Priority Climate Action Plan Guide: Organic Waste & Landfill Methane Strategies

Deliver fast emissions reductions and powerful community benefits with historic climate pollution reduction grant funding

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Introduction

The Inflation Reduction Act's Climate Pollution Reduction Grant (CPRG) program presents a unique opportunity for states, local governments, tribes, and territories to advance ambitious, community-driven greenhouse gas reduction strategies. The program, administered by the US Environmental Protection Agency (EPA), is structured in two phases: $250 million in formula grants to develop climate action plans, followed by $4.6 billion in competitive grants to implement those plans. Now, planning grant recipients have until **Spring 2024** to submit a **Priority Climate Action Plan (PCAP)** to the EPA in order to compete for implementation funding.

Including organic waste and landfill methane strategies in the PCAP fulfills the multiple goals of the CPRG program: to achieve significant cumulative greenhouse gas (GHG) reductions by 2030 and beyond, bring substantial community benefits, particularly in low-income and disadvantaged communities, and scale up innovative approaches across jurisdictions. Strategies to reduce organic waste disposal and strengthen landfill methane controls are technically feasible, readily available, and cost-effective. Furthermore, the waste and materials management sector received less dedicated IRA funding than other sectors, making the CPRG program a powerful and complementary opportunity for methane reductions.

This guide walks through the required PCAP elements with recommendations, examples, and resources for planning grant recipients pursuing organic waste and landfill methane strategies.

Key takeaways

- **Focus on methane in the GHG inventory** to identify near-term, high-impact GHG reduction opportunities.
- **Pursue GHG reduction measures that address landfill emissions, upstream and downstream.** Reducing organic waste disposal – through waste prevention, food donation, and organics recycling – is the most effective way to prevent methane generation. At the same time, strengthening landfill emissions controls, beyond minimum federal standards, can achieve near-term methane reductions from previously buried waste and protect landfill-adjacent communities. **Instituting organic waste bans *and* updating state landfill emissions regulations are two high-priority measures** that planning grant recipients should include in the PCAP to achieve significant GHG reductions with powerful co-benefits. These measures will position planning grant recipients well to unlock additional funding in the CPRG implementation phase.
- **Deliver powerful co-benefits for communities.** Waste sector measures can help to address food insecurity, improve health outcomes, create circular economy jobs, and produce value-added products, like compost, that improve soil health and sequester carbon.
- **Accelerate and scale impact with intergovernmental coordination and other federal funding.** State and local governments have broad authority for waste management, putting GHG reduction measures firmly in reach. Partnerships and other federal funding can ensure fast, effective implementation across multiple jurisdictions.

CPRG background and required PCAP elements

As of September 2023, the EPA has awarded CPRG planning grant funding to 46 states plus the District of Columbia and Puerto Rico, 79 of the country's most populous MSAs, more than 200 tribes, and four U.S. territories. As a next step, planning grant recipients must develop and submit a **Priority Climate Action Plan (PCAP)** to the EPA by **March 1, 2024** for states and metropolitan areas, and by **April 1, 2024** for tribes, tribal consortia, and territories. GHG reduction strategies must be submitted in the PCAP to be eligible for implementation grant funding.

EPA has launched two competitions for CPRG implementation grants: a general competition for $4.3 billion and a competition only for tribes, tribal consortia, and territories for $300 million. For the general competition, applications are due April 1, 2024. EPA plans to award 30 to 115 grants ranging between $2 million and $500 million. For the tribes and territories only competition, applications are due May 1, 2024. EPA plans to award 27 to 103 grants ranging between $1 million and $25 million. This means that not all planning grant recipients will get implementation funding, and developing a strong PCAP is an important prerequisite.

Anticipated timeline for general competition and parallel timeline for tribes & territories only competition

What is a PCAP?

The Priority Climate Action Plan is a focused list of "near-term, high-priority, implementation-ready measures" to reduce local climate pollution. Planning grant recipients can develop new climate action plans or update existing ones. There are four required elements: a GHG inventory, quantified GHG reduction measures, a low-income and disadvantaged communities benefits analysis, and a review of authority to implement. Recipients are also encouraged to include cost estimates and workforce planning analysis for GHG reduction measures, where possible, and identify relevant funding sources.

