

Just as the Hudson Valley gave birth to the modern American environmental movement in the 1960s, we are again positioned to design a system of prosperity and sustainability to inspire the nation.

We have the opportunity to consider new and innovative technologies that will propel and encourage others for generations to come.

**The Cultivator Presents:
Hudson Valley Circular Biogas Systems**

A Green Innovative Grant Program Opportunity

*Proposal For Wappingers Falls,
Dutchess County, New York*

We need your help:

1. Permission to integrate the Village's Water Chestnut Harvesting Operations Into a GIGP application for 'community contribution'
2. Sponsoring a NY Consolidated Funding Application (CFA)

Host Community For A Green Innovative Grant Program (GIGP)

Hudson Valley Biogas has proposed the solution -

The Cultivator will execute the plan.

Problem



Food Waste
Organic & Nutrient Loss



Invasive Species
Ecosystem Destruction



Linear Production
Landfilling & Pollution

Supportive Research

Assessment Of Biogas Feedstocks In New York's Hudson Valley



www.HudsonValleyBiogas.org

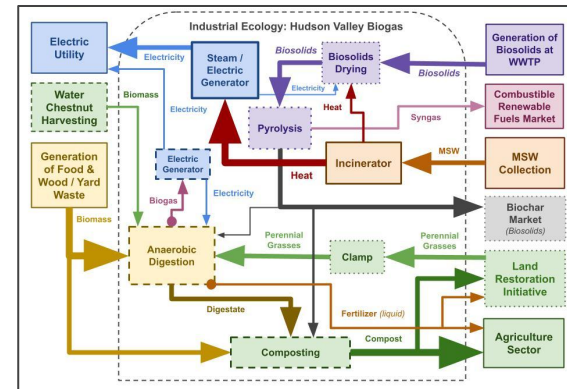
Fall 2020

Nicholas Paul Catania

Norwegian University of Science and Technology

Faculty of Engineering - Department of Energy and Process Engineering

Circular Biogas Systems For New York's Hudson Valley



www.HudsonValleyBiogas.org

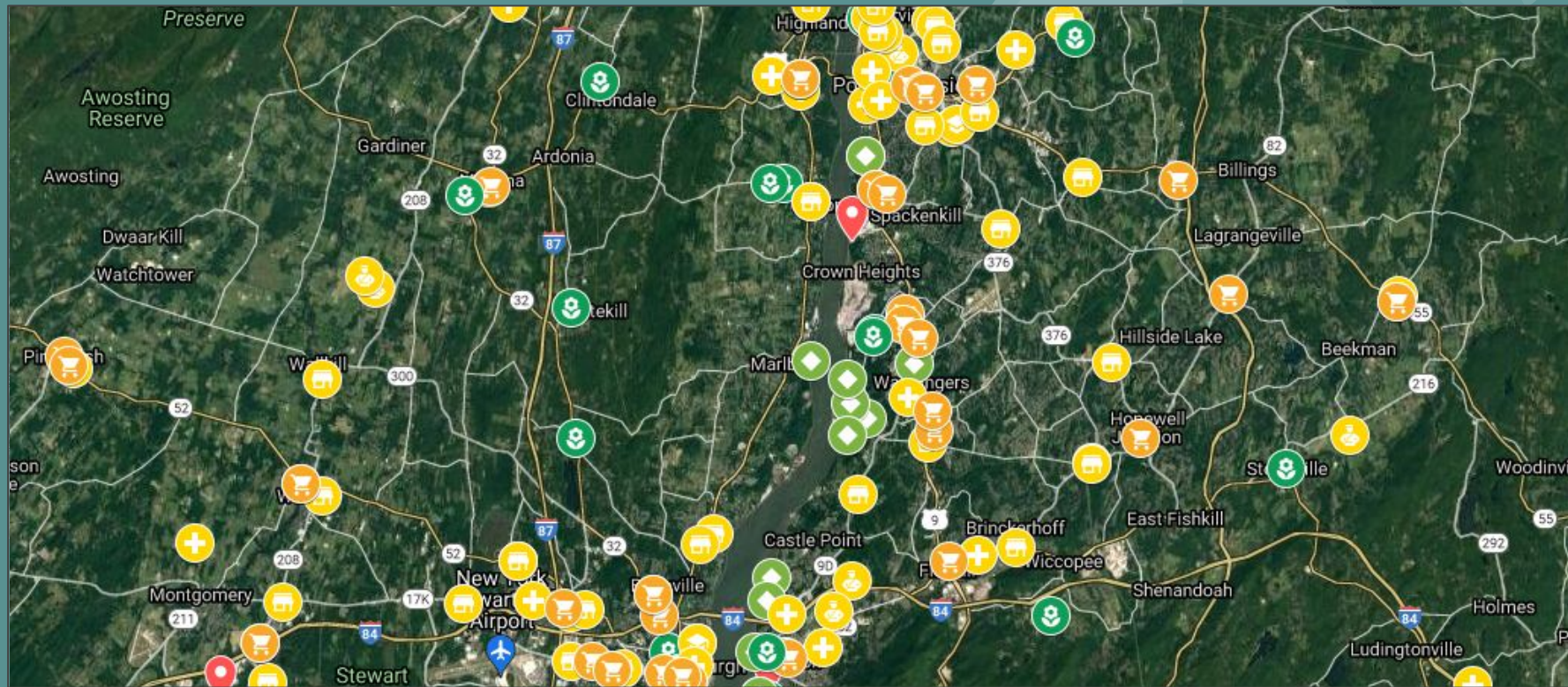
Expected Summer 2021

Nicholas Paul Catania

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Faculty of Engineering - Department of Energy and Process Engineering

