

Food Waste Processing

Anaerobic Digestion

CCSMM – Organics Collection & Diversion Working Group



THANK YOU FOR THIS OPPORTUNITY



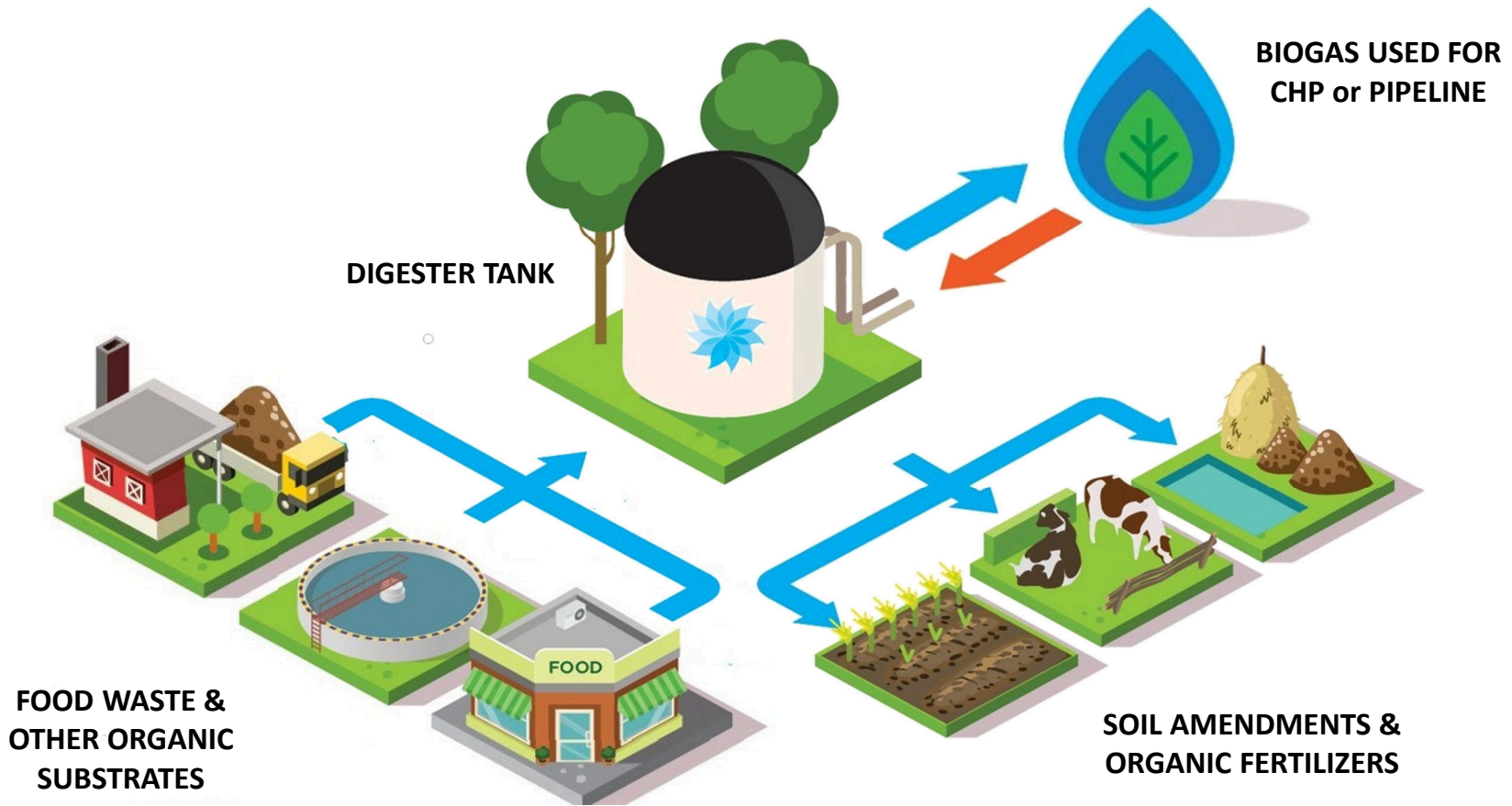
- Vice President & Managing Director of Quantum Biopower
- RecycleCT Foundation - Treasurer
- Recognition – Local & National
- UConn graduate
- Raising a family in Northwest, CT

· [Hartford Magazine](#), [Biomass Magazine](#), [Business Journal](#), [New York Times](#)



