

Harp Renewables

Introducing Harp Renewables

- Harp Products & Technology
- Client Testimonials
- Upcycle Projects (large scale)
- Q&A/Appendix



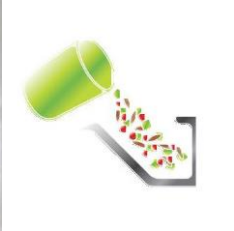
Organic Waste to Soil Regeneration



Harp Renewables designs and manufactures thermophilic aerobic digestion systems that transform organic waste into high-value soil products since 2014.

Harp “Dry” Bio-Digesters™ combine biological and mechanical processes to reduce organic waste volume and weight by up to eighty percent in less than twenty-four hours.

How the Process Works



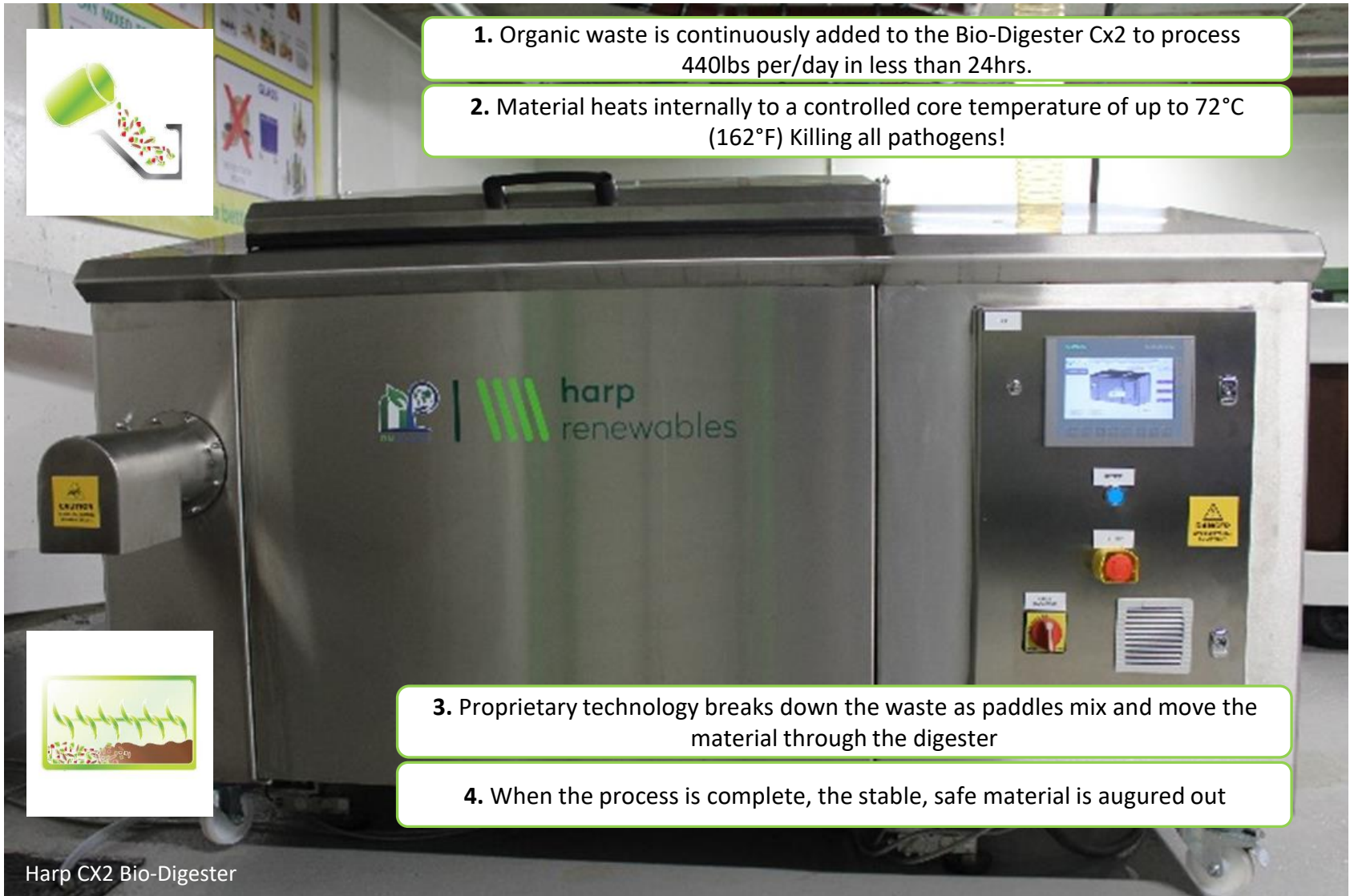
1. Organic waste is continuously added to the Bio-Digester Cx2 to process 440lbs per/day in less than 24hrs.

