

State-led Solutions to Tackle Climate Pollution from Landfills, Create Economic Opportunity, & Benefit Communities

September 26, 2023



Webinar Agenda



Welcome & Opening

Olivia Alves

Senior Associate, RMI



Landfill Methane Overview

Katherine Blauvelt

Circular Economy Director,
Industrious Labs



State-led Solutions Panel

Leia Guccione

Managing Director, US
Program, RMI

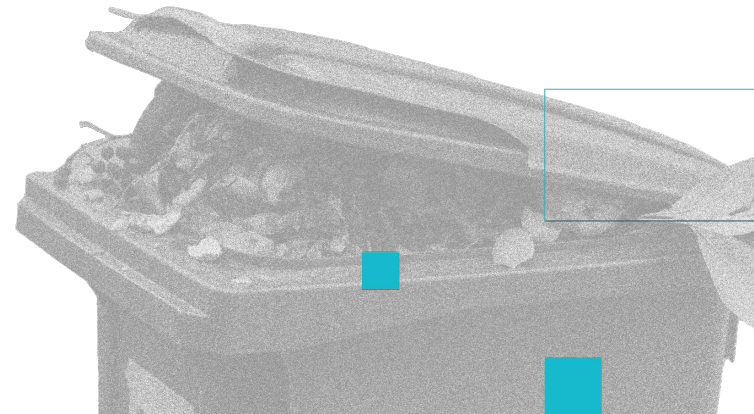
Opening Remarks



Gina McCarthy

**First White House National
Climate Advisor and Former U.S.
EPA Administrator**

Landfill Methane Overview



Methane in Landfills Overview

Industrious Labs



Methane in Landfills 2023





Benefits of Taking Action on Waste

Immediately slow near-term warming

Deliver on our state, national and global climate commitments

Address harms to communities

Create jobs and local benefits



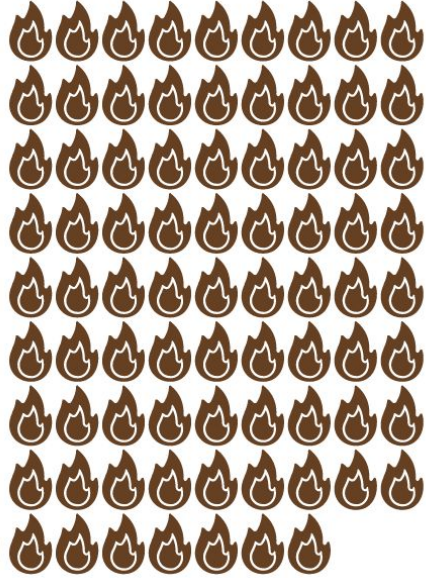
Landfills create
14.3% of total U.S.
methane emissions.

That's **295 million metric tons** of greenhouse gases per year.

Equivalent to 66 million passenger vehicles driving for a year.

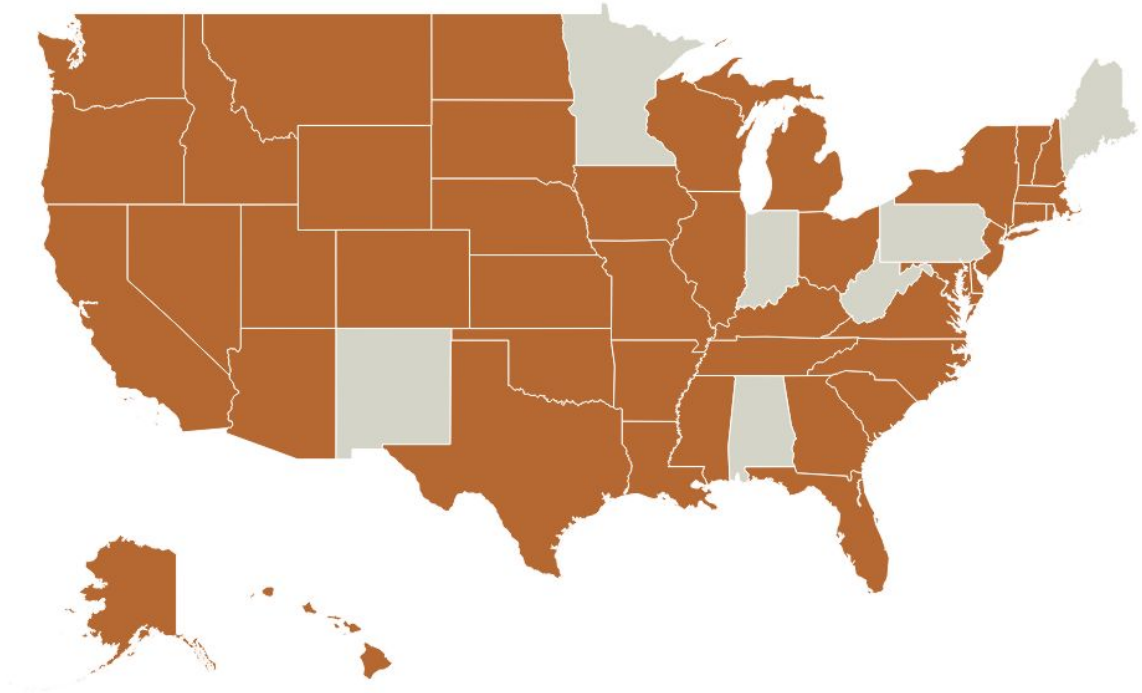


Or 79 coal-fired power plants

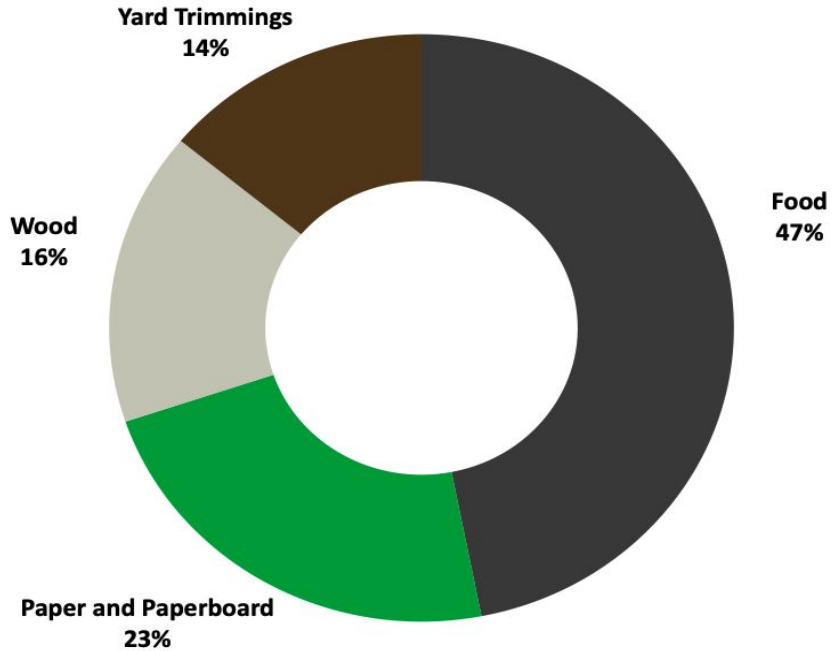


In 43 states, municipal solid waste landfills are the largest industrial methane-emitting sector

