

IAWWTF Renewable Energy / Carbon Negative Projects

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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





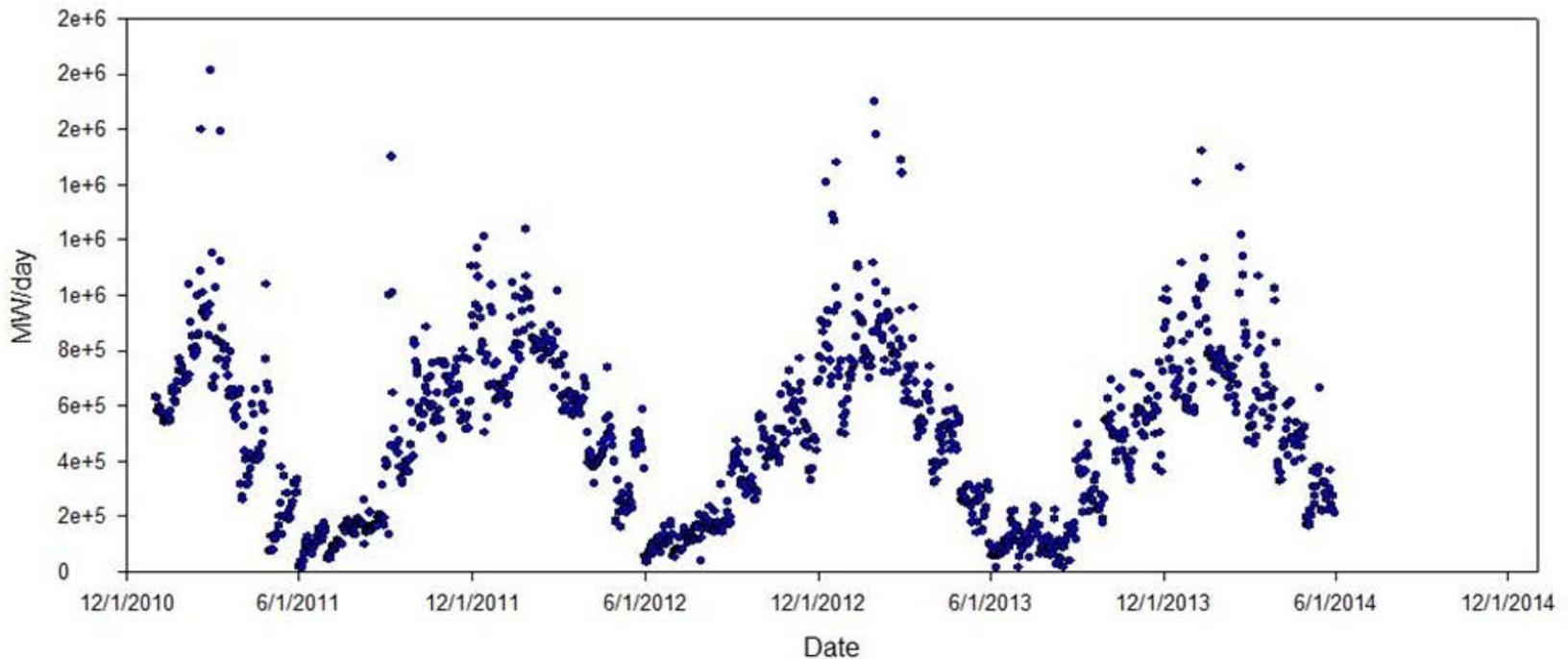
Effluent Thermal Energy Recovery (ETER) project



