Hudson Valley Regional Council
Landfill Biofilters Project
Town of Woodstock
1/7/25 WEC Meeting

Presenter:
Mary Lambert, Climate Action Planning Manager, HVRC

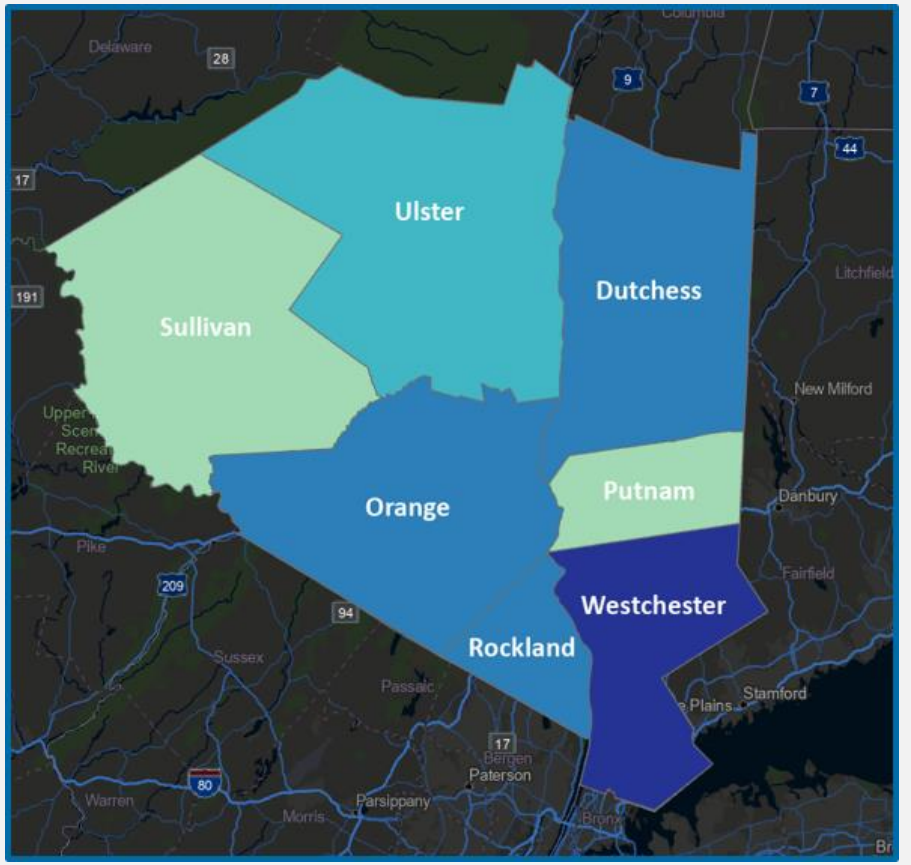
Agenda

- HVRC and Project Background Summary
- Landfills and Biofilters
- Project Planning and Next Steps
- Questions