2. Material heats internally to a controlled core temperature of up to 72°C (162°F) Killing all pathogens!



3. Proprietary technology breaks down the waste as paddles mix and move the material through the digester

4. When the process is complete, the stable, safe material is augured out

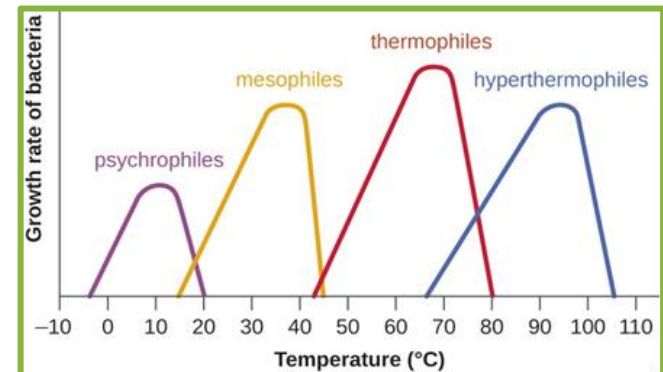


Harp CX2 Bio-Digester

Harp Bio-Technology

Thermophilic Aerobic Digestion (Proprietary Microbial Enzyme Mix)

- Reduces waste up to 80% in less than 24 hours
- Destroys pathogens with high temperatures
- Binds ammonia molecules to eliminate odors
- Prevents oxidation/change of carbon into CO₂ No GHG greenhouse gases
- Constant re-generation of microbes - No replenishment needed
- Produces nutrient-rich (N/P/K) fertilizer - \$\$\$\$\$



Harp Bio-Digester™ Product Line

On-Site Applications



CX2



CX5

Mid to Large Scale Applications



CX20



CX50

System	CX2	CX5	CX10	CX20	CX50
Daily Input Capacity (US tons per 24 hrs.) ¹	Up to 0.2 (440 lbs.)	0.6 (1,100 lbs.)	1.1 (2,200 lbs.)	2.2 (4,400 lbs.)	5.5 (11,000 lbs.)
Monthly Input Capacity (US tons/month)	6.6	16.5	33	66	165
Bio-Product Production (US tons/month) ²	1.6	4.1	8.2	16.5	41.2
Equipment Footprint (length/width/height)	6 x 4 x 4 feet	12 x 4½ x 4½ feet	17 x 5 x 5 feet	18 x 5 x 8 feet	22 x 12 x 9 feet

¹ Assumes weight volume calculation for food waste, per EPA guidelines; weight will vary with feedstock density

² Assumes 75% conversion; 25% residual material by weight

Proven Product Performance

History of Successful System Installations and Use by Customers



Shopping & Entertainment



Farms



Zoos



Schools



Hospital Kitchens



Hotels/Resorts



Food Processors



Residences/Companies

Food Services & Facilities Client



"We haven't sent any waste to the landfill since we installed the Harp Bio-Digesters..."

"The easy process has been embraced by our tenants"

"We are delighted with this initiative, which directly feeds into our 'People Planet' Sustainable Strategy."

MICHAEL FARRELL Manager,
Capital Dock Aramark

Municipal Client

"It is an ideal solution for any organization with excess food waste -- cities and towns, food courts, shopping centers, hospitals, large schools or businesses"



"I would have no hesitation in recommending Harp Renewables to any interested party"

BERNADINE CARRY
Environmental Officer
County Meath, Ireland

Shopping Center/Food Court Client



MERMAID QUAY, Cardiff, United Kingdom

- Over 30 outlets feed one CX5 digester
- 7,800 lbs. food waste processed weekly
- Soil product used in on-site greenhouse

