



GEORGIA

DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

Expanding Landfill Gas to Energy (LFGTE) Projects

Peach State Voluntary Emissions Reduction Studies

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Landfill Gas to Energy Projects Stakeholder Meeting
October 15, 2025



MEETING OBJECTIVES

Georgia EPD is seeking input for its case study on expanding LFGTE projects to be included in the Peach State Voluntary Emissions Reduction Studies (PSVERS).

During this meeting, we will:



Provide an overview of the Climate Pollution Reduction Grant (CPRG) program, which is funding the PSVERS



Describe Georgia's emissions reductions planning work to date



Review the details of the proposed initiative to expand LFGTE projects



Discuss your comments on the section and changes made to incorporate them



MEETING ATTENDEES



Landfill Owners



Utilities



Academia



Business



Government



Advocacy and Environment

These organizations may inform how the Study aligns with existing agency-specific priorities and initiatives, contribute subject matter knowledge, provide on-ground implementation insights, and validate environmental benefits and considerations.



AGENDA

- 1 Overview of the study to expand LFGTE projects
- 2 Project background
- 3 Quantifying the impact of the expanding LFGTE initiative
- 4 Summary of feedback and revisions
- 5 Next steps

OVERVIEW OF THE STUDY

EPD performed a case study to evaluate the adoption of landfill-gas-to-energy (LFGTE) projects in municipal solid waste landfills (MSWLFs) across the state. The PSVERS, funded by the Climate Pollution Reduction Grant (CPRG) program, assesses the potential impacts of the implementation of these projects.



Sources:

[Image] Environmental Protection Agency, Understanding and Control of Municipal Solid Waste Landfill Air Emissions Grants.

1. GHG Protocol, Global Warming Potential Values. August 7, 2024.

2. U.S. Environmental Protection Agency, Landfill Gas Energy Project Development Handbook. January 2024.

Why is intervention needed?

MSWLFs in GA contribute to methane emissions and air pollution. LFGTE projects can reduce methane emissions from MSWLFs while producing energy.

The importance of LFGTE projects

- Methane, the gas released by decomposing organic waste in MSWLFs, has a global warming potential 27 times more powerful than carbon dioxide.¹
- A LFGTE project can capture 60-90% of the methane created by a landfill over its lifetime.²
- LFGTE projects can generate electricity, renewable natural gas (RNG), or thermal energy to serve diverse applications, displacing the need for the combustion of fossil fuels.



PROJECT BACKGROUND: PURPOSE AND CONTEXT

The analysis of the case study to expand LFGTE projects was funded by the **Climate Pollution Reduction Grant (CPRG)** program. It will be published as part of the **Peach State Voluntary Emissions Reduction Studies (PSVERS)** in December. This program is overseen by the **U.S. Environmental Protection Agency (EPA)** and Georgia's work is led by the **Environmental Protection Division (Georgia EPD)**.

Climate Pollution Reduction Grant (CPRG) Overview

- As part of the Inflation Reduction Act, the Climate Pollution Reduction Grant (CPRG) program provided \$5 billion in grants to **states, local governments, tribes, and territories** to develop and implement plans to **reduce greenhouse gas (GHG) emissions and other harmful air pollution**.
- Georgia EPD was awarded a **\$3 million** planning grant.
- Atlanta Regional Commission was awarded a **\$1 million** planning grant.





PROJECT BACKGROUND: PSVERS TIMELINE

The analysis of the case study to expand LFGTE projects will be published as part of the **Peach State Voluntary Emissions Reduction Studies (PSVERS)** in December. The **PSVERS** follows the Peach State Voluntary Emission Reduction Plan (**PSVERP**), published in March 2024, which proposed an initial suite of emission reduction measures.