HVRC and The Mid-Hudson Region

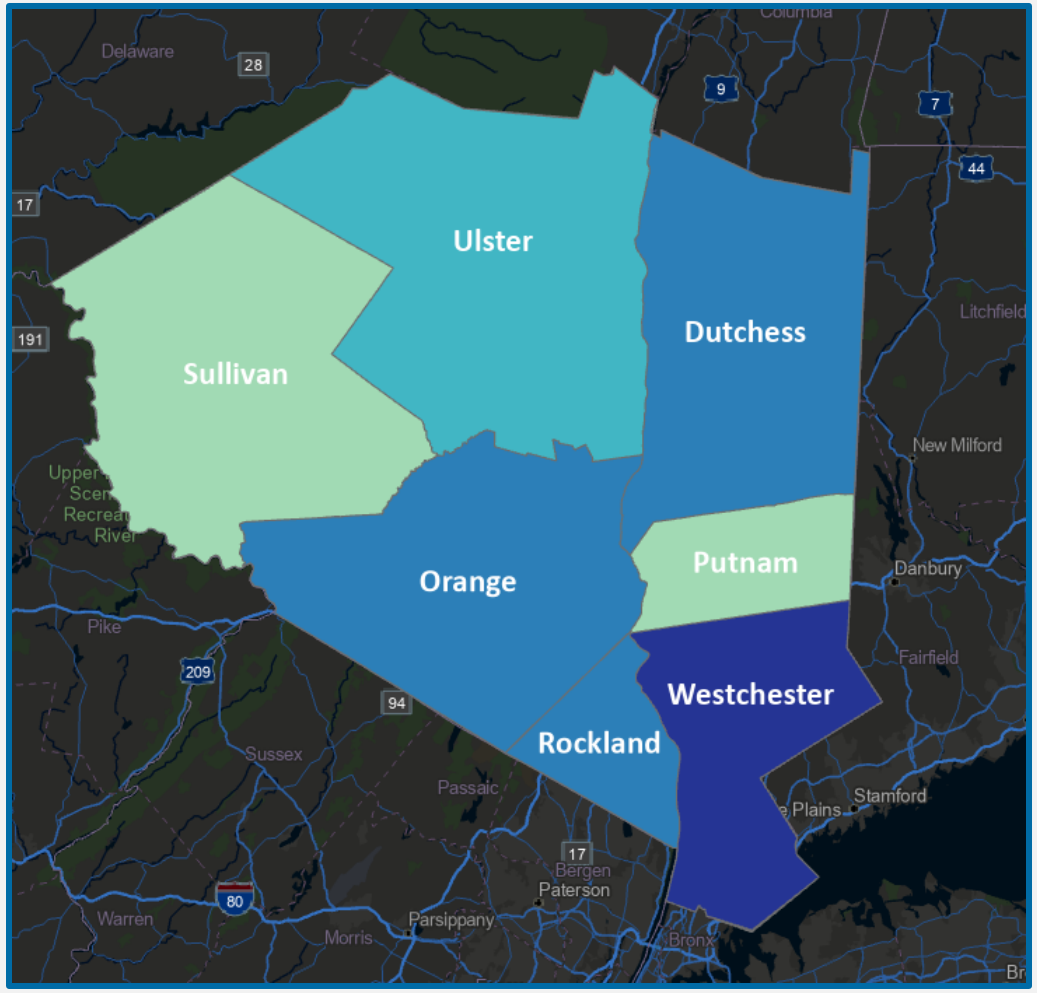
HVRC is a regional planning organization established in 1977 comprised of county governments from Sullivan, Dutchess, Orange, Putnam, Rockland, Ulster, and Westchester counties.

HVRC is one of approximately 650 regional councils in the United States that provide a regional perspective, offering planning, education, outreach, and advocacy for the counties and communities they serve.



HVRC Regional Initiatives

- **US EPA CPRG Landfill Biofilter Project**
- US DOC Economic Development Administration
- US EPA Rural, Small, Tribal Wastewater Program
- US NBRC & NYS DOS (to Sullivan County Local Governments only through HVRC's designation as a Local Development District)
- NYS DEC 604(b) Water Quality Planning Program
- NYSERDA Clean Energy Communities Program
- NYS Climate Smart Communities Program
- HVRC Climate Action Planning Institute & CAPI-Adapt
- Regional Platforms
  - Materials Management Working Group
  - Mid-Hudson Regional Sustainability Coalition



Hudson Valley Regional Council

HVRC Landfill Biofilters Team

Dr. Sehrish Asghar
Environmental Scientist

Technical fieldwork and research for Landfill Biofilters Project

Mary Lambert
Climate Action Planning Manager

Landfill Biofilters Project Manager and technical assistance related to climate adaptation and resilience.