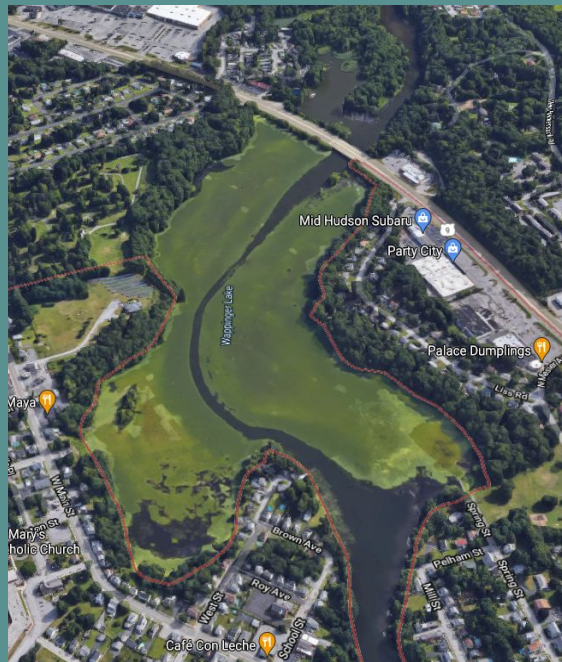
Opportunity: Local resources



Hudson Valley Biogas potential feedstock map

Data primarily sourced from NYSP2I and the USDA

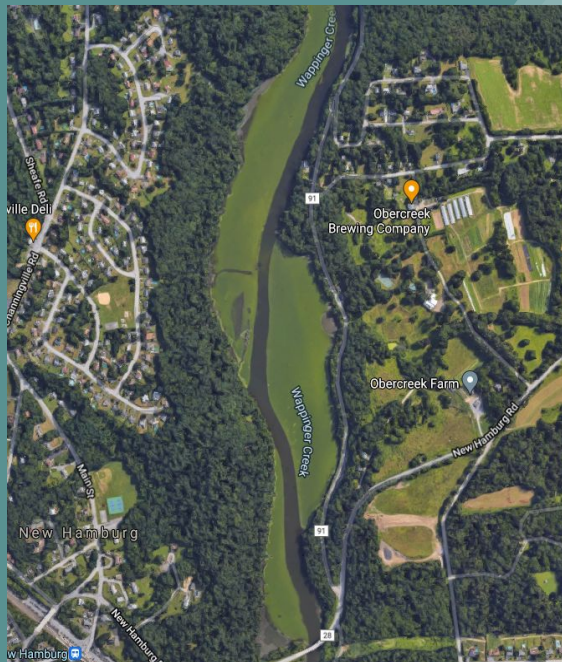
Opportunity: Invasive water chestnut



Wappinger Lake

~55 acres

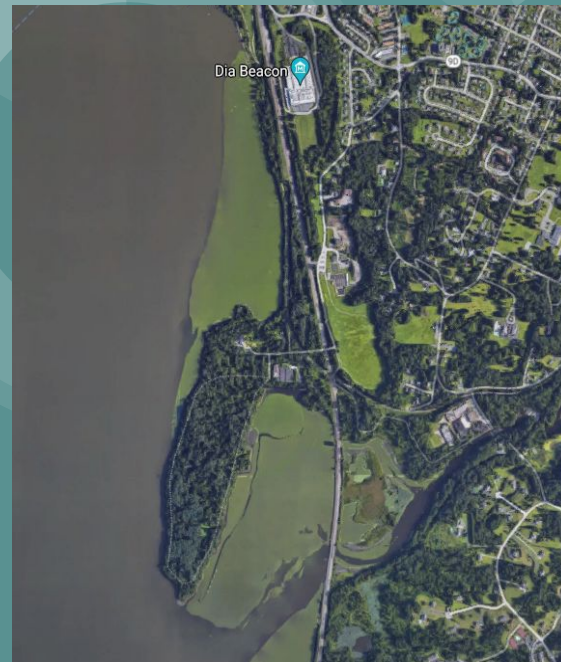
Estimated 400 tons



Wappinger Creek

~45 acres

Estimated 350 tons



Denning's Point

~135 acres

Estimated 1,000 tons

Solutions: Prototype models



Anaerobic Digestion

Shipping Container Solutions

FB120: ~900 tons / year

Biogas / Compost / Liquid Fertilizer



Pyrolysis

Small-scale Biochar Production

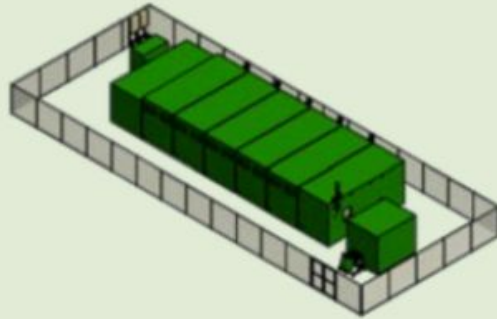
AR1: FB120: ~750 yards³ / year

Soil Amendment / Heat / Distillates

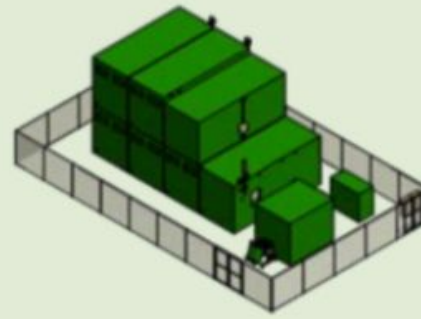
Technology

**Anaerobic
Digestion**

FB/MB 120



Flat footprint: 11 x 28 m



Stacked footprint: 11 x 18 m

Max. input:

2,500 kg / day
(solid waste)

5,650 kg / day
(slurry)

