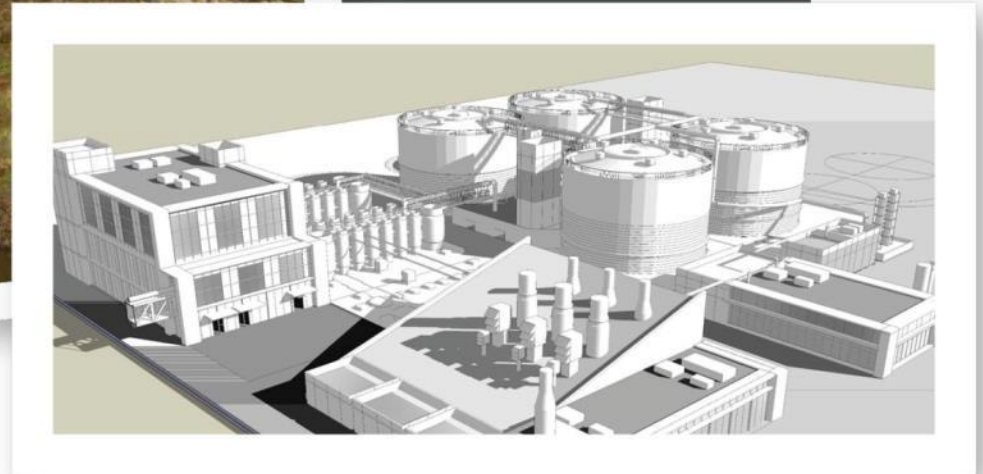


Improving urban soils with biosolids



Rooting DC
February 28th, 2015

Bill Brower
Biosolids Operations Manager,
DC Water



Outline

- Introduction to DC Water
- Urban soil deficiencies
- DC Water Biosolids Program
 - Current uses
 - Compost: Our gateway product
 - New technology; new material

DC Water Sewer Service Area

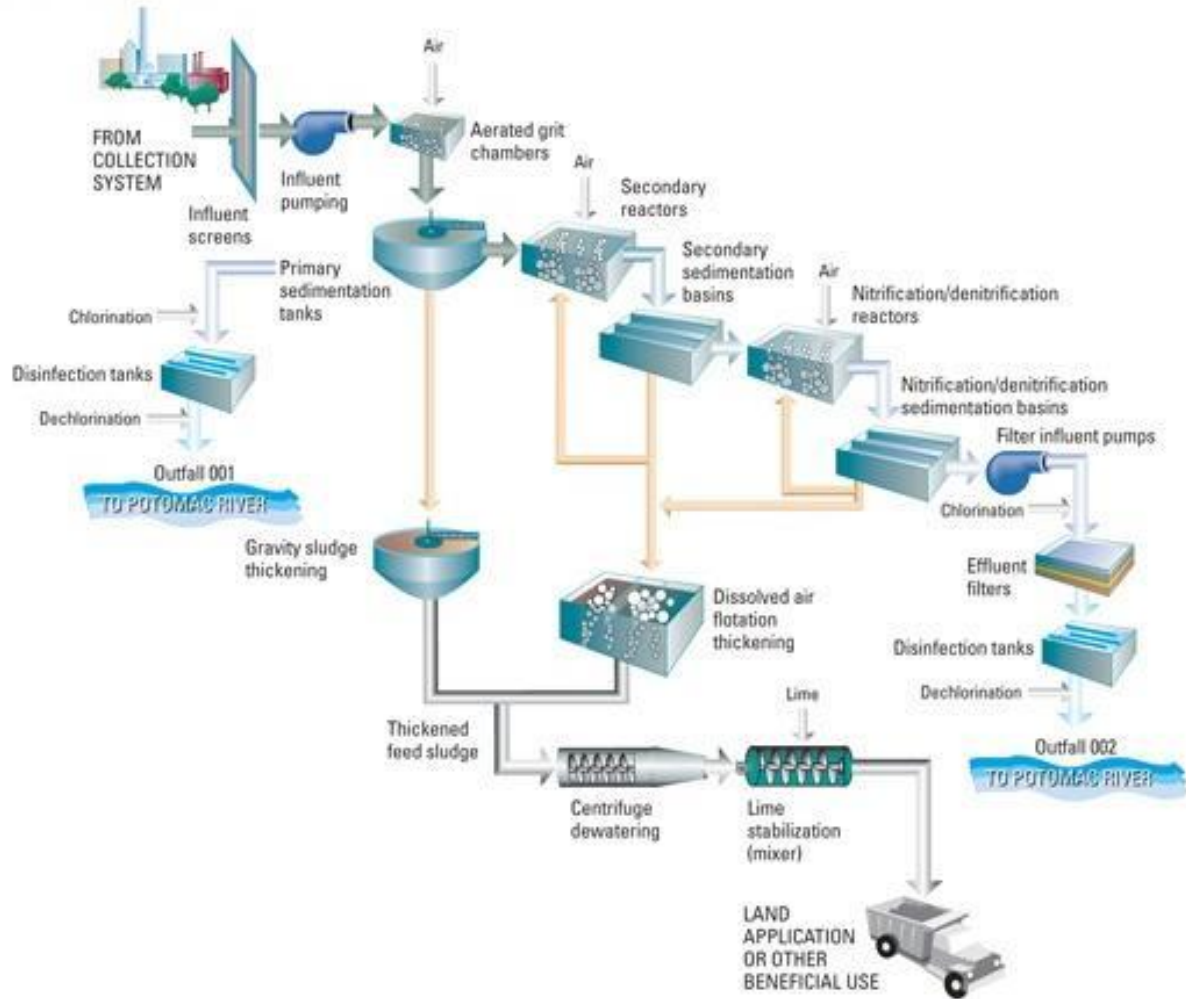
- Wastewater treatment for over 2.2 million population
- District of Columbia + portions of Maryland and Virginia (as far away as Rockville, Great Falls, College Park and Dulles airport!)
- Excellent history of treatment performance





