

IAWWTF Renewable Energy / Carbon Negative Projects

Anna Kelles, Tompkins County Legislator
Jose Lozano, Ithaca Area Wastewater Treatment Facility



IAWWTF Sustainable Energy Projects



Biodigestion and CoGen



Effluent energy recovery



Biochar from biosolids



Biodigesters and CoGen project



Biodigesters and CoGen project

Co-digestion	6,697 MWh/day	@ Max biogas production capacity	18 MWh/day
[IAWWTF Data by JL]		& 24 million Lb/yr food waste	
		Currently = 2,074 MW/year	6 MWh/day





Effluent Thermal Energy Recovery (ETER) project

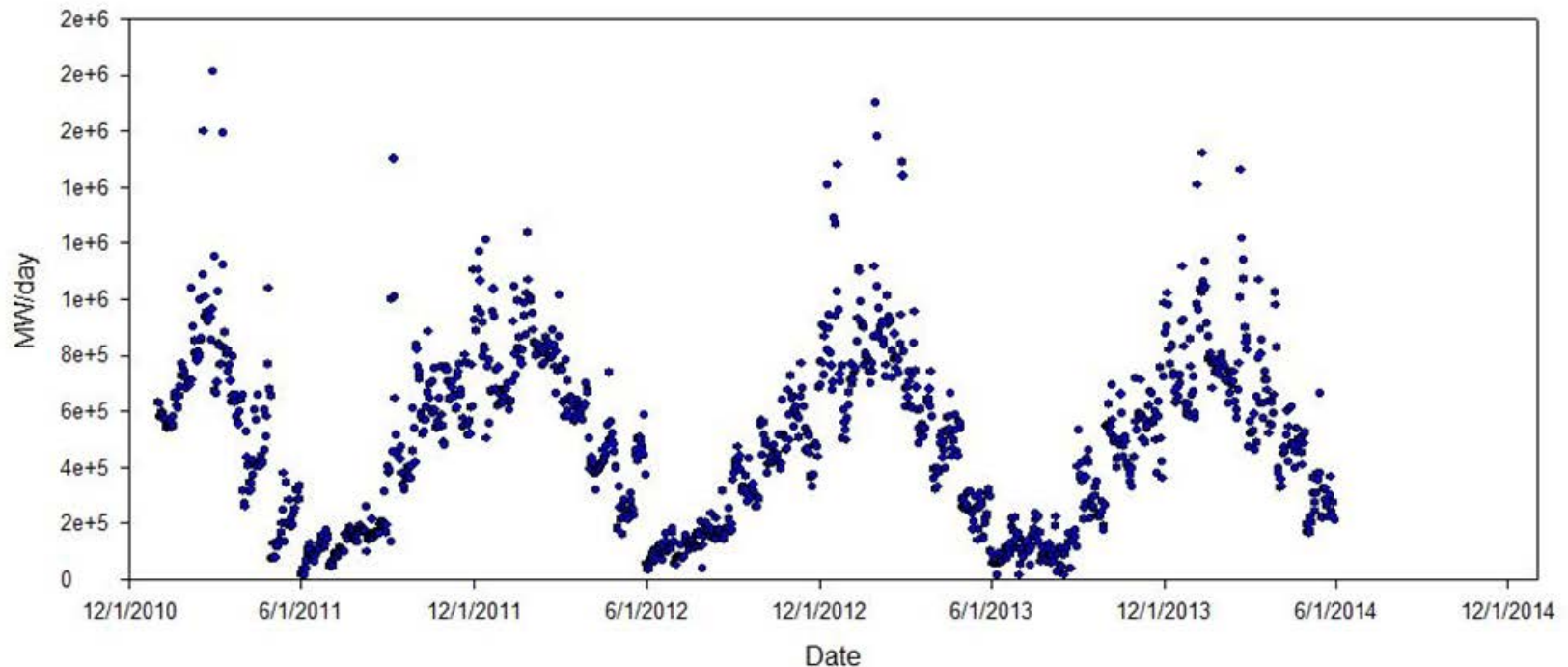




Effluent Thermal Energy Recovery project

ETER	7,300 MWh/day	@ 4% efficiency, annual mean	20 MWh/day
[IAWWTF Data by JL]		<u>Heat pumps e-consumption not included</u>	

