

How Capturing Landfill Methane Can Reduce Emissions and Strengthen Communities in Georgia

Summary

Landfills don't usually make the list of headline climate solutions, but they represent one of Georgia's biggest untapped opportunities for cutting greenhouse gas emissions. In this conversation, Garry Harris, Managing Director of the Center for Sustainable Communities, joins host Eriqah Vincent to explain how landfill methane capture works, how it benefits nearby communities beyond just emissions reduction, and why environmental justice has to be built into these projects from day one.

Key Takeaways

- Methane is a far more potent greenhouse gas than carbon dioxide, up to 30 times stronger over a 100-year timeframe and more than 80 times stronger over 20 years, making landfill methane capture a high-impact, near-term climate solution.
- Georgia's 77 landfills produce roughly 65 billion cubic feet of landfill gas annually. That gas can be captured, refined, and used for electricity, industrial applications, or transportation fuel instead of escaping into the atmosphere.
- Georgia already has 19 landfill gas-to-energy facilities producing about 66 megawatts of power, with more potential sites identified across the state.
- Landfill gas capture delivers real co-benefits beyond emissions reductions, including improved local air quality, reduced odor and explosion risk, and new jobs in engineering, construction, and operations.
- Landfills have historically been sited near lower-income communities and communities of color, so Garry emphasizes that these projects must be built on authentic community ownership, not just notification after decisions are already made.

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Eriqah Vincent: Hello, everyone. Thank you once again for joining us for the Drawdown Georgia Climate Interview series. I'm greatly excited to talk today to a colleague of mine, who I've worked with many times before. Today we're joined by Garry Harris at the Center for Sustainable Communities.

Thank you so much, Garry, for being with us today. It's great to see you once again, and I'm really excited — and I know our audience will be too — to hear more about what the organization is working on right now, and about the project you're going to talk about. So thank you so much for being here.

Garry Harris: Well, thanks so much for having us here again. The Center for Sustainable Communities is all about making a more just, sustainable, equitable, and resilient world for all, and this project falls right in there — in terms of sustainability, building resilient communities, and equity as well.

So we're really excited to talk about it this morning.

Eriqah Vincent: Wonderful, thank you. Please introduce yourself to our audience, Garry, and tell us about the work you do at the Center for Sustainable Communities.

Garry Harris: Good morning. My name is Garry Harris. I'm Managing Director for the Center for Sustainable Communities. We're all about making communities greener, cleaner, healthier, safer, and more climate resilient through equity and environmental justice. We use an approach called Just Science — we use science, engineering, technology, and data science research to come up with just solutions that help mitigate racial, social, climate, environmental, and health disparities.

We operate in two states, Georgia and Virginia — Atlanta, Georgia, as well as Hampton Roads, Virginia. Last year we did about 80 different activities, projects, and events, all around these themes of sustainability and justice. So again, this project falls right in there.

We've got a lot of climate actions going on right now. We just held a town hall last weekend where we had about 50 people come out to talk about energy justice and climate justice. So again, this project falls right in that vein. I'm excited.

Eriqah Vincent: Thank you so much. Of course, we're here today to talk about one of the 20 Drawdown Georgia climate solutions — one that may be a little less familiar. That's the solution we're here to talk about today: landfill methane. So can you begin by explaining how landfills produce methane, first of all, for our audience, and why this is a significant climate issue?

Garry Harris: Yeah, absolutely — excited about this. Landfills are everywhere, throughout the world and throughout the country, because we're constantly producing waste, particularly food waste and organic waste. It's got to go somewhere.

So, unfortunately, we put it in landfills, and what happens is it breaks down, it decomposes, and it releases methane, and also CO₂. Methane is a greenhouse gas with a very strong potential to affect climate change. If we look at the global warming potential — which is the measure of how much climate impact a greenhouse gas has compared to CO₂, typically measured over a hundred-year timeframe, although other timeframes can be used — methane's global warming potential is up to 30 times more harmful over a hundred-year timeframe. But it increases significantly, to more than 80 times, over a 20-year timeframe, showing this powerful short-term impact on climate.

So just imagine, with the number of landfills across the country, across the world, and in Georgia — we have 77 — those landfills are sitting there all day long, releasing gas. It's capped, it's measured, it's monitored, but still, some leaks out, and when it leaks out, it goes up into the atmosphere and has that heat-trapping impact that greenhouse gases have — again, many times more than CO₂.