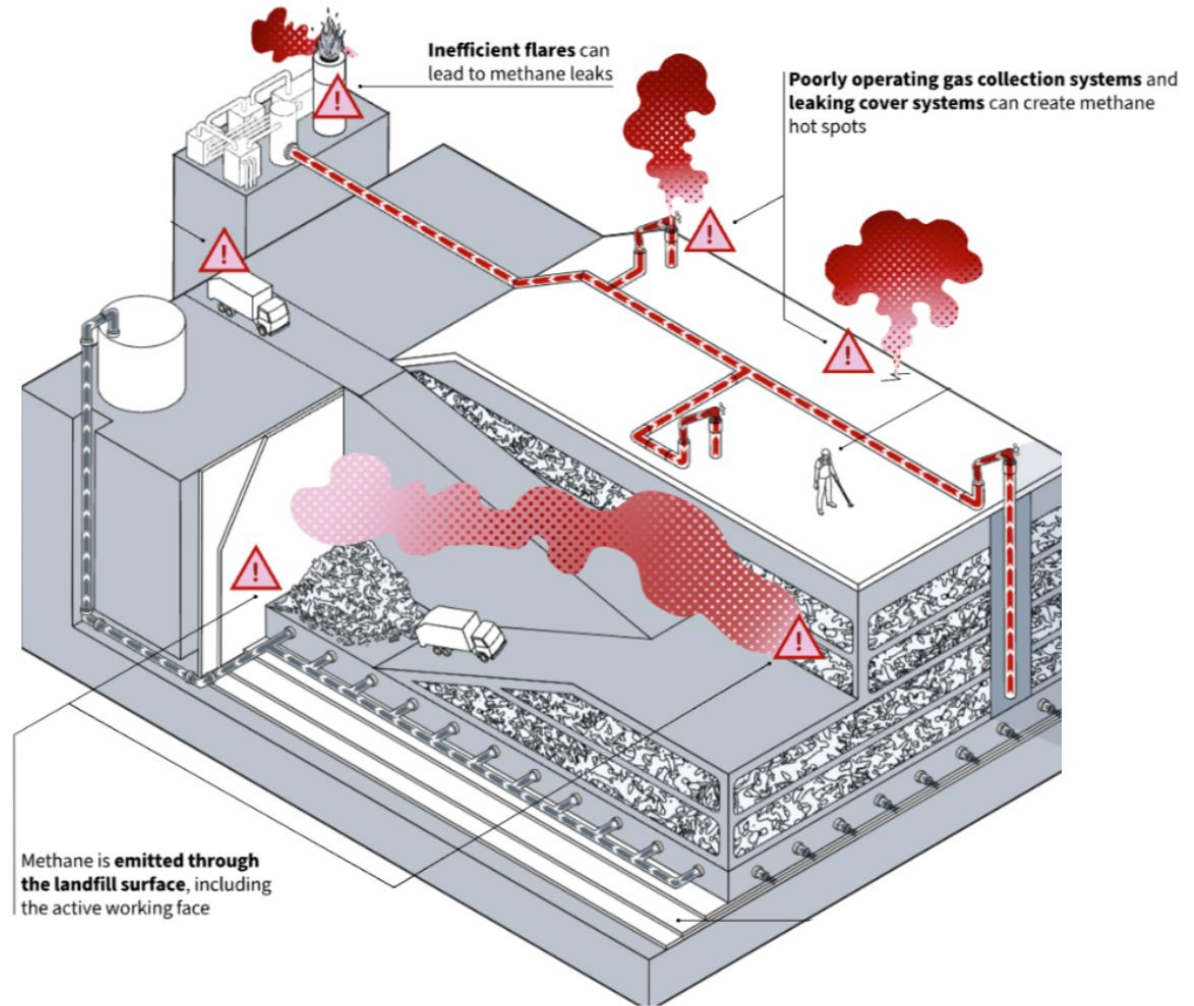
Advanced monitoring aerial measurements suggest substantial underestimates in official inventories



Organic waste in landfills creates methane

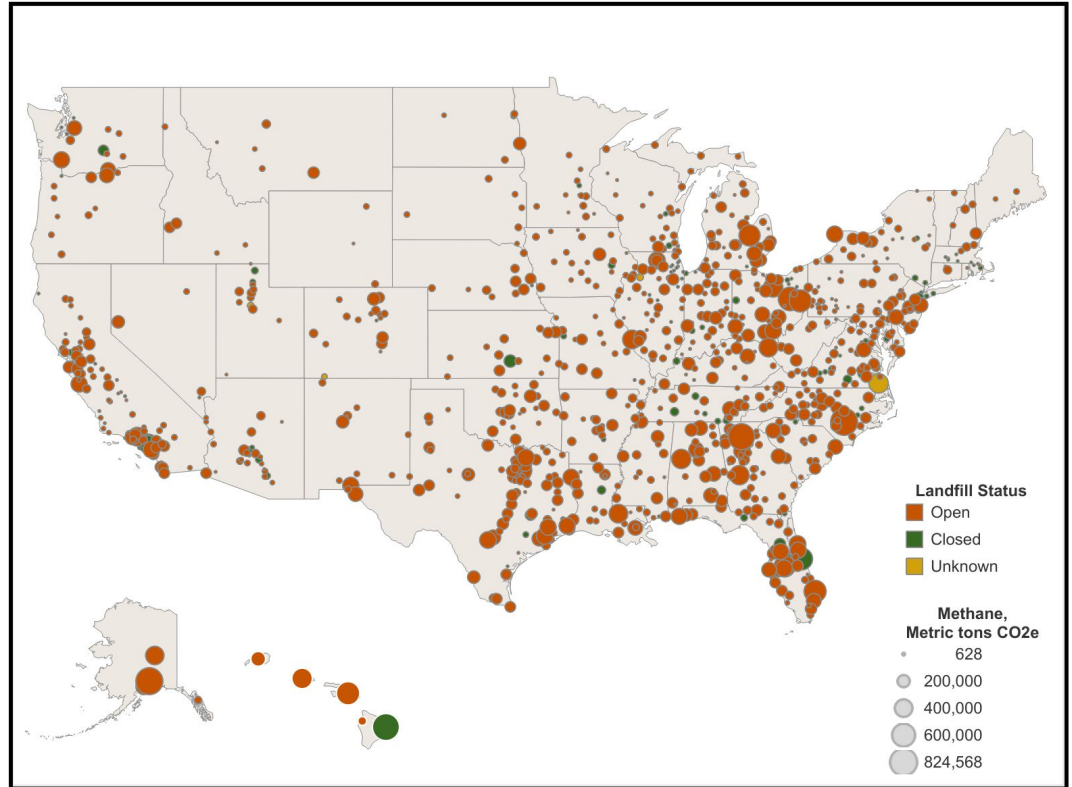


Each red exclamation point is a failure that can be remedied



Interactive 50-state map of landfill emissions:

dontwasteourfuture.org



State panel urges Bristol to close its local landfill after years of odor complaints