PROJECT BACKGROUND: PROGRESS TOWARDS THE FINAL PSVERS

The PSVERS highlights two emissions reduction measures:

- **Landfill Gas to Energy Expansion**
- Reforestation Incentive

} *Focus of today's session*

These measures were selected because of their emissions reduction potential, feasibility of implementation, and alignment with state priorities such as economic and workforce development.

} *Topics for stakeholder review*

EPA requirements for the PSVERS include:

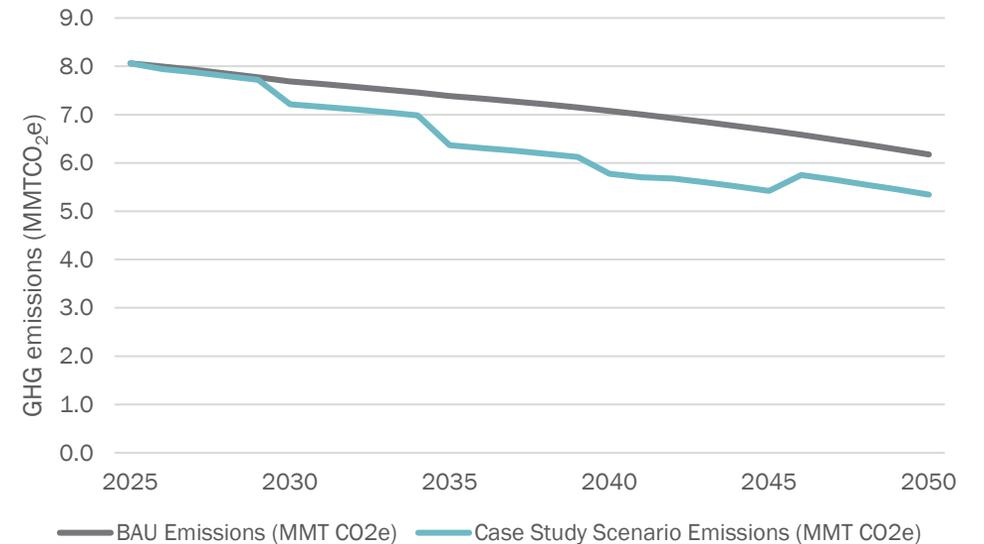
- Statewide emissions inventory
- Emissions projections
- Emissions reduction targets
- For individual emissions reduction measures:
 - Review of authority to implement
 - **Intersection with other funding availability**
 - **Quantified reduction potential**
 - **Benefits analysis (including co-pollutants, climate resilience, and more)**
 - **Workforce planning analysis**

QUANTIFYING IMPACT: OVERALL METHODOLOGY

The impact of the expanding LFGTE projects measure is estimated as the **difference in direct methane emissions reductions and avoided emissions** between a business-as-usual scenario and a case study scenario. The impact of the measure was estimated as follows:

1	Identify landfills designated as candidate or future potential sites for LFGTE projects
2	Estimate the average generation rate of landfill gas at each of these landfills
3	Identify the type of LFGTE project potentially to be installed at each candidate and future potential landfill
4	Approximate timeline of LFGTE projects
5	Estimate average annual direct emissions reductions and avoided emissions of each LFGTE project
6	Aggregate emissions reductions and avoided emissions resulting from all LFGTE projects from 2026 to 2050

Projections of BAU Emissions and Case Study Scenario Emissions of the Waste Sector



Note: The figure only displays direct emissions reductions resulting from LFGTE projects as avoided emissions do not directly reduce waste sector emissions.

1. IDENTIFY LANDFILLS DESIGNATED AS CANDIDATE OR FUTURE POTENTIAL SITES FOR LFGTE PROJECTS

The case study scenario is characterized by the possible site location of LFGTE projects at the 25 MSWLFs designated by the EPA Landfill Methane Outreach Program (LMOP) as **candidate** or **future potential** for LFGTE projects.¹

- **“Candidate”**: Landfill is either currently accepting waste or has closed within the last five years, contains at least 1 million tons of waste, and lacks any operational, under-construction, or planned projects.
- **“Future potential”**: Landfill is open but does not meet the technical criteria for candidate status yet or has an operational project but there is opportunity for additional energy recovery.