PCAP REQUIRED ELEMENTS

	GHG Inventory	Quantified GHG Reduction Measures	Benefits Analysis (LIDAC)	Authority to Implement
Definitions	Simplified accounting of greenhouse gas emissions over a specific period	Specific programs, policies, and projects that achieve or facilitate quantifiable reductions in GHG pollution	Assessment of impacts GHG reduction measures would have on low-income and disadvantaged communities	Review of statutory or regulatory authority to implement the quantified GHG reduction measures
Key Considerations for Organic Waste & Landfill Methane Strategies	• Focus on methane sources to identify high-impact, near-term GHG reduction opportunities • Use 20-year global warming potential to adequately reflect the benefits of methane action • Improve inventory accuracy with jurisdiction-specific data on waste composition and landfill methane leakage	• Include upstream measures, like organic waste prevention, edible food donation, and organics recycling, that prevent methane generation and ensure organic materials are put to their highest and best use • Include downstream measures, to improve landfill gas capture and reduce fugitive landfill emissions, to cut methane quickly from waste-in-place and protect nearby communities • Build from existing policies, programs, and climate action plans	• Meaningfully and continually involve LIDAC in the PCAP development process • Consider the full range of potential benefits, from addressing food insecurity to creating circular economy jobs to improving public health outcomes and quality of life	• Pursue interagency and intergovernmental collaboration to advance big-picture strategies • Leverage complementary federal funding sources to support implementation

Developing a strong PCAP will position planning grant recipients well to compete for implementation funding, since implementation grant applications will be evaluated on all these elements, as well as job quality, cost effectiveness, and transformative impact (see here for full evaluation criteria).

Focus on methane in the GHG inventory to limit near-term warming

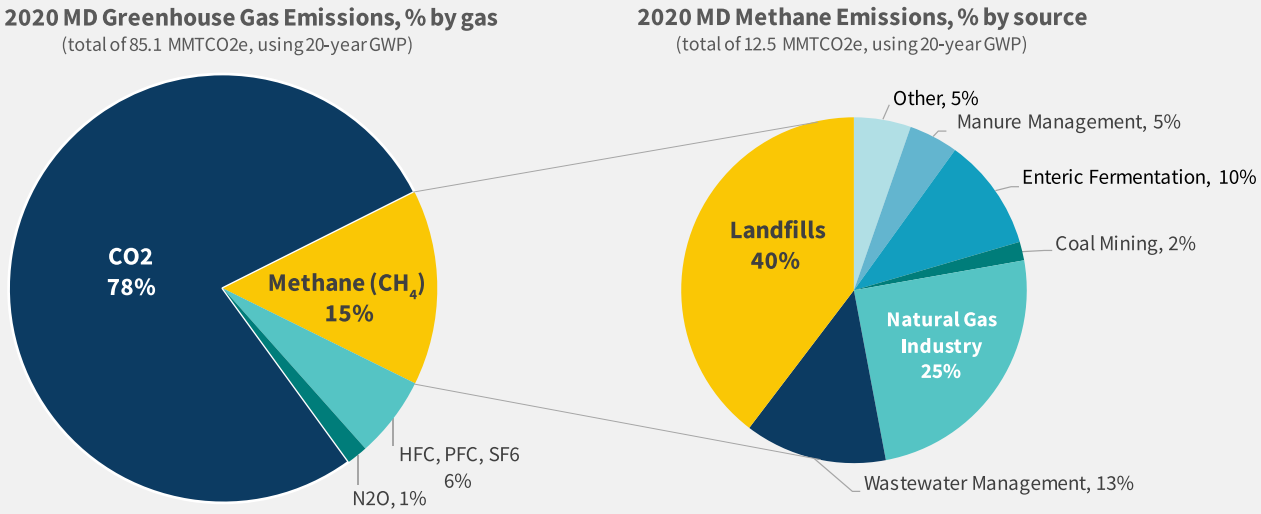
Including methane emissions in the GHG inventory will advance climate action that yields immediate, high-impact results. Methane is a **short-lived climate pollutant** with about 80 times the warming power of carbon dioxide over twenty years. Due to its short lifetime, methane disproportionately impacts near-term warming. Methane emissions alone are responsible for roughly one-third of warming impacts millions of Americans are experiencing right now — from record heat waves to flash flooding and intense hurricanes. **Fast action on methane** is considered the single best strategy we have to slow near-term warming, while delivering co-benefits for air quality, public health, and agricultural productivity.