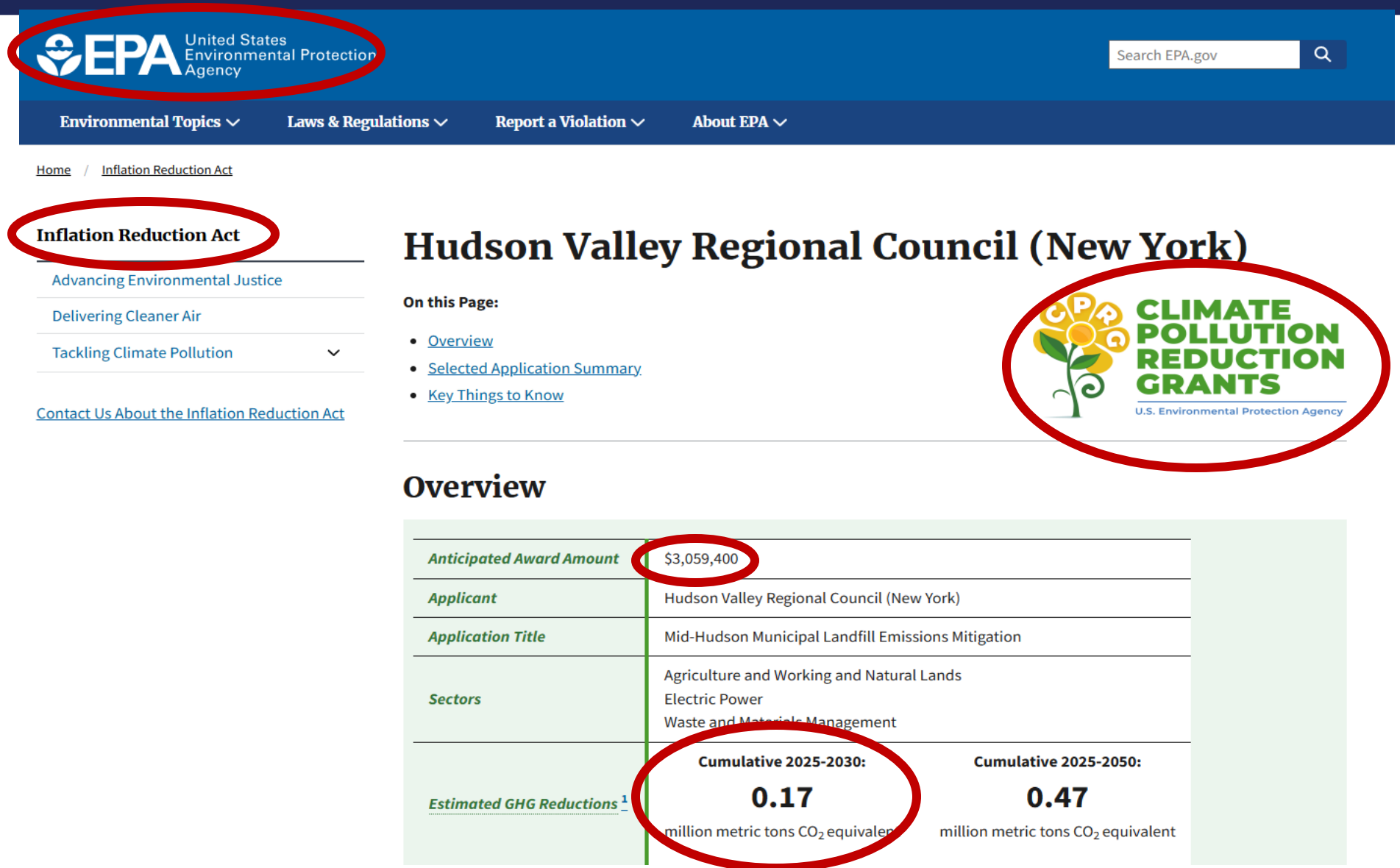
Eleanor Peck
Deputy Director

CEC & CSC technical assistance to counties and cities.