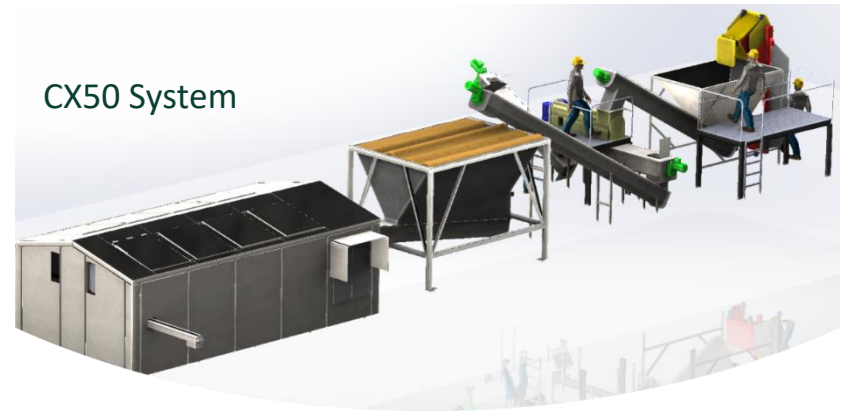
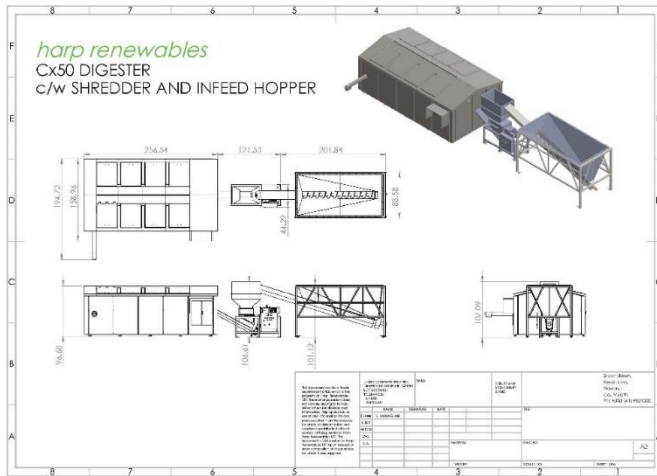


Creating a Circular Economy (Maui R&D Example)