370 MGD plant capacity
Largest AWTP in the world

Wastewater treatment=removing solids



Urban soils are typically poor

- Compacted
- Poor drainage
- Low in nutrients
- Low in organic matter
- pH issues
- Disturbed soil profile (excavation, addition of fill)
- Some have elevated levels of pollutants, trash, construction debris

The Value in Biosolids



Organic Matter

- Food for soil microbes
- Builds soil tilth
 - Erosion Resistance
 - Water-holding capacity
- Ability to retain nutrients

Energy

For Energy Recovery

- Energy in the chemical bonds of organic matter
- 9,300,000 Btu/metric ton of biosolids available through anaerobic digestion

Nutrients

Macro-Nutrients

- Nitrogen (~5%)
- Phosphorus (~2%)
- Calcium

Micro-Nutrients

- Zinc
- Copper
- Molybdenum

Drought-resistance

- More root & shoot growth
- Improved yields

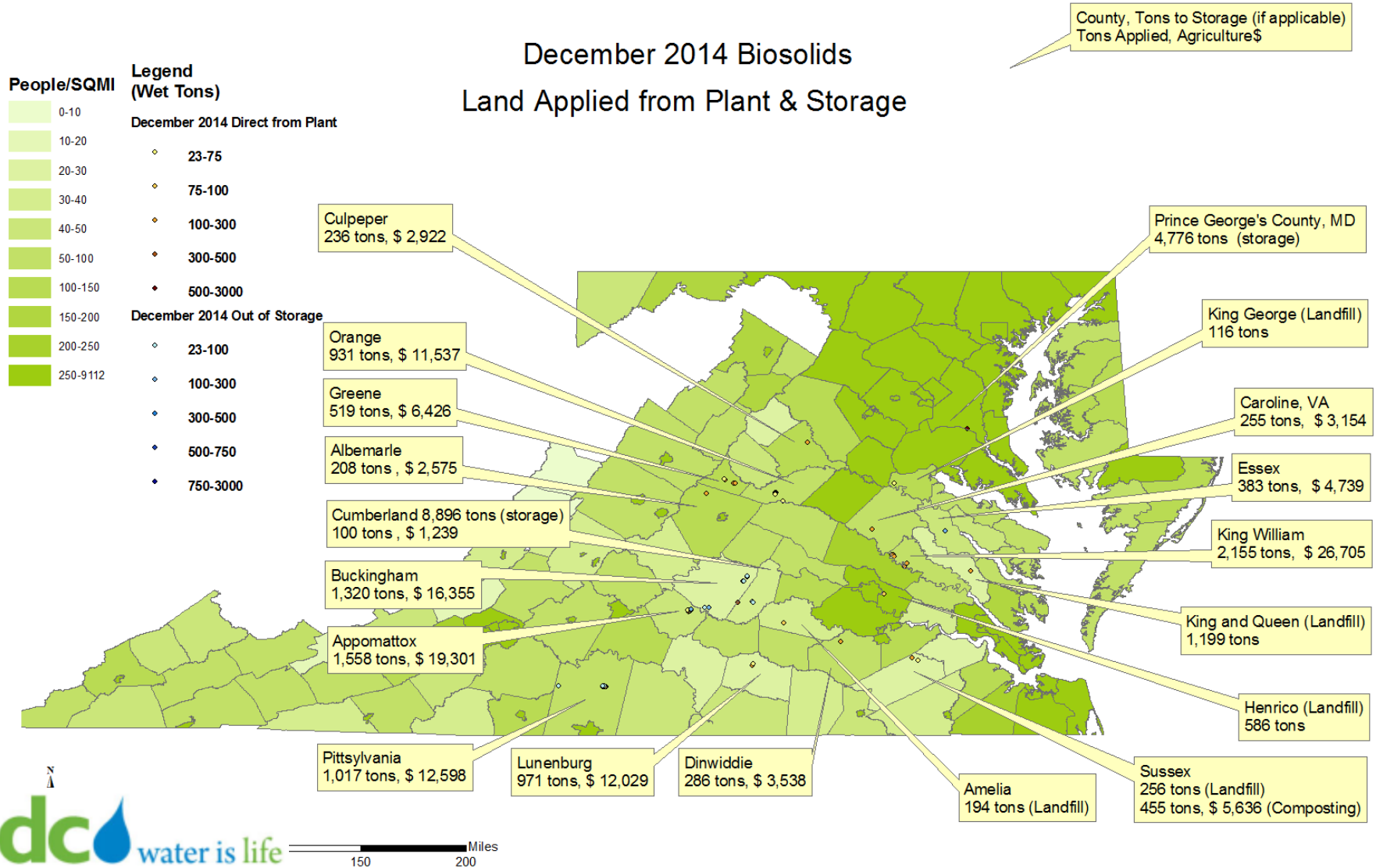
Current uses of biosolids

- Agriculture
- Soil remediation
- Silviculture
- Compost: urban uses

Agriculture: Primary use since the '30s



Biosolids Land Applied from Plant and Storage



BIOSOLIDS NEWS

Information for Virginia Farmers from the Virginia Biosolids Council • October 2005

One farm family's experience

"We couldn't survive without biosolids"



Glen and Melissa Witt and son, Joel.

Glen Witt and his father manage more than 1,000 acres in Bedford County for the production of beef cattle and timber. "We've been applying biosolids on our pastures and hay fields for 14 years," explains Witt. "We couldn't survive without biosolids."

Witt says that people who don't earn their living from farming don't seem to understand that the land application of biosolids is a safe and effective way to help preserve Virginia's family farms and the green space that we all value.

"Those fields of corn, soybeans, hay and stands of timber that people see on their drive through the country aren't state parks," he says. "They are businesses that must make a profit—or at least break even—to survive."

Witt says his experience with biosolids is typical of many of his farmer neighbors who each year must make substantial dollar investments for seed, feed, fertilizer, labor and equipment, along with their own blood, sweat

