Aerobic In-Vessel Rotary Drum Technology
For
Composting of Recovered Discarded Uneaten Food

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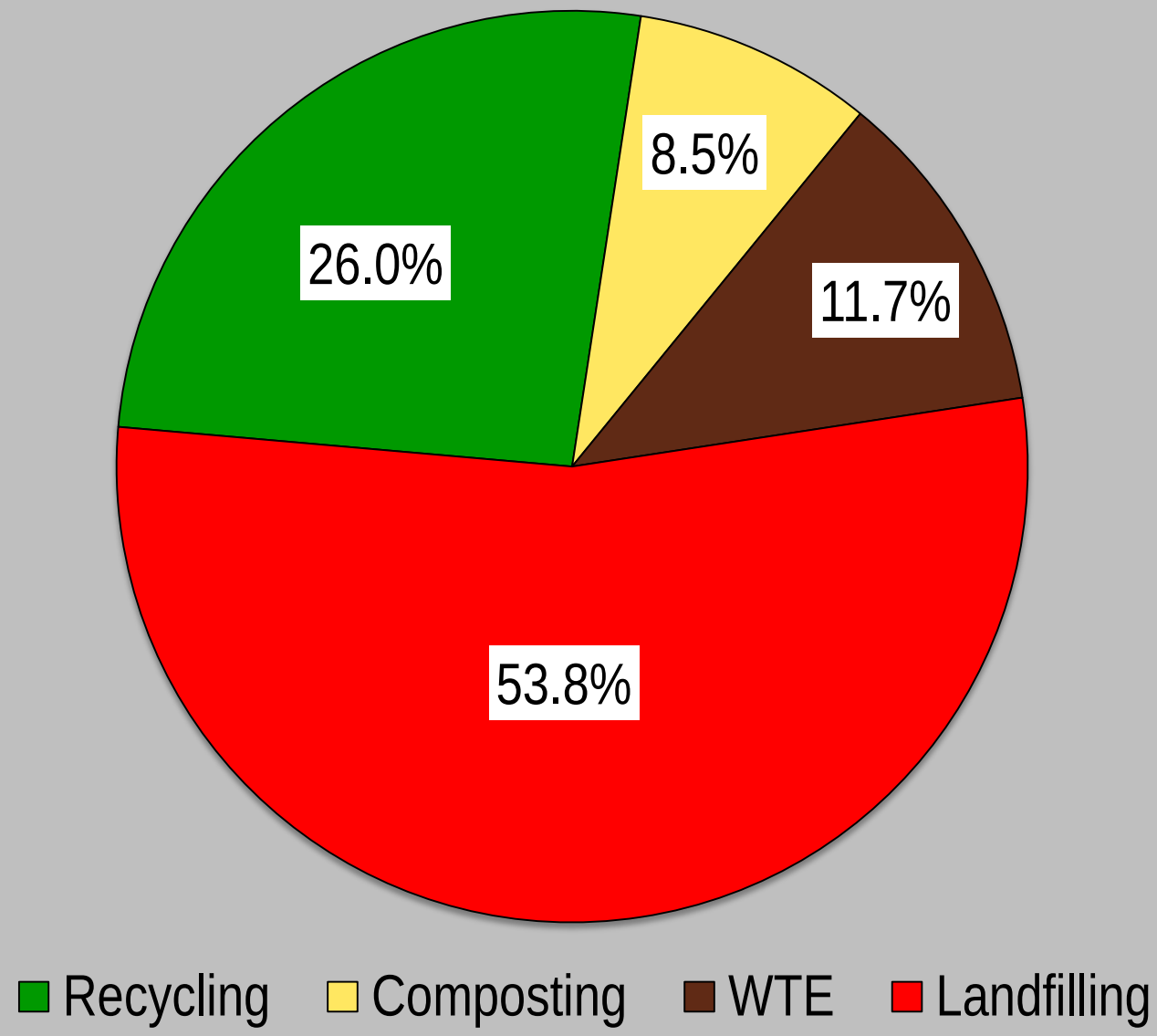
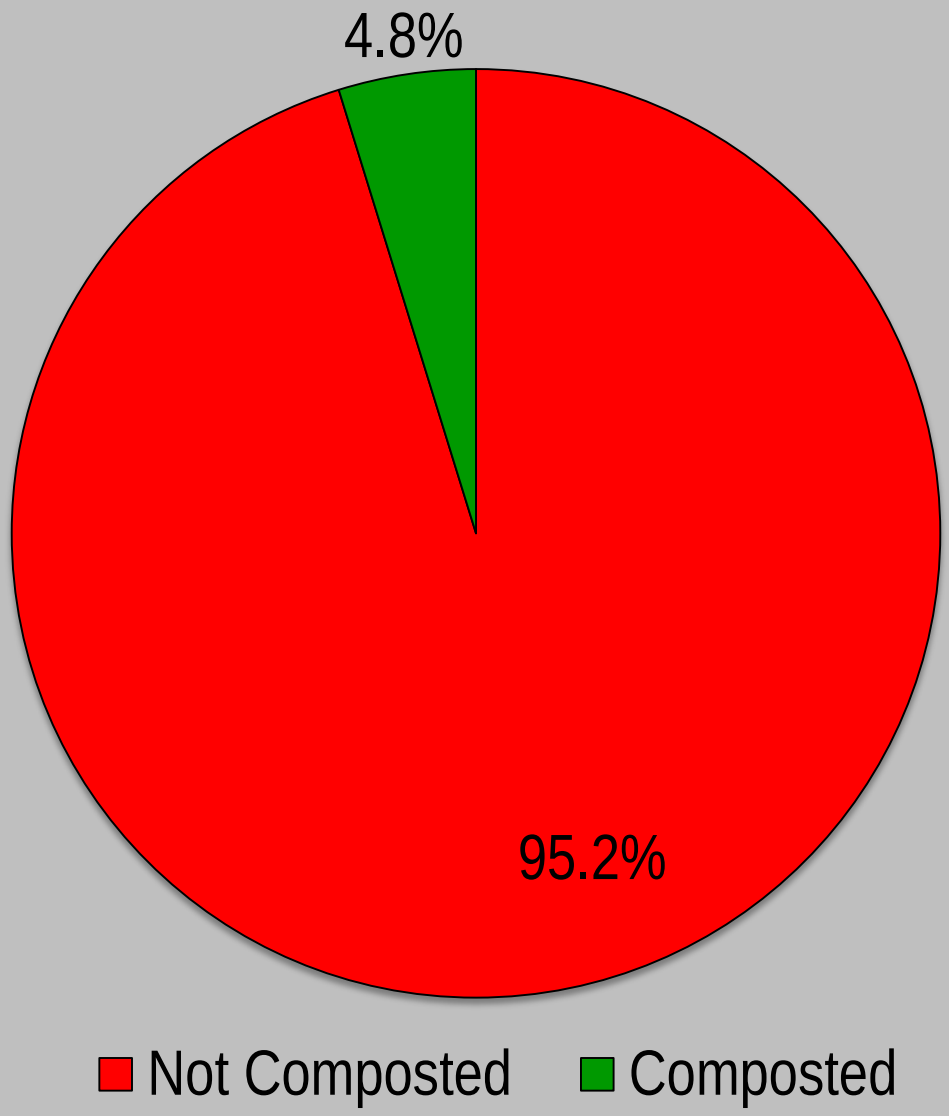
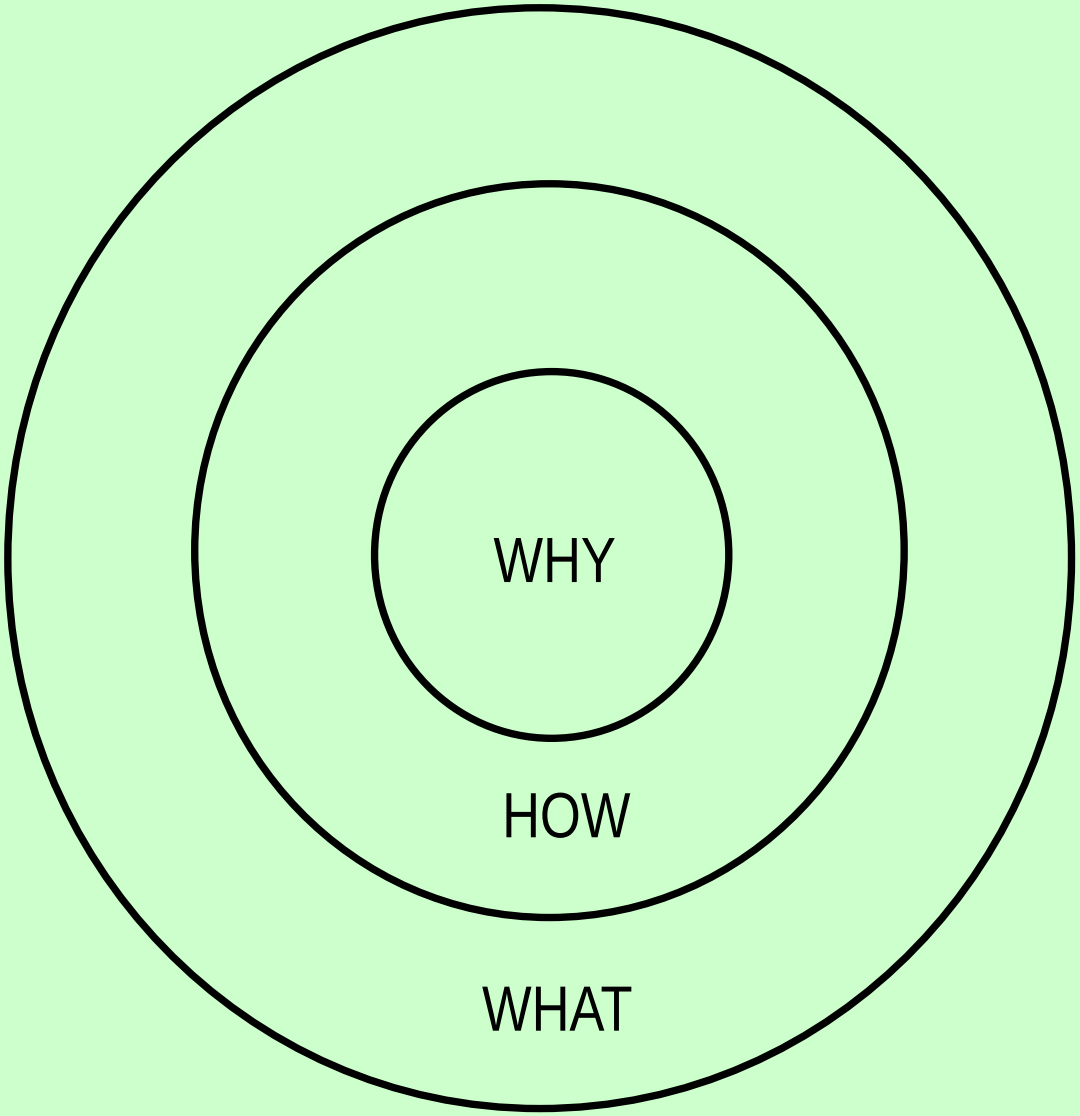
Tens of millions of tons of discarded uneaten food are generated year after year in the United States alone!