- Pine Bluff Landfill
- Chesser Island Road Landfill, Inc. MSWL
- Eagle Point Landfill LLC
- R & B (Banks) Landfill
- Turkey Run Landfill
- Grady Road Landfill
- Deans Bridge Road MSWLF
- Murray County Landfill
- Cedar Grove Landfill
- Hall County Candler Road MSWLF
- Crisp County Landfill
- City of Thomasville MSWLF
- Savannah-Dean Forest Road SL
- Camden County SR 110 MSW Landfill
- Walker Mountain Landfill
- Newton County Landfill
- Decatur County Solid Waste Facility
- Atkinson County - SR 50 MSWL
- Bartow County MSWLF
- City of LaGrange Landfill
- City of Tifton / Omega / Eldorado Road LF
- Laurens County - Old Macon Road MSWL
- Habersham County SR13 MSWL
- Fort Stewart Landfill
- Jefferson County CR-138 MSWL

Sources:

1. U.S. Environmental Protection Agency, [LMOP Landfill and Project Database](#). Updated 8/18/25.

2. ESTIMATE THE AVERAGE GENERATION RATE OF LANDFILL GAS AT EACH OF THESE LANDFILLS

The LFG generation rate was a key input in informing the type of LFGTE project (Renewable Natural Gas (RNG), electricity, direct thermal) best suited for each candidate and future potential landfill. The annual LFG generation rate was estimated for each landfill by:

- Retrieving the amount of waste accepted historically by inputting the landfill facility ID into EPA's LandGEM tool.¹
- Estimating the average flow rate of LFG generated annually from the contained waste using a first-order decomposition rate equation modeled in EPA's LandGEM tool.



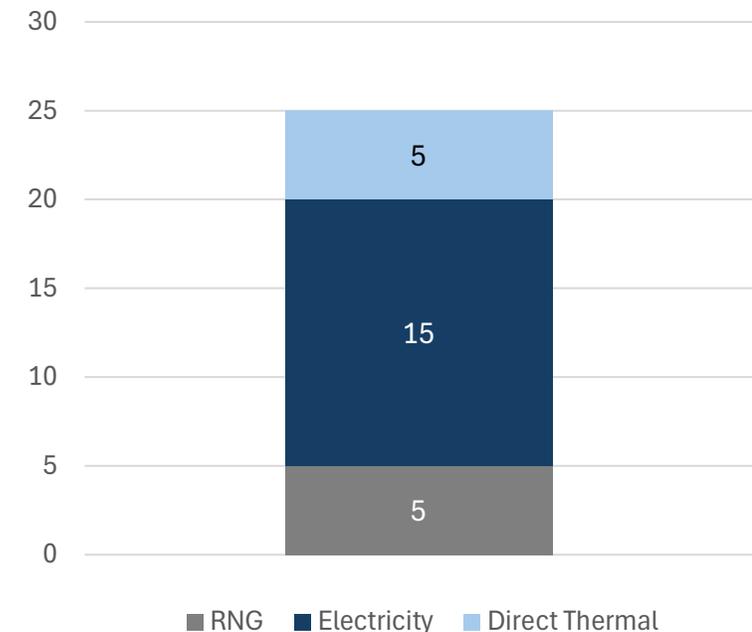
Sources:

1. U.S. Environmental Protection Agency, [Landfill Gas Emissions Model \(LandGEM\)](#).
2. [Image] U.S. Environmental Protection Agency, [Materials and Waste Management Research](#).