and tears to preserve a way of life that they love.

"Our farm is much more productive because of biosolids," explains Witt. "We get double the rolls of hay from our biosolids fields than we do from fields that receive chemical fertilizer. As far as I'm concerned, biosolids are not just a cheap substitute for chemical fertilizer; they enrich the soil with organic material and improve resistance to drought."

Witt recalls that a few years ago he spent about \$6,000 on a chemical fertilizer application for a hay field. It didn't rain for weeks," he says, "with the result that the chemical nitrogen was useless and wasted my \$6,000 investment. The natural nitrogen in biosolids doesn't burn during dry spells and it produces lush growth as soon as it does rain."

And what about the health and safety claims of biosolids opponents? "My family lives right in the middle of a 30-acre hayfield that has received biosolids for years," says Witt. "We are all healthy and happy, and so are our cattle. According to the opponents of biosolids, we should all be dead by now."

Witt says that when people attack biosolids out of ignorance and emotion, they are attacking farmers. "I'm sure they don't mean us any harm," he says, "but they are doing harm just the same. They need to calm down, listen the facts about biosolids and have some regard for the people who help put the food on their table."



The Virginia Biosolids Council (VBC) supports the land application of biosolids in Virginia through information and education on the beneficial use and safety of biosolids. The VBC was created by wastewater treatment plants, land application companies and biosolids users, and is available as a resource to those who need information about the recycling of biosolids.

Soil Reclamation: Stafford County Airport







A photograph of a pine forest with a dirt path. The trees are tall and thin, with green needles. The ground is covered in brown leaves and pine needles. A white box with the word "Silviculture" is overlaid on the bottom left.

Silviculture

Composted biosolids: “gateway” material for urban use (Class A)

