

# A Superpowered Approach to Energy Independence and Organics Management

Anaerobic Digestion Workshop  
Hosted by CRRA and BioCycle  
April 12, 2010



## Does This Make Sense?



More than  $\frac{3}{4}$  of our energy comes from sources that pollute our environment



We sent enough food, yard, and wood waste to landfills and incinerators to fill Giants Stadium more than 50 times



In 2008, the U.S. recycled only 2.5% of its MSW food waste.

## Does This Make Sense?



We could produce enough energy  
from discarded organic MSW to  
power over 2.5 million homes!

our energy  
comes from  
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environment

wood waste to landfills and  
incinerators to fill Giants Stadium  
more than 50 times

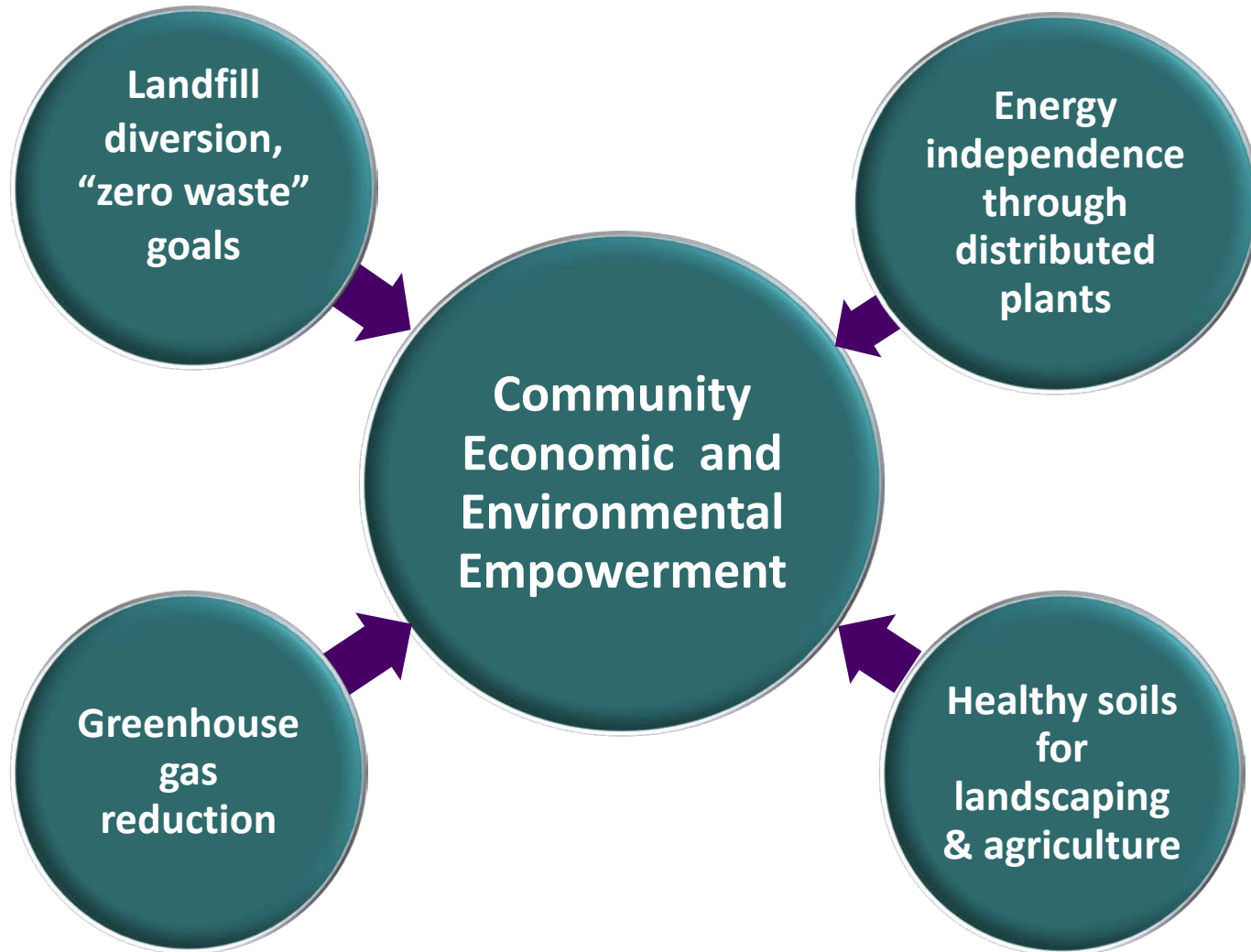
recycled only  
2.5% of its MSW  
food waste.