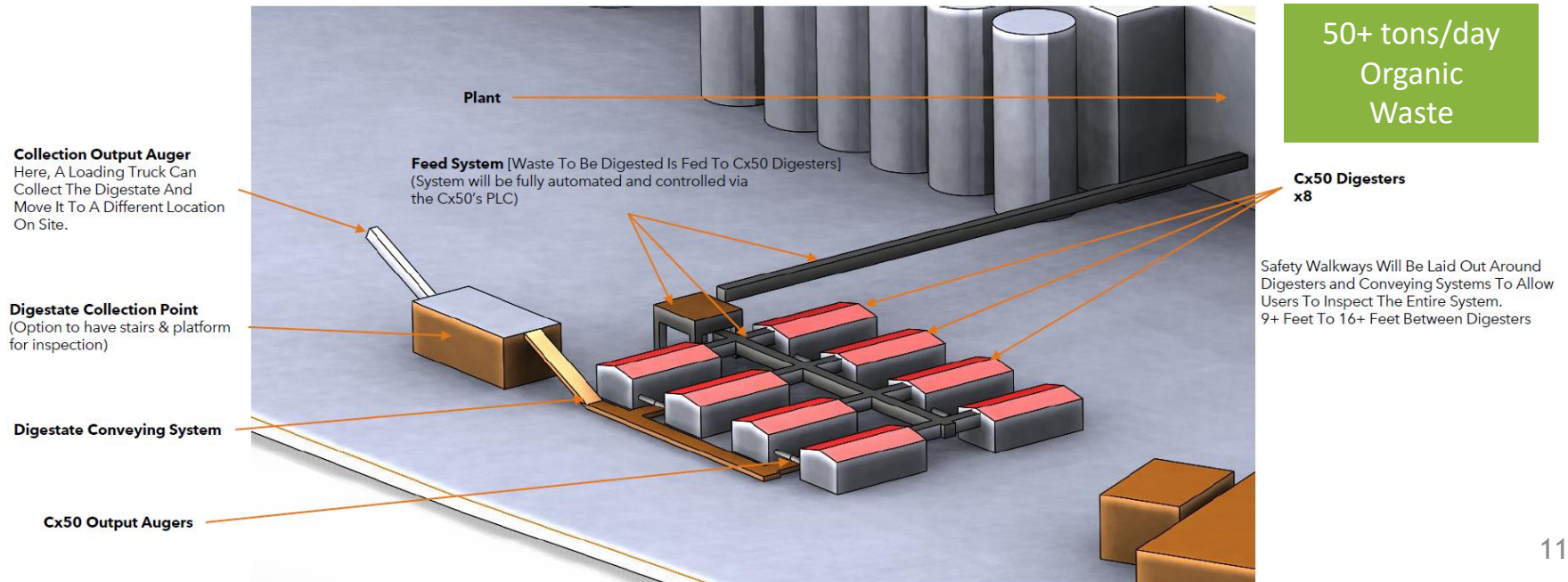


We also provide large-scale, integrated facilities for waste collection, conversion, and soil regeneration, as well as zero waste and carbon offset consulting services.

Multiple Units for Large Scale Operations



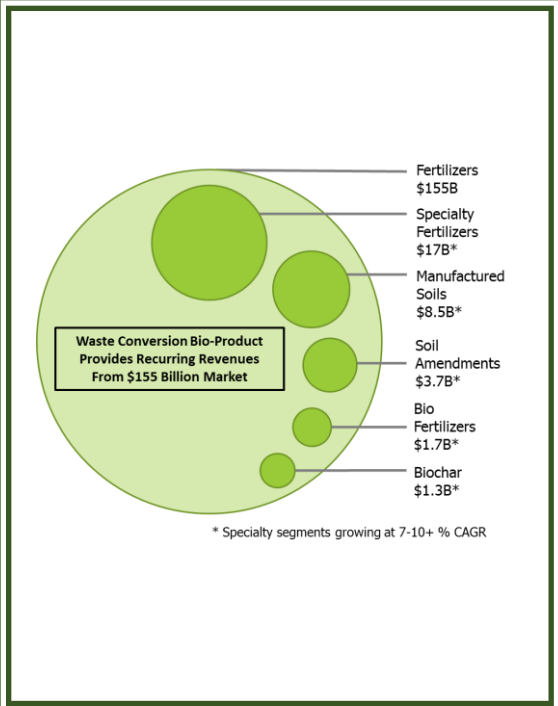
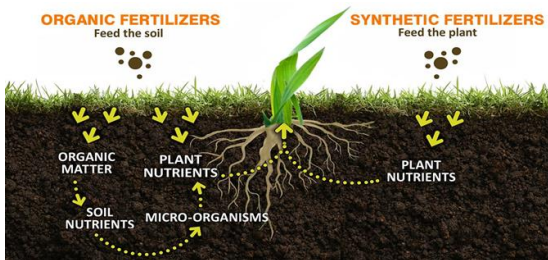
Cx50 Digesters c/w Feed & Collection Systems



On-Site Solutions: Go Green & Save \$

- **Replace Dumpsters, Bins and Carts**
- **Streamline Waste Processes with Improved Labor Workflow**
- **Replace Monthly Garbage Bills with Lease Payment Option**
- **Secure Predictable Payment Amounts with No Annual Increases**
- **Save Significant Costs During Life of Equipment**
- **No Pathogens, No Odors, No Vermin**
- **Reduce Transportation, Pickups, etc.**





- High organic content
- Carbon sequestration
- No rancidity or odor
- No GHG emissions
- High NPK content
- Pathogen free
- Low toxicity