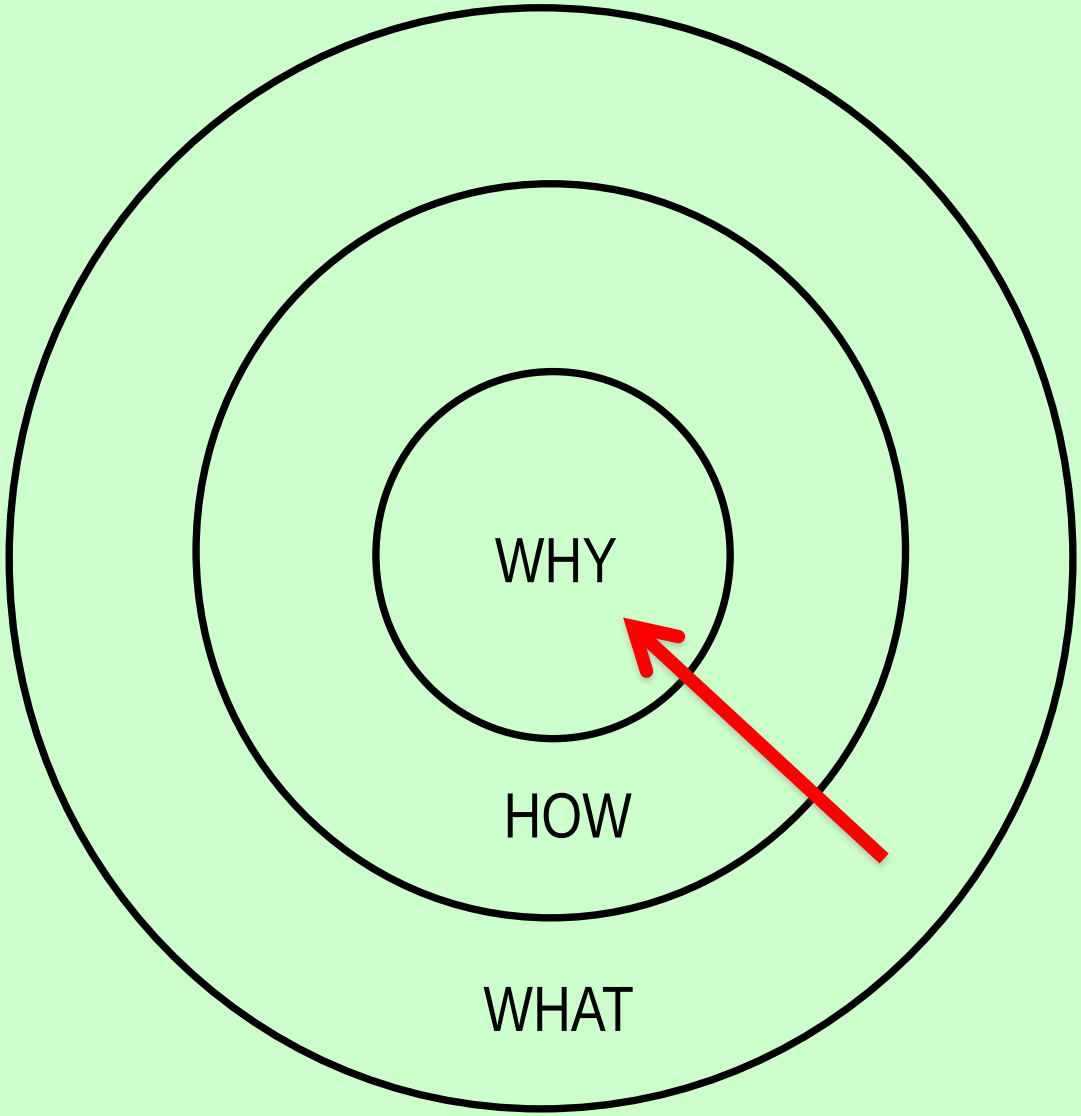
Management of Municipal Solid Waste in 2012
251 million tons generated