But on the flip side, it's natural gas. It's the same thing that runs through pipelines, though it has some impurities in it. About 180 million cubic feet of this gas is produced per day across the 77

landfills in Georgia. If you look at that, that's over 65 billion cubic feet of gas produced per year, and all of this gas can be captured. It can be transformed and used for energy production, to support industrial processes, or converted into LNG and used for transportation.

So it's strong potential for climate, strong potential for revenue, and strong potential to increase quality of life by having a renewable gas source.

Eriqah Vincent: Got it. Thank you so much for that detailed explanation, and thank you for talking about — I was going to ask you about how much methane gas landfills produce in Georgia, and you already answered that question. There are all different ways people talk about reducing how much waste goes to the landfill — recycling, reuse, reducing our consumption in general. Besides those more typical ways we talk about diverting waste from landfills, what are some other ways you see that we can reduce methane gas emissions from landfills themselves?

Garry Harris: The main strategy is to divert it — don't let it get to the landfill in the first place. Let's have great composting programs, great programs that educate and make folks aware that they need to try to compost or separate out the food waste and yard waste. But there are several other ways too.

We can put a bio-cap over closed portions of the landfill, and that bio-cap will break down the methane and prevent it from being released. We can also improve landfill gas capture by installing and upgrading methane capture systems — wells, pipes, and vacuum pumps that suck the gas out — and use flares and other systems to get rid of the gas as well. Besides these bio-covers, we can enhance the monitoring of these landfills. In the past, we just did manual checks — we went out with detectors, figured out where it was leaking, and capped it. Now we can use things like drones and satellites for faster detection and repair of leaks.

Then there are operational methods. When we're putting waste into landfills, we have an active face, or an open face, and that allows methane to be released. If we reduce the size of that active face, we reduce the amount of methane that's leaking out. And then there's policy and regulation — we need to implement stricter regulations, such as lower thresholds requiring landfills to install gas collection systems, and enforcing bans on organic waste in landfills. They do this in Colorado and other places. So we want to not only capture this gas, refine it, and use it, but also use these other methods — operational improvements, enhanced monitoring, these bio-covers with bacteria that eat and break down the methane, and policy and regulation. But it starts at the source — separating that waste out, composting, and so on.

Eriqah Vincent: Yeah, and I can imagine that might be the most effective —

Garry Harris: Yep.

Eriqah Vincent: — doing that instead. We're talking here about the climate solution of landfill gas recovery, or capture, which is what you mentioned, and you touched on this a bit already, but if you wanted to speak more about what landfill gas recovery is exactly, and unpack that a little more — how is gas captured in landfills in order to potentially use it for other things, or store it in other ways?

Garry Harris: So what we're talking about is landfill gas. It's composed of two components — methane and CO₂ — and it's gas that's formed as a result of food waste, yard waste, and other organic material breaking down. That creates a lot of gas in these landfills. Landfill gas capture

is all about capturing, treating, and then using the methane from waste as a renewable energy source.

Here's how it works: we have vertical pipes that go down into the landfill, and these pipes are porous, which allows the gas to seep into them. There are also horizontal pipes that go into the landfill – as we build the cells of the landfill, we install these horizontal pipes as well. Then we have a vacuum, or blower, system that sucks the gas out and into a filtering system, which removes the moisture and impurities.

What comes out is refined, renewable natural gas that we can use for a myriad of things. It's clean, high-quality gas, and we can use it to produce biofuels, like liquefied natural gas for transportation, reducing methane emissions and replacing fossil fuels. Every time we have a cubic foot of this renewable natural gas coming out of the landfill, we're displacing the oil and coal used in fossil fuel power plants, as well as in industrial applications. So it's extremely beneficial to the environment, to health, and to the welfare of local communities.

Eriqah Vincent: You talked about natural gas, liquefied natural gas that could be used for vehicles and other things – how many landfill energy projects are here in Georgia, if you wanted to touch on any in particular, and what are the benefits of these systems to local communities?

Garry Harris: Right now we have about 77 landfills throughout Georgia, and again, they release about 180 million cubic feet of renewable natural gas daily – which comes up to about 65 billion cubic feet of natural gas annually. So it's a great source of renewable energy, and the way we handle this natural gas is through flares, biofilters, and energy recovery facilities. We ensure that the gas comes out and is used in various ways.