3. IDENTIFY THE TYPE OF LFGTE PROJECT BEST SUITED FOR EACH CANDIDATE AND FUTURE POTENTIAL LANDFILL

- The **national distribution of project types among existing operational LFGTE projects in the U.S.** helped inform the determination of the number of each LFGTE project type evaluated at candidate and future potential landfills.¹
- Next, the project type for each landfill was determined using the average generation rate of LFG at the landfill (**step 2**). The generation rate of LFG was a key input in determining project type because each project type is dependent on a minimum amount of LFG to be cost effective for the owner.² It is assumed that:
 - The **five candidate and future potential landfills with the highest average annual LFG generation rate** would be best suited to install RNG projects.
 - The **five landfills with the lowest average annual LFG flow rate** would be best suited for direct-use LFGTE projects.
 - The **remaining 15 landfills** would be best suited for electricity-generating LFGTE projects.

Total Number of each LFGTE Project Type



Sources:

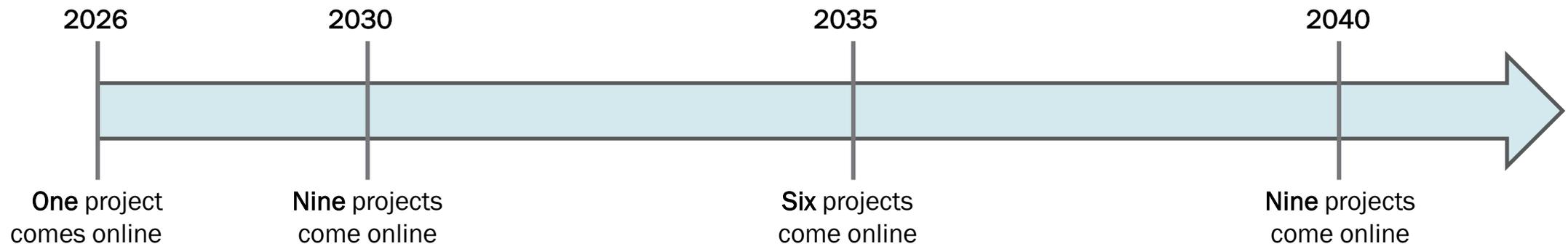
1. U.S. Environmental Protection Agency, [About the Landfill Methane Outreach Program](#). Updated September 20, 2024.
2. U.S. Environmental Protection Agency, [LFG Energy Project Development Handbook](#). January 2024.

4. APPROXIMATE MODELED TIMELINE OF LFGTE PROJECT INSTALLATION

- The LFGTE projects at the 25 candidate and future potential landfills were modeled to **come online during different years between 2026 and 2040**.
- LFGTE projects installation at landfills with earlier planned closure years were anticipated to come online earlier than those located in landfills with later planned closure years.
- It was assumed that each LFGTE project will have a **lifetime of 15 years** before going offline and no longer operating. 15 years is considered the average lifetime for the equipment installed in LFGTE projects.¹

LFGTE Project Year Based on Landfill Closure Year

Landfill Closure Year	Year LFGTE Project will Come Online
2025 - 2029	2026
2030 - 2039	2030
2040 - 2049	2035
After 2050	2040



Sources:

1. U.S. Environmental Protection Agency, [LMOP Landfill Gas Energy Cost Model \(LFGcost-Web\) User's Manual, Version 3.6](#). September 2023.

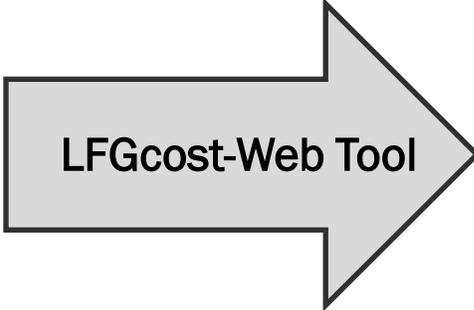
5. ESTIMATE AVERAGE ANNUAL DIRECT EMISSIONS REDUCTIONS AND AVOIDED EMISSIONS OF EACH LFGTE PROJECT

- Each LFGTE project results in **direct emissions reductions** and **avoided emissions**.
 - **Direct emissions reductions:** The direct reduction of methane emissions resulting from the landfill gas capture system of the LFGTE project.
 - **Avoided emissions:** Indirect emissions avoided from the energy product of the LFGTE project displacing the consumption of a fossil fuel.
- The **EPA LFGcost-Web tool** was used to determine the average annual direct emissions reductions and avoided emissions resulting from each project's operation.