## That's Why We Formed Harvest

- Distributed, domestic, clean energy; significant new value creation from organic waste
- Action and support for zero-waste and diversion of organic materials, particularly food waste
- Technology to capture renewable energy from organic discards is at tipping point
- Local development is essential for successful projects
- Product marketing is a critical element



## Benefits of Organics Recycling for Communities



## Harvest's Unique Characteristics

- Organics recycling company building next-generation facilities that unlock and optimize the energy and compost value of organic waste streams
- 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 education

## Harvest's Capabilities

### Development & Acquisition

- Site control
- Facility acquisitions
- Stakeholder outreach
- Permitting
- Feedstock agreements
- Negotiate PPAs, carbon credits
- SSO programs

### Financing

- Provide all or a portion the equity required for the project
- Obtain government grants incentive programs
- Obtain low-interest construction financing

### Project Delivery

- Experienced engineers design facility to fit site and community's needs
- Efficient and cost-controlling construction management
- Portfolio of best-in-breed technologies to deploy

### Operation

- Provide all operations and maintenance services
- Wholesale and retail soil products marketing
- Focus on safety, productivity, odor control, and compost quality

## Harvest Core Technologies: Composting and Balance of System

Harvest employees have multiple patents granted or filed on composting and other processes including:

- Covered aerated static pile composting
- Biofiltration systems
- Leading in-vessel compost process (IPS)
- Biochar and other applications

Biofilter system

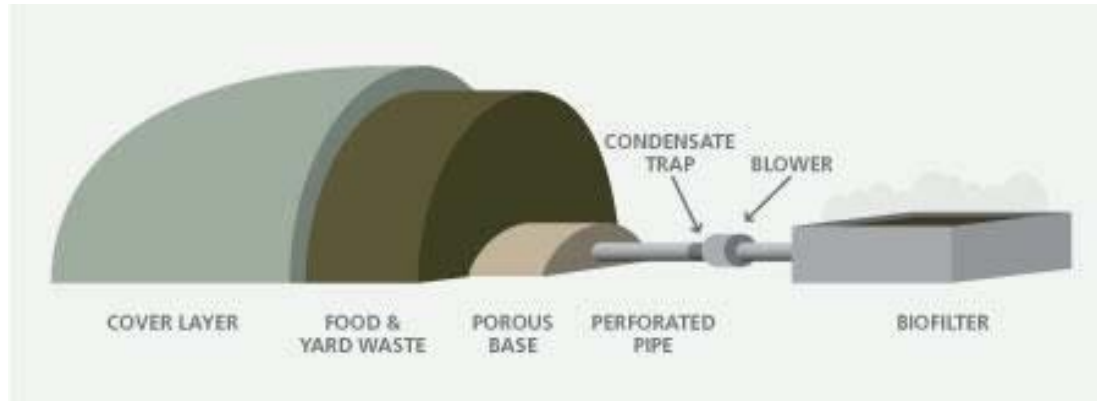


Finished compost ready for sale



Ventilation to biofilter

## Covered Aerated Static Pile (CASP) Composting



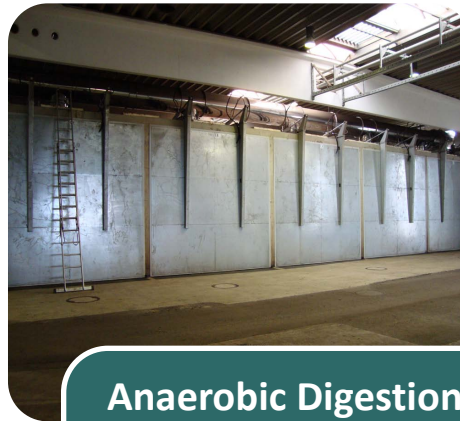
- Odor control measures incorporated into design:
  - Pile Construction: Smaller surface area to decrease amount of material exposed to air
  - Static Aeration: Reduces the release odor by pumping air through the pile, rather than turning
  - Cover: Organic pile cover acts as a natural biofilter to treat odiferous particles
  - Biofiltration: Captures odiferous air and treats it, removing odor before it's ever exposed to the atmosphere
- Harvest also designed its Covered ASP with efficiency and quality in mind:
  - Reduced Energy Costs: 38% less energy consumption per ton
  - High Throughput: 36% more processing capacity due to greater space efficiency
  - Year-round Production: Unaffected by seasonal composition, volume, and moisture levels
  - High-quality, high-value compost: Products sells out 100% where technology is in use

## High Solids Anaerobic Digestion



### Input of Organic Material

- Organic food and yard waste delivered to facility
- Waste mixed with previously digested material to inoculate and placed into digesters using wheel loaders