Landfills emit methane as organic waste — food, paper, yard waste — decomposes without oxygen. More food waste reaches US landfills than any other material, making up about a quarter of all landfilled waste. Landfill methane generation typically begins within the first year of waste disposal and can continue for more than 50 years. All told, municipal landfills generate more than 14 percent of US methane emissions, or about 295 million metric tons of CO_2e annually, according to inventories calculated using a twenty-year global warming potential (GWP). That's roughly equivalent to driving 66 million gas-powered cars or operating 79 coal-fired power plants for one year. Worse, according to the EPA's research staff, landfill emissions are likely understated by at least a factor of two. Empirical data from aircraft and satellite surveys show large methane plumes coming from landfills across the country, with substantial under-reporting at some landfills.

At the state and local level, landfills are often the largest inventory source of methane. For example, a municipal solid waste landfill was the number one industrial methane emitter in 37 states, according to data provided by operators to the EPA's Greenhouse Gas Reporting Program in 2021.

Recommendations to incorporate landfill methane in the GHG inventory

- **Planning grant recipients should categorize and quantify all major sources of methane in their inventories, using a 20-year global warming potential (GWP).** A 100-year GWP understates the potency of methane emissions and the benefits of near-term action. Examples: The Maryland Department of Environment (pictured below) and New York State Department of Environmental Conservation use a 20-year GWP for methane in their inventories to identify high-impact GHG reduction measures.



- **The EPA provides** several tools to develop GHG inventories for states, local governments, and tribes. Tools may default to a 100-year GWP; replacing that value with the 20-year GWP will ensure methane sources are represented on a climate-relevant timeline.
- Planning grant recipients can further improve inventory accuracy for landfill methane emissions by gathering **jurisdiction-specific data to update default assumptions**. For example, planning grant recipients should consider: (1) conducting waste characterization studies to gather data on waste composition and methane generation potential, and (2) collecting information from landfill operators to develop appropriate assumptions for landfill gas collection and methane leakage rates at the landfill.

Achieve significant GHG reductions by tackling landfill emissions upstream *and* downstream

Given their potent near-term warming impacts, landfills are a high priority for interventions. Thankfully, there are **implementation-ready GHG reduction measures** to significantly cut landfill emissions today that planning grant recipients should include in their PCAP.

Upstream: There are proven, often low-cost strategies to reduce organic waste disposal in landfills to prevent methane generation. State and local governments should pursue upstream measures that follow the EPA's food recovery hierarchy with a focus on waste prevention, food rescue and donation, and organics recycling: turning residual organics into animal feed, compost, digestate, or biogas. Following the hierarchy and avoiding emissions upstream can maximize benefits for the environment, society, and the economy. For example, while a ton of food waste emits about half a ton of CO_2e emissions in the landfill, preventing that food from becoming waste can avoid about four tons of emissions along the supply chain, per EPA's WARM model. Resources and model policies for state and local governments to develop upstream strategies to reduce food waste can be found in NRDC's Food Matters program and the Zero Food Waste Coalition's State Policy Toolkit.

Downstream: At the same time, there are easy-to-implement downstream strategies to cut methane emissions quickly from previously landfilled waste. State and local governments should strengthen landfill controls beyond the minimum federal standards to increase methane capture, reduce fugitive emissions, and stop large leaks fast. Example policies include the landfill air regulations in California, Oregon, and Maryland, and there are many best management practices and technologies that municipal landfills can adopt today to reduce emissions, such as automated well tuning, advanced methane monitoring, and low-cost biocovers, which use naturally-occurring bacteria to destroy high volumes of methane.

Entities should include both upstream and downstream measures in their PCAPs to maximize GHG reductions. Upstream strategies avoid locking in future methane emissions, while downstream strategies cut methane quickly from landfills today. Composting and anaerobic digestion can achieve a 95% methane reduction efficiency when compared to landfilling organic waste, according to EPA estimates, while stronger landfill controls can reduce emissions by 25-50%. Incineration should not be used for managing organic discards, as it is polluting and expensive.

Specific GHG reduction measures to consider for the PCAP:

Below, we outline waste methane reduction goals and the regulatory and non-regulatory measures that can achieve those goals. In particular, we recommend planning grant recipients consider **organic waste bans and stronger state landfill regulations** (highlighted below) as potential PCAP measures that can deliver major GHG reductions and powerful co-benefits. Several jurisdictions have already implemented organics diversion policies or landfill methane regulations. Even where such policies are already in place, grant recipients should emphasize these measures in the PCAP, as CPRG resources can make existing programs more successful.