IAWWTF Effluent T power content



Effluent Thermal Energy Recovery project



City Harbor site plan

Effluent Thermal Energy Recovery project

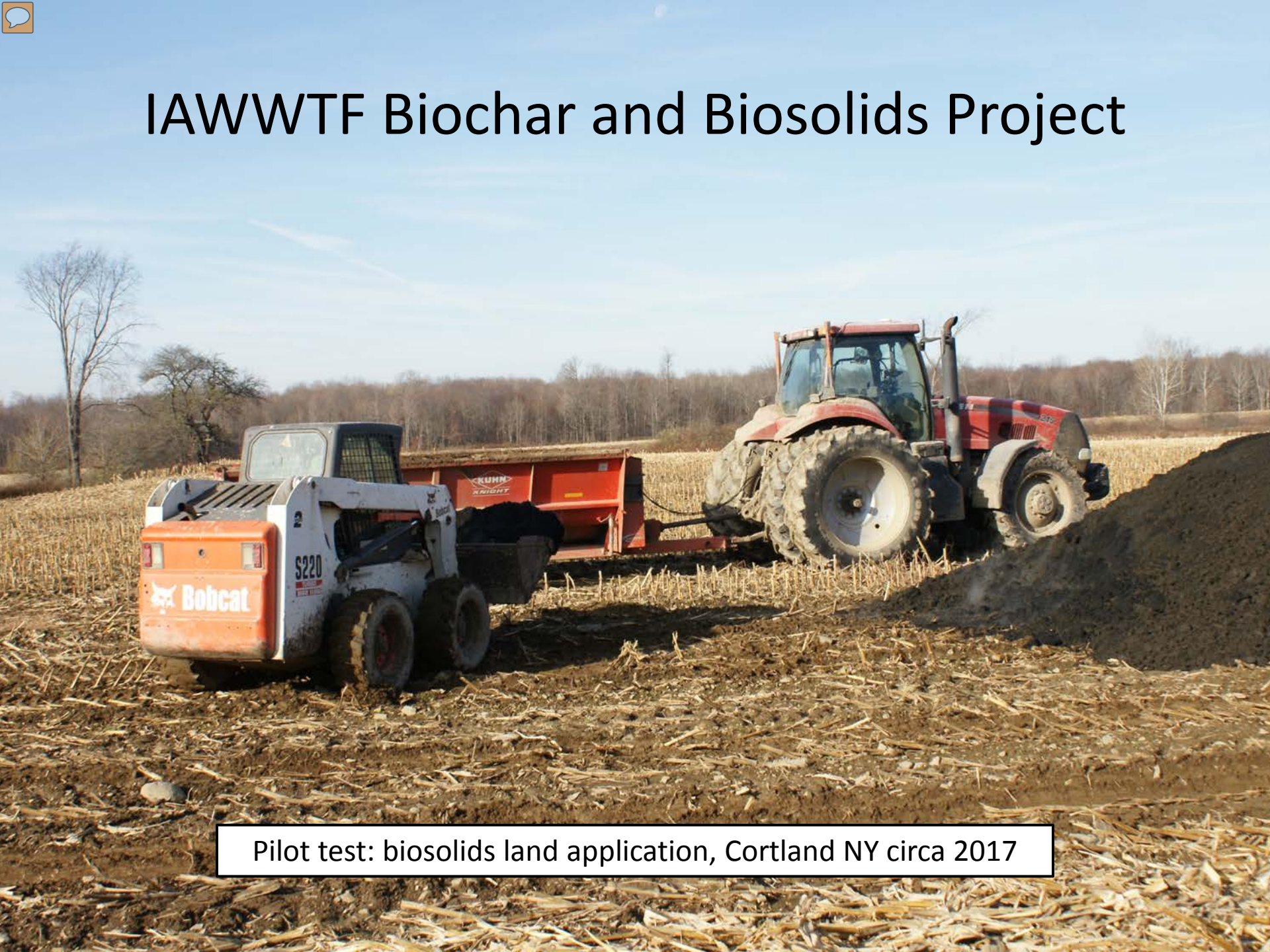
- ETER project business model:
 - All capital costs – City Harbor LLC, a consortium of local and regional developers
 - The LLC will then purchase the energy at 50% rate of a conventional energy district