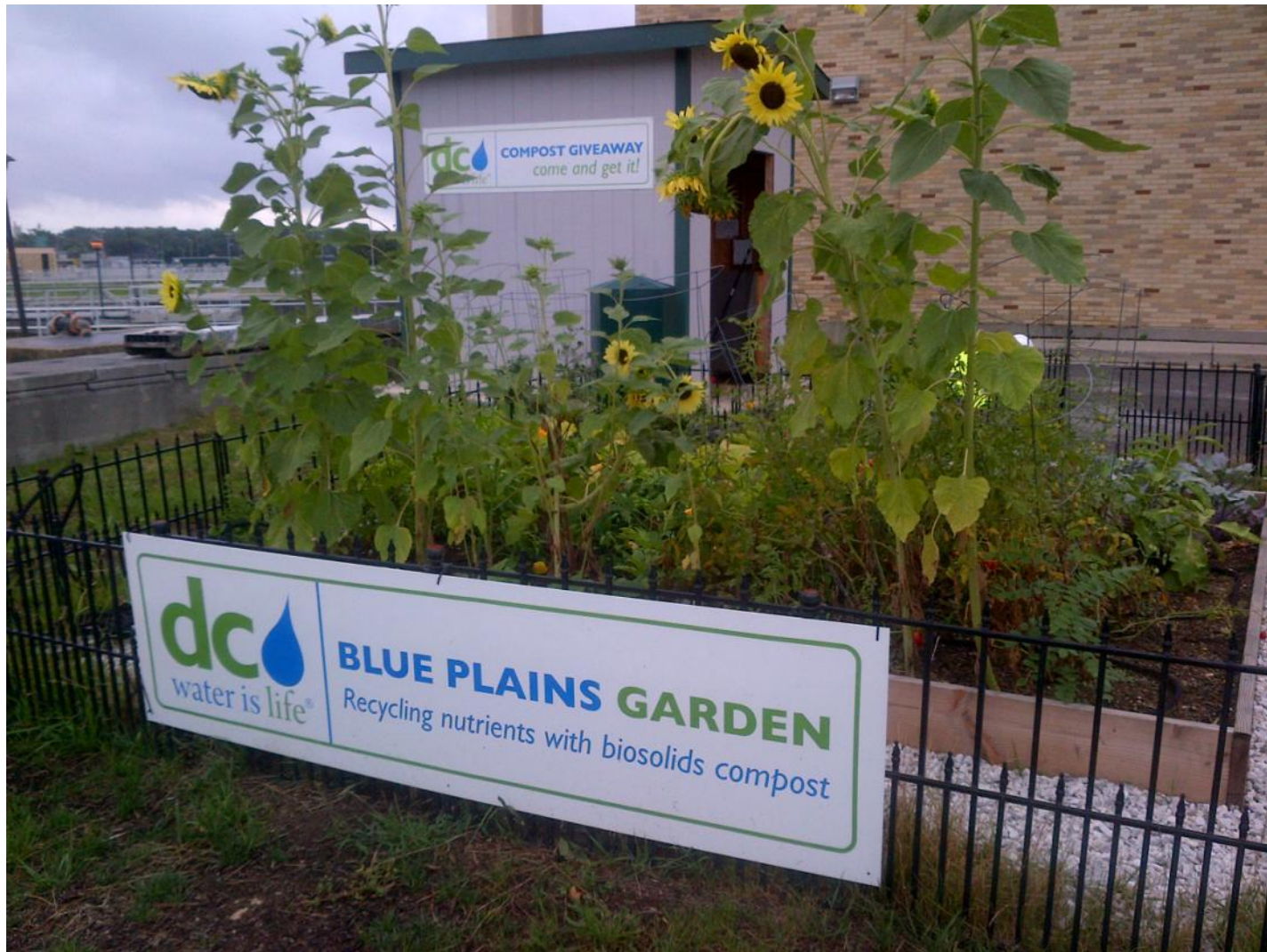


Renewed effort

- Compost product in the '80s & '90s
- Large % of total production
- Demand > supply
- Bags or bulk to: professional landscapers, contractors, grounds managers, nurseries, homeowners
- Used on the lawns at the White House, Mount Vernon, the Maryland Governors Mansion and the National Arboretum
- Awarded winning program