BY KATE MASTERS - APRIL 26, 2022 6:24 PM



'We're Taking Action Into Our Own Hands' — A Community Stands Against a Landfill

Sampson County site ranks No. 2 among U.S. landfills for methane emissions. Rotting food is part of the problem.

BY LISA SOBB - JANUARY 25, 2023 8:00 AM



'It's horrible': Graham residents complain of smell from landfill

Some residents say that the smell coming off a nearby landfill has become unbearable. Although the landfill has implemented some fixes, they won't work right away.



COMMENT

Odors 'like feces' and runny eyes: Complaints grow for Middle Point Landfill

Residents push back against Rumpke expansion that would quadruple trash volume

The waste and recycling company is planning to expand its facility in the western part of the Tri-State.



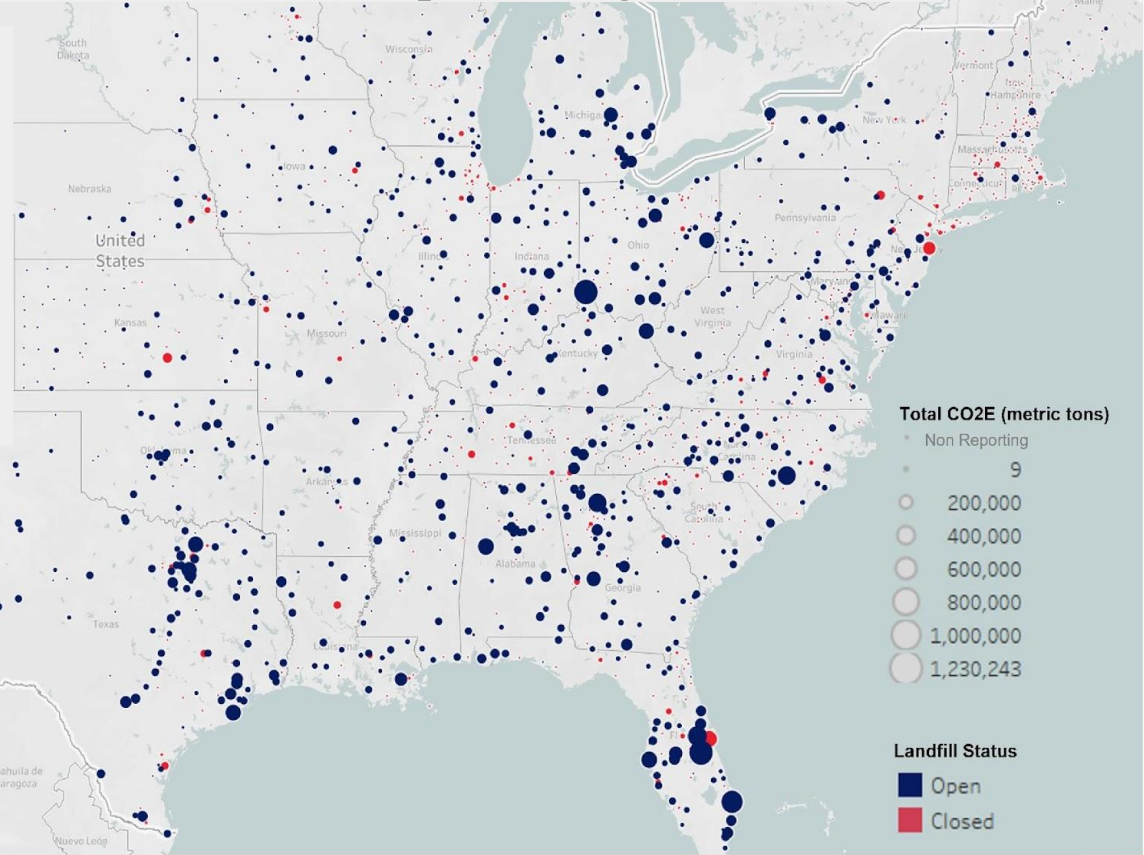
Winnebago Landfill odor draws 534 people to take legal action

Neighbors of the Winnebago Landfill say as the number of complaints grow, so does the smell.



Landfill-adjacent communities confront odor, leachate and air quality issues

Landfills are often sited in overburdened communities. **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 percentage of people of color or low-income.