IAWWTF Biochar and Biosolids Project



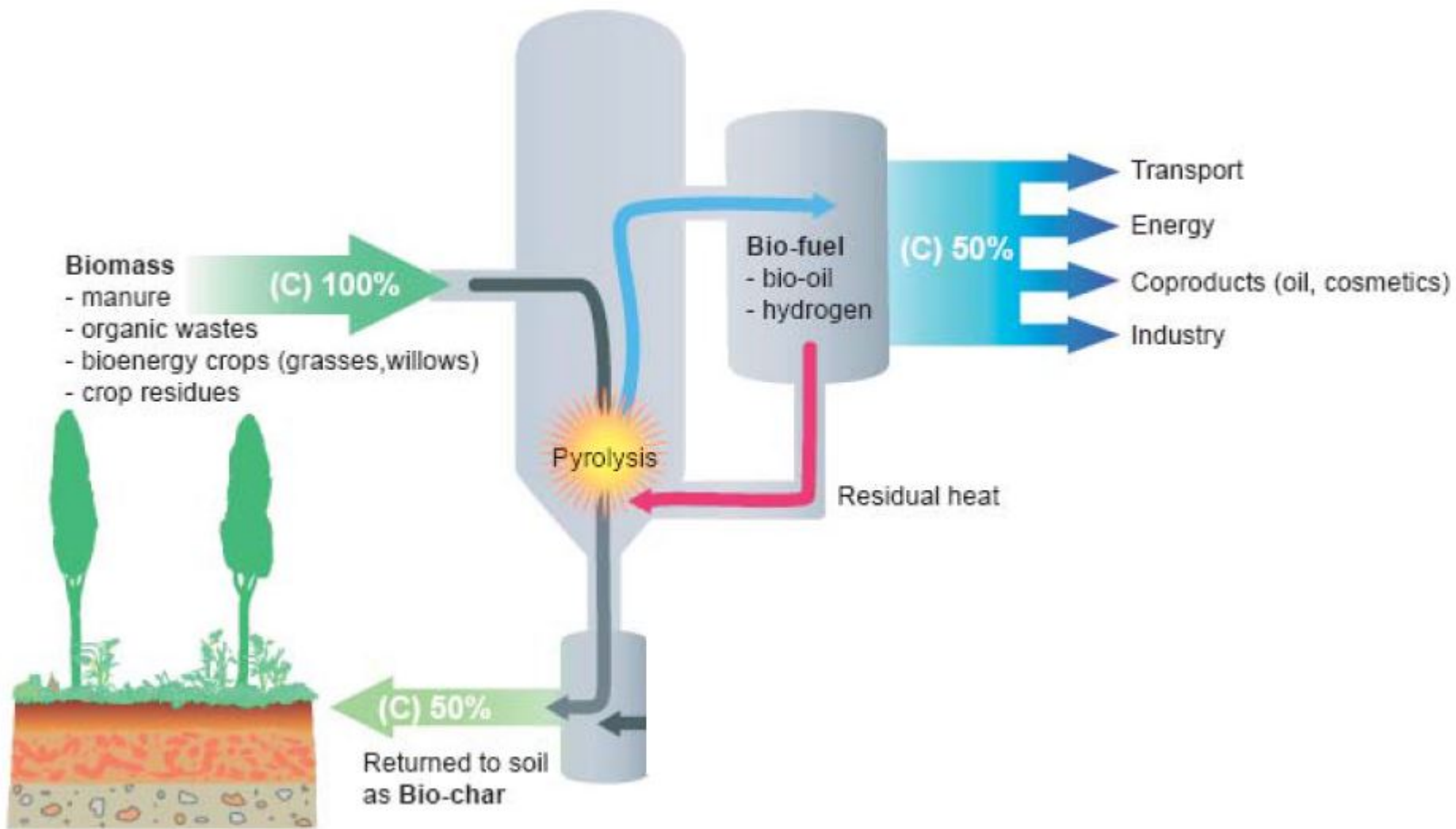
The biosolids from the biodigester project are currently disposed in the Seneca Meadows landfill (50 miles away from Ithaca) costing \$409K / yr (2019) - 12.5 wet tons per day

IAWWTF Biochar and Biosolids Project



Pilot test: biosolids land application, Cortland NY circa 2017

IAWWTF Biochar and Biosolids Project



IAWWTF Biochar and Biosolids Project



How Much Energy potential?

- **Ithaca case** = 13 to 20 MWh per day - From 12.5 wet tons of biomass
- **Albany North case** = 450 to 650 MWh per day - From 100 wet tons of biomass

IAWWTF Biochar and Biosolids Project



Biochar market?

- \$3.1 Billion (12% Compound Annual Growth Rate)
- Agriculture: 50% market share
- \$100.00/ ton (whole sale)

Biochar benefits?

- Crop yield
- Phosphorus rich
- Fertilizer use reduction
- Soil quality
- Runoff reduction
- GHG emissions reduction

Serves as an alternative to peat and perlite

IAWWTF Biochar and Biosolids Project

- Biochar and Biosolids project business model
 - Product development fully paid for by two private companies: Rockwell Collins and EthosGen
 - System optimization during piloting done by a Cornell faculty partner
 - Pilot installation at the IAWWTF
 - Units are being designed for use on farms and WWTFs
 - Commercial units designed to have a 3-5 year ROI



IAWWTF Sustainable Energy Projects Summary

Source	Max Power [MWh/day]	Fossil C
		Avoidance [Lb/day]
Co-digestion	18	7,186
ETER	20	7,984
Biochar	15	5,988
Total	53	21,159

Take home: 53 MWh/day is enough to power 19,000 homes which replaces 7.7 million pounds per year of fossil Carbon



State policy change needed

- Currently New York's DEC CO₂ Budget Trading Program specifies offset for only 5 project categories:
 - Landfill methane capture and destruction
 - Reduction in emissions of sulfur hexafluoride (SF6)
 - Sequestration of carbon due to afforestation
 - Reduction or avoidance of CO₂ emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency in the building sector, &
 - Agricultural manure management operations.
- According to this list Co-Digestion, Biochar production, & Effluent energy recovery may not qualify for CO₂ emissions offsets, at this time.



THANK YOU



PFAS in Biosolids		
04.11.2019 08:00 Grab		
Dry results in ng/g	[ng/g]	
EPA 537 V.1.1 modified		
Perfluorodecanoic acid	2.5	surfactant, flame retardant
Perfluorohexanoic acid	3.1	stain and waterproofing
Perfluorooctanesulfonic acid	7.4	stain repellent (Scotchgard).