### Anaerobic Digestion

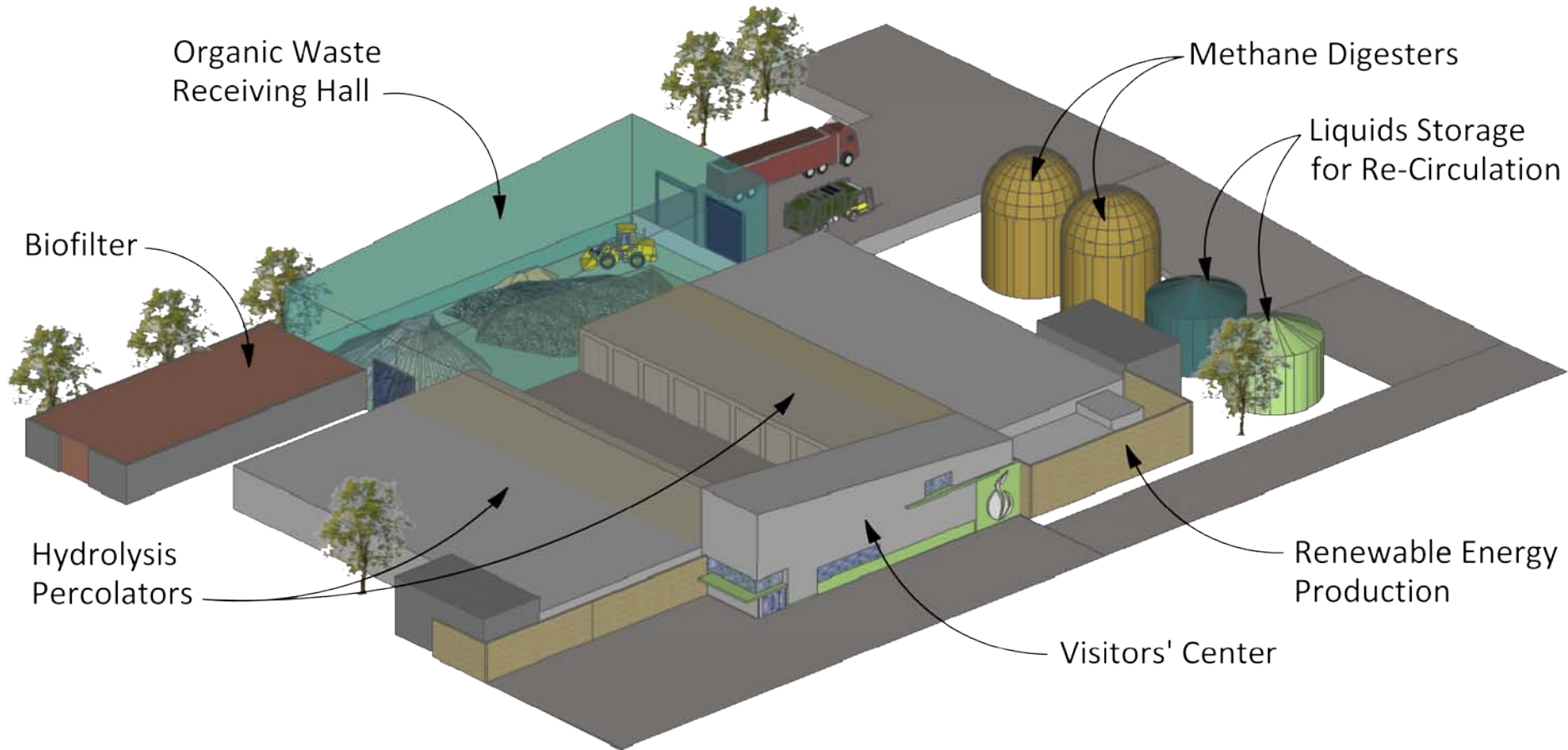
- Volatile organic compounds broken down by microorganisms in percolate liquid
- Biogas collected, processed, and sold as electricity, pipeline natural gas, or CNG fuel



### Aerobic Composting

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

## Sample HSAD Facility Layout



## **Increasing Organics Recycling Options**

## Feedstock Specifications

Required volume	30,000 tons per year minimum
Preferred material	50-70% food waste, 30%-50% yard waste
Bulk density	1000 lbs/cubic yard or less
Solids content	Targeting 35%; can handle 20%-50%
Porosity	45% by volume or more
Carbon/nitrogen	20:1 – 30:1
Regularity of supply	Need regular supply of food waste; can handle seasonality of yard waste

## Siting Specifications

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

## 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 communities/processing plants and their infrastructure
- Devoting resources to community education and environmental leadership programs
- Helping to implement organics source separation programs
- Obtaining available government credits and incentives