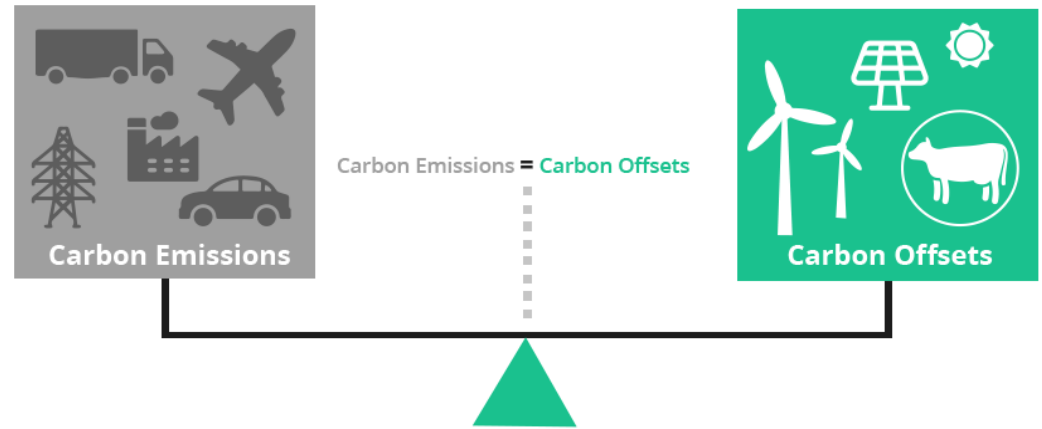
Harp Premium Organic Bio-Fertilizers



Carbon Offsets

How a Carbon Offset works.

1 CO₂ Offset = 1 Metric Ton of Carbon Dioxide Reductions



EXAMPLE: ILLUSTRATIVE ONLY

Harp Product	Tons of Food Waste Processed Annually (Landfilled-Avoided)	MTCO ₂ E (Reduction)	Annual Carbon Credit Est. (\$3.01 per MTCO ₂ E* to \$5.00 per MTCO ₂ E)
CX50	1,716	7,080	\$21,310 to \$35,400
CX20	686	2,830	\$8,518 to \$14,150
CX10	343	1,415	\$4,259 to \$7,075

Unlike composting or anaerobic digestion, our technology prevents carbon oxidation and sequesters the carbon in the soil product

Management Experience

COMPANIES



PEPSICO



Procter & Gamble



McKinsey & Company



solazyme



Maui Land & Pineapple Company, Inc.



DYNTEK



waste resource technologies



Waste Equipment & Bio-Tech Experience

- Fortune 100 Cos & Start-Ups
- 15+ yrs. Global Waste Equipment Mfg.
- 30+ yrs. Development & Construction
- 10+ New Bio/Tech Products Commercialized
- 1st On-Site US Food Waste Treatment Systems

INDUSTRIES



Biotechnology



Waste Mgt.



Industrial



Agriculture



Info. Technology

Harp Renewables Company Snapshot



Profitable, Private-Equity Backed Company with No Debt



Proven, Robust Technology



History of Satisfied Customers



Circular Economy Solutions



Sustainability Benefits, Carbon Offsets



Experienced Global Management & Local Partnerships (Waste Haulers)

Appendix



**Our mission is to divert organic waste material from landfill disposal
and create regenerative soil products**

Harp Acceptable Waste

All Food Waste

- Fruits & Vegetables
- Grains, including breads, cereals, rice, pasta, flours, doughs
- Proteins, including meats, poultry, fish, beans, eggs, nuts, seeds
 - Including fish, poultry and meat bones (shred large bones, hard shells)
 - Including poultry feathers, meat hides, paunch, fleshings (cartilage, etc.)
- Dairy, including milk, yogurt, cheese (15-20% of load)
- Fats, Oils, Greases and Confectionary Products (15-20% of load)
- Food & Beverage Ingredients, sugars, spices, starches, coffee grounds, etc.

All Green Waste

- Plants, live or dried, including trimmings, stems, potting soil, etc.
- Wood shavings, sawdust from untreated wood (15-20% of load)

Harp Acceptable Waste, cont.

All Animal Waste

- Domestic animal waste, including bedding and litter
 - Pets (dogs, cats, birds, reptiles)
 - Livestock (cattle, sheep, pigs, goats, poultry)
 - Beasts of burden (horses, camels, donkeys)
- Wild animal waste (carnivores, herbivores, omnivores)
- Includes: manure, skins, feathers, body parts

Other Organic Waste

- Cardboard (max. 15-20% of load)
- Food-soiled paper towels, napkins (max. 15-20%)
- Organic soiled paper, restroom paper
- Shredded newspaper
- Non-glossy or non-colored print paper products
- Compostable cups, bowls, cutlery, packaging (10%)
(must be Biodegradable Products Institute “BPI” approved)
<https://products.bpiworld.org>
- DAF sludge; Waste water sludge (see Company for special treatment)



Unacceptable Waste



Hazardous materials, including batteries and electronics, etc.