Source: Environmental Integrity Project, 2021 EPA Data

A Two-Pronged Approach to Cut Waste Methane



Upstream
Prevent landfill
methane
generation

Waste prevention &
food donation

Organics recycling

Downstream
Mitigate methane
at the landfill

Smart landfill design
& operations

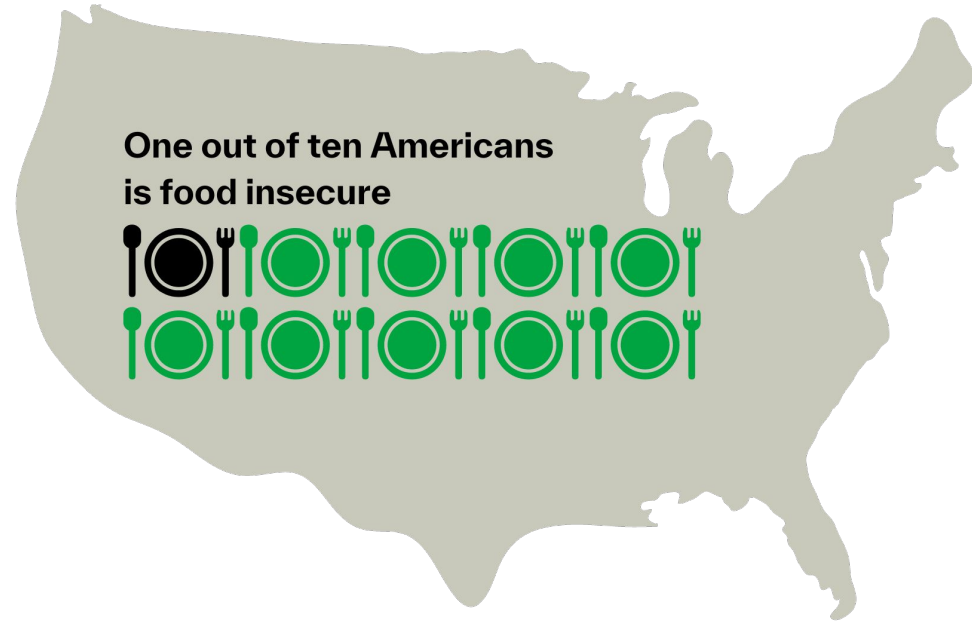
Advanced leak
detection & repair



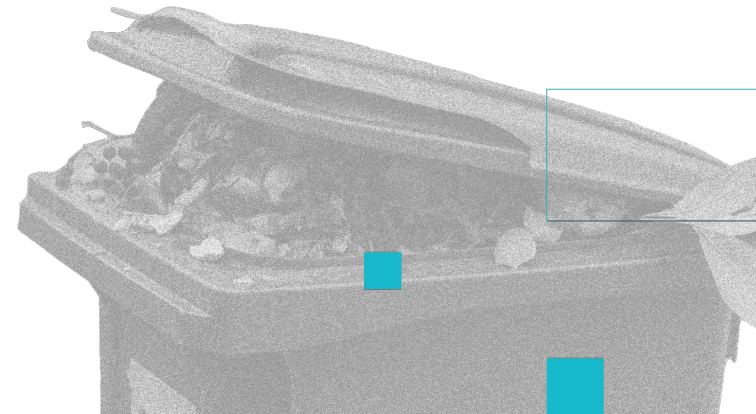
Ready-to-go solutions create good instead of creating problems

We must address waste in place *and* prevent new waste.

- 95% methane reduction potential
- Better control of methane emissions helps mitigate harms to communities
- Alternatives create many times more jobs, beneficial uses



State-led Solutions Panel



State-led Solutions Panel



Darby Hoover

Senior Resource
Specialist,
Natural Resources
Defense Council



Dr. Jason Schroeder

Air Resources
Supervisor,
California Air
Resources Board



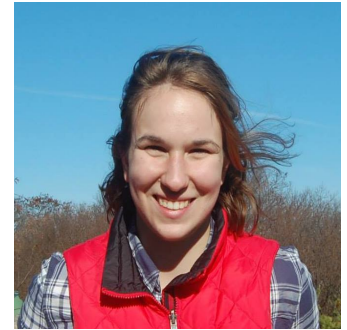
Nick Lapis

Director of
Advocacy,
Californians Against
Waste



Randy Mosier

Deputy Program
Manager, Maryland
Department of the
Environment



Emily Ranson

Chesapeake
Regional Director,
Clean Water Fund

Natural Resources Defense Council

Darby Hoover





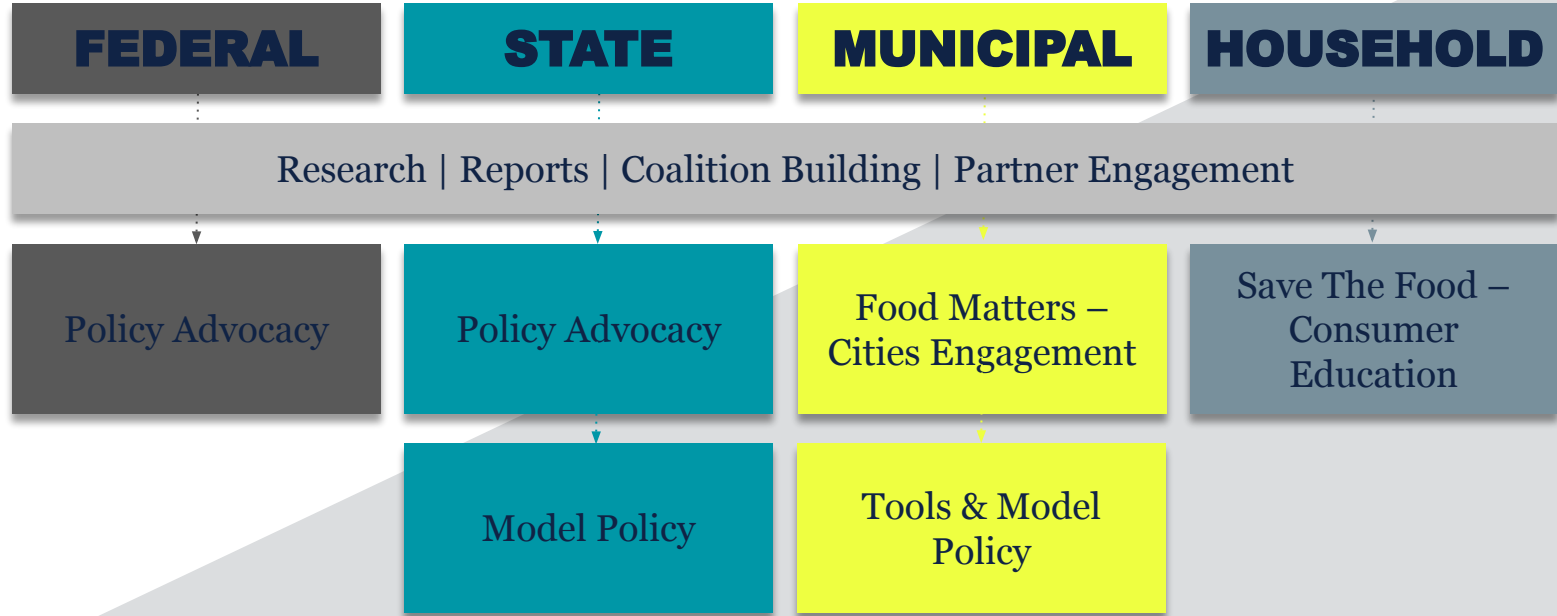
ACHIEVING ZERO FOOD WASTE: STATES AND CITIES

Darby Hoover, NRDC

State-led Solutions to Tackle Dangerous Climate Pollution from
Landfills, Create Economic Opportunity, and Benefit Communities

September 26, 2023

NRDC'S FOOD WASTE WORK



FOOD RECOVERY HIERARCHY

1

PREVENTION

Reducing the amount of food that goes to waste.