One way is electrical power production – after the gas is refined, it goes into a power production facility with gas turbines or internal combustion systems that produce electrical power. We have about 19 of those across the state already, producing about 66 megawatts of power. That power can be used on-site by the municipal sanitation group running the facility, or it can be connected to the grid. Another way this gas is used is by neighboring industrial applications, like smelters, kilns, and furnaces. It can also be refined and used as biofuel, sent into natural gas pipelines, or used in an application called Combined Heat and Power, where it's used to produce both electricity and a thermal application at the same time.

So, from transportation to industrial applications to power production to combined heat and power – those are the energy benefits. But beyond that, there are the actual environmental benefits that come from this gas as well. As we're capturing it, cleaning it up, and refining it, the communities located adjacent to the landfill are getting the benefit of cleaner air. Using landfill natural gas as an energy source offsets the need for non-renewable sources like coal and oil, avoiding the emissions of harmful pollutants like sulfur dioxide and particulate matter, PM2.5 and PM10. Landfills can be really smelly, too, so doing all of this controls the odors and air pollutants that are part of normal landfill operations – the system destroys non-methane organic compounds and sulfates present in the raw gas, eventually reducing unpleasant odors.

Beyond the environmental benefits, there are economic benefits too. It creates jobs – anytime you retrofit a landfill with an energy production source, it has to be designed, installed, constructed, and operated, which produces both temporary and long-term jobs for engineers, construction firms, operational personnel, and technicians, particularly for local communities if we direct those opportunities to them. It can also generate revenue and cost savings – landfill

owners and local governments can come together to figure out ways to market this gas, either as landfill gas or refined as a renewable gas product. So there's a revenue generation model there too.

Then there's attracting new businesses — having a reliable, cost-effective, local source of energy means an industrial facility that needs that kind of energy source may choose to move in. It also enhances energy independence — landfill natural gas provides a stable, 24/7 baseline renewable energy source, reducing communities' dependence on external, non-renewable energy. And then there are health and safety benefits from reducing explosion hazards and health risks, and it promotes responsible planning, because instead of a landfill just sitting there for decades, you can transform it into something that's not only energy-producing but also part of stable community planning. Check this out — in Hampton Roads, Virginia, we took our landfill and turned it into Mount Trashmore, and now it's used as a park and recreation facility, with a lake, all around what was once a landfill.

Eriqah Vincent: You talked about local community benefits. We know that oftentimes structures like a landfill, or other structures that may initially be unsightly or unsafe, are often placed in communities that are lower-income, or Black and Brown communities.

Garry Harris: Right.

Eriqah Vincent: So are there ways you've seen that relationship change, when you're talking about some of this landfill gas capture —

Garry Harris: Right.

Eriqah Vincent: — piece, and the energy justice and environmental justice piece? Are there ways you've seen that kind of turn around, with communities that are plagued with having landfills there — they're not going to put the landfills in more affluent communities —

Garry Harris: Yeah, exactly.

Eriqah Vincent: — in which we've been able to kind of turn around those injustices on the front end, into something that can be beneficial for the same communities that were harmed in the past?

Garry Harris: Yeah, absolutely. We're constantly looking at this through an equity, environmental justice, and climate justice lens. What hits you right up front is that lower-income communities, underserved communities, vulnerable communities are impacted by climate in far worse ways.

So we reduce the possibility of climate impacts, and we also reduce the burdens created in these lower-income communities, particularly from climate. If we're removing the methane — and methane is a source of climate impact — we're also protecting these communities. Landfill projects can capture somewhere from 60 to 90 percent of this potential greenhouse gas, which again is up to 80 times more potent. But the bottom line is, when it comes to siting these landfills, we have to make sure they're sited properly — meaning they're not always placed in close proximity to a low-income community, and if they are, certain protections need to be taken. We have to have a robust, open, and engaging permitting process for these landfill projects, with town hall meetings, so that all of those benefits I talked about — health, environmental, and economic — are directed in a deliberate manner to the surrounding communities, so that we're maximizing the benefit there.

These landfills have got to be managed and operated with the community in mind, so we're not filling them with too much bad stuff that could harm the local community. We're already getting odors, but there's also the liquid runoff, and this methane is explosive, so there's a hazard to storing that stuff on-site. We've got to be mindful. Even when we do these energy projects, these retrofits, it involves design, construction, operation, testing, and finally startup, and the community has to be plugged in at each and every phase. The companies that do these retrofits have to put the community first and make sure their voices are lifted up, amplified, and meaningfully engaged.