- **Phase out organic waste disposal in landfills and incinerators.** Several states and cities have passed legislation or ordinances that require reductions in organic waste disposal in landfills, while advancing alternatives like waste prevention, surplus food donation, composting, and anaerobic digestion. California law, for example, mandates a 75% reduction in organic waste disposal state-wide by 2025. Vermont law requires waste generators to source-separate food scraps and send them to facilities that manage them in an approved manner. Successful organics bans and diversion policies generally take a phased-in approach, cover all generators, invest in community outreach, and provide grants for implementation and infrastructure buildout. Some policies specifically require a portion of surplus food be donated to ensure edible food is put to the highest and best use. Mandatory food waste reporting, especially for large waste generators, can help track progress and compliance. Examples: California SB 1383, Washington HB 1799, Vermont Universal Recycling Law, Austin, TX, Hennepin County, MN, New York City, Boulder, CO.
- **Promote waste prevention and surplus food donation.** At the state level, reforming food date labeling policies can improve consumer understanding, prevent unnecessary food disposal, and break down barriers to food donation (ex: ZFWC Model State Law). In addition, several states offer tax incentives for food donation (ex: Missouri, Iowa, and Pennsylvania), and California tax law provides a credit for 50% of transportation costs incurred when donating food. Clear food safety guidance can help advance food donation, too (ex: Texas food code). Local governments can support waste prevention and food rescue operations through rebates for businesses or consumers (ex: Austin Zero Waste Rebate Program), awareness campaigns and food waste reduction programs in K-12 schools. Raising landfill tipping fees or instituting pay-as-you-throw pricing at the municipal level can also encourage participation in waste prevention and donation efforts (ex: ILSR Disposal Surcharge Fee)

- **Support source-separated organics collection, processing, and recycling infrastructure.** Local governments can provide curbside organics collection or drop-off services for residents to recycle organic discards. There are about 400 food scrap collection programs in the US, including programs in Prince George's County, MD, Minneapolis, MN, and State College, PA. Grant funding at the state-level can support the build-out of organic waste recovery and processing infrastructure (ex: MassDEP Organics Grants, CalRecycle Organics & Food Recovery Grants). Permitting and zoning reform can help speed construction of composting and anaerobic digestion facilities. State and local governments can also develop and support programs to advance recycling of food scraps into animal feed.
- **Develop end markets for products made from organic waste**. Annual procurement targets for compost from state and local governments can help organics recyclers ensure a consistent market for finished compost products. Potential use cases include agriculture, landscaping, construction, erosion control in roads and highway projects, and wetlands restoration projects. Compost can improve soil health, reduce stormwater runoff, and increase carbon storage. Examples: SB 1383, HB 1799, NRDC Model Compost Procurement Policy.
- **Update state regulations to better control for landfill methane emissions.** Three states have taken action to better control their landfill methane emissions by setting stronger standards than EPA's. State rules make several improvements to landfill design, operational, and monitoring requirements to increase methane capture and reduce the risk of large leaks. Examples: California, Oregon, Maryland. The Maryland Department of Environment estimates a 25-50% reduction in landfill emissions once the rule is in full effect.
- **Expand voluntary adoption of landfill best management practices, beyond minimum federal standards.** Many landfills are municipally owned and operated, so planning grant recipients can easily implement best management practices (BMPs) to reduce harmful landfill emissions today. Entities can also partner with privately-owned landfills to advance adoption of BMPs and ensure emissions transparency. BMPs include: more comprehensive methane monitoring to quickly detect and repair leaks (leveraging drones, continuous monitoring, or other remote sensing techniques); improving landfill cover materials and practices (deploying methane-oxidizing biocovers, and limiting time between daily, intermediate, and final cover); optimizing gas collection system performance (installing and expanding wells early, using automated wellhead tuning, managing liquid levels); and ensuring efficient methane destruction. Robust data collection and reporting requirements can help track the efficacy of BMPs and ensure emissions transparency, especially for nearby communities. State and local governments can set quantitative targets to increase landfill gas capture rates and reduce fugitive emissions through BMPs (ex: New York State Scoping Plan, King County, WA).
- **Deploy advanced monitoring technology to quickly find and fix large landfill methane leaks.** Governments can also leverage data from satellites and aircraft surveys to identify methane "super-emitters" and reach out to landfill operators to encourage, or require, leak repairs. Some state agencies have coordinated overflights with methane remote sensing providers to identify high-emitting facilities. The agencies then provided the methane plume data to landfill operators, prompting successful voluntary repairs at several landfills (ex: Pennsylvania-Carbon Mapper Overflights, CARB Remote Sensing Program). In Pennsylvania, overflights resulted in a 37% emissions reduction in detected emissions from the landfills that were super-emitters. Governments could consider partnering with remote sensing providers on tailored overflights or leveraging free, publicly available data from the Carbon Mapper portal. Higher-frequency data will soon be available to states and local governments with additional methane-detecting satellites scheduled to launch in 2024.