Blue Plains Garden & Compost Giveaway














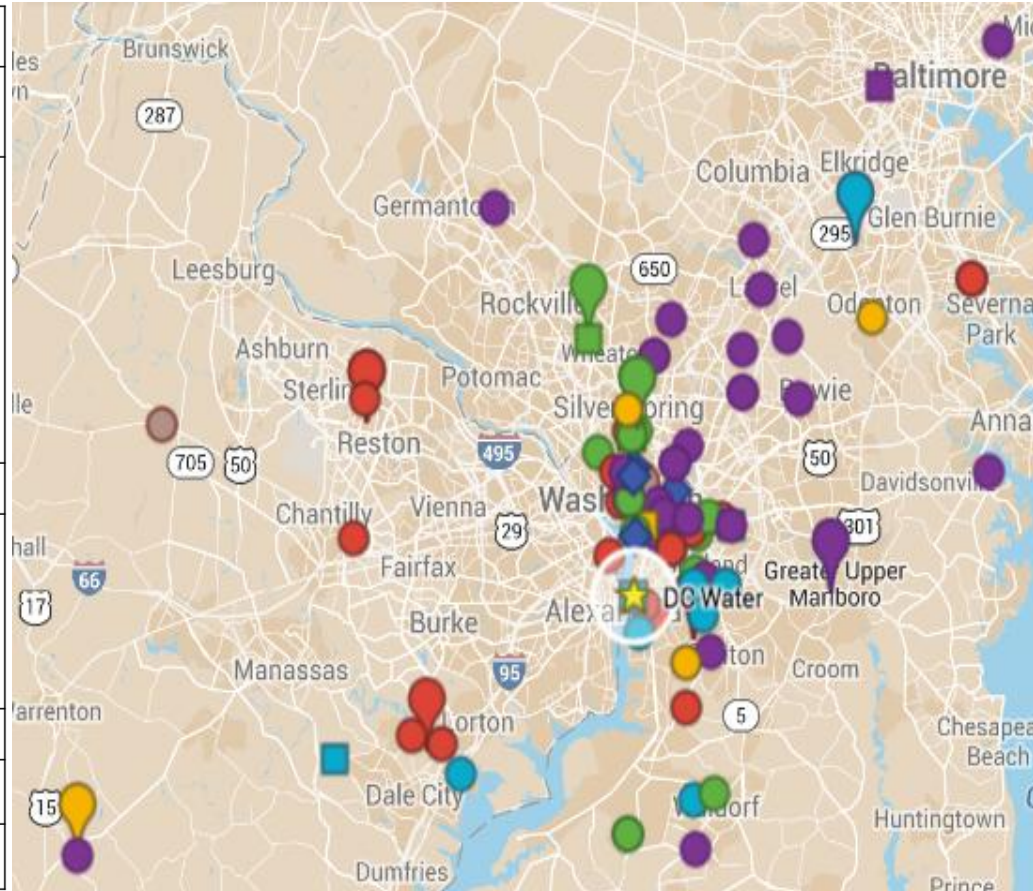


Urban tree plantings



Map of compost use

Key	
Color	lbs. of compost
	0-39
	40-199
	200-599
	600-1499
	1500-6000
	≥ 8000
Shape	Frequency
	1
	2-3
	4-8
Symbol	Location
	DC Water
	Community Garden



- 21 comm. gardens & tree plantings in all 4 quadrants
- 160+ tons of compost to employees and on-site

Connecting with the DC Gardening Community



First Annual

HOME GROWN DC FAIR

A Celebration of DC Farms and Gardens

SATURDAY, SEPTEMBER 7TH
4PM - 7PM

Old City Farm & Guild: 925 Rhode Island Ave. NW

**THE FIRST
DC ONLY FARMERS MARKET**

DC STATE FAIR VEGETABLE JUDGING CONTESTS

LIVE MUSIC, COMMUNITY AND FOOD

homegrowndc@gmail.com
www.facebook.com/HomegrownDCFair

organized by:

Neighborhood Farm Initiative

Common Good City Farm
GROWING FOOD. ENRICHING COMMUNITY.

OLD CITY Farm & GUILD

GLENS Garden Market

dc water is life

FRESH FARM markets

Nutrient Rebate Research Projects –

\$2/wt rebated through biosolids contracts. DC Water is obligated to spend it on research

Virginia Tech

- Drought resistance study
- Greenhouse gas balance
- Wintertime N uptake
- P land base analysis
- Blended soil products development



University of Maryland

- Wye poplar plantation surface application
- Odor modeling and prevention
- Mine reclamation w/poplar