Hudson Valley Regional Council

Program Background

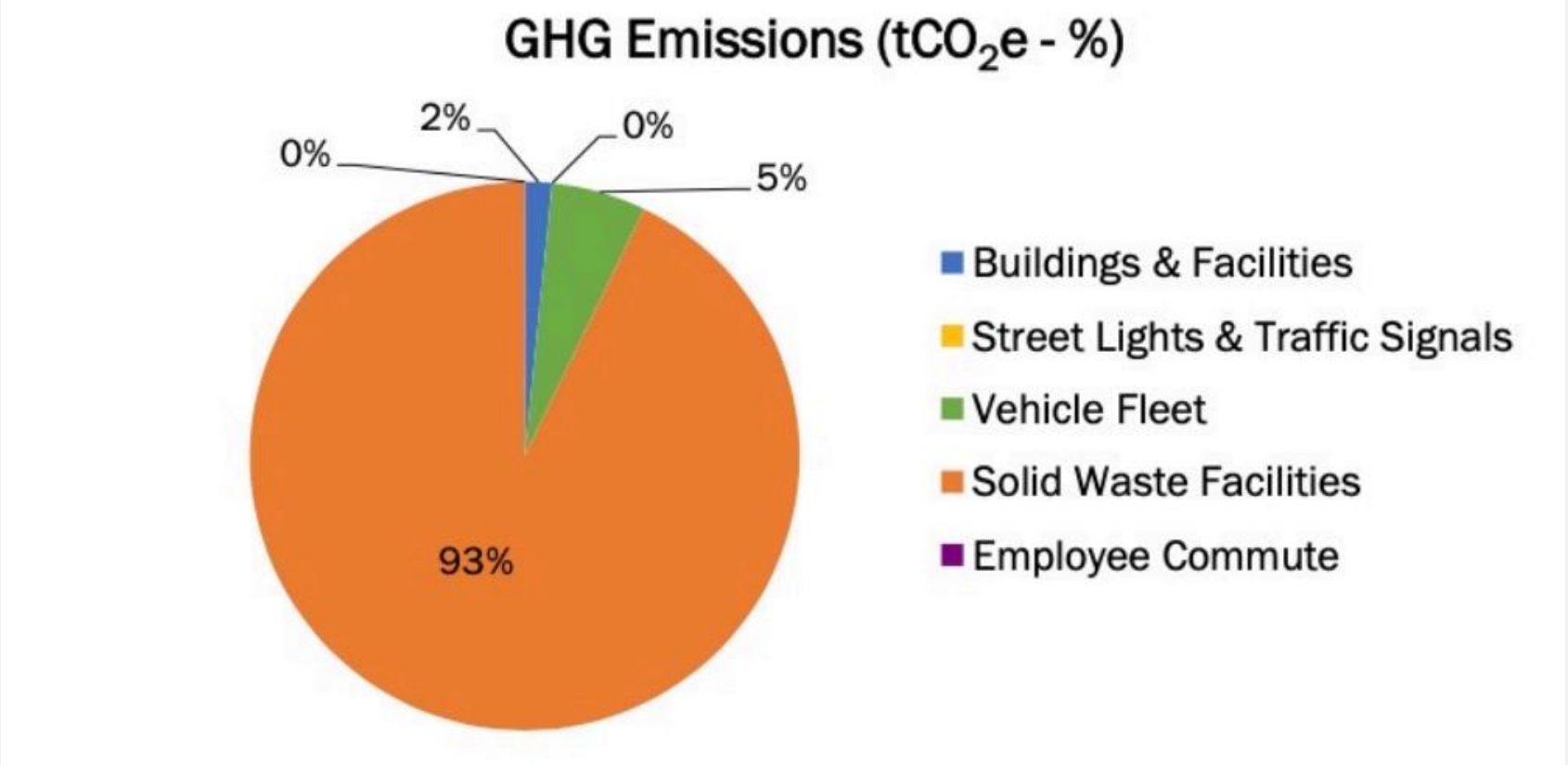
Background Review



Landfill Issues?

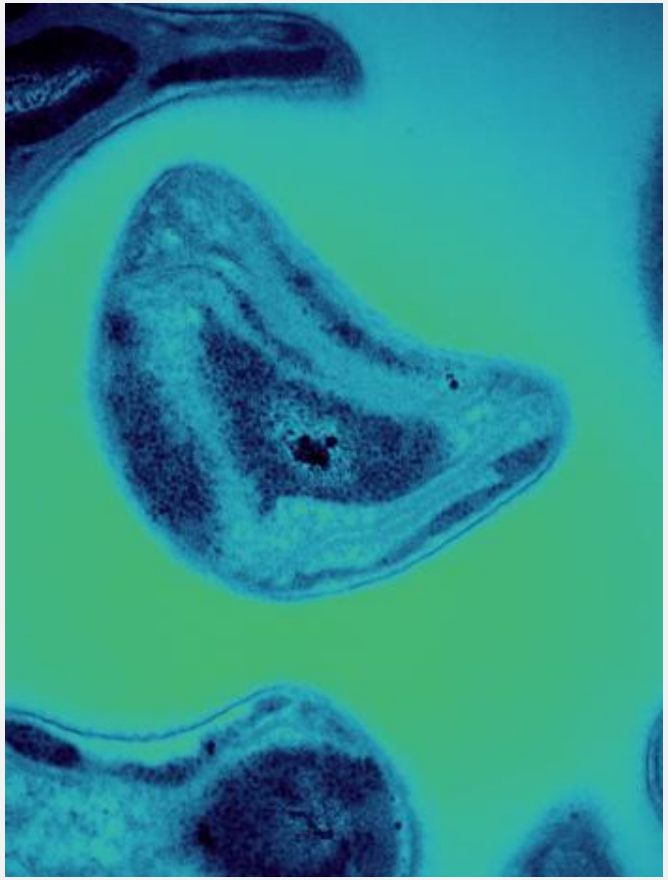
- Municipal landfills are often by far the largest source of government operations greenhouse gas emissions in a given municipality.
- Most landfills are too small to warrant methane capture for energy production – or even flaring.
- Many are contaminated and under investigation from NY State.
- Some emit foul smells and/or do not support native habitat

Town of North East Total Emissions by Sector



Why Biofilters?