2

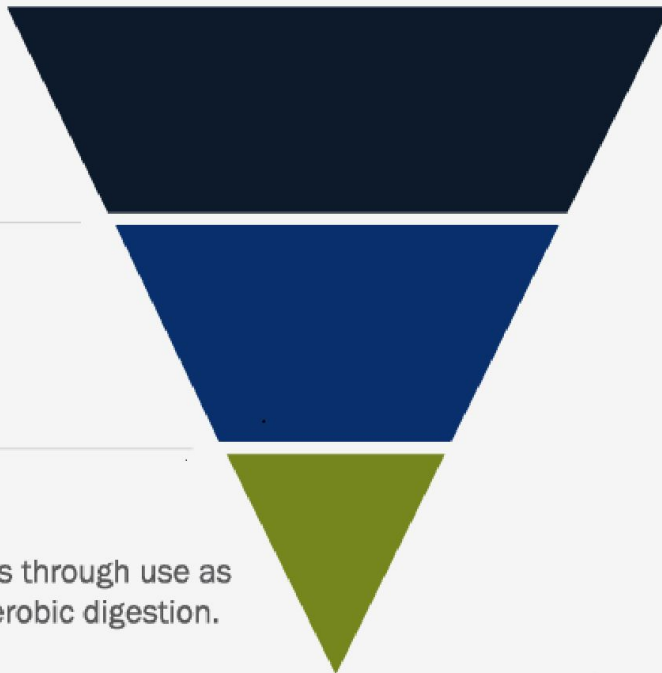
RESCUE

Donating surplus food to feed the hungry.

3

RECYCLING

Diverting food waste from landfills through use as animal feed, composting, or anaerobic digestion.



Based on ReFED adaptation of the EPA Food Recovery Hierarchy | ReFED.com

If 500,000 tons of food....

is **LANDFILLED** 
it emits **248,748 MTCO²e**

Boo!

is **COMPOSTED instead** 
it prevents **306,541 MTCO²e**

- equivalent to removing *65,000 vehicles* from the road

Yay!

is **PREVENTED** 
it prevents **2,079,000 MTCO²e** or *440K+ vehicles*

ZERO FOOD WASTE COALITION



1 Create a food loss and waste reduction office within the USDA and authorize funding for it to offer grants and support food waste reduction efforts

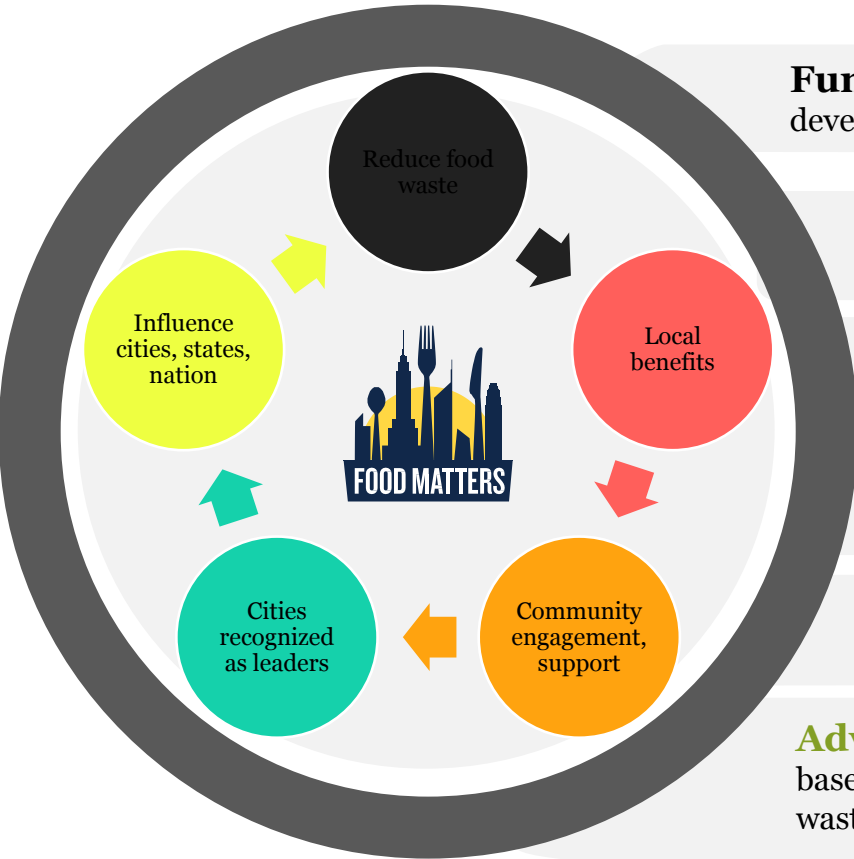
2 Increase funding for planning and infrastructure to reduce food waste and enhance food recovery

3 Standardize and clarify date labels

4 Fund research in food waste prevention, upcycling, and recycling solutions



FOOD MATTERS INITIATIVE



Fund transformative food waste initiatives to mobilize the development, adoption and implementation of food waste policy in cities

Exert collective influence using a member-driven approach to advocate policies at the local, state, and federal level

Enable and foster peer learning and engagement

Cultivate leadership so city leaders can excel in their roles as changemakers

Support cities to communicate more effectively to showcase and advance their food waste work

Advance strategies, methodologies, standards, and governance tools based on data and metrics for planning, implementing, and measuring food waste reduction programs and policies

Tackling Food Waste in Cities: A Policy and Program Toolkit



RETHINK

- Measure & Set Targets
- Modify Collection Policies
- Lead by Example



REDUCE

- Increase Public Awareness
- Support Business Engagement



RESCUE

- Address Policy Barriers
- Build Infrastructure & Capacity



RECYCLE

- Expand Organics Infrastructure

COMPOST PROCUREMENT POLICY

Policy Opportunity:

Compost procurement

Policy can require the use of compost products where appropriate

Supporting NRDC resource:

Model Compost Procurement Policy

Template is easily adaptable with commentary provided explaining the benefits of each provision.

Key provisions of the model:

- Purpose
- Municipal and state legal authority and policy support
- Definitions
- Procurement requirements (e.g. landscaping, construction, roads and highways)
- Compost sourcing and quality requirements
- Reporting

STATE POLICY

NRDC
REPORT
AUGUST 2021
R. 21-07-B

MID-ATLANTIC FOOD WASTE POLICY GAP ANALYSIS AND INVENTORY

NRDC
REPORT
AUGUST 2021
R. 21-07-D

SOUTHEAST FOOD WASTE POLICY GAP ANALYSIS AND INVENTORY

NRDC
REPORT
AUGUST 2021
R. 21-07-E

GREAT LAKES FOOD WASTE POLICY GAP ANALYSIS AND INVENTORY

STATE FOOD WASTE POLICY REPORTS



OCTOBER 2021
R. 21-10-8

REPORT

ILLINOIS FOOD WASTE POLICY GAP ANALYSIS AND INVENTORY



Organics Disposal Bans and Recycling Laws

Date Labeling

Food Donation Liability Protections

Tax Incentives for Food Rescue

Organics Processing Infrastructure Permitting

Food Safety Policies for Share Tables

Food Systems Plans, Goals and Targets

Plans Targeting Solid Waste

Climate Action Goals

Grants and Incentives Programs

ACHIEVING ZERO FOOD WASTE

A State Policy Toolkit

MAY 2023



This is a product of the Zero Food Waste Coalition. ZFWC brings consumers, businesses, and government together to build momentum and alignment on food waste policy.