Inputs

- Annual waste disposal history
- Type of LFGTE project and technology (ex. standard reciprocating engine for electricity projects)
- Project start year
- Suggested tool inputs (ex. methane generation rate constant, expected LFGTE project lifetime)

LFGcost-Web Tool



Outputs

- Average annual direct methane emissions reductions
- Average annual avoided emissions

Sources:

1. U.S. Environmental Protection Agency, [LMOP Landfill Gas Energy Cost Model \(LFGcost-Web\) User's Manual, Version 3.6](#), September 2023.

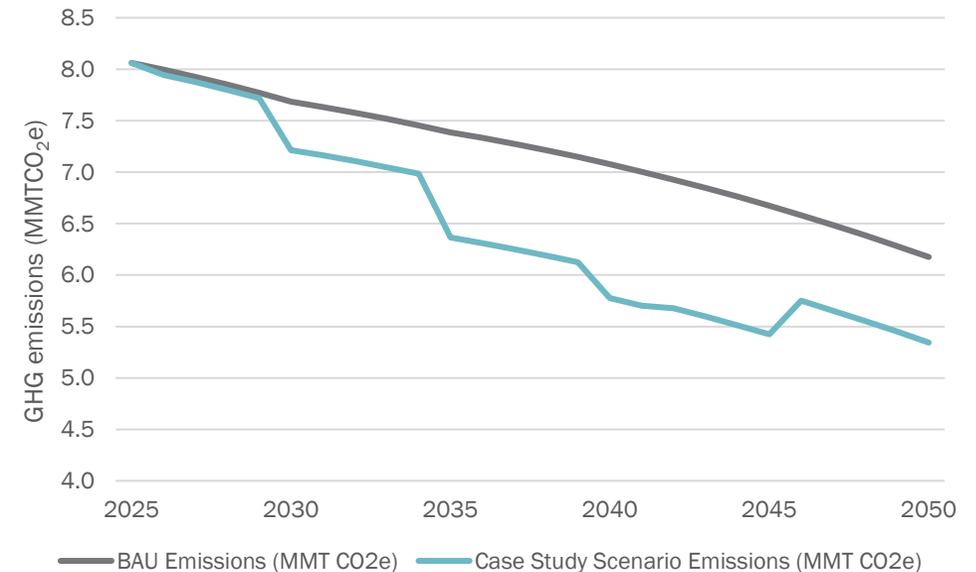
6. AGGREGATE EMISSIONS REDUCTIONS AND AVOIDED EMISSIONS RESULTING FROM ALL LFGTE PROJECTS FROM 2026 TO 2050

- Annual direct emissions reductions and avoided emissions resulting from each project were summed based on the modeled project installation timeline to estimate total annual values each year from 2026 to 2050.

The installation of LFGTE projects at candidate and future potential landfills in the case study scenario results in:

- 0.68 MMT CO₂e** cumulative direct methane emissions reductions by 2030 and **19.4** cumulative MMT CO₂e direct methane emissions reductions by 2050
- 0.26 MMT CO₂e** cumulative avoided emissions by 2030 and **8.5 MMT CO₂e** cumulative avoided emissions by 2050

Projections of BAU Emissions and Case Study Scenario Emissions of the Waste Sector



Note: The figure only displays direct emissions reductions resulting from LFGTE projects as avoided emissions do not directly reduce waste sector emissions.