- Biofilter microorganisms called methanotrophs break down methane emissions converting them into energy or other relatively harmless byproducts.
- Reduce other common pollutants, such as volatile organic compounds (VOCs), hydrogen sulfide and ammonia.
- Mitigate foul odors.



Credit: Oak Ridge National Laboratory

Why Biofilters for Municipal Landfills?

- Put landfills to use – as a source of municipal GHG emissions reductions.
- Assist NYS towards reaching CLCPA goals
- Earn points under NYS Climate Smart Communities program
- Potential generation of carbon credits
- Position landfill as a potential source of revenue generation (solar), climate resilience (battery storage).
- Leverage landfill borders for local ecosystem support (native pollinators).
- Opportunity to create a positive narrative of landfill as a climate mitigation and adaptation solution.

In Summary

- Natural and Environmentally friendly
- Cost-effective
- Low maintenance post-implementation
- Efficient at mitigating methane

Landfill biofilter and biocover studies / projects from the Italy, Denmark, Germany and the U.S. (among others) for decades have demonstrated methane reductions anywhere from 30-95%.

Landfill Biofilters Project Participants

Landfill Participant Criteria?

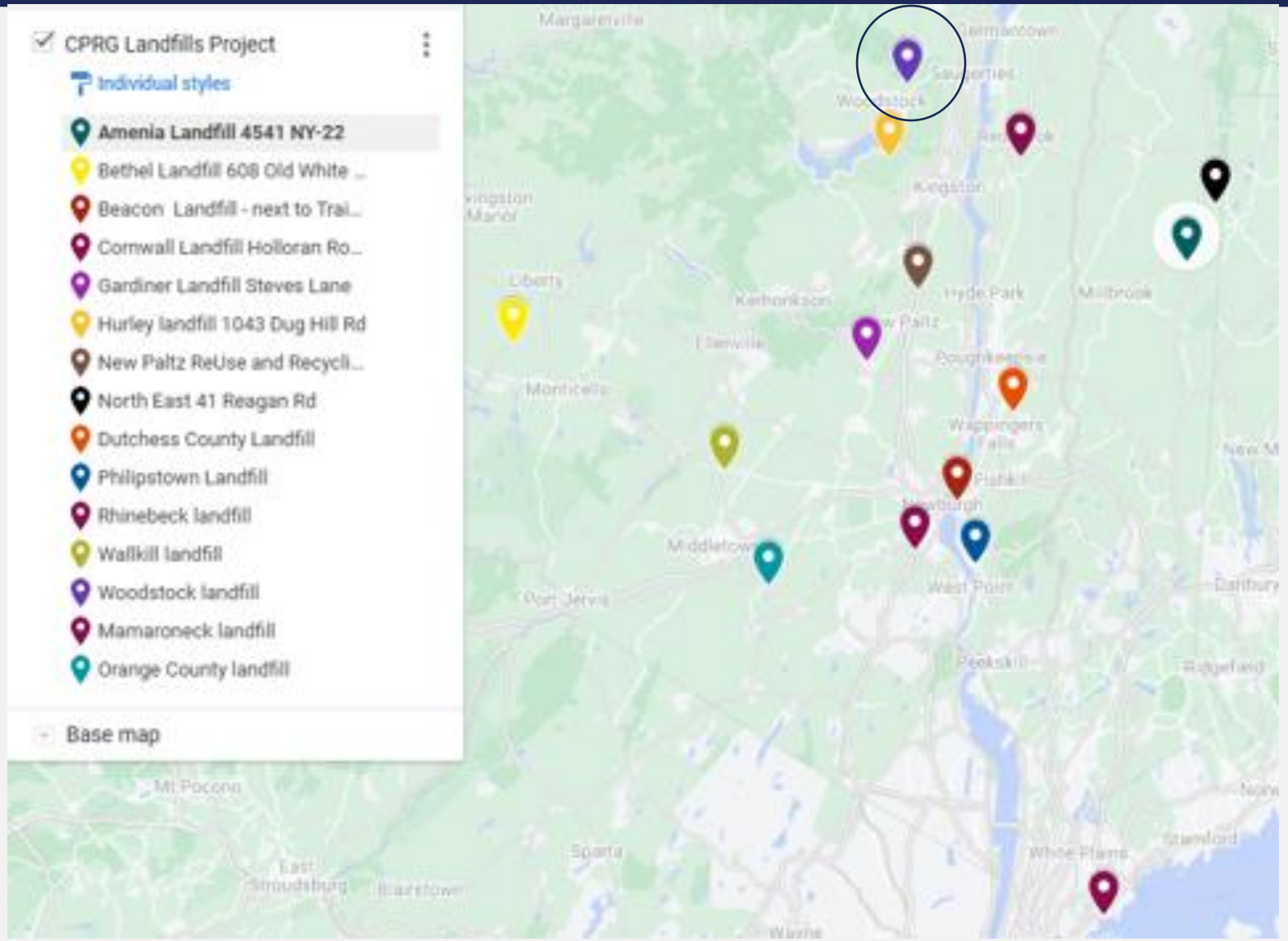
- Landfill has declining gas flow and declining gas quality.
- Gas wells are not producing significant methane.
- Wells are not connected to an active gas collection system.
  - Active wells use vacuum pumps or blowers to actively pull landfill gas from the surrounding waste material.
  - This system contrasts with passive wells, which rely solely on natural pressure gradients for gas movement.
  - Active systems often produce high flow rates and pressures that biofilters are not designed to manage.
  - Active gas collection systems are usually tied to energy recovery or flare systems.

