

Empowering Organics

POWER Session
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Empowering Organics

Our purpose is to help businesses, governments, and individuals meet zero waste and diversion goals and implement sustainable waste management practices. Using innovative technologies, we create a new path for organics that transforms wastes into valuable resources

ORGANIC FEEDSTOCK

*(e.g. food scraps, yard trimmings,
paper fibers and clean wood waste)*



ENERGY



COMPOST & NUTRIENT-RICH SOIL PRODUCTS



Turning organic waste into valued resources

Harvest Power, Inc. Profile

Founded in 2008, we provide industry recognized expertise, innovative technologies and project development capability to harness the renewable energy and soil-building potential in organic waste.

Corporate Profile

- Recognized industry leading experience in organics waste management, plant operations, and odor control; 5 proprietary patents
- Financial investments from Kleiner Perkins Caulfield & Byers, Munich Venture Partners, Waste Management Inc
 - \$40MM in debt, equity and grants to date
- 45 full-time employees to date
- Expanding technology portfolio supported by industry-leading science and technology advisors

Operating Facilities

- Own and operate Fraser Richmond Soil & Fibre, the largest, most efficient composter of food and yard waste in Canada
 - Profitably processing over 200k tons of food and yard waste per year
 - Marketing generated end product and selling out yearly
 - Planned commencement of high solids anaerobic digestion facility in 2011 to increase capacity and process a greater percent of food waste

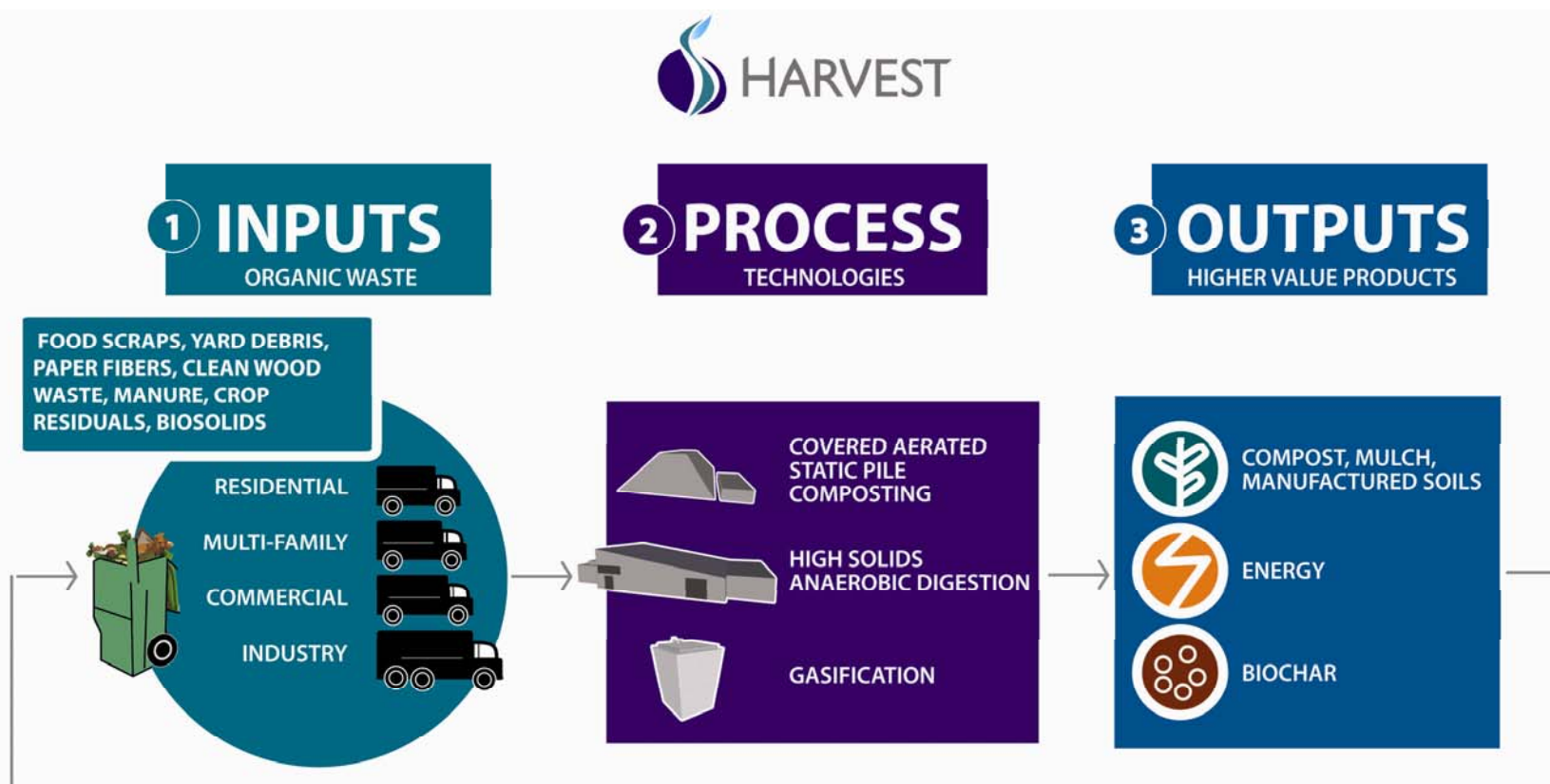




Harvest's Unique Characteristics

- Organics recycling company building next-generation facilities that unlock and optimize the energy and compost value of organic waste streams
- Highly experienced management team with expertise in design, development, finance, construction, renewable energy, and compost marketing
- Financial resources devoted to investing in and acquiring high-value projects along with partners
- Commercialized best-of-breed technologies that extract energy value from organics
- Source separated program development and support, community outreach and education