Management of Discarded Uneaten Food and Other Organics in 2012
36.4 million tons generated, 1.7 million tons composted



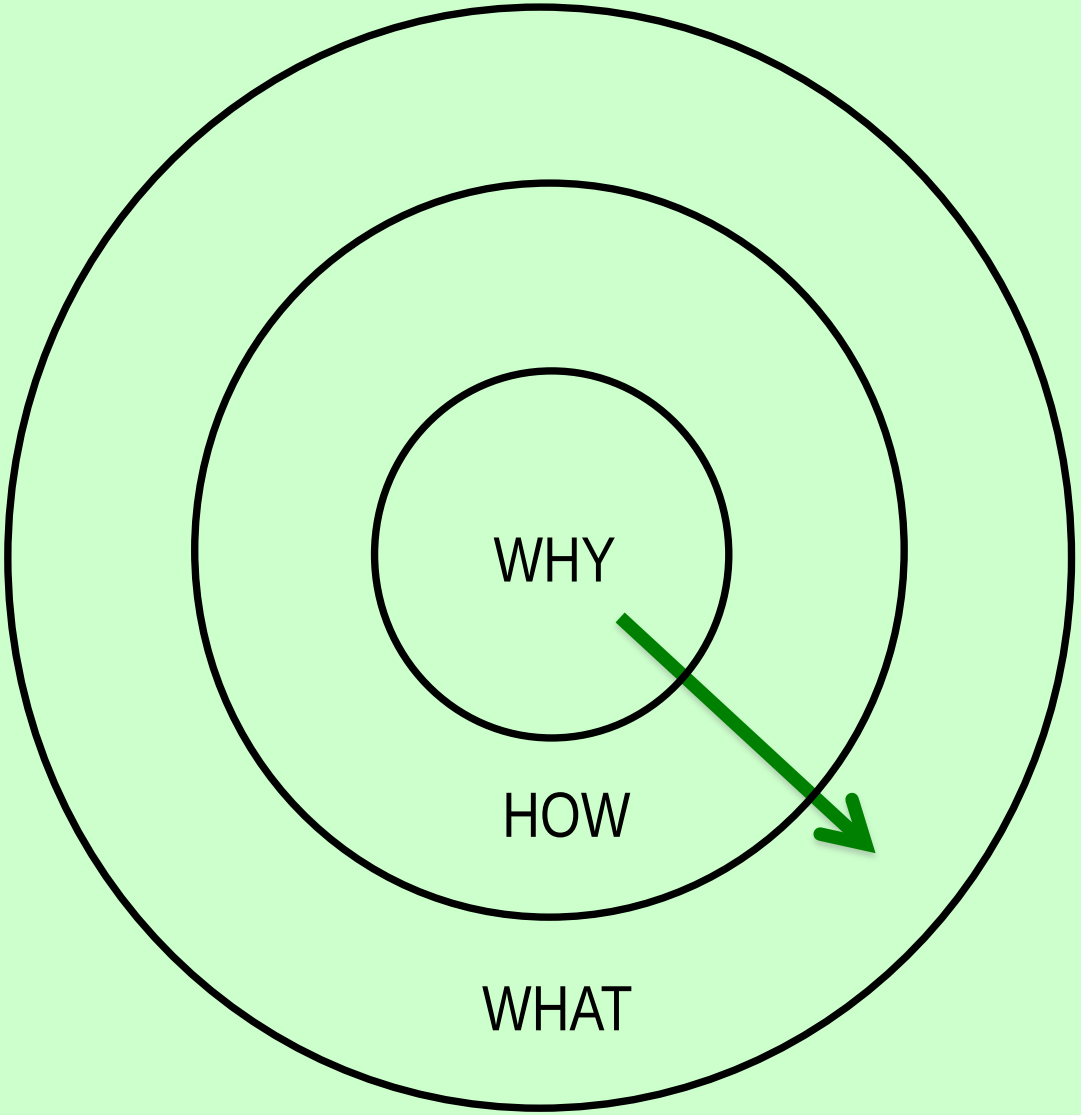

WHY
HOW
WHAT



What? We have all of this discarded uneaten food that we must have removed from the site. It's costing us a lot of money to do so. We have to find a less expensive way to get rid of it!

How? We found this system that takes the food waste and transforms it into water so all we have to do is flush it down the drain and *voilà*, its gone!