ZERO 
FOOD
WASTE
COALITION

<https://zerofoodwastecoalition.org/state-toolkit/>

Toolkit Policies



Building & Broadening Organic Waste Bans

- Organic Waste Bans
- Food Donation Requirements
- Mandatory Reporting Laws
- Disposal Surcharge Fees



Opportunities to Promote Food Donation

- Liability Protections
- Tax Incentives
- Food Safety Guidance



Supporting Organic Waste Processing Infrastructure

- Permitting & Zoning for Composting & AD Facilities
- Recycling Food Scraps into Animal Feed



Developing End Markets for Compost

- Compost Procurement
- Incentivize Compost Application



Preventing Food Waste Upstream

- Date Labeling



Other Governmental Actions

- Food Waste Reduction in K-12 Schools
- Climate & Solid Waste Plans
- Government Support for Food Waste Reduction

Policy Section Contents

Background

- Connection to Food Recovery Hierarchy
- Historical Development and Current United States Landscape
- Federal Law Context

Components of Model Policy

- Key Considerations
- Lessons Learned from Other States
- Links to Additional Resources

Model Legislation

- Drafted State Legislation
- Adaptable for Each State's Context

California Air Resources Board Dr. Jason Schroeder



California Methane Policy



Short-Lived Climate Pollutant Reduction Strategy

March 2017

California Environmental Protection Agency
Air Resources Board

2022 SCOPING PLAN FOR ACHIEVING
CARBON NEUTRALITY
NOVEMBER 16, 2022



Senate Bill 1383 (2016): Requires reductions in SLCPs

- 40% reduction in methane and HFCs from 2013 levels by 2030
- 50% reduction in black carbon from 2013 levels by 2030
- For landfills, it requires 75% organic waste diversion

Research has shown that landfills are complex systems and a wide range of conditions (i.e., atmospheric, operational, biological, chemical, and physical) may contribute to variability in emissions

CARB's Landfill Methane Regulation

- The Landfill Methane Regulation (LMR) was initially adopted in 2010 as a discrete early action measure in response to Assembly Bill 32 (Nuñez, 2006).
- CARB's 2022 Scoping Plan Update identified improved control measures as a critical strategy to achieve near-term emissions reductions from landfills.
- CARB hosted a May 2023 workshop on Preliminary Concepts for Potential Improvements to the Landfill Methane Regulation focusing on three areas: emission monitoring, operational requirement, and reporting practices.

Monitoring



Operational Requirements

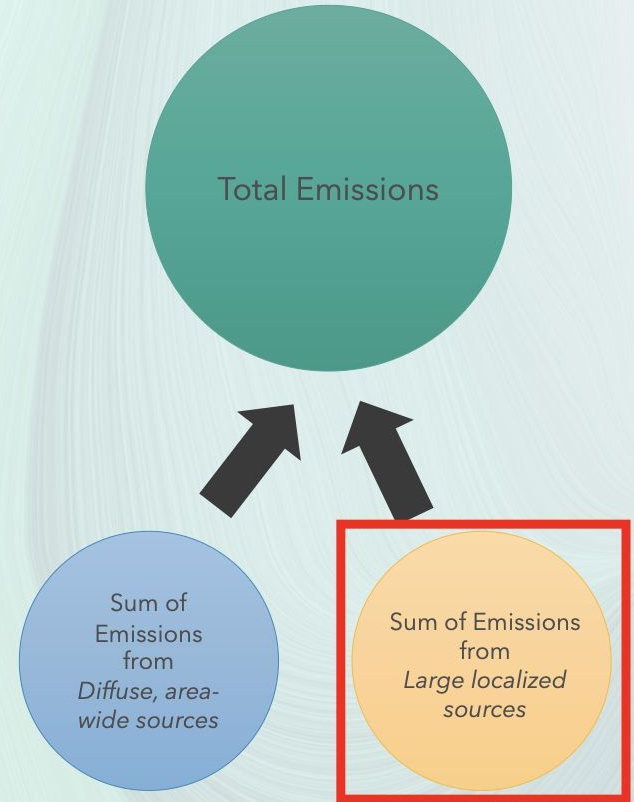
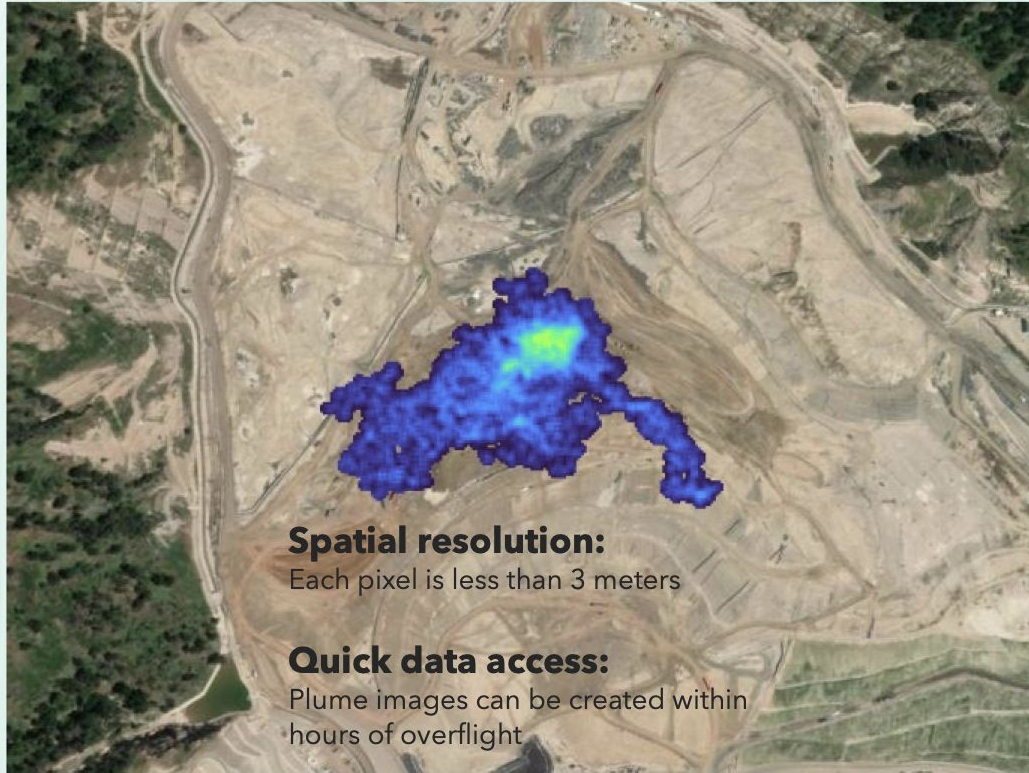


Reporting



- Staff is refining concepts based on public comments received.