Every year
36,395,000 tons
of food go to waste in the US

HOW QUANTUM WORKS



FOOD WASTE WE PROCESS



**Pre/Post Consumer
Food**



**Packaged Food
Waste**



**Manufacturing
Waste**



Bulk Waste



OUR DIGESTER PRODUCES – RENEWABLE GAS



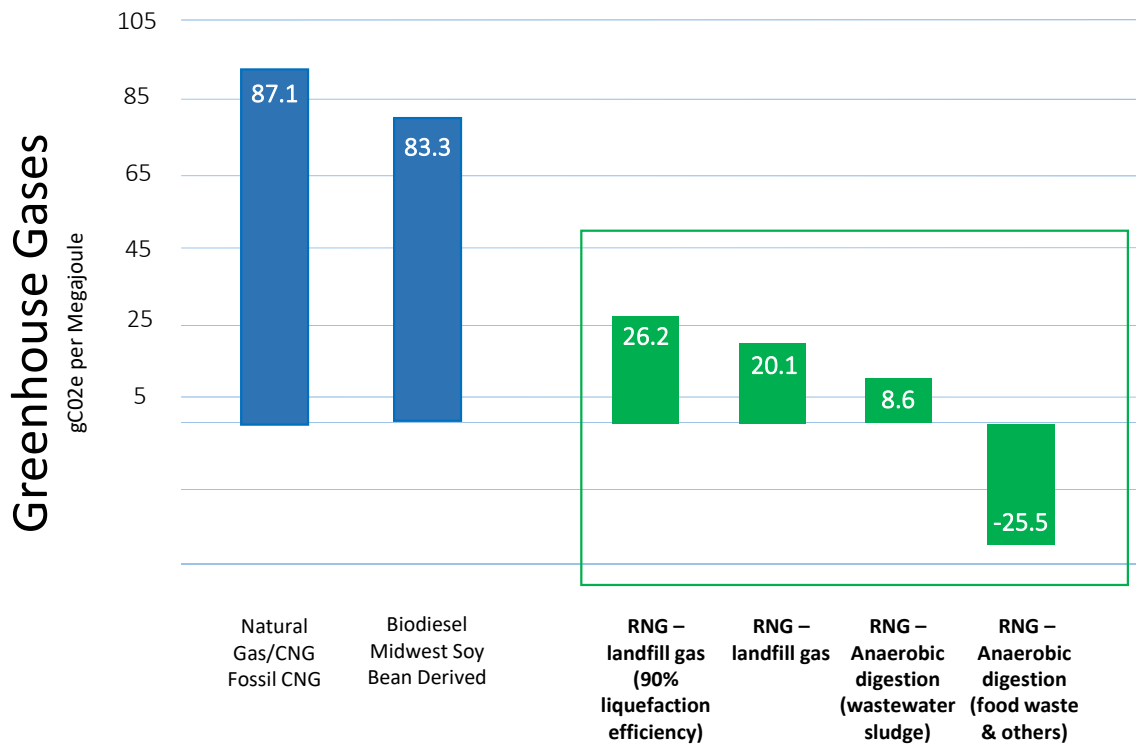
BIOGAS

Same chemical composition as natural gas

Decarbonized fuel – far lower carbon intensity than traditional natural gas

Excellent replacement to traditional natural gas

Carbon Intensity Score of Fuels



OUR DIGESTER PRODUCES – ORGANIC SOILS

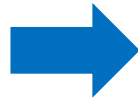


- Developed a 100% Organic Compost Blend Product
- Worked for 18 months with Southern CT State Agronomy Lab
- Excellent organic source of organic N/P/K