Project Participants

Amenia Town Landfill
Town of Bethel Landfill
Beacon City Landfill
Dutchess County Airport Landfill
Town of Gardiner Landfill
Town of Hurley Landfill
Mamaroneck Taylor's Lane
New Paltz Landfill
North East Town Landfill
Philipstown Landfill
Rhinebeck Town Landfill
Wallkill Town Landfill
Woodstock Town Landfill

Facility Name	Biofilters	Pollinators	Solar Feasibility	Battery Storage	TOTAL
Amenia Town Landfill	1	1	1	1	4
Town of Bethel Landfill	1	1			2
Beacon City Landfill	1	1			2
Dutchess County Airport Joint Landfill	1				1
Town of Gardiner Landfill	1	1			2
Town of Hurley Landfill	1	1	1	1	4
Mamaroneck Taylor's Lane	1	1		1	3
New Paltz Landfill	1	1		1	3
North East Town Landfill	1	1		1	3
Philipstown Landfill	1		1	1	3
Rhinebeck Town Landfill	1		1		2
Wallkill Town Landfill	1	1			2
Woodstock Town Landfill	1	1	1	1	4
TOTAL	**13**	**10**	**5**	**7**	**35**

About the 14 Cohort Participants



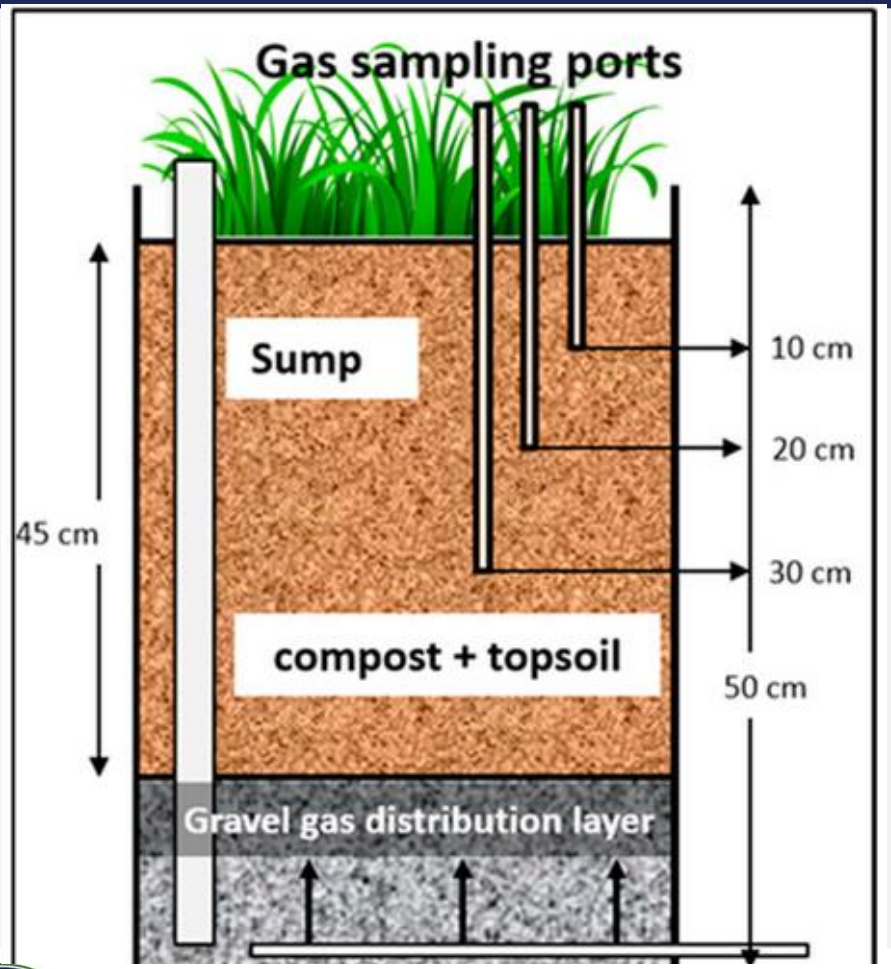
North
Woodstock, Hurley, and Rhinebeck
East
Northeast and Amenia
Central - East
Dutchess, Beacon, Philipstown
Central - West
New Paltz, Gardiner,
West
Bethel, Wallkill Orange County (wait list)
South
Mamaroneck

Landfills Biofilter Solution

Biofilter Solution

Biofilter Design

Biofilter Solution



3 Steps

- The contaminated gas stream enters the biofilter through a porous layer, such as gravel.
- The gas then permeates through the biofilter medium, which is usually compost or soil.
- The treated gas exits the biofilter after methane and other contaminants are reduced.

Key Factors

- Humidity
- Temperature
- Oxygen levels / Oxidation

Biofilter Design

Jefferson County, Washington, US

Factors influencing biofilter design include:

- Methane concentration/volume
- Vent size, dimensions, layout and distribution
- Landfill topography and space availability
- Media type
- Environmental factors
- Cost