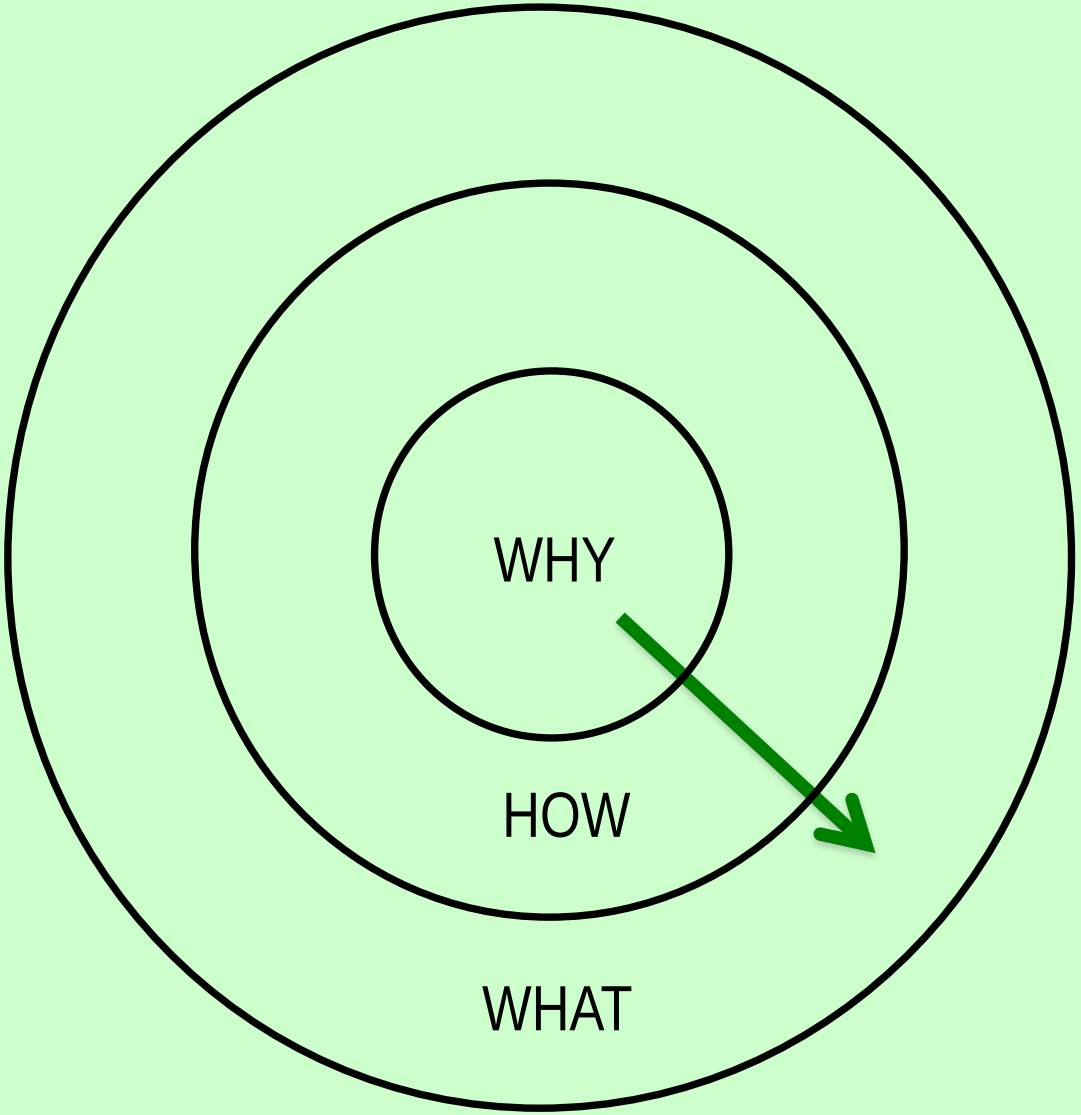
Why? Because we want to save money.



Why? We believe that restoration of soil is vital to achieving environmental reconciliation, resilience, and sustainability.

How? We have decided to install a local or on-site system that transforms discarded uneaten food into nutrient-dense compost in just 5 days. We'll use the compost to restore the vitality or soil.

What? More productive soil and the ability to grow food more sustainably.



Why? We believe that to achieve sustainability society must be equitable, fair, and just regarding employment and food justice.