USDA + University of Maryland

- Triclosan, trichlorocarbon
- PBDEs



+



Biosolids Enhance Drought Stress Tolerance in Corn



Biosolids



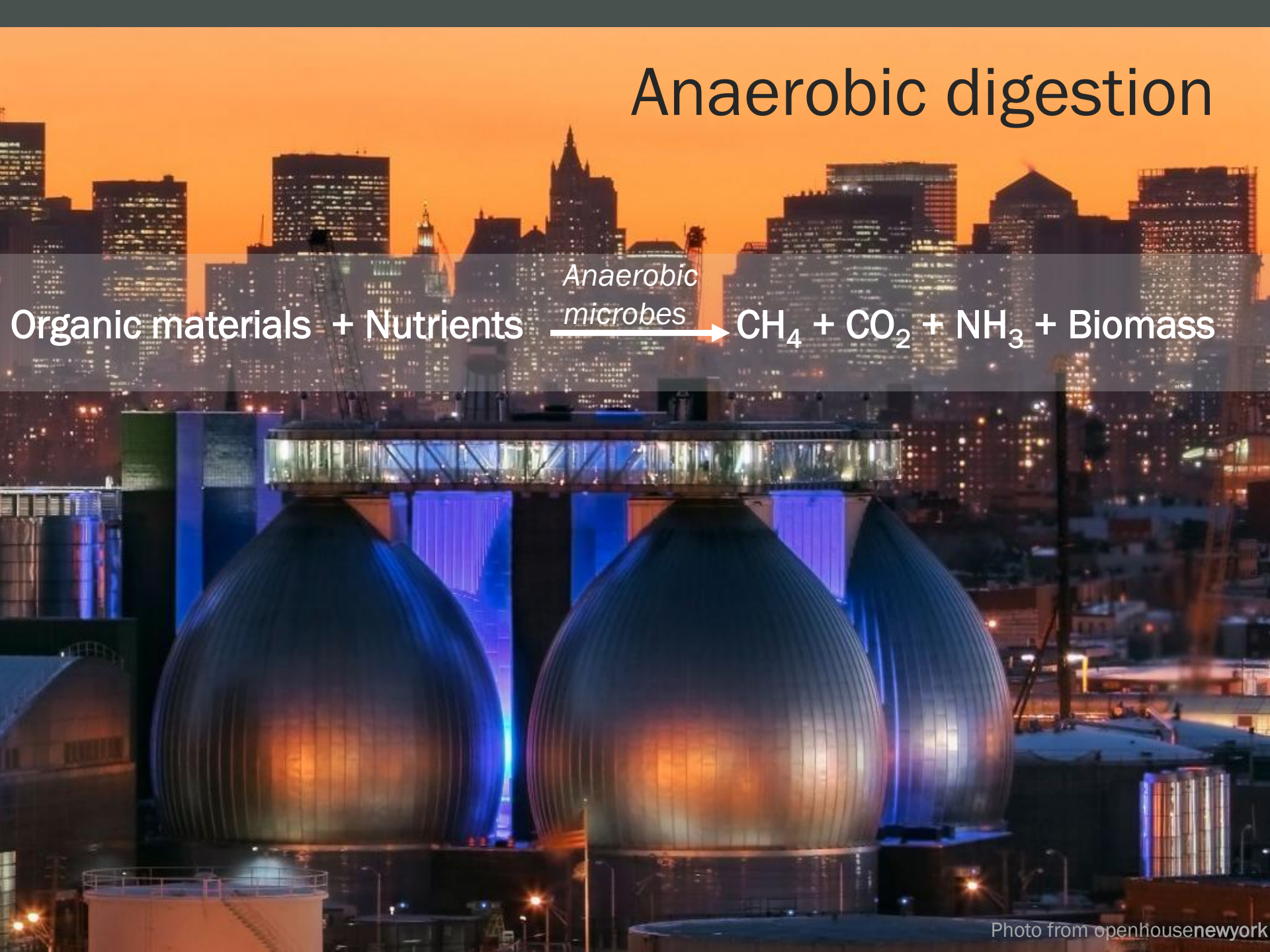
1.0x Ag N rate

Digestion and Thermal Hydrolysis Project: Starting up

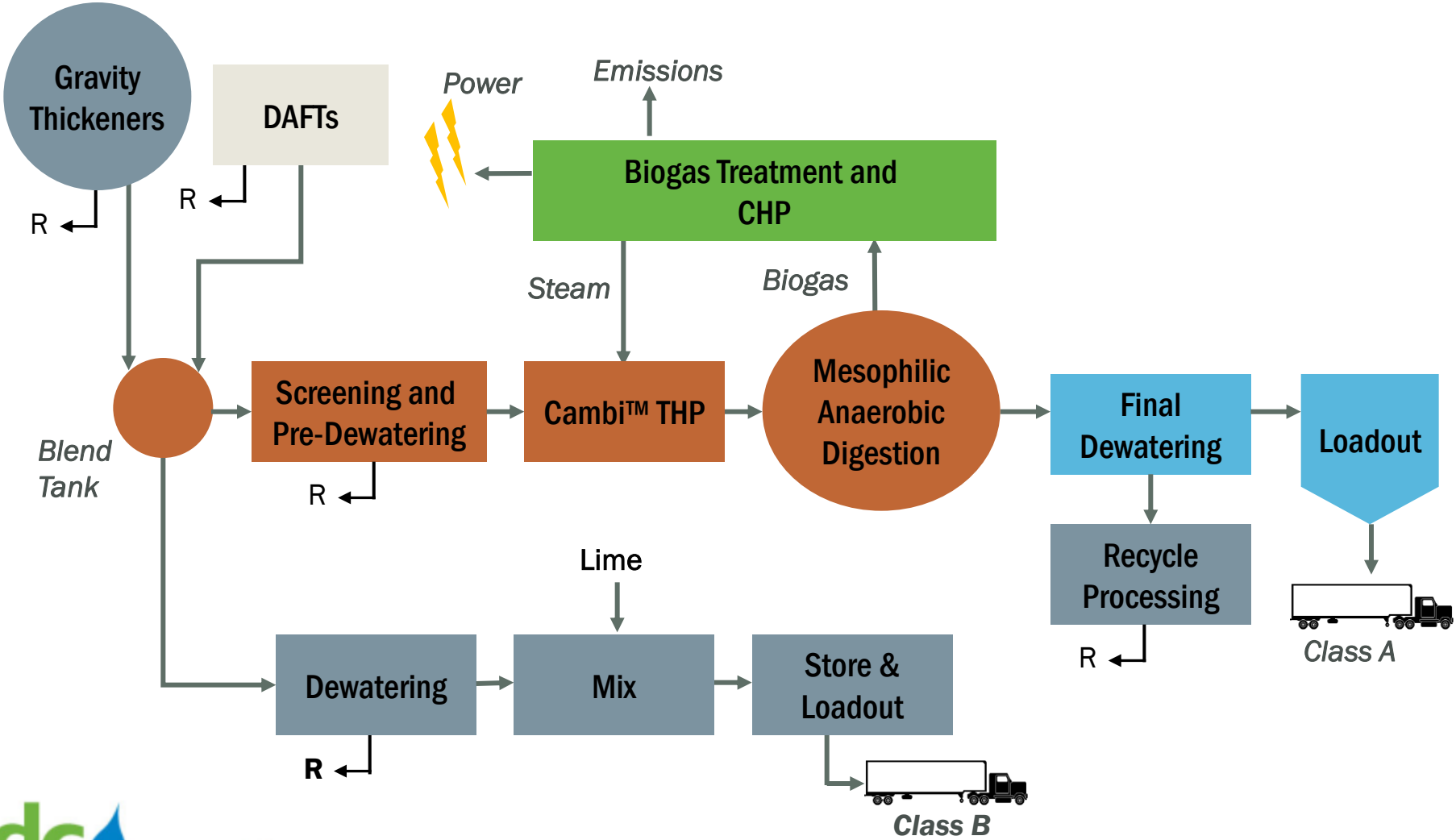


Anaerobic digestion

Organic materials + Nutrients $\xrightarrow{\text{Anaerobic microbes}}$ $\text{CH}_4 + \text{CO}_2 + \text{NH}_3 + \text{Biomass}$