Methane "Plume Mapping" Technology



Detectable with plume-mapping remote sensing

Airborne Research Surveys Conducted in California

Simulating Satellite Data Using the same instrument on airplanes - allows for pilot studies

Four airborne research campaigns that quantified emissions and demonstrated voluntary mitigation

Campaign #1 - 2016-2018 - California Methane Survey

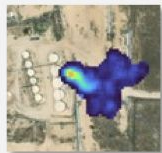
Campaign #2 - Nov 2020

Campaign #3 - Nov 2021

Campaign #4 - June 2023 - data available later in 2023*

* Responses are still being collected for 2023

Using methane plume data to support mitigation



Plume detection received by CARB

Infrastructure Identified

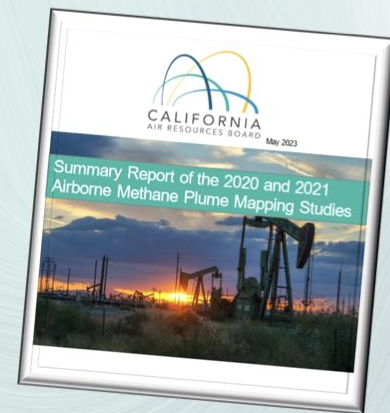
Operator Contact Determined

Operator Notified

Operator Performs Inspection

Operator Repairs Leak

Example workflow: Plumes typically shared with operators within a few days, often leading to repairs within a couple weeks.



Around 40-50% of plumes at landfills were from emission sources that were unknown to the operator and could be repaired

<https://ww2.arb.ca.gov/resources/documents/su-mmmary-report-2020-and-2021-airborne-methane-plume-mapping-studies>



California's contribution to methane-detecting satellites



Carbon Mapper Consortium

Two satellites launch in 2023. Funded by philanthropists.

CARB will play a key role in validating the methane data quality and demonstrating its potential use

JULY 13, 2022

CA Budget Passes: First-of-its-kind \$100 million climate initiative will slash methane emissions in California via satellite monitoring

\$100M for Methane Satellites

- Competitively bid through RFP; multiple bidders are expected
- RFP is currently live!
- CA wants to work with other jurisdictions to expand usage and increase mitigation

Thank You!

Californians Against Waste

Nick Lapis





CAW Extended Family
2023

The mission of Californians Against Waste is to **protect communities** by eliminating the pollution inherent in the extraction and disposal of natural resources.

CAW believes in **preventing waste at its source** and **holding producers responsible** throughout a product's lifecycle to transition California to a thriving circular economy.

GLOBAL WARMING SOLUTIONS ACT (AB 32, 2006)

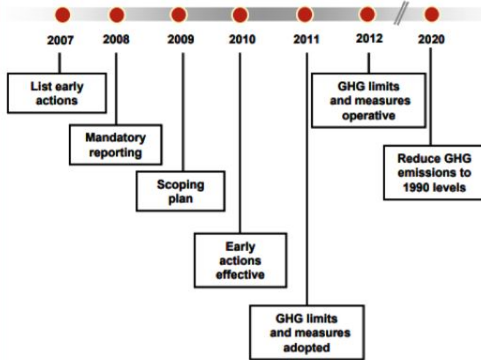
Regulations to reduce GHGs to 1990 levels by 2020



GLOBAL WARMING SOLUTIONS ACT (AB 32, 2006)

Regulations to reduce GHGs to 1990 levels by 2020

Figure 1
Comprehensive Multiyear Program
Established by AB 32



PROPOSED EARLY ACTIONS TO MITIGATE CLIMATE CHANGE IN CALIFORNIA



April 20, 2007



Table 1
Group 1 – ARB Discrete Early Action Measures
Per Health & Safety Code Section 38560.5

Number	Sector	Description	2020 Reductions (MMT CO ₂ E)
1-1	Transportation	Low Carbon Fuel Standards (LCFS)	19.20
1-2	Transportation	Reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems (MVACs)	1.2
1-3	Waste	Improved landfill methane capture	2.4
Group 1 Total Reductions			13-26

Notes on Table 1: Measure 1-1 subsumes two prior measures from the March 2006 Climate Action Plan: "Alternative Fuels – Biodiesel Blends" and "Alternative Fuels – Ethanol in Gasoline" that were jointly estimated to achieve 4 MMTCO₂E by 2020.

Table 2
Group 2 – Additional GHG Reduction Measures
Underway or to be Initiated by ARB in 2007-2009 Period

Number	Sector	Description	2020 Reductions (MMT CO ₂ E)
2-1	Agriculture	Manure management (methane digester protocol)	1
2-2	Agriculture	Specification of stationary agricultural engines	0.1
2-3	Commercial	Specifications for commercial refrigeration	>7.3
2-4	Commercial	Reduction of perfluorocarbons (PFCs) from the semiconductor industry	0.6
2-5	Commercial	Reduction of hydrofluorocarbons (HFCs) from foam production/installation including extruded polystyrene and block foam	TBD
2-6	Education	Guidance/protocols for local governments to facilitate GHG emission reductions	TBD
2-7	Education	Guidance/protocols for businesses to facilitate GHG reductions	TBD
2-8	Electricity	Detection, repair, and recycling equipment for sulfur hexafluoride (SF ₆)	0.7
2-9	Energy Efficiency	Light-covered paving, cool roofs and shade trees	TBD
2-10	Fire Suppression	Replacement of high global warming potential (GWP) gases used in fire protection systems with alternate chemicals	0.1
2-11	Forestry	Forestry protocol	TBD
2-12	Oil & Gas	Reduce venting/leaks from oil and gas systems	1
2-13	Transportation	Strengthen light-duty vehicle standards	4

FINAL REGULATION ORDER

Methane Emissions from Municipal Solid Waste Landfills

Subchapter 10. Climate Change Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions Subarticle 5. Methane Emissions from Municipal Solid Waste Landfills

Adopt new Article 4, Subarticle 5, sections 95460 to 95476, title 17, California Code of Regulations, to read as follows: (Note that the entire text of sections 95460 to 95476 set forth below is new language to be added to the California Code of Regulations.)

§ 95460. Purpose

The purpose of this subarticle is to reduce methane emissions from municipal solid waste (MSW) landfills pursuant to the California Global Warming Solutions Act of 2006 (Health & Safety Code, Sections 38500 et. seq.).

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95461. Applicability

This subarticle applies to all MSW landfills that received solid waste after January 1, 1977.