How? In order to create jobs, we have decided to embrace the findings of the ILSR and create a local or on-site program to recover and compost discarded uneaten food. AIVRD technology is the best option for such a program.

What? Job creation and a more equitable, fair, and just food system.

	TRUCKING	
NO TRUCKING	Landfill CO_2, NO_x, SO_x, PM-10, CO, PAHs CH_4, Lechate, Volume Lost Nutrients	Composting CO_2, NO_x, SO_x, PM-10, CO, PAHs CH_4, Lechate N, NH_3, P, P_2O_5, K, K_2O, Ca, Mg, Cl, Na, S, Cu, Mn, Zn, Fe, Al, B, NO_3
		N, NH_3, P, P_2O_5, K, K_2O, Ca, Mg, Cl, Na, S, Cu, Mn, Zn, Fe, Al, B, NO_3

Americans spent nearly $840 million in 2011, not including hauling fees, to landfill discarded uneaten food!


HUMAN POPULATION (MOUTHS TO FEED)
AMOUNT OF LAND FOR FOOD PRODUCTION
SOIL FERTILITY

Key Calculations and/or Considerations

Most systems require some form of energy, typically electricity.

- volts x amps = Watts
- Watts x hours = kilowatt hours or kWh
- kWhrs x cost for electricity = cost of electricity to operate system

Most systems indicate capacity in lbs. or tons.

- 1 gallon of mixed discarded uneaten food ≈ 4 lbs.

Processing time

Auxiliary components

End product (Law of Conservation of Mass/Matter)

ENERGY USE COMPARISONS
BRAND A VS BRAND B

BRAND A	Daily Capacity (food)	Voltage	Amps	Watts	kW	Daily Run Time (hours)	kWhrs (daily load)	kWhrs (ton load)	Operating Cost (daily load) ($0.11/kWhr)	Operating Cost (ton loaded) ($0.11/kWhr)	Operating Cost (ton off-loaded) ($0.11/kWhr)	Operating Cost (260 days - loading) ($0.11/kWhr)
	2,000											
Shredder		480	7.6	3,648	3.65	1.50	5.47	5.47	$0.60	$0.60	$0.60	$156.50
Conveyor		480	3.4	1,632	1.63	1.50	2.45	2.45	$0.27	$0.27	$0.27	$70.01
Drum		480	4.8	2,304	2.30	0.85	1.96	1.96	$0.22	$0.22	$1.08	$56.01
Blower		480	7.6	3,648	3.65	3.20	11.67	11.67	$1.28	$1.28	$6.42	$333.86
Controls		480	1.2	576	0.58	24.00	13.82	13.82	$1.52	$1.52	$7.60	$395.37
			24.6	11,808	11.81		35.38	35.38	$3.89	$3.89	$15.97	$1,011.75

BRAND B	Daily Capacity (food)	Voltage	Amps	Watts	kW	Daily Run Time (hours)	kWhrs (daily load)	kWhrs (ton load)	Operating Cost (daily load) ($0.11/kWhr)	Operating Cost (ton loaded) ($0.11/kWhr)	Operating Cost (ton off-loaded) ($0.11/kWhr)	Operating Cost (260 days - loading) ($0.11/kWhr)
	2,200	220	150	33,000	33.00	21.5	709.5	645.65	$78.05	$71.02	$710.21	$20,291.70

Note: Brand A provides a potential for 260 tons of compost. Brand B provides a potential for 28.6 tons of "sterile bio-mass". At $40/ton, Brand A provides a revenue potential of $10,400. Brand B provides a revenue potential of $1,144.

Note: Annual cost/ton of compost is $3.89. Annual cost/ton of "sterile bio-mass" is $709.50.

