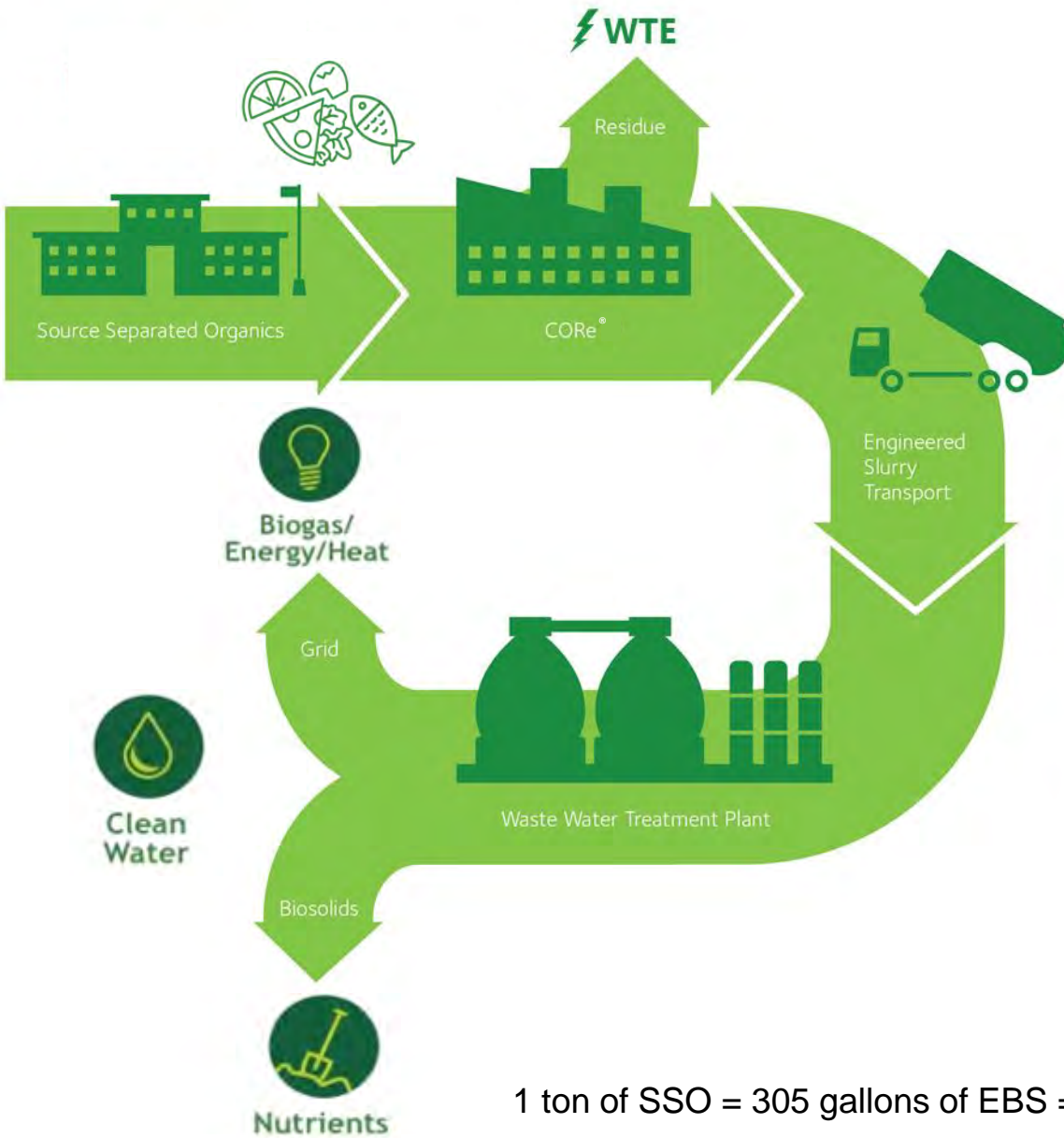


Food Recovery Hierarchy





“**Co-digestion** is a process whereby **energy-rich** organic waste materials (food scraps) are added to dairy or **wastewater (WWTP) digesters** with excess capacity. In addition to diverting food waste and FOG from landfills and the public sewer lines, these **high-energy** materials have at least **three times** the methane production potential (e.g. biogas) of biosolids and manure.”