Sample climate action plans that address organic waste & landfill methane emissions

See below for sample climate action plans from across the United States that include upstream and downstream GHG reduction measures to tackle organic waste and landfill emissions:

- **State:** California Air Resources Board Scoping Plan for Achieving Carbon Neutrality, New York State Climate Action Council Scoping Plan, Delaware's Climate Action Plan
- **MSA:** Memphis Area Climate Action Plan, City of Chicago Climate Action Plan, King County, WA Climate Action Plan, City of San Diego Climate Action Plan
- **Tribal:** Sault Ste. Marie Tribe of Chippewa Indians, Tribal Energy Systems: Climate Preparedness and Resiliency, EPA Developing Tribal Integrated Waste Management Plans

EPA's Waste Reduction Model (WARM) can help planning grant recipients quantify the potential GHG reductions, energy savings, and economic impacts of different waste management practices, such as source reduction, composting, anaerobic digestion, and landfilling.

Deliver substantial community benefits through waste methane measures

The CPRG program encourages planning grant recipients to develop plans that reduce climate pollution while building the clean energy economy in a way that benefits *all* Americans, provides new workforce training opportunities, and effectively addresses environmental injustices in disadvantaged communities. The PCAP specifically requires a low-income and disadvantaged communities (LIDAC) benefits analysis to identify communities impacted by potential GHG reductions, evaluate expected benefits, and provide an overview of planned engagement with LIDAC representatives and residents.

Many landfills and incinerators directly impact disadvantaged communities. An analysis utilizing EPA's Environmental Justice Screening and Mapping Tool (EJScreen) found that 54 percent of landfills reporting to the Greenhouse Gas Reporting Program have communities within one mile of the landfill that exceed the national average for either people of color or those with low incomes. Beyond methane, landfills can emit toxic, illness-causing benzene, toluene, vinyl chloride, and other dangerous gasses. The runoff from landfills, known as leachate, can contaminate drinking water. Incinerating waste is not an acceptable alternative solution for organics disposal, as it just exchanges one problem for another. Trash incinerators emit hazardous air pollutants such as lead and mercury. Incinerators also generate a byproduct, toxic incinerator ash, which must be disposed of, often at a landfill. Incinerators are disproportionately sited near low-income and BIPOC communities; about 80% of US municipal solid waste incinerators are located in such communities.

GHG reduction strategies that improve landfill methane controls can also reduce emissions of hazardous air pollutants, volatile organic compounds, and odors — helping to address the air quality, health, and quality of life issues facing communities near landfills. Strategies to prevent and divert organic waste from landfills can also help reduce odors, minimize leachate generation and associated groundwater pollution, and prevent landfill expansion. Waste sector GHG reduction strategies bring several additional co-benefits for communities, outlined below, to consider for the PCAP.

Examples of potential community benefits from waste sector GHG reduction measures

- **Addressing food insecurity** by expanding surplus food donation
- **Improving soil health**, **supporting local food production**, displacing carbon-intensive fertilizers, and sequestering carbon through compost application
- **Creating jobs and workforce development opportunities** in the circular economy: studies show composting can support up to six times as many jobs as landfilling or incineration, and effectively implementing best management practices at landfills may require more personnel
- **Promoting social inclusion, empowerment, and youth mentorship** while greening neighborhoods through community composting
- **Improving public health outcomes** by reducing emissions of co-pollutants, such as volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and other air toxics that can endanger the physical and mental health of residents near landfills or incinerators
- **Improving air quality and quality of life** by improving controls of landfill odors and precursors to smog-forming ozone
- **Avoiding landfill expansion or costly waste exports** by extending the life of existing landfills through waste prevention and diversion
- **Increasing resilience to climate change** through GHG reduction measures that have both GHG benefits and climate adaptation benefits (e.g., composting reduces landfill methane emissions, and compost application can decrease water and pollution runoff and aid in reforestation and wetlands restoration).