BRAND A		BRAND B	
Capacity			
lbs/day / (kg/day)	500 / 227	lbs/day / (kg/day)	254-750 / 115-340
lbs/ 5-day wk / (kg/wk)	2,500 / 1,135	lbs/ 5-day wk / (kg/wk)	1,270-3,750 / 575-1,700
tons/260-day yr (tonnes/260-day yr)	65 / 59	tons/260-day yr (tonnes/260-day yr)	33.0-97.5 / 29.9-88.4
Power supply		Power supply	
Volts	240 or 480	Volts	400
Amps	30	Amps	16
Phases	3	Phases	3
Energy Consumption		Energy Consumption	
Total kWhrs/day	22.87	Total kWhrs/day	2.35
Total kWhrs/5-day wk	114.35	Total kWhrs/9 wks	148.05
Total kWhrs/ton	417.48	Total kWhrs on Average/ton	592

The cost to transform one ton of uneaten food into one ton of compost is the most striking difference between the two systems.
BRAND A does so in 5 days. BRAND B stipulates "Keeping all material in the cylinder for 8-10 weeks...".
Based on this information an $0.11/kWhr US, the costs comparisons, based on a 5 day resident time for BRAND A and a 9 week resident time for BRAND B are:

	kWhrs/ton	Energy Cost Ton	Unit Cost US$	Energy Cost 100 Tons	Total Cost 100 Tons	Savings
BRAND A	417	$46	$135,000	$4,587	$139,587	$20,925
	kWhrs/ton	Energy Cost Ton	Unit Cost US$	Energy Cost 100 Tons	Total Cost 100 Tons	Costs
BRAND B	592	$65	$154,000	$6,512	$160,512	-$20,925

	Energy Cost 5 Years	Total Cost 5 Years	Energy Cost 10 Years	Total Cost 10 Years	5-year savings	10-year savings
BRAND A	$22,935	$157,935	$45,870	$180,870	$28,625	$38,250
					5-year costs	10-year costs
BRAND B	$32,560	$186,560	$65,120	$219,120	$28,625	-$38,250

Brand B cautions, "The waste material from restaurants often contains large volumes of similar types of material. This can lower the capacity of Brand B as a 'balanced diet' is very useful for an optimum throughput. Food waste from restaurants also tends to be fresher than from housing and this can slow down the onset of the biological process."
Brand B also cautions, "It can take anything from 8-12 weeks for the machine to get up and running with a healthy biological process and producing compost. In the initial stages of the startup period more wood pellets/sawdust needs to be added and less food waste than later on."

Given: 240 V, 30 A; Claim: 30 kWhrs/week (average)

240 V x 30 A = 7,200 W or 7.2 kW

7.2 kW x ?hrs/week = 30 kWhrs/week

$$\frac{7.2\ \text{kW}}{7.2\ \text{kW}} \times ?\text{hrs/week} = \frac{30\ \text{kWh/week}}{7.2\ \text{kW}}$$

$$\frac{\cancel{7.2\ \text{kW}}}{\cancel{7.2\ \text{kW}}} \times ?\text{hrs/week} = \frac{30\ \cancel{\text{kW}}}{7.2\ \cancel{\text{kW}}}\text{hrs/week}$$

hrs/week = 4.17

7.2 kW x 4.17 hrs/week = 30.02 kWhrs/week

4.17 hrs/~~week~~ x 1 ~~week~~/7days = 0.6 ~~hrs~~/day x 60 minutes/~~hr~~ = 36 min/day

Claim:

- 250 lbs. Per Cycle yields
  - ~25 lbs. 100% Sterile Bio-mass +
  - ~ 20 Gallons Water
  - ~ 90% mass reduction

Analysis:

“A pint is a pound, the world around.”

1 gallon = 8 pints, therefore, 1 gallon is 8 lbs.

20 gallons = 160 lbs.

~25 lbs. 100% Sterile Bio-mass + ~160 lbs. water = ~185 lbs.

250 lbs. – 185 lbs = 65 lbs.

Where is the other ~ 65 lbs. of matter?

Does it accumulate in the equipment?

In deference to the late Dr. Albert Bartlett, Professor Emeritus, University of Colorado, don't believe any claim until you've either confirmed the calculations on which a claim is based or performed the appropriate calculations yourself to verify the validity of a claim.

Thank you.

Any questions?