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

- 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



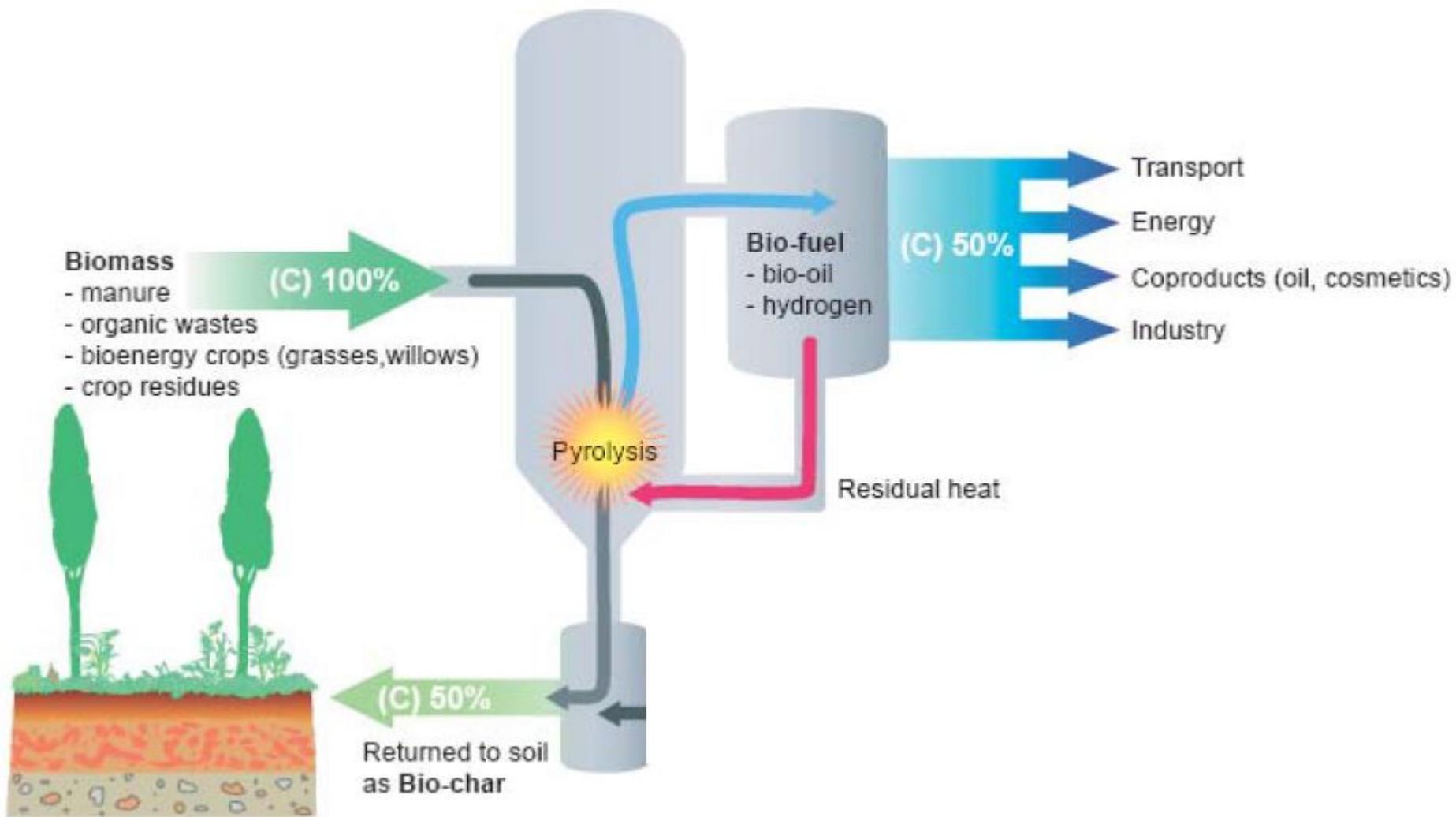
The biosolids from the biodigester project are currently disposed in the Seneca Meadows landfill (50 miles away from Ithaca) costing \$409K / yr (2019) - 12.5 wet tons per day

IAWWTF Biochar and Biosolids Project



Pilot test: biosolids land application, Cortland NY circa 2017

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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).