Waste Management's **CORe®** process is a **local, urban solution for Boston** that takes **food material** and through our proprietary process we convert that material into our **EBS® product**.

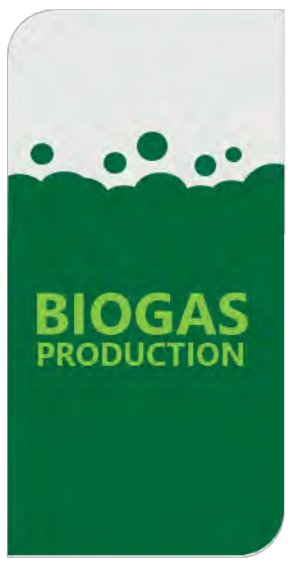
EBS® is a high quality, consistent product that removes **>97%** of the **physical contaminants** found in urban food waste.

The **EBS®** product is used to create **renewable, sustainable energy** in partnership with **long term** local partnerships, helping them approach **zero waste**

1 ton of SSO = 305 gallons of EBS = ~3MMBTU of Energy

Fast Facts
Co-Digestion

>70%



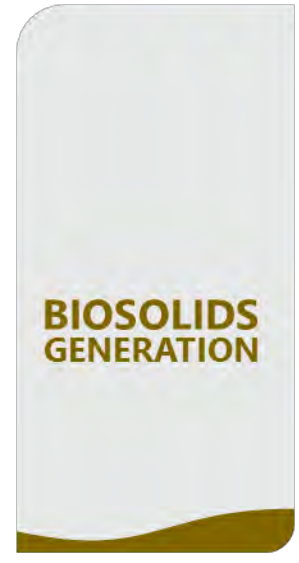
Increase in renewable **biogas** production with as little as 10% **EBS® volume addition**

>85%



Conversion rate of **EBS®** from **food waste** that are converted to biogas

~0%



Little to no additional generation of biosolids with **EBS®** according to **independent, peer reviewed** research

1 ton of SSO = 305 gallons of EBS = ~3MMBTU of Energy



Greater Lawrence Sanitary District



- **Progressive** WWTP in New England
- Recognized by MassDEP and EPA for **innovation**
- Investing over **\$24 million** in the **“Organics Energy Project”**
- **Over \$7 million** provided by the DEP, DOER, CEC, and CWT of Massachusetts
- **Renewable energy** produced will be used for facility heat and electricity
- Energy savings of **\$2.5 million** per year, with potential to **export to grid**
- **Longstanding, successful** program creating fertilizer from biosolids
- **100%** of fertilizer product sold to **local** agriculture and landscape businesses




Portland
Coming 2020


New York
2016


Boston
2017


Los Angeles
2011


New Jersey
2018



Branded and distributed in bulk and bagged products under the **earthlife**® brand



Over **5,000 tons** sold annually to agriculture and landscape projects **since 2004**

A **Massachusetts** manufactured slow release product with **NPK of 4-2-0 + Iron**



EPA Certified Class A EQ (Excellent Quality) product and is a **Registered Fertilizer (#371)** with the State of Massachusetts



Reducing local agriculture's **dependence** on **inorganic fertilizers** made from **fossil fuels**

Fast Facts Biosolids

MORE THAN
15
MILLION
TONS

Of biosolids are recycled into nutrient rich fertilizer each year to **local communities and agriculture**
55% of the biosolids produced by waste water treatment plants in the US are **safely recycled** each year as organic soil amendments and fertilizer

Biosolids recycling is a safe and proven practice.
40 years of independent, peer reviewed research – including studies by the **National Academy of Sciences** – has demonstrated **the safety** and benefits of its use



The **US EPA** reviews the federal regulations to ensure that the regulations are protective of the **public health and environment.** This review occurs every **two years** to ensure protections are in place and effective



Co-Digestion is a **proven solution** for large scale, urban food waste

Helping solve climate change with the **lowest Greenhouse Gas (GHG) footprint** of food waste processing options



Through co-digestion, food waste can be **recycled** as both **fertilizer** and a **renewable energy** source

Food is energy, let's not waste it.