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# APPENDIX

## Management Team

**PAUL SELLEW** is Chief Executive Officer of Harvest Power, Inc. Paul has been a leader in the organics industry for more than 25 years. In 1982, he founded Earthgro, Inc., which grew to be the second largest producer of compost-based lawn and garden products in North America. Paul has also been a senior executive with Synagro Technologies, Inc., helping to build it into the leading organics residuals management business in the U.S. He has also founded and led International Process Systems, Inc. a composting technology provider (principal patent holder), Allgro, Inc. a biosolids compost marketing firm, Environmental Credit Corp. a carbon credit creation and trading firm, and Backyard Farms the largest producer of hydroponic greenhouse tomatoes on the east coast. Paul graduated from the Cornell University College of Agriculture and Life Sciences.

**NATHAN GILLILAND** is Harvest's Chief Financial Officer. Nathan formerly was an Executive Vice President at Bain Capital, managing \$2 billion in investments in utilities, power generation and consumer products. Prior to Bain, Nathan co-founded MyCounsel.com and managed strategic planning and acquisitions for Nutraceutical Corporation. Nathan was also a consultant at Bain & Company. Nathan earned his B.A. with Highest Honors from the University of California-Berkeley.

**JAN ALLEN, P.E.** is Chief Technology Officer for Harvest. Jan was a principal technologist at CH2M Hill's Environmental Services Business Group and is recognized as an industry leader in organic conversion technology and research. He specializes in environmental engineering, construction management, and industrial operations of solid waste management, composting, bulk material handling, microbiological systems, and odor control facilities. Jan is a civil engineer and certified Compost Facility Operator. He is registered inventor on a series of patents for composting systems and biofiltration. He graduated with distinction from Purdue University with a B.S. degree.

## Appendix: Management Team

**TOM BINTZ** is EVP, Operations. Tom has been a leader in the organics industry for more than 12 years. Most recently he served as Senior Vice President of Operations with Synagro Technologies, Inc., helping to build it from a \$20 million dollar regional company into the leading organics residuals management business in the U.S. He also served as Vice President Operations and Vice President Corporate Controller during his tenure with Synagro. Prior to that he was Vice President Controller of ETD, Inc. (a billion dollar distribution company) and was a Senior Consultant with Deloitte & Touche. Tom earned his BS Degree in Management from Purdue University and his MBA from Texas A & M. He also received his Certification in Public Accountancy in Texas.

**THOMAS KRAEMER, P.E.** is Harvest's Vice President for Project Delivery. Tom was a vice president for waste management services in the western U.S. for CH2M HILL, Inc., where he managed engineering and construction projects for over 20 years. Tom's background is in engineering of solid waste management and biogas energy facilities. He holds an MS degree in civil and environmental engineering from the University of Wisconsin-Madison.

**WAYNE H. DAVIS** is head of Incentives and Governmental Affairs. Wayne is a co-founder and former General Counsel of Backyard Farms, where he directed the environmental permitting processes for development of over 40 acres of greenhouses and a 17 MW combined heat and power biomass facility. Previously Wayne was Chief Compliance Officer for Fidelity Brokerage Company. Wayne graduated *magna cum laude* from both Harvard Law School and Williams College.

## Appendix: Management Team (cont.)

**MATT MITCHELL** is Harvest's Vice President of Acquisitions and Strategic Development. Prior to joining Harvest, Matt structured and oversaw private equity investments across a range of industries for Heritage Partners and prior to that, Seacoast Capital. Matt holds a B.A from Colgate University and an M.B.A from the University of Virginia's Darden School. Matt is a Chartered Financial Analyst.

**KATE WATTSON** is Harvest's Director of Business Development. Kate was a Development Associate at Horizon Wind Energy where she managed the development of wind power projects, led the company's market research and analysis, and directed multiple initiatives lobbying state legislatures to further the deployment of wind energy. Kate received a B.A. magna cum laude in environmental science and public policy from Harvard College and an M.B.A from Harvard Business School.

**TOM KELLEY** is Business Development Manager for Harvest. Tom is recognized as an industry leader with 25 years experience in the organics and horticulture industry, specializing in compost sales and marketing. Tom was recently Western Coast Sales Director for Gro-Well Brands, prior to which he directed product sales and marketing for Synagro Composting Company of California, Inc. developing programs to effectively market, sell and distribute 550,000 cubic-yards in 2005. Over a 10-year period with Synagro, Tom sold in excess of 4,000,000 cubic-yards of compost. Tom is on the Board of Directors for the United States Composting Council and received his B.A. in Business Administration from North Texas State University.