Digestate residuals

Organic N: 6%
Organic P: 2.5%
Organic Potassium: .5%



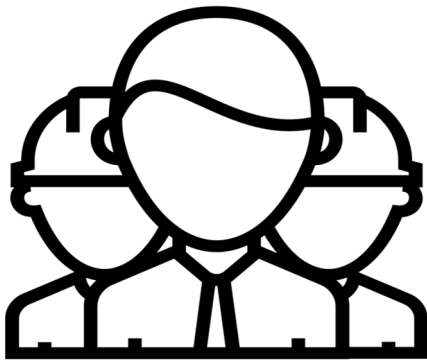
Finished Compost



Grow Study

2-3X growth compared to regular compost
Stronger plant rooting and leaf vigor

A STRONG CT ACADEMIC COALITION



**OUR EXTENDED TEAM INCLUDES OUR
ACADEMIC COMMUNITY**

**ONE OF THE STRONGEST OPERATIONS TEAMS
IN THE U.S.**

UConn

School of Engineering - advanced digestion processes and automated learning

School of Business – Entrepreneurship development & Market Research



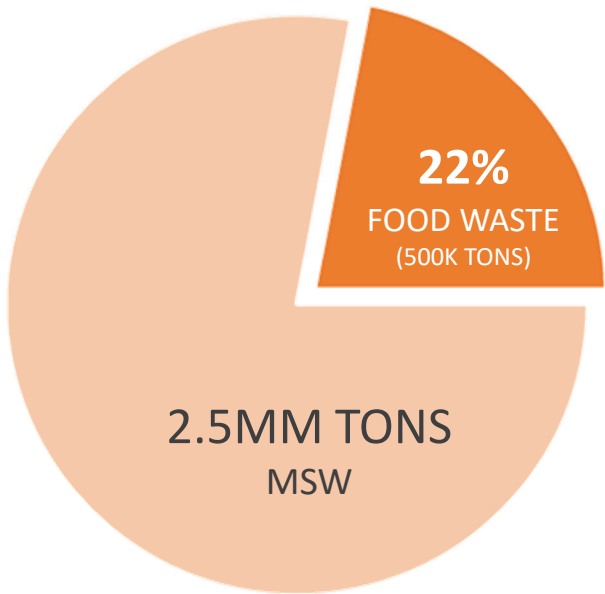
Science Department – Agronomy lab in nutrient classification and plant growth with soils Quantum produces.

Yale

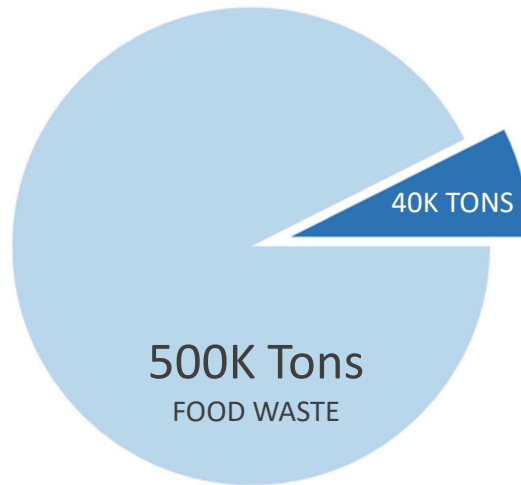
School of Sustainability – Environmental policy around decarbonized energy

Environmental Engineering – processes and materials recovery

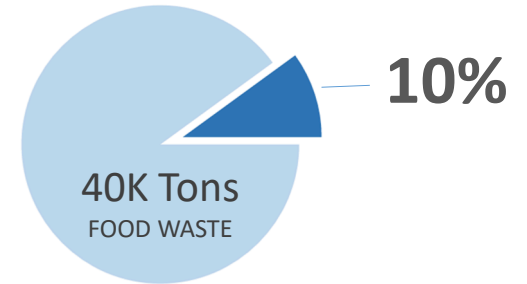
FOOD DIVERTED FROM STATE MANDATE



FOOD WASTE IN THE STATE
WASTE STREAM

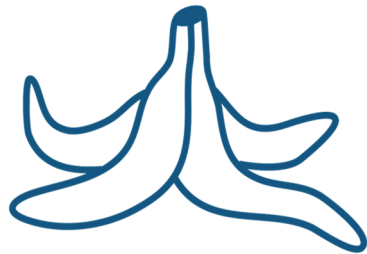


QUANTUM'S CAPACITY TO
PROCESS FOOD WASTE IN THE
STATE



FOOD WASTE BEING GENERATED
FROM STATE DIVERSION
MANDATE AT QUANTUM

QUALITY VS. QUANTITY ORGANICS RECOVERY

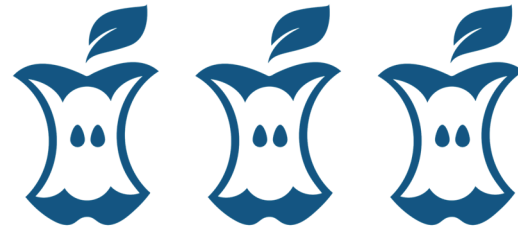


FOOD WASTE QUALITY

GENERALLY FREE FROM CONTAMINANTS & GRIT



- Higher probability for creating soils/reusable end products post digestion
- Higher biogas production
- Less risk for operational upsets and equipment from less pure organics inflow



FOOD WASTE QUANTITY

“CAPTURABLE” FOOD WASTE IN VOLUMES

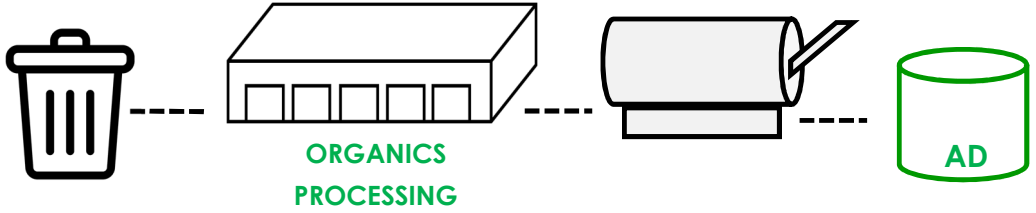


- Does quality suffer?
- Impacts ability to reuse post-digested materials as materials
- Process considerations; methane production and equipment to process lower quality food waste