Planning grant recipients should meaningfully engage with residents, leaders, and representatives of LIDACs throughout the planning process to identify and incorporate community-driven priorities and ensure the full range of the potential impacts, benefits and disbenefits, of GHG reduction measures are considered, discussed, and reflected in the PCAP.

Preventing and diverting organic waste and strengthening landfill controls can also be some of the **most cost-effective GHG measures** that states, tribes, territories, and local governments can take. Preventing or diverting organic waste from landfills can reduce the costs associated with managing discards and generate revenue from valorized end products, like compost. CalRecycle's organic waste recycling program, for example, is one of the top ten most cost-effective California Climate Investment programs for reducing GHG emissions. Strengthening landfill gas controls can be cost-effective at rates far below the threshold that the EPA found to be reasonable for the oil and gas industry. EPA notes that the majority of potential landfill methane abatement can be achieved at break-even prices and in some cases generate incremental revenue for operators through increased methane capture.

Implementation, funding, and resources

State and local governments have broad authority and responsibility for waste management, putting implementation-ready measures firmly in reach. There are many existing programs and policies to reduce organic waste disposal and strengthen landfill emissions controls that planning grant recipients can build from. For measures where specific authority must still be obtained, planning grant recipients should outline in the PCAP any actions needed from other entities. The EPA encourages interagency and intergovernmental coordination to accelerate and scale up GHG reduction measures.

The EPA also encourages entities developing a PCAP to identify federal funding opportunities that could support implementation. EPA has gathered CPRG-related funding opportunities by sector (see: Waste and Materials Management). Below, we highlight a few funding opportunities relevant to the waste sector. Additional funding opportunities can be found through the IRA Guidebook, BIL Guidebook, and the Federal Funding Opportunities for Local Decarbonization tool.

Funding Opportunity	Source	Agency	Details
Greenhouse Gas Reduction Fund (GGRF)	IRA	EPA	$20 billion to nonprofit financing entities and community lenders to support clean energy and air pollution reducing projects in communities. EPA will make grants by September 2024 with financing distributed and recycled on an ongoing basis to eligible projects.
Solid Waste Infrastructure for Recycling (SWIFR) Grant Program	BIL	EPA	$275 million to assist states, local governments, tribes, and territories in making improvements to local waste and materials management systems, including organics management.
Energy Efficiency and Conservation Block Grant (EECBG) Program	BIL	DOE	$550 million to assist states, local governments, and tribes in implementing strategies to reduce energy use and improve energy efficiency. Reducing and capturing landfill GHGs is a focus area.
Methane Monitoring	IRA	EPA	$20 million for methane monitoring; landfills are a focus areas.
Composting and Food Waste Reduction (CFWR) Cooperative Agreements	Farm Bill	USDA	More than $20 million from FY20-23 to assist local and municipal governments with compost and food waste reduction plans.

Other tools and resources

- EPA CPRG Planning Grants: Program Guidance for States, Municipalities, and Air Pollution Control Agencies
- EPA CPRG Planning Grants: Program Guidance for Federally Recognized Tribes, Tribal Consortia, and US Territories
- EPA CPRG Tools and Technical Assistance: GHG Inventory
- EPA CPRG Tools and Technical Assistance: GHG Reduction Measures
- EPA Waste Reduction Model (WARM)
- EPA CPRG Tools and Technical Assistance: Low Income and Disadvantaged Communities Benefits Analysis
- EPA Funding Opportunities and EPA Programs Related to the Food System
- Local Action Framework: A Guide to Help Communities Achieve Energy and Environmental Goals
- Tribal Waste Management Funding Resources Directory
- EPA Managing and Transforming Waste Streams: A Tool for Communities
- Policy and Program Impact Estimator: A Materials Recovery Greenhouse Gas (GHG) Calculator for Communities
- EPA Sustainable Management of Food Resources
- EPA Downstream Management of Organic Waste in the United States: Strategies for Methane Mitigation
- Zero Food Waste Coalition, Achieving Zero Food Waste: A State Policy Toolkit
- ReFED Food Waste Insights Engine
- ELI, A Toolkit for Incorporating Food Waste in Municipal Climate Action Plans
- NRDC, Tackling Food Waste in Cities: A Policy and Program Toolkit
- ILSR, Composting for Community Map
- Industrious Labs, U.S. State Landfill Emissions Dashboard
- RMI, Key Strategies for Mitigating Methane Emissions from Municipal Solid Waste
- CCAC, UNEP Solid Waste Emissions Estimation Tool (SWEET)
- RMI, The Future of Landfills is Bright
- Zero Foodprint