Processes and Transformations



Harvest Core Technologies

Harvest deploys site-specific best-of-breed technologies to maximize project economics:

- **Composting**

- Proprietary top-tier composting systems and processes to enhance project revenue
- Highest degree of odor and process control
- Highly efficient with demonstrated cost leadership

- **High Solids Anaerobic Digestion (HSAD)**

- Simple, robust, and low cost system to generate and capture methane gas from dry organic residuals
- Enclosed design for odor control
- Many facilities operating in Europe → commercially proven technology
- Harvest specializes in technology transfer

- **Distributed Biomass Gasification**

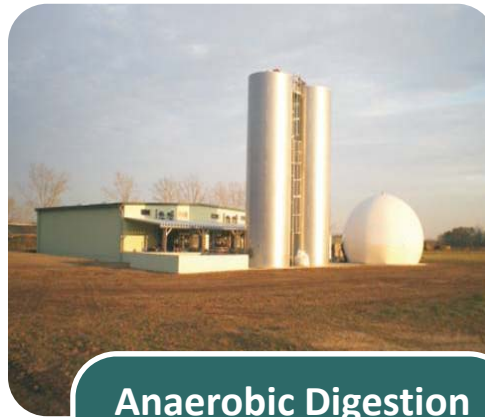
- Allotermal gasification produces clean syngas with high heating value → broad range of applications
- 20 times the heat transfer capability of traditional gasification technologies
- Small footprint leads to low capital costs and high siting flexibility
- Earlier stage technology with one plant operating in Europe

High Solids Anaerobic Digestion



Input of Organic Material

- Source separated organic food and yard waste delivered to facility
- Little to no pre-processing required
- Waste placed into hydrolysis percolators using front end loaders



Anaerobic Digestion

- Organic residuals broken down by microorganisms in percolate liquid
- Biogas collected, processed, and sold as electricity and heat (pipeline natural gas or CNG fuel are also possible)