**Pyrolysis
(Biochar)**

AR1A

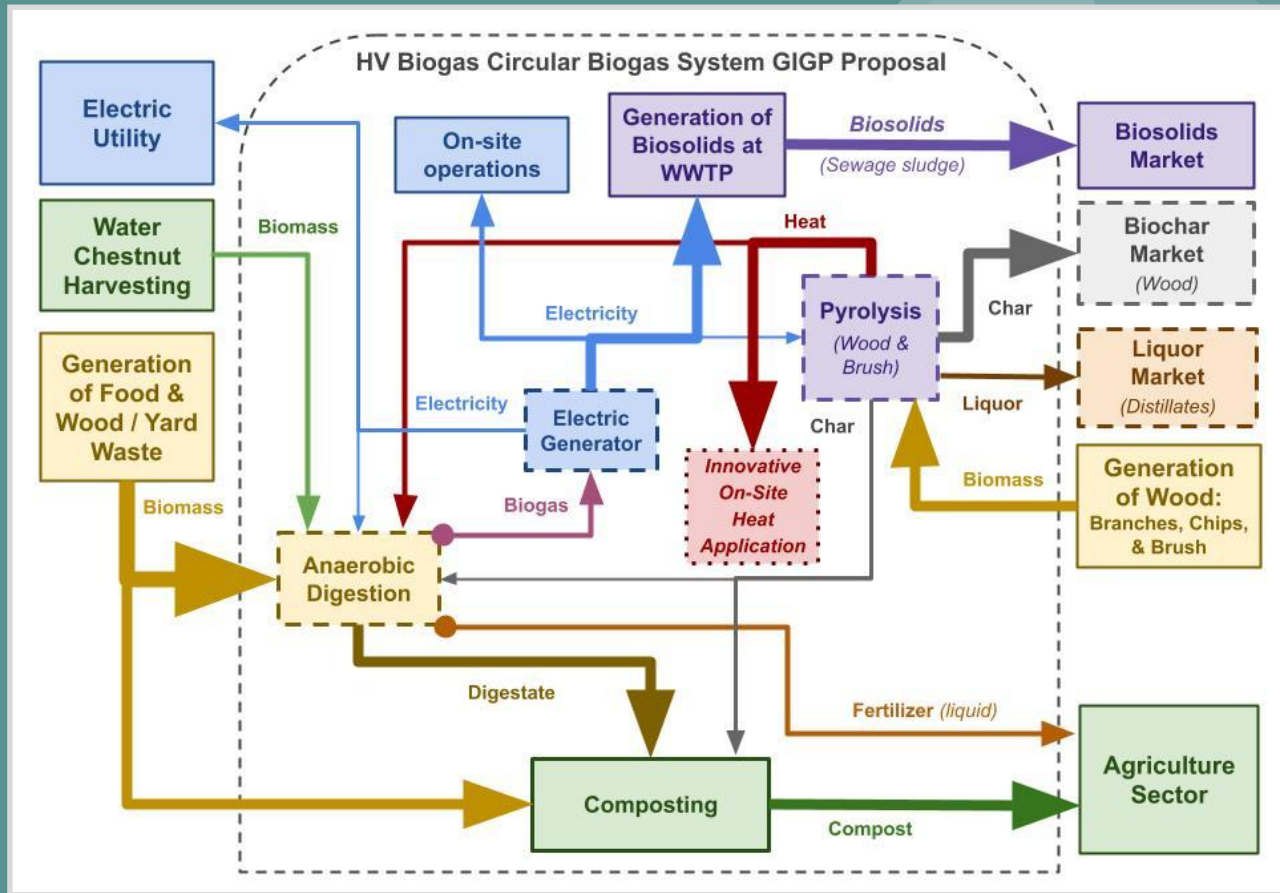


Max. input:

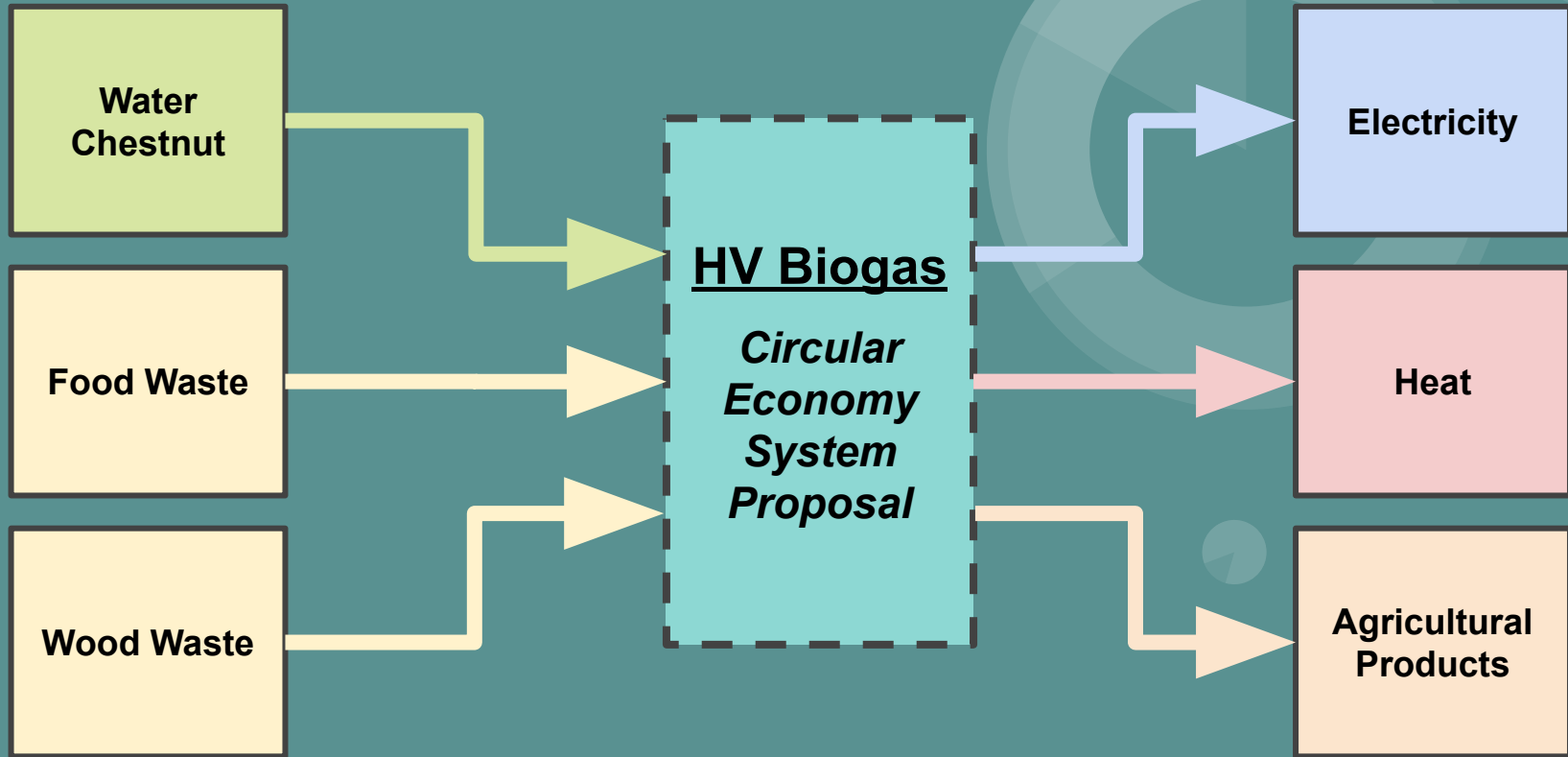
3 yard³ / batch
1 Batch / Day

Dimensions:
8 ft x 20 ft
8 ft high

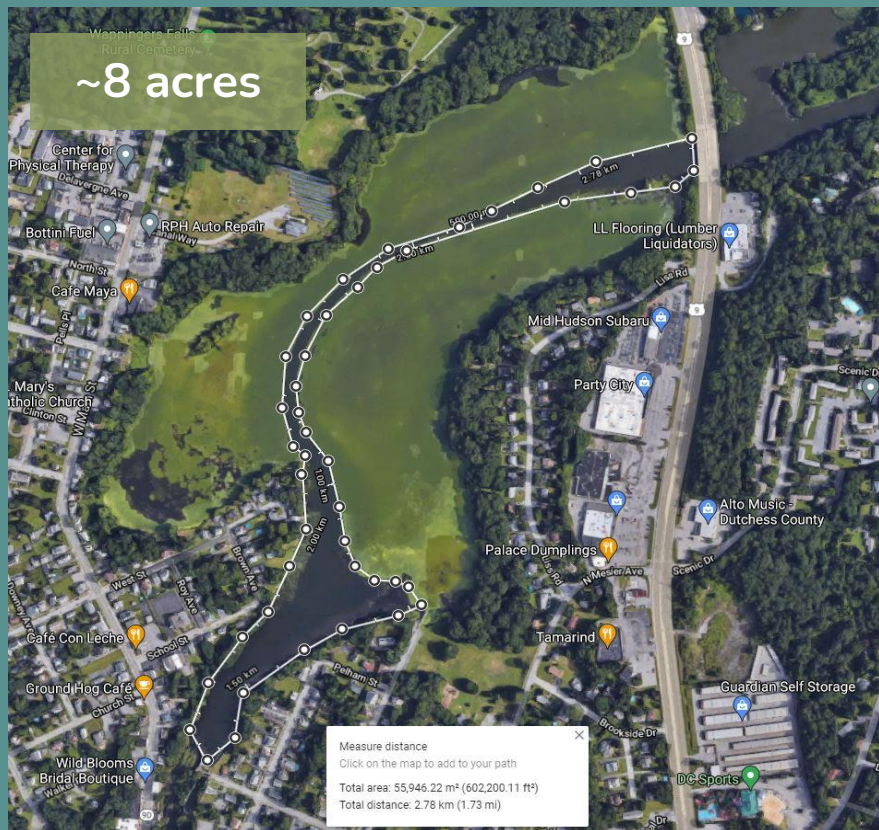
Technology: Systems Solution



Direct Benefits



Wappinger Lake: Water Chestnut Harvesting



Difference: ~20 acres (estimate 150 ton removal & 100 lbs phosphorus)

Proposed Candidate Locations:



Candidate Location A
Wappinger Highway Department
10 Highway Dr.
Wappingers Falls, NY 12590



Candidate Location B
Village Biomass Staging Area
Clapp Ave & Franklindale Ave.
Wappingers Falls, NY 12590



Candidate Location C
Village Highway Garage
100 Market St.
Wappingers Falls, NY 12590

Please discuss and share preference / recommendation

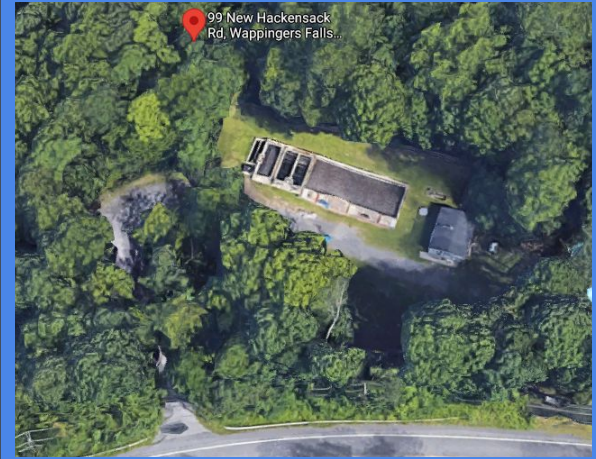
Proposed POTW Electricity Recipient(s):



Application Recipient A
Village Water Treatment Facility
2784 W Main St,
Wappingers Falls, NY 12590, USA



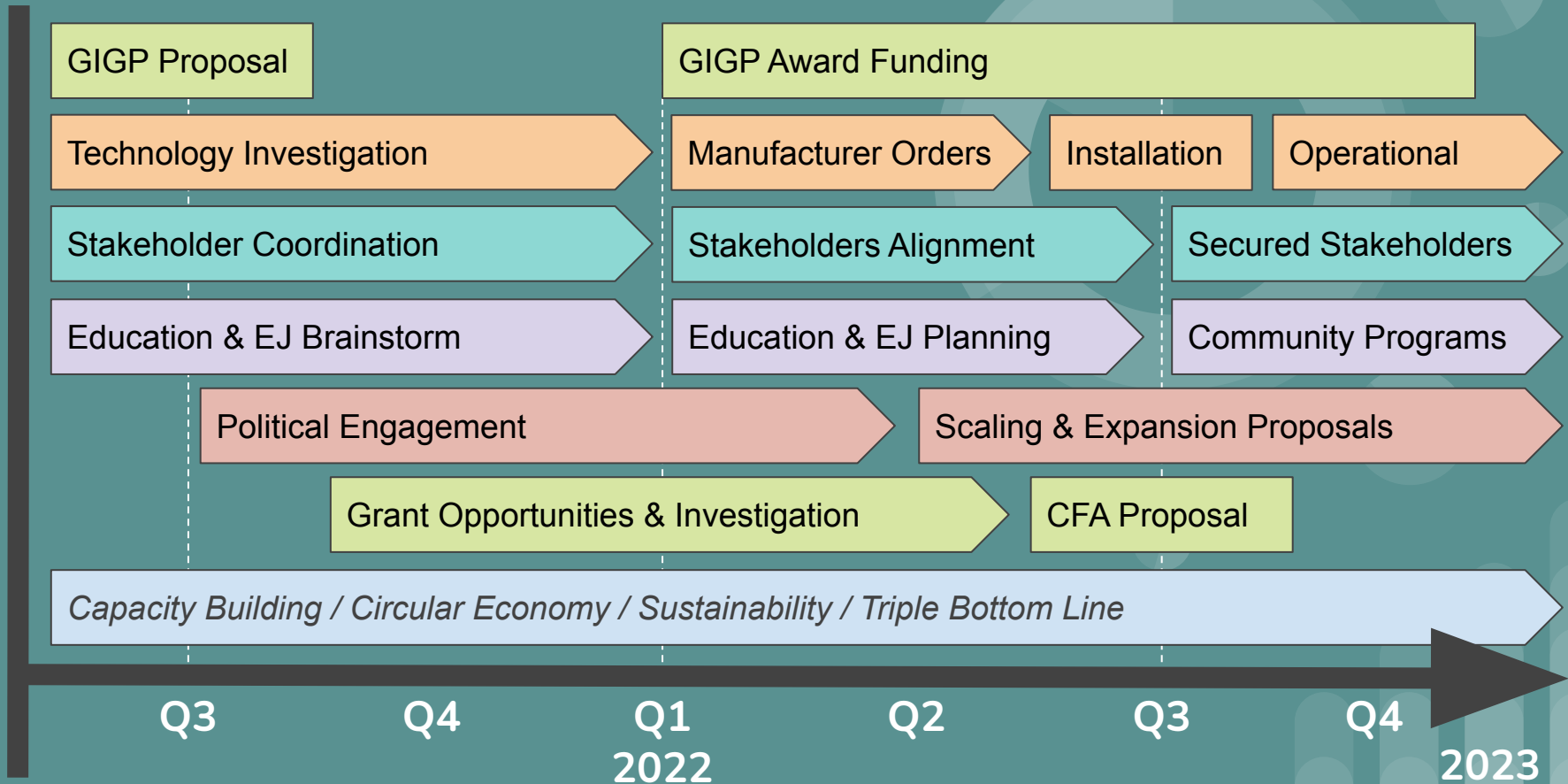
Application Recipient B
Tri-Municipal Sewer Connection
345 Sheafe Rd,
Wappingers Falls, NY 12590