WORKFORCE PLANNING ANALYSIS

Job Creation and Economic Benefits

- The installation of LFGTE projects generates temporary jobs **during the construction phase**, while the ongoing operation of the systems creates **long-term employment opportunities**.
 - EPA estimates that each LFGTE project can directly create between nine and 18 jobs and indirectly stimulate between 32 and 68 jobs through its initial construction.
- LFGTE project construction and operation can benefit **local and state-wide businesses and results in new jobs** at engineering firms, construction firms, equipment vendors, and businesses specialized in well drilling and pipeline installation.
- The expenditures and employment impacts of LFGTE projects result in **direct and indirect economic effects in Georgia**.
 - **Direct effects** result from onsite jobs and new purchases from local business that are required to build and operate the project.
 - **Indirect effects** as these local businesses that spend their new revenue on suppliers or to pay their employees.

Workforce and Economic Impacts of LFGTE Project Implementation at Candidate and Future Potential Landfills in Case Study Scenario¹

	2026-2030	2026-2050
Number of Direct Jobs Created within the State	182	1,249
Number of Direct and Indirect Jobs Created within the State	1,076	8,186
Total State-wide Economic Output including Indirect Effects (Thousands of Dollars)	244,930	2,000,420

Sources:

1. U.S. Environmental Protection Agency, [LMOP Landfill Gas Energy Cost Model \(LFGcost-Web\) User's Manual, Version 3.6](#). September 2023

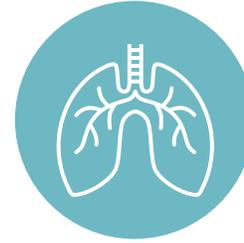
ADDITIONAL CO-BENEFITS

In addition to emissions reductions and workforce and economic benefits of LFGTE projects, other benefits of the expanding LFGTE projects measure include:



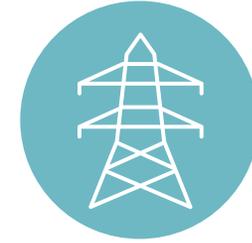
Improved safety

Methane is highly flammable and can reach explosive concentrations in poorly ventilated areas.¹ Collecting and managing LFG can enhance safety by mitigating the risks of explosion hazards associated with gas accumulation.



Direct and avoided co-pollutant emissions

The process of capturing and transforming LFG into energy destroys most non-methane organic compounds, including VOCs and hazardous air pollutants, like benzene, toluene, and ethyl benzene.² Also, producing energy from LFG reduces need for non-renewable resources, such as coal, diesel, or natural gas.



Grid stability and access to renewable energy

LFGTE systems can enhance grid stability by acting as a distributed energy resource.³ In addition, LFGTE systems are a source of renewable energy, increasing access of potential communities and businesses looking to purchase renewable energy.

Sources:

1. Berkeleyside, Berkeley fined \$130,000 for air quality violations at Cesar Chavez Park. April 4, 2024.
2. Xihe Zhou et. al., Environmental and human health impacts of volatile organic compounds: A perspective review. February 2023.
3. U.S. Environmental Protection Agency, Landfill Methane Outreach Project.

PSVERS

Progress-to-

Date

Q & A

SUMMARY OF FEEDBACK

Stakeholder feedback was facilitated from October 1 – October 8. Feedback from stakeholders were grouped and addressed in the following categories:

1. Estimates of installation costs
2. Improving the gas collection efficiency of existing collection systems
3. Most recent update on planned projects
4. Levelized cost of energy (LCOE) considerations
5. Highlighting a subset of LFGTE projects with the greatest emissions reduction potential
6. Discussion of additional considerations in determining potential project type
7. Potential project transition at end of life

**Thank you for
your
responses!**



ESTIMATES OF INSTALLATION COSTS

Feedback

- For RNG-generating LFGTE projects, the actual interconnection costs for RNG pipelines described by a stakeholder were greater than the estimations provided in EPA's LFG Energy Project Development Handbook.
- If gas collection and control systems (GCCS) are not already present at the proposed LFGTE sites, consider the installation costs associated with GCCS systems.