Non-organic materials, including:

- Metals
- Plastics
- Glass
- Rubber
- Non-compostable dinnerware, cutlery, packaging



Caustic materials, including bleaches and acids



Treated organic materials

- Sawdust from pressure-treated plywood or lumber
- Colored, dyed or glossy paper products
- Coal, charcoal or ashes (nothing left to digest)



Medical waste (see Company for special treatment)

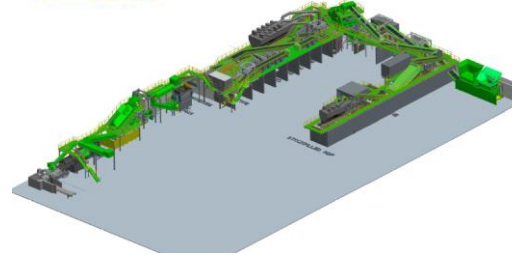


Comparison to Conventional Composting

Conventional Compost	Harp Accelerated Bio-Digester
Microbes create self-generated heat	Microbes secrete potent hydrolytic enzymes - bio-catalysts for accelerated thermal process
Significant GHG emissions: CO ₂ + N ₂ O + CH ₄	Low GHG emissions. Binds carbon & nitrogen
Temperature 55 to 65 C for weeks to months	Temperature >70 C; Pathogen free
Waste volume reduced 40% - 50%	Waste volume reduced 75% to 80%
Requires structure. Suitable for woody material	Ideal for food waste
Open batch system; consumes space	Closed continuous system; small footprint
Open windrows carry risk of rodents etc.	No risk of rodents and other pests
Variable moisture. Sometimes wet & heavy	Low moisture content; Light weight material
Some odors present	Odor-free. Enzymatic process binds ammonia
Lower & less consistent nutrient content	Higher & more consistent nutrient content
Suitable as soil amendment	Suitable as soil amendment and fertilizer



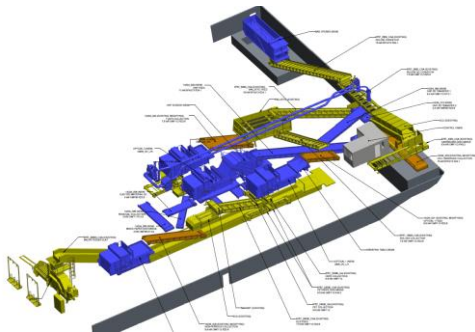
21 T/PH Dry Recycling Plant in Swindon, UK



Upgrades 70 T/PH C&D plant in Dartford, UK



150 ton/per hour C&D plant in Sydney, AUS



Upgrades 20 T/PH Thorton MDR plant in Dublin

Large Scale Project Experience

On-Site Processing Fulfills Legal Requirements

Table 1. State organic waste bans and recycling laws currently in effect

	California	Connecticut	Massachusetts	Rhode Island	Vermont
Citation	Cal. Pub. Res. Code § 42649.81	Conn. Gen. Stat. Ann. § 22a-226e	310 Mass. Code Regs. 19.017	R.I. Gen. Laws Ann. § 23-18.9-17	Vt. Stat. Ann. tit. 10, § 6605k
Food Waste Generators Covered	Any business, e.g., commercial or public entity such as a firm, partnership, corporation, or association organized as a for profit or nonprofit entity	Commercial food wholesaler or distributor, industrial food manufacturer or processor, supermarket, resort or conference center. Universities and K-12 schools not covered, but stand-alone, university-owned conference centers are covered	Any individual, partnership, association, firm, company, corporation, department, agency, group, or public body (including city, town, district, county, state, federal, or other government unit).	Commercial food wholesaler or distributor, industrial food manufacturer or processor, supermarket, resort or conference center, banquet hall, restaurant, religious institution, military installation, prison, corporation, hospital or other medical care institution, casino, or covered educational facility	Any individual, partnership, company, corporation, association, unincorporated association, joint venture, trust, municipality, the State of Vermont or any agency, department, or subdivision of State, federal agency, or any other legal or commercial entity
Waste Production Threshold Covered	2016: 8 cubic yards/week (cy/wk) 2017: 4 cy/wk 2020: 2 cy/wk if state-wide organic waste disposal has not been reduced to 50% of the level in 2014	2014: 104 tons/year (tpy) 2020: 52 tpy	1 ton/week ¹	2016: 104 tpy 2018: 52 tpy for covered education facilities.	2014: 104 tpy 2015: 52 tpy 2016: 26 tpy 2017: 18 tpy 2020: Food scraps banned from landfill completely.
Population or Distance Exemptions	Local governments of rural jurisdictions (pop. 70,000 or fewer) can exempt their jurisdictions from law	20 miles	None	15 miles	20 miles (until 2020)
Action Required	Subscribing to organic waste recycling service, processing on-site, or selling or donating edible surplus food	Sending food waste to a composting or anaerobic digestion (AD) facility or animal feed operation (AFO), donation for human consumption, on-site treatment, or reducing waste generated below threshold	Sending food waste to a composting, AD facility, AFO, donation for human consumption, on-site treatment, or reducing waste generated below the threshold ²	Sending food waste to a composting, AD, or other authorized recycling facility, AFO, or on-site treatment ³	Source reduction, donation for human consumption, sending food waste for agricultural use, composting, AD, or energy recovery, or on-site treatment