Application Recipient C
Wappingers Wildwood WWTP
99 New Hackensack Rd,
Wappingers Falls, NY 12590, USA

Please discuss and share preference / recommendation

Timeline



Proposed Funding Arrangement:

POWER PURCHASE AGREEMENT (PPA):

- Third-party developer installs, owns, and operates on the property.
- Customer purchases the system's electric output for a predetermined period.
- Customer receives a stable and low-cost electricity with no upfront cost.
- Owner receives tax credits and income from the sale of electricity.



Community PPA Precedent:

*Solar installation at the
Village's Water Treatment Facility*

2784 W Main St, Wappingers Falls, NY 12590, USA

Financials:

~\$1 million

Green Innovative Grant
'Energy Efficiency'
Sustainability & Environmental Justice

75%

25%

~\$400K

Community Support
Water Chestnut Harvesting,
Investment Financing, etc.

Technology ~75%

~\$1.4 million

Circular Economy System

Management ~13%

~14%

~\$185K

Integration /
Setup

~15%

~46%

~\$650K

Anaerobic Digestion

~\$210K

Pyrolysis (*biochar*)

Operations ~12%

~8%

~\$107K

Employees (2.5)
Self-Sustaining
After Year 1.5

~4%

~\$50K

Education &
Programming

~4%

~\$65K

Municipal Support

~9%

~\$135K

Project Coordination

Cultivator Team



Nick Catania, Project Lead
Hudson Valley Biogas

Industrial Ecologist, NTNU, Norway, HoneyBees 911 LLC
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Jim Cunliffe, Co-founder
Tech Valley Center Of Gravity

Global Solutions & Innovation Resources
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[read more](#)



Brandon Costelloe-kuehn

Youth & Society

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[read more](#)



Matt Alexander

Finance & Politics

City Comptroller at City of
Peekskill, New York

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[read more](#)



Melissa Everett, Ph.D.

Stakeholders & Economy

Sustainable Hudson Valley,
Executive Director

melissa.a.everett@icloud.com

[read more](#)

New York State Driving Forces:



1) Restore Local Water Systems



2) NYS Excess Food Waste Legislation

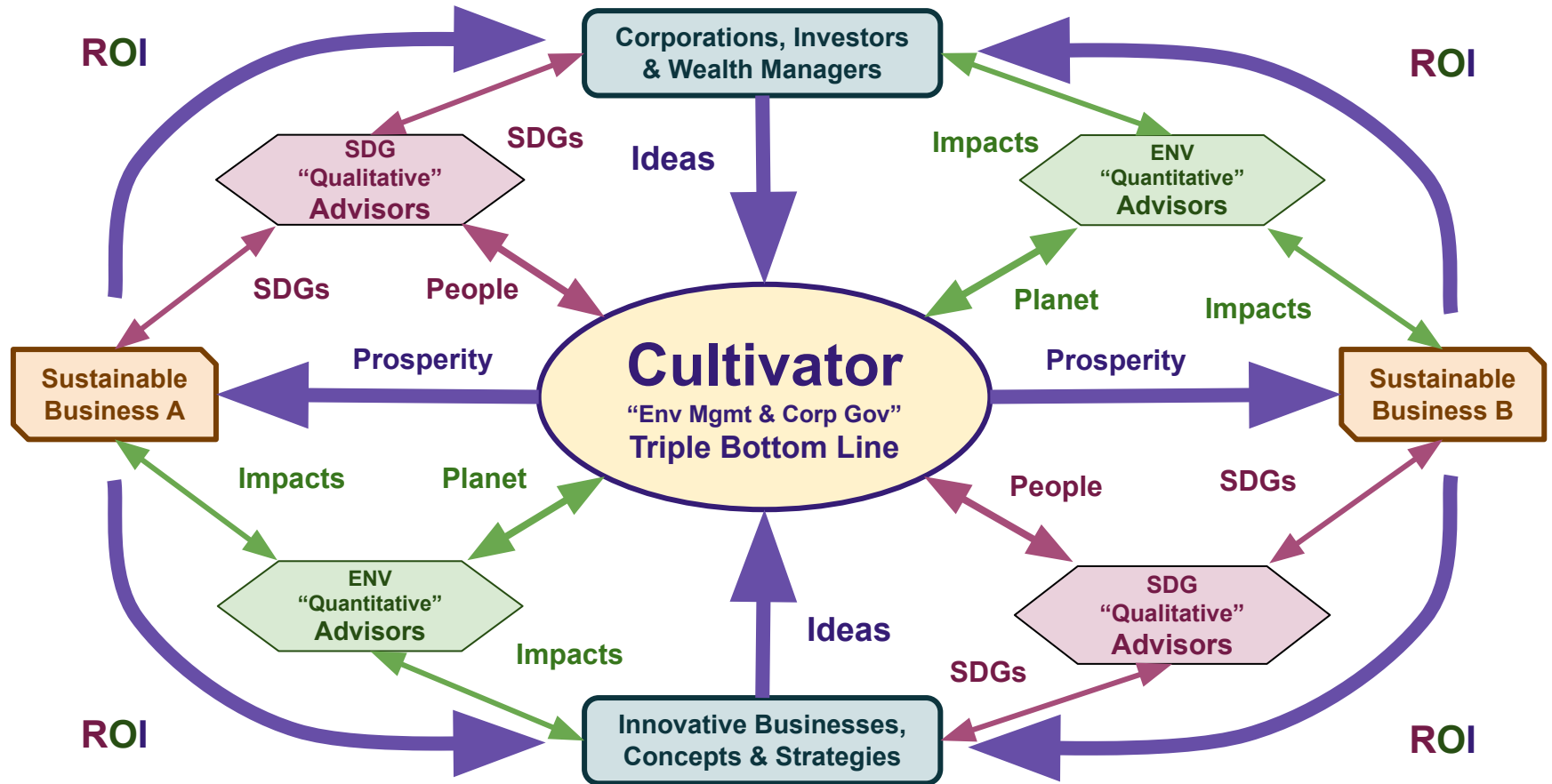


3) CLCPA Renewable Energy Initiatives



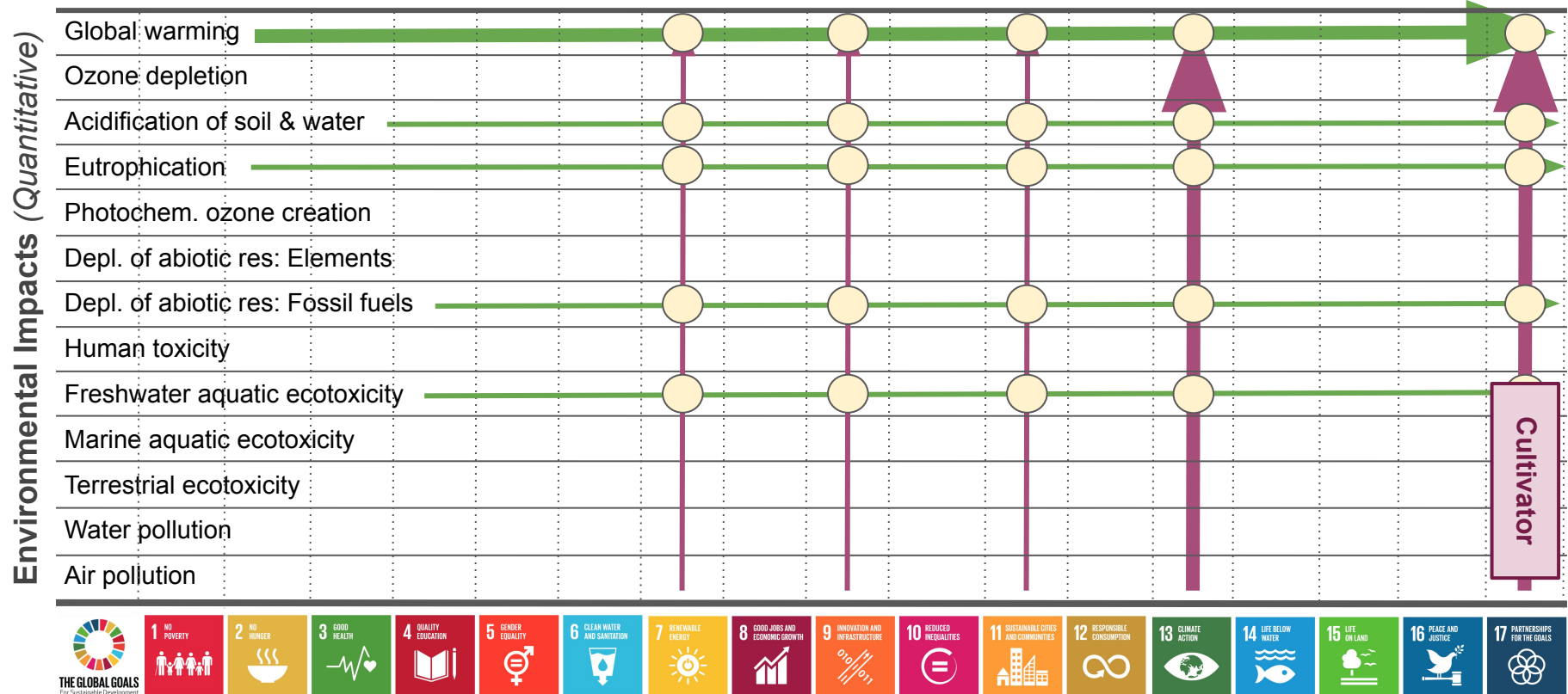
4) Addressing Environmental Justice

Cultivator Framework

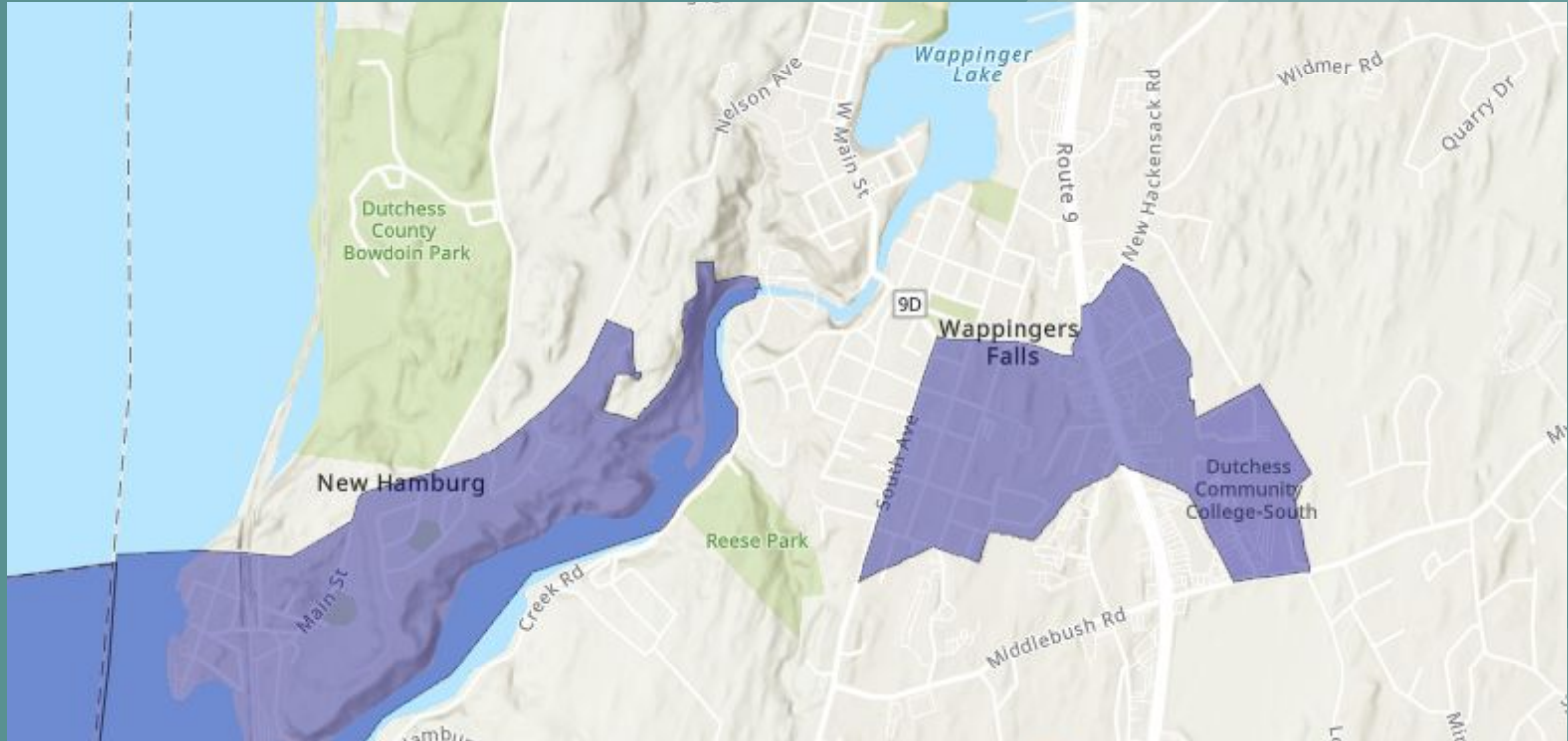


Cultivator Advisory

Biogas Production In New York's Greater Hudson Valley



Environmental Justice Areas



NYS DEC Commissioner Policy 29 on Environmental Justice and Permitting (CP-29)

ArcGIS Webmap of the Potential EJ Areas 2020

Education & Environmental Justice



Kathy Puffer

Education

Training & Consulting
Puffer Biogas

puffer.biogas@gmail.com



Video: [Small scale biogas education is for everyone](#)

*With support for class
setting, organization, &
public outreach from:*



Stakeholders:

- NYSP2I
- NYS DEC
 - Division of Materials Management
 - Office of Invasive Species Coordination
 - Region 3 Environmental Permits
 - Climate Change
 - Partnerships for Regional Invasive Species Management (PRISM)
 - Lower Hudson
 - SLELO
- US Army Corps of Engineers (USACE)
- NYSERDA
- Clarkson University
- Beacon Institute for Rivers & Estuaries
- Cornell University
- Cornell Waste Management Institute
- Iowa State University: C-Change
- Cary Institute
- Sustainable Hudson Valley
- Hudson Valley Regional Council
- Hudson River Watershed Alliance
- Northeast RISCC Management
- Solar Cities: Global Biogas Education
- Hudson Valley Vertical Farms
- Organix Recycling
- Alltech
- Lindum (Norway)
- American Biogas Council
- Ithaka Institute for carbon intelligence
- **Cornell Cooperative Ext**
 - Dutchess County
- **Invasive Water Chestnut**
 - Beacon Institute for Rivers & Estuaries (Clarkson University)
 - Hudsonia (Bard College)
- **Land Conservancy Groups**
 - Columbia Land Conservancy
 - Dutchess Land Conservancy
 - Hudson Highlands Land Trust
 - Stony Kill Foundation
- **Universities**
 - Vassar College
 - Dutchess County Community College
 - Marist College
 - Culinary Institute of America
 - Mount St. Mary's

Supporting Organizations:



Hudson Valley Regional Council

<https://hudsonvalleyregionalcouncil.org/>



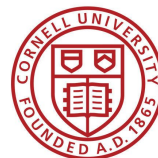
Sustainable Hudson Valley

<https://sustainhv.org/>



Pollution Prevention Institute

<https://www.rit.edu/affiliate/nysp2i/>



Cornell Cooperative Ext: Dutchess

<http://ccedutchess.org/>



Columbia Land Conservancy

<https://clctrust.org/>



Regional Invasive Species Mgmt

<https://www.lhprism.org/>



Clarkson: Beacon Institute

<https://www.clarkson.edu/academics/beacon>

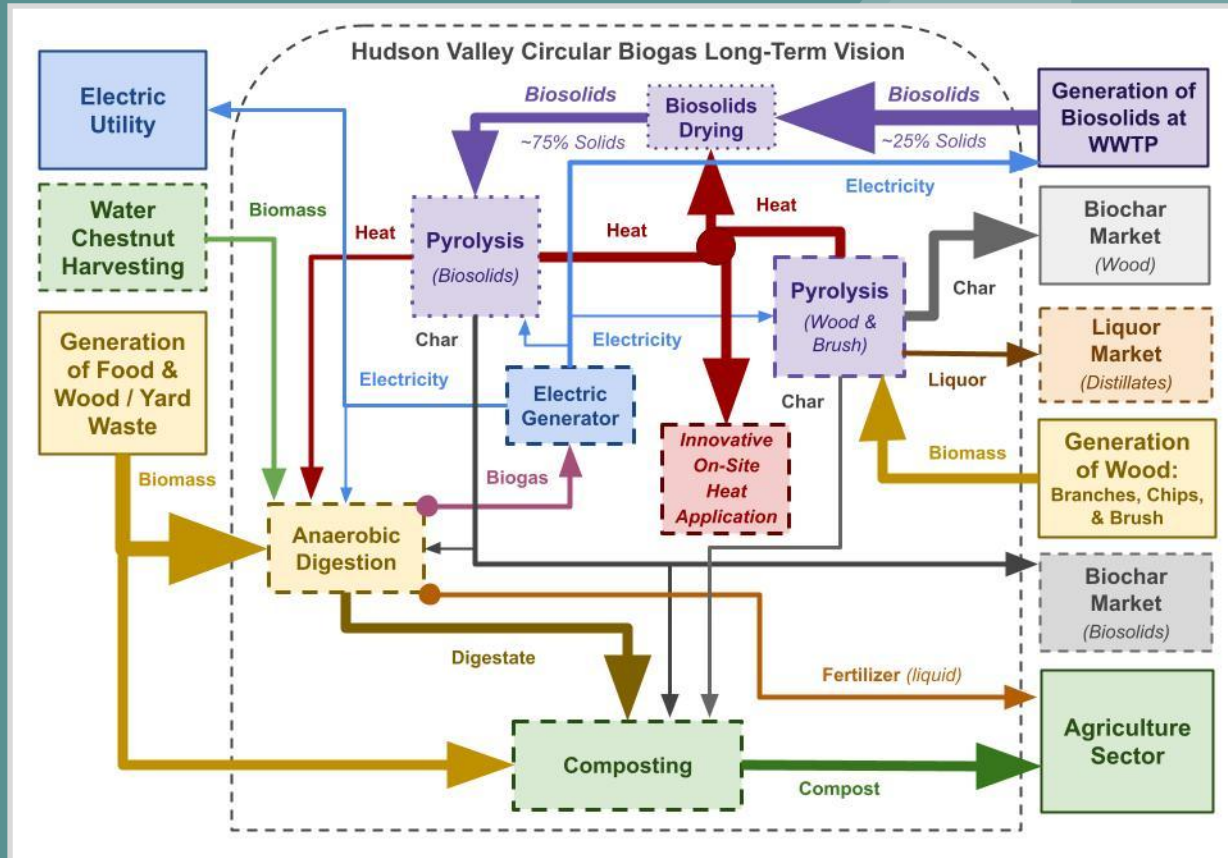


ClimatePoint

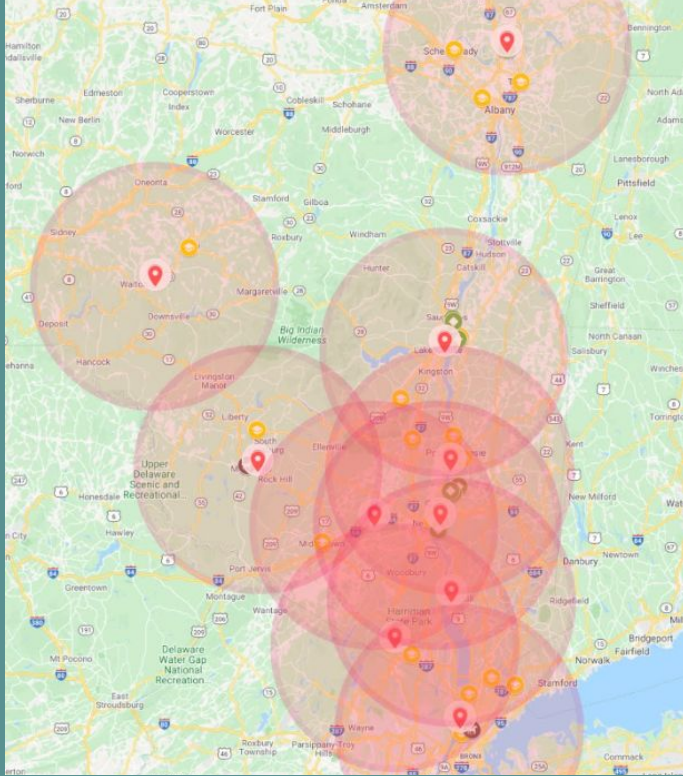
<https://en.climatepoint.com/>

Letters of support to be included with GIGP application

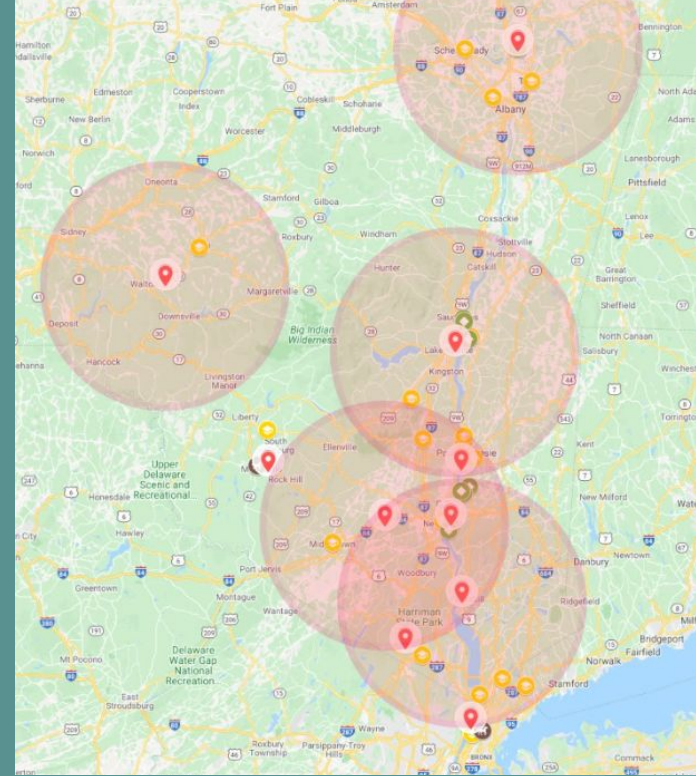
Long-Term Vision & System Solution



Regional Initiative: 25-Mile Radii (Food Waste)



10 Hudson Valley Biogas Proposals



5 of 10 Hudson Valley Biogas Proposals

Transitioning from outdated linear business practices.....



.....to new circular economy system solutions.


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