Potential Incorporation

- Interconnection costs were further discussed with the stakeholder during a meeting and the interconnection costs of RNG projects listed in the Study can be increased to a broader range reflective of on-the-ground expectations.
- Additional text can be provided acknowledging the associated costs of installing GCCS systems when needed.



IMPROVING THE GAS COLLECTION EFFICIENCY OF EXISTING COLLECTION SYSTEMS

Feedback

Consider the additional direct methane reductions that could result from landfills with existing GCCSs improving the overall gas collection efficiency of their system.

Potential Incorporation

Additional text can be provided to qualitatively describe the potential increase in emissions reductions that could result from improvements in GCCS collection efficiency.

- For example, automated real-time control systems can improve overall gas collection efficiency by at least 10-20% compared to manual monitoring.¹

Sources:

1. Rocky Mountain Institute, 5 Ways to Cut Landfill Methane Pollution: How Local Governments Can Lead. June 27, 2025



MOST RECENT UPDATE ON PLANNED PROJECTS

Feedback

There was inquiry on whether the four LFGTE projects designated as planned in the BAU scenario have already begun construction and if the projects were using specific incentives to support project economics.

Potential Incorporation

Additional research is being performed to further understand the current status of each planned landfill and any published details of the associated off-taker purchasing agreements.

- Research findings can be incorporated.



LEVELIZED COST OF ENERGY CONSIDERATIONS

Feedback

Considerations of the levelized cost of energy (LCOE) were suggested to better understand the economic feasibility of the candidate and future potential LFGTE projects.

Potential Incorporation

- In future analysis, the levelized cost of energy of the candidate and future potential landfills with the greatest emissions reduction potential can be explored.
 - In addition to assessing economic feasibility, the LCOE can help compare costs across technologies such as solar and wind.
- The previous work performed by Drawdown Georgia in assessing LCOE of potential LFGTE projects can be leveraged as a useful resource.



HIGHLIGHTING A SUBSET OF LFGTE PROJECTS WITH THE GREATEST EMISSIONS REDUCTION POTENTIAL

Feedback

Because some LFGTE projects produce greater emissions reductions compared to others, it may be worth considering a case study where the state prioritizes certain projects above an emissions reduction potential threshold for further study or implementation.

Potential Incorporation

If the state considers any additional analyses, prioritization criteria could include emissions reduction potential.



DISCUSS ADDITIONAL CONSIDERATIONS IN DETERMINING POTENTIAL PROJECT TYPE

Feedback

In selecting the potential project type at each landfill, consider variables such as geographic proximity to potential end-users, revenue potential, and current market conditions in addition to the rate of landfill gas generation.

Potential Incorporation

- Additional considerations that drive the selection of project type such as geographic proximity to potential end-users, revenue potential, and current market conditions can be further discussed.
- In future analysis, if a subset of proposed LFGTE projects are examined, the impacts of these considerations can be studied in more depth based on available data.



POTENTIAL PROJECT TRANSITION AT END OF LIFE

Feedback

Consider the possibility of operational electricity-generating projects transitioning into RNG-generating projects at the end of their lifetime. In recent years, this transition has become common in today's market environment.

Potential Incorporation

The potential of operational electricity-generating projects transitioning into RNG-generating projects can be discussed in the relevant narrative as it is currently not explored.

PSVERS

progress-to-
date

Q & A

NEXT STEPS

1

Stakeholder Input Addressed, Engagement Closes

- Stakeholders have had the opportunity to provide feedback during the comment period and feedback has been incorporated.

Next steps

2

EPD Review

- EPD will review a completed draft of the PSVERS with its leadership.

3

Prepare Final Draft of PSVERS

- Draft document will undergo internal review and then a final review for content and design.

4

PSVERS Due to EPA

- EPD will submit the PSVERS to EPA by December 1, 2025.



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