Management Team Background

Robert Webber, CEO

- 25+ years experience in bio-tech, waste, ag/food, & hospitality
- CEO & COO/CFO, Maui Land & Pineapple (NYSE);
- CEO, Dyntek (OTC); CCO, Solazyme (Nasdaq);
- CFO, Waste Resource Tech.; COO, Santa Catalina Island Co.
- Sr. Mgr. McKinsey & Co. (Fortune 500 bio-tech, services)
- MBA, Harvard Bus. School; JD, Columbia Law School

Clint Knox, EVP Development

- 25+ years experience in project engineering & development
- 12+ years experience in material processing and waste conversion technology industry
- EVP Technology & Dev., Waste Resource Technologies;
- VP of Project Development, BioEnergy Hawaii (10 years)
- Designated LEED Accredited Professional since 2009

Scott Sloan, VP Sales & Marketing

- 30+ years experience in sales/sales management in consumer, B2B, government, technology & academic markets
- Executive leadership roles at PepsiCo, Procter & Gamble, Maybelline
- Founder/CEO, MegaForce, retail merchandising over 40,000 outlets
- President, Precision Aerial Data, infrared thermography for energy savings in commercial buildings and real estate
- VP Sales & Marketing, Check Robot, automated checkout technology for grocery industry

Sonny Burkett, VP Sales & Bus. Dev.

- 30+ years experience in technology product & system sales
- Pres., Food Recycle Science (food waste dehydrators)
- VP Sales & Marketing, Hungry Giant Recycling
- Sales Marketing Manager, C. Itoh Electronics (Itochu); Division Manager, AST Research; VP Sales, Talaris Laser Systems; Division Manager, Bosch USA; Mgr. AT Kearney Consulting
- Business Management, Indiana University

Shane Finnegan, Founder & President

- 20+ years experience in engineering & development
- Founder & owner, Harp Renewables; Harp Electrical Engineering; Project Lead Engineer, Turmec, Ltd
- Acquired bio-tech formulas in 2014; Redesigned aerobic digesters
- Cert. Engineering, DKIT, Ireland

Joseph Cowley, VP Engineering

- 15+ years experience in project engineering and technology
- Engineer, Boliden Mining; Foreman & site engineer leading Irish civil engineering company; Engineer, Topcon Ireland
- DIP business management and agriculture
- Business Services Engineer, Dublin Institute of Technology
- Civil Engineering, Dundalk Institute of Technology (DKIT)

Tim Dummer, VP Commercialization

- 30+ years experience in new product dev. & global sales
- Global Bus. Mgr., DuPont (15 yrs); Global Dir. New Markets, GE Plastics; VP BD, GE Tech Ventures; Sr. Dir. BD, Solazyme;
- VP Commercialization, Rennovia; Founder, Venture Catalyst Advisors (product innovation, commercialization & growth)
- Six Sigma, DuPont; Adv. Mgt. Program, GE Crotonville
- Global Business Mgt, INSEAD; B.Chem-Eng, Univ. of Bradford

Harry Petersen, VP Facilities

- 30+ years experience in construction industry
- Licensed contractor and business owner, developed wastewater treatment, other projects in diverse environments
- VP Construction & Facilities, Waste Resource Technologies; VP Construction & Facilities, Santa Catalina Island Company
- Experienced with waste conversion equipment providers, design engineering, installation, commissioning, and operations

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