Biofilter Cost & Maintenance

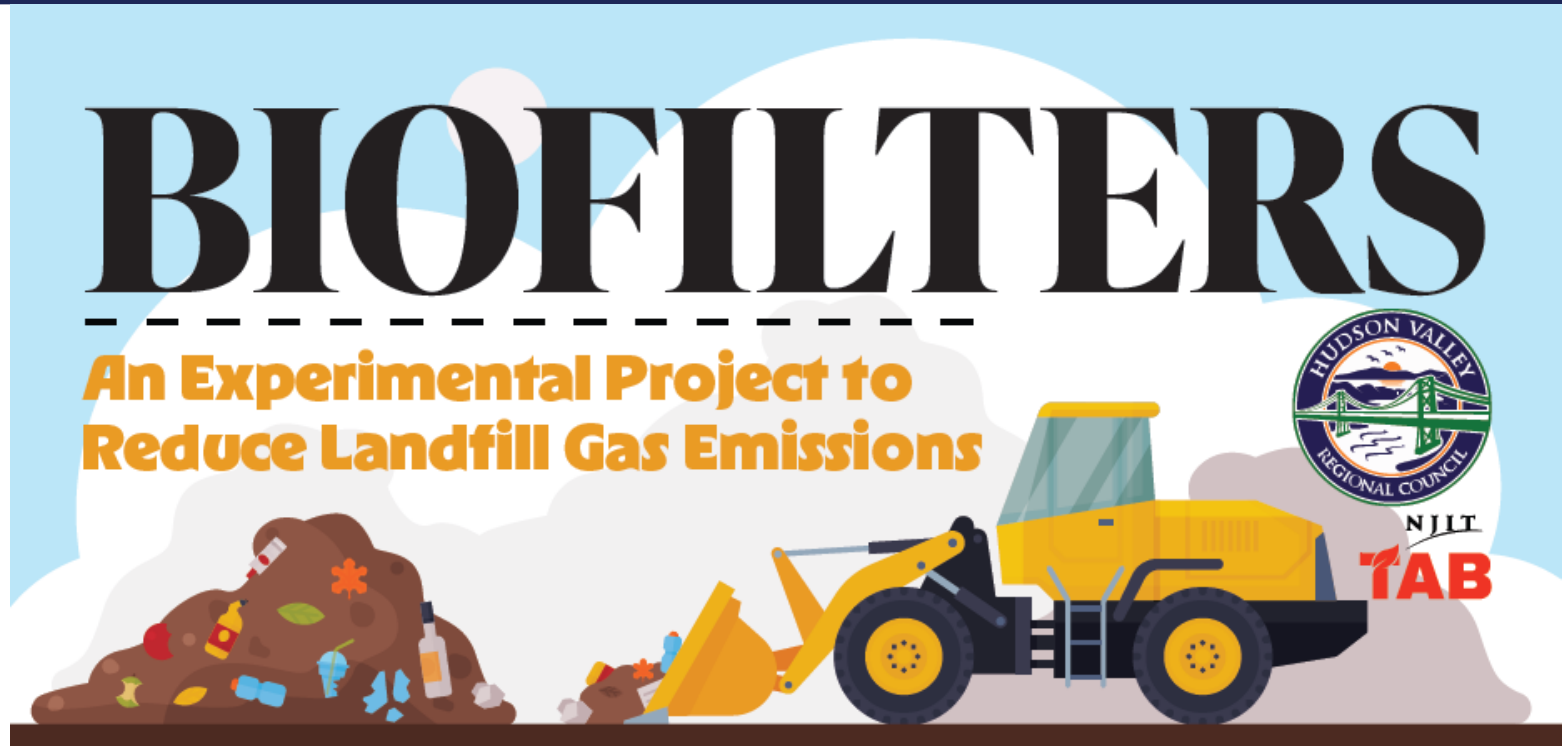
- **Size:** Small, mobile – as small as 2x4 raised beds or piles of mulch
- **Cost:** ~$40-$60K to design and construct biofilters on small landfill. More for larger landfills.
- **Maintenance:** Replenish mulch every 2-5 years – spot treatments as needed (bears, storms, etc.)

Project Status and Next Steps

Outreach and Engagement Partner

New Jersey Institute for Technology

- Educational Materials
- Community Engagement
- Event Coordination
- Panels
- Marketing



NJIT
New Jersey Institute of Technology

Work Completed to Date

- Award Contract Formalization and Program Kick-off (November, 2024)
- Initiated Program Planning and Research
- Press conference / Kick-off event
- Received support from EPA and all relevant DEC landfill project managers.
- Quality Assurance Plan and Data Management Plan submitted and approved by EPA.
- Conducted site visits and background research
- Co-created marketing flyer with outreach and engagement partner: NJIT.
- Hired Environmental Scientist, Dr. Sehrish Asghar.
- Hired Quality Assurance and Data Consultant, GeoSyntec Consulting.
- Drafted a Memo of Understanding (MOU) for Participating Municipalities.

Next Steps for HVRC

- Meet with municipal legislatures.
- Secure signed MOUs from all participants.
- Determine and purchase monitoring equipment.
- Conduct baseline methane emissions measurements.
- Submit year 1 annual report to EPA.
- Issue RFP and select consultant for design of biofilters.

Next Steps for Municipality

- Send HVRC a signed Memo of Understanding (MOU).
- Locate your landfill's Site Management Plan or Post-Closure Maintenance and Monitoring Manual (PCMMM) as needed.
- Provide HVRC any relevant research and historical data related to your landfill (from municipality and/or landfill consultants).

Q & A

Will the Town have a chance to see the design before it is implemented?
Yes. Once we have the preliminary biofilter designs, we will share them with the Town and the NYS DEC for review and sign-off.

Will there be any cost to the Town?
No. However, at the end of the 5-6 year project, the Town has the option to keep the biofilters or to have HVRC remove them. If you choose to keep them, there will be some upkeep and maintenance, mainly periodic replenishment and repair or replacement of structural elements as needed.

Will the landfill cap be affected?
No. All project activities will occur on top of the cap, with no direct disturbance or interaction with the cap itself.

Thank you for your partnership and support!

CPRG Landfill Biofilters Project Web Site
https://hudsonvalleyregionalcouncil.org/cprglandfills

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Mobile: 914-498-9811

Questions?