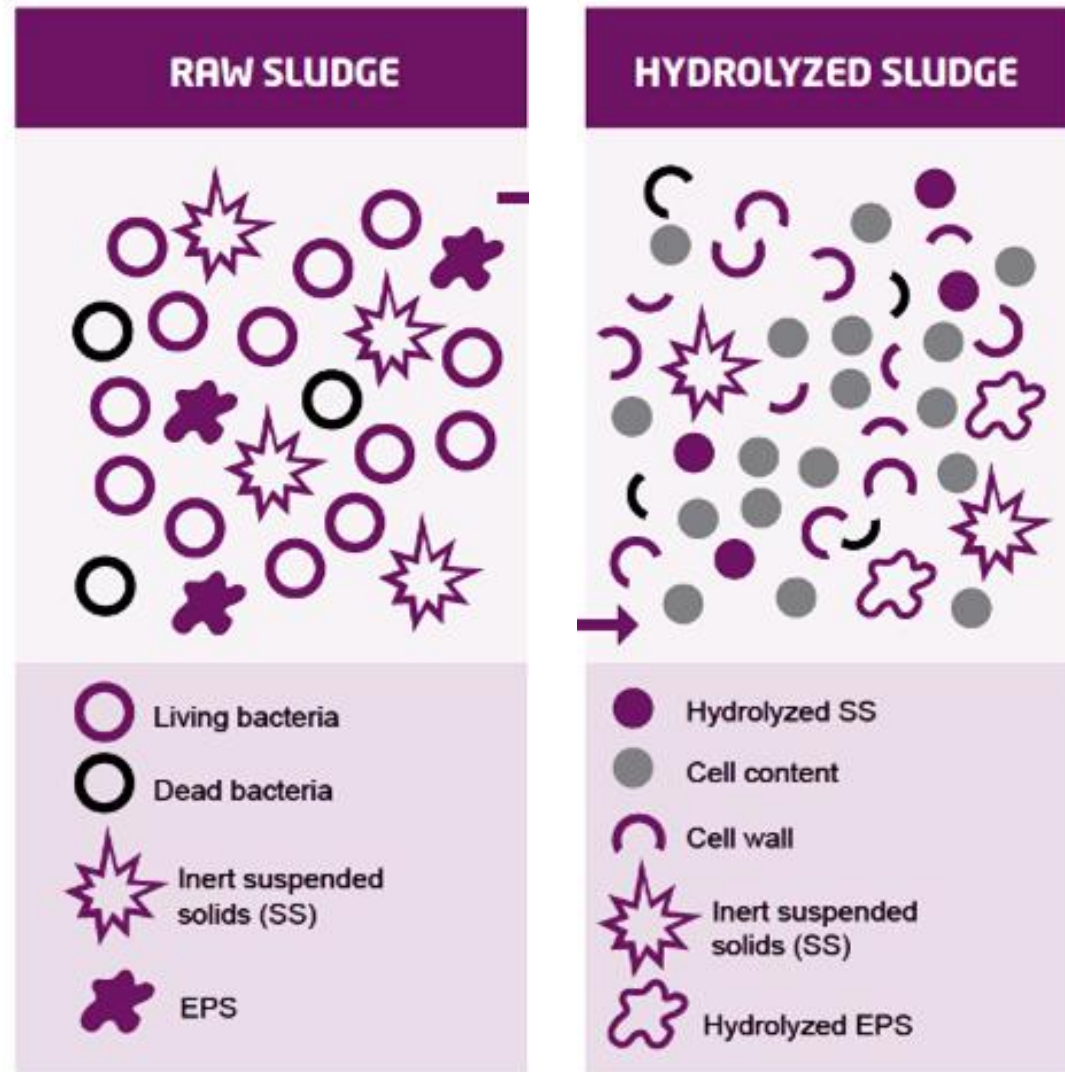


Process Schematic of DC Water's New Biosolids Program



Why Thermal Hydrolysis? Reinventing Biosolids

1. Easier to pump and mix
2. Smaller digester space
3. Class A Biosolids



Program Benefits

Reinventing Biosolids



Reduce biosolids quantities by more than 50%



Improve product quality (Class A and more)