And — get me on my soapbox now — communities have got to own these projects. Not just be informed, not just educated, not just made aware, but they have to own these projects. That means they're involved in every aspect of its operations, permitting, and analysis. They even go along on some of the inspections, to make sure the facility is operating the way it should. So the owners and operators who are going to be gaining these economic benefits have to come with the community in mind first.

Eriqah Vincent: I think it's so important for our audience to hear that, because we've seen inauthentic engagement, where the community is brought in at the end of the project planning, to be told about the things that are being done — and that gets checked off the list as community engagement, even though the community hasn't been involved in every step to make that thing happen. Not just from the landfill being introduced to the space, but from the project that wants to be introduced in its place, like we talked about with Hampton Roads, Virginia. That's authentic community engagement that's organic, and that respects the community not as an afterthought, but as partners in the work. And also being able to hear from the community on the back end — if there are things that, after the project is created and implemented, we thought would go well but didn't — being open to that feedback and to changing course.

Garry Harris: And if I could add — we were also fortunate enough to co-author a guide for authentic community engagement along with the NAACP. It's called the Guidelines for Equitable Community Involvement in Building and Development Projects and Policies, and it provides guidance on how to insert yourself and engage in a meaningful way throughout a project. It's online now, so check it out.

Eriqah Vincent: Thank you so much — that's a great resource that would definitely be valuable for our audience. I've learned so much. I knew a little bit about landfill gas recovery, but I've learned so much more in this short time with us, so thank you so much, Garry.

Now, time for our last question — my favorite question that we ask all of our guests: what's giving you hope around climate in Georgia?

Garry Harris: Well, I think what's giving me hope around climate is stuff like this — we're doing a podcast, we're doing outreach as a result of it, we're educating people. But before that, there was the Georgia Drawdown effort itself, bringing together colleges, universities, and a myriad of stakeholders to come up with this robust, well-thought-out, data-driven analysis and technique that helped point us in the right direction for these solutions.

But then there's also the grassroots and local action — we've got a lot of dedicated folks in Georgia driving change through local school boards, clinics, and community groups, really creating a bottom-up approach. Last weekend, we had a town hall meeting where we brought in about 50 people and had round-table discussions about energy equity, energy justice, and

community and climate resilience. Holding forums like that on a frequent basis, around the state, gives me hope — having a commitment to equity, that new initiatives like the Drawdown climate solutions and equity grants, which we were a recipient of, ensure that equity stays central to climate strategies.

And then there's renewable energy growth itself. Although we've had rollbacks by the current administration in terms of grants and other initiatives, we're still expanding solar energy, particularly in rural areas, and implementing sustainable energy approaches. What gives me hope is the resilience and innovation happening — for example, The Ray Highway, an 18-mile stretch of eco-friendly highway, and the coastal resilience projects happening in Georgia as well. There's a lot of effort to build community resilience and innovation.

Then there's workforce development and educational opportunities happening across Georgia, whether at HBCUs, or through organizations like ours, where we've started a tech academy on the west side of Atlanta that gets folks into a program which gives them credentials and puts them into a high-paying job, whether in the environmental field or the technology field. So there's a myriad of things happening across Georgia — everything from grassroots work, to coalition building around colleges and universities, to renewable energy growth, resiliency, innovation, workforce development, technology. It's a lot going on.

Eriqah Vincent: Yeah.

Garry Harris: We can't just sit back and let other folks do it. We can't sit back and watch — we have to be engaged in a meaningful, authentic, and genuine manner, so that we're all helping to move the needle on climate, move the needle on equity, and move the needle to ensure that we're building strong, resilient communities.

So I would encourage everybody out there to find your space — whether it's with a renewable energy company, or helping to build a coastal project, or working on workforce development — but do engage, and engage in an authentic manner, because it's a lot of work to do, and we all have to do it. That's what gives me hope.

Eriqah Vincent: Thank you so much, Garry, for all of your words today. I totally agree on the momentum in Georgia, regardless of what's happening outside the state and federally — we are doing great work here. So thank you so much for being here, and thank you for that answer, and for all the information about landfill gas recovery. I think it's a really important solution, one that's maybe less talked about, but something we should all really think about. So thank you again for being here, it was good to see you once again. And thank you all for joining us once again for this Drawdown Georgia Climate Interview series — we'll see you next time for our next great guest, to talk more about climate solutions in Georgia.

Garry Harris: Okay, thank you.