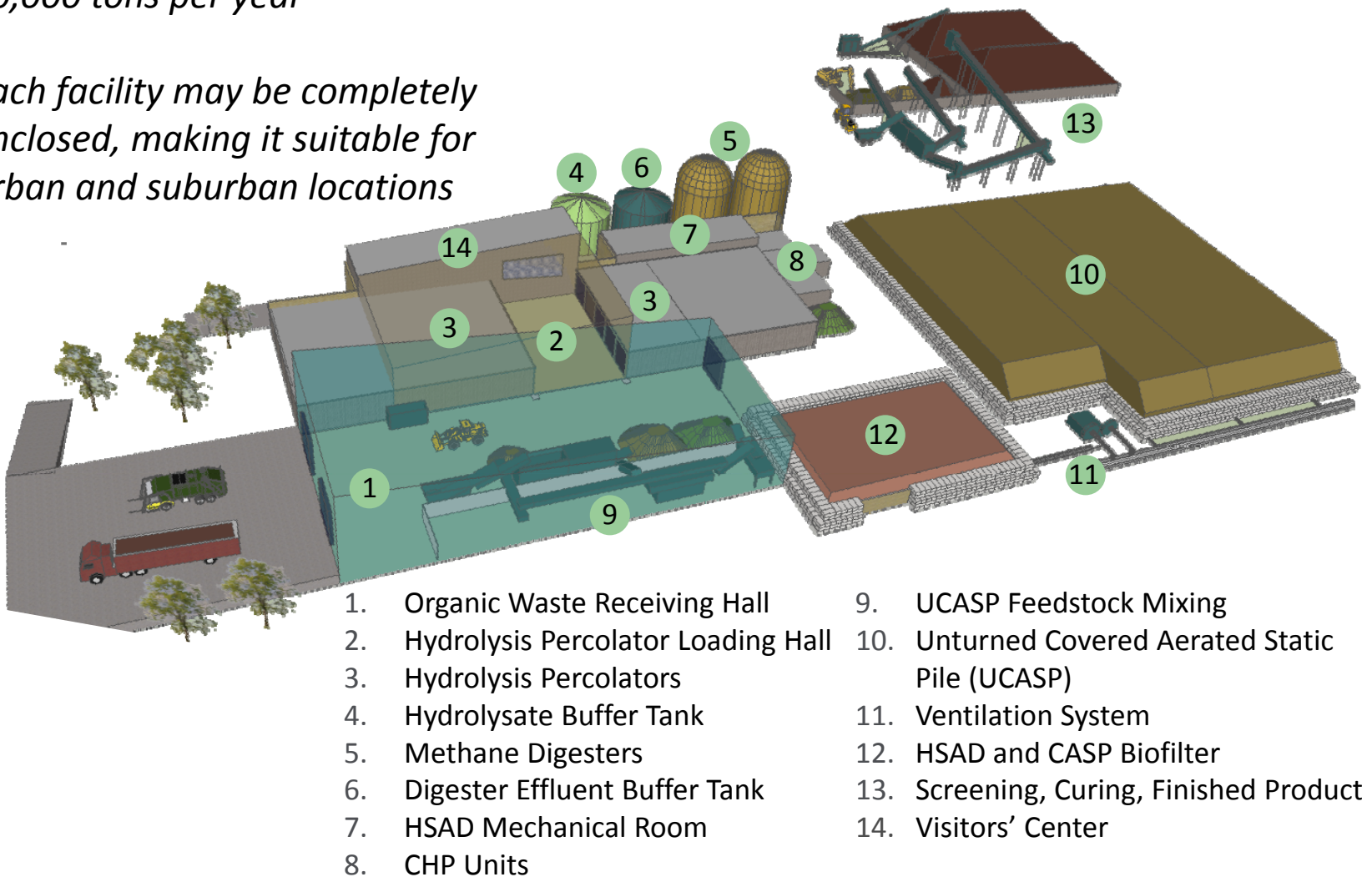
Aerobic Composting

- Digestate aerobically composted, cured, and aged over six weeks
- Finished compost product screened and marketed

30,000 tons per year

Each facility may be completely enclosed, making it suitable for urban and suburban locations

HSAD Facility Diagram



Sample Plant Photos



HSAD System Specifications

Organic Material Input Requirements

Minimum Capacity	30,000 tons per year of organic waste, produces approximately 2 MW of power and heat
Preferred material	50%-70% food waste, 30%-50% yard waste, plus additional yard waste for post-anaerobic digestion composting
Bulk density	750 lbs/cubic yard or less
Solids content	Targeting 35%; can handle 25%-50%
Regularity of Supply	Need regular supply of food waste; can handle seasonality of yard waste by storing material from high-volume seasons for use during winter

Preferred Site Characteristics

Size	3-10 acres (including aerobic composting)
Zoning	Heavy industrial and/or solid waste zoning
Existing Use	Prefer location permitted to handle solid waste (compost facilities, transfer stations, etc.) or other industrial use
Co-location	Co-location with large user of electricity and/or heat is desirable (e.g., greenhouses, wastewater treatment plants, manufacturing plants, etc.)
Road access	Good access and excess truck traffic capacity
Neighbors	Compatible surrounding land uses, good distance from the nearest sensitive receptor

HSAD – Environmental Attributes

Biogas Purity



Process yields biogas with average methane content of 65% to 80%, considerably higher than many other HSAD technologies. Less biogas cleaning and processing required.

Residence Time



Process design allows for a feedstock residence time of approximately two weeks, increasing processing capacity and reducing facility footprint

Operational Requirements



No grinding, slurring required; only moving part is front-end loader; entire process controlled by computer.

HSAD – Environmental Attributes (2)

Odor Control



AD process naturally breaks down many of the volatile compounds that cause odor; system under negative pressure with air ventilated through biofilter, eliminating VOCs; facility totally enclosable.

Water Usage & Leachate Control



Large portion of leachate is re-circulated to aid in digestion and gas yield; the remainder may be used in compost process.

Energy Requirements

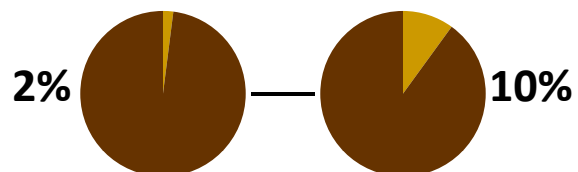


Very low parasitic energy use; requirements can be met completely with energy generated on-site.

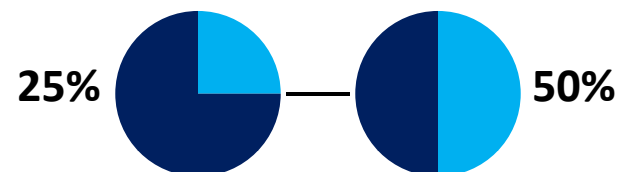
Wet vs. High Solids Anaerobic Digestion

**Solids
Content**

Wet



High Solids



Feedstock

WWTP, manure



Food, yard, wood waste



**Pre-
Processing**

Grinding, slurring

None



Conclusion: Partnering with Harvest

Harvest can help communities:

- Become leaders in sustainability through organics recycling
- Control costs and process resources internally
- Increase energy independence and clean the air through local, distributed, low-cost, clean energy
- Revitalize local landscape and agriculture through high-grade organic soil products
- Minimize environmental impacts of waste processing through small-footprint facilities

We do so by:

- Designing, developing, financing, building, and operating organics recycling facilities
- Customizing our state-of-the-art facilities to fit processing plants' feedstock and infrastructure
- Devoting resources to education and environmental leadership programs
- Obtaining available government credits and incentives