Generate 13 MW of clean, renewable power



Cut GHG emissions dramatically



Save millions of dollars annually when the facility begins operating in 2014

Thermal Hydrolysis Digested Dewatered Products from the UK

30% solids



Very stable

Class A



No debris



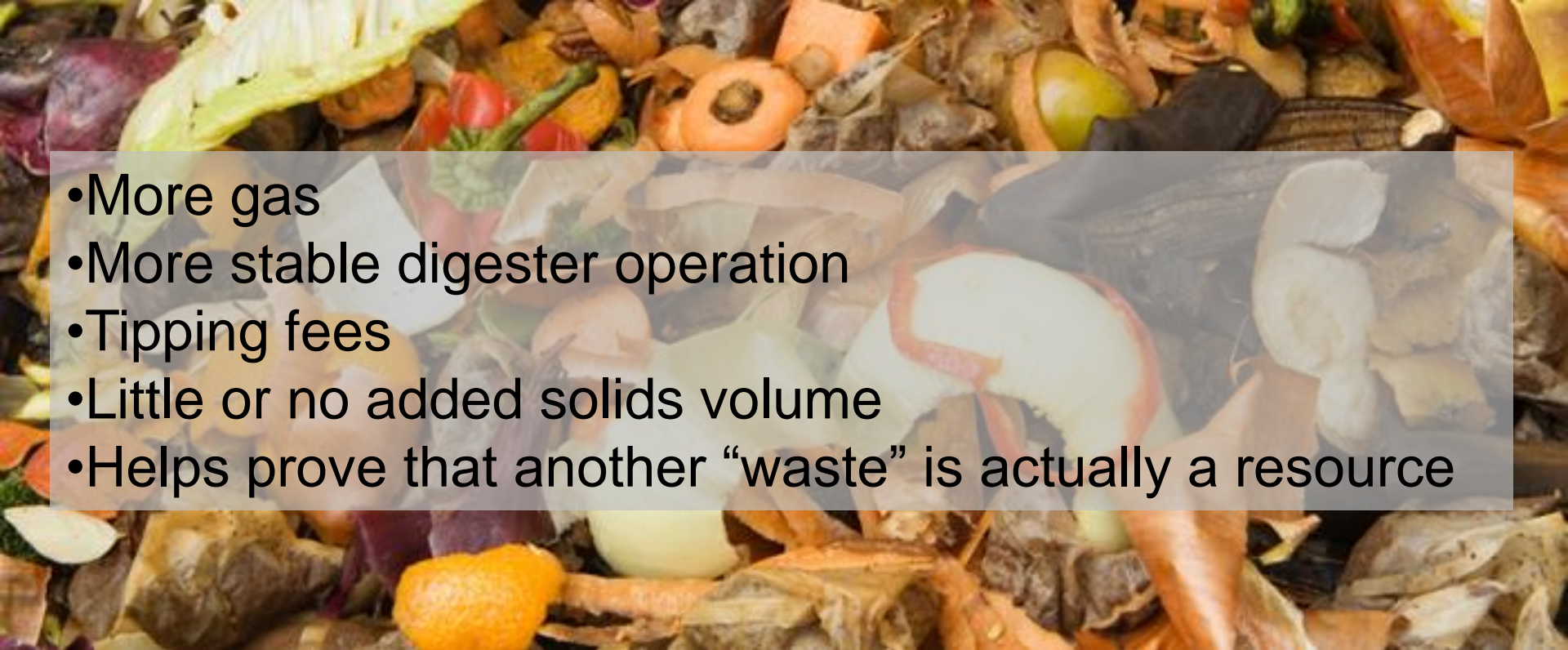
Low odor



Potential for digested material

- Use in tree planting (reduces runoff)
- Bioretention mixes
- Restoration & remediation projects
- Green roofs (reduces runoff)
- **Urban gardens & farms**
- Golf courses
- Employee and citizen use
- Partnering with civic groups, DC and federal agencies, environmental groups, etc.
- Carbon sequestration

Co-digestion of food waste

- 
- More gas
 - More stable digester operation
 - Tipping fees
 - Little or no added solids volume
 - Helps prove that another “waste” is actually a resource

**There is no such thing as waste,
only wasted resources.**



Bill Brower

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