MUNICIPAL FOOD WASTE DIVERSION

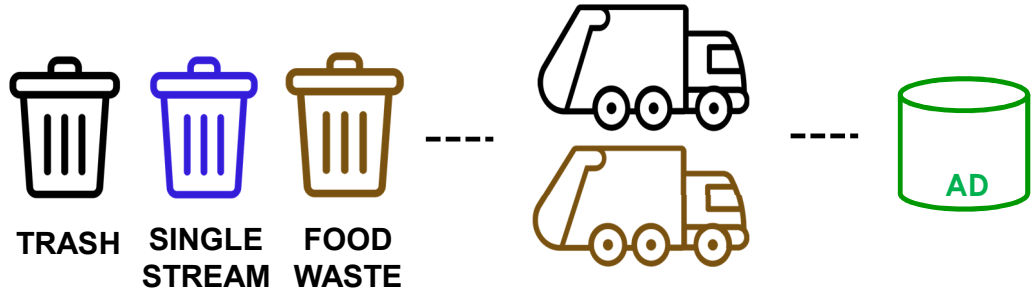


TRANSFER STATION SEPARATION



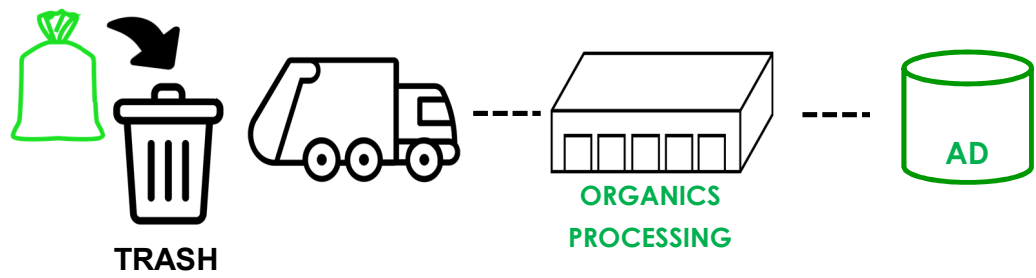
- Low/moderate quality organics
- Higher volume recovery
- Operational ease – plug n’ play
- Cost & Quality?
 - Questionable soil reuse

CURBSIDE COLLECTION



- Higher quality organics
- Programmatic municipal roll-out
- Requires new logistics - cost
- Efficacy & Quality?

CO-COLLECTION



- Higher quality organics
- Programmatic municipal roll-out
- Minimizes new logistics
- Efficacy & Quality?

COMMUNITY BENEFITS OF DIGESTION



- Created 50 construction jobs with local firms for a year
- Hired fulltime staff, most of whom live in the community
- Cornerstone of the Town's sustainable energy plan
- Leased town owned land and re-imagined use on town's decommissioned landfill
- Compliment and support local businesses; fertilizer companies and upstart organics collection companies



→ **EVERSOURCE** →

5 Beneficial Accounts in Southington

20 year agreement

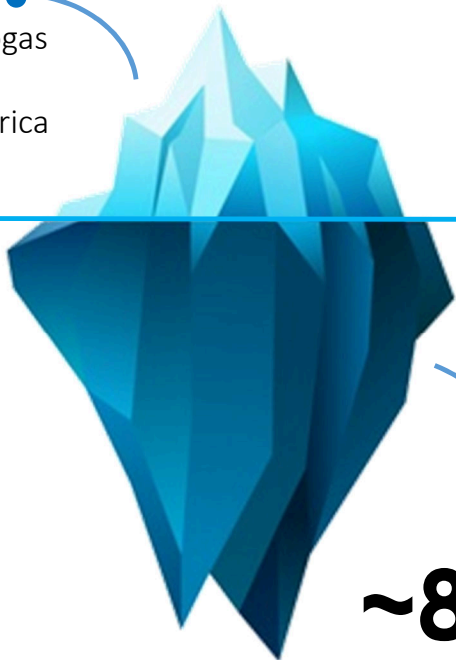
Average – 20% savings on annual utility bills

FUTURE OF DIGESTION IN CONNECTICUT



249.

Existing biogas
Systems in
North America



~8,000

Potential biogas systems
in North America

WE ARE COMMITTED TO

- Creating a landfill diversion model that incentivizes municipal food diversion
- Assisting in policy and standards for beneficial reuse of digestate products
- Supporting energy policy that recognizes environmental benefits of biogas.
- Continuing to assess metrics of food waste diversion quality for efficacy in digestion processing



THANK YOU

Brian Paganini
bpaganini@quantumbiopower.com