Note: Authority cited: Sections 38501, 38510, 38560, 38560.5, 38580, 39600, and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38550, 38551, 38560, 38560.5, 39003, 39500, 39600, and 39601, Health and Safety Code.

§ 95462. Exemptions


- This subarticle does not apply to landfills that receive only hazardous waste, or are currently regulated under the Comprehensive Environmental Response, Compensation and Liability Act 42 U.S.C. Chapter 103 (Promulgated 12/11/80; Amended 10/17/86).
- This subarticle does not apply to landfills that receive only construction and demolition wastes, inert waste, or non-decomposable wastes.
- This subarticle does not apply to closed or inactive MSW landfills with less than 450,000 tons of waste-in-place.

May 2015



Short-Lived Climate Pollutant Reduction Strategy

CONCEPT PAPER

California Environmental Protection Agency
 **Air Resources Board**



Effectively Eliminate Disposal of Organic Materials at Landfills

Organic waste constitutes more than one-third of California's waste stream. Food waste alone accounts for about five million tons of landfilled organics each year. Efforts to divert organics from landfills, and to develop an organics infrastructure that makes best use of the material, are a key element of integrated strategies to increase production and access to renewable energy, reduce air pollution, improve agricultural soil health, and reduce GHG emissions from a broad array of sources throughout California.








CONCEPT PAPER

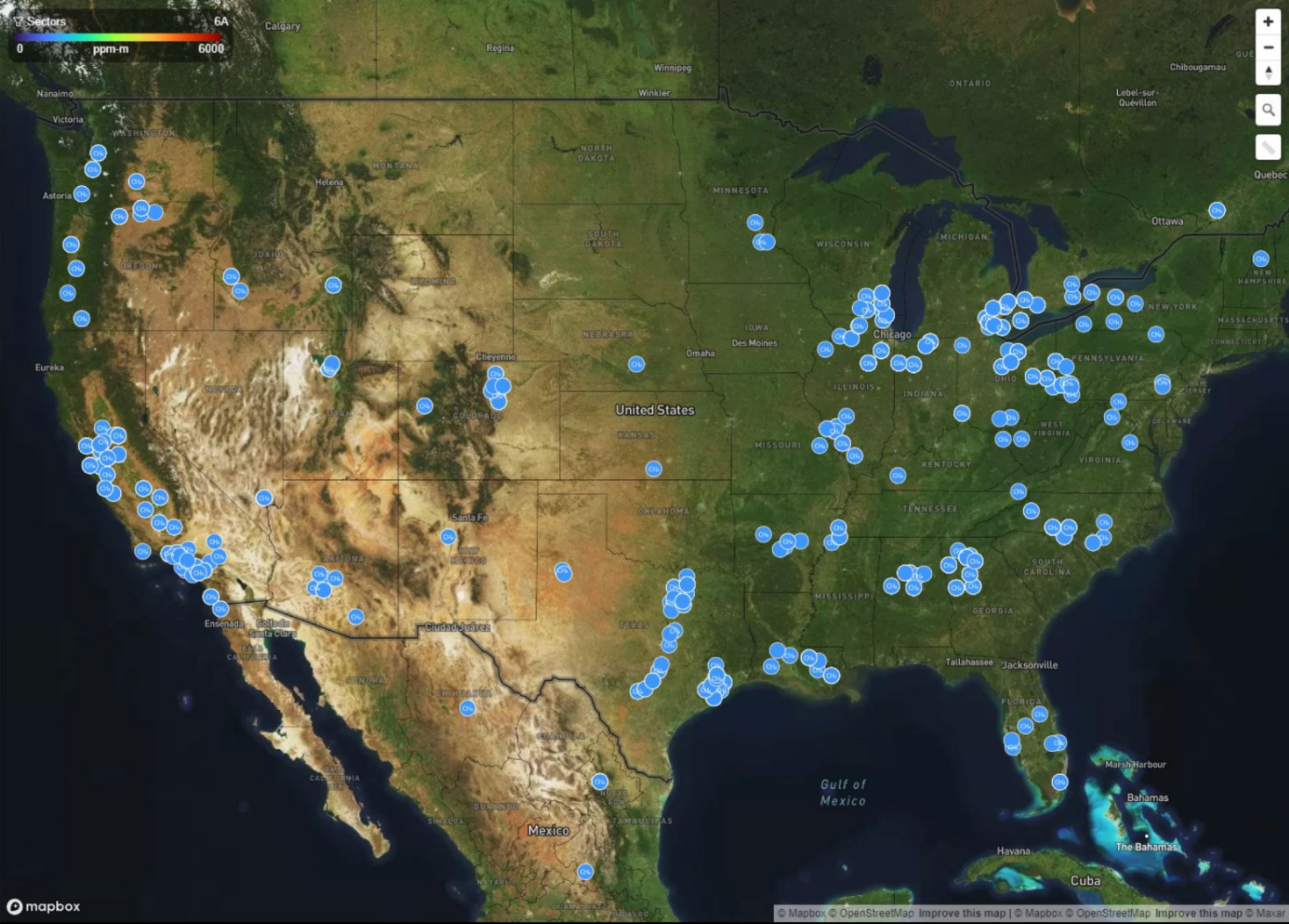
Search by Plume Name

Filters Layers

- Sources
- Plumes Origins
- Scenes
- Source Clustering
- Plumes
- layer opacity - 100%

Select All Highest Emissions

-  **Needville, Texas, United States**
Apr 16, 2023 18:49
29.39349°N, 95.71385°W
Sector: Solid Waste (6A)
Emission: 7951 ± 1762 kg/hr CH₄
-  **San Jose, California, United States**
Apr 6, 2022 18:18
37.45878°N, 121.94243°W
Sector: Solid Waste (6A)
Emission: 6471 ± 3207 kg/hr CH₄
-  **Westwego, Louisiana, United States**
Jun 4, 2022 15:58
29.9351°N, 90.26264°W
Sector: Solid Waste (6A)
Emission: 6131 ± 2306 kg/hr CH₄
-  **Buford, Georgia, United States**
Apr 20, 2022 15:04
34.13589°N, 84.0394°W
Sector: Solid Waste (6A)
Emission: 6039 ± 1938 kg/hr CH₄
-  **Needville, Texas, United States**
Apr 16, 2023 17:07
29.39305°N, 95.71645°W
Sector: Solid Waste (6A)
Emission: 5580 ± 671 kg/hr CH₄
-  **El Carmen, Nuevo León, Mexico**
Apr 2, 2023 18:15
25.87325°N, 100.30617°W
Sector: Solid Waste (6A)
Emission: 5420 ± 908 kg/hr CH₄
-  **Jackson, Georgia, United States**
Sep 27, 2022 18:02
33.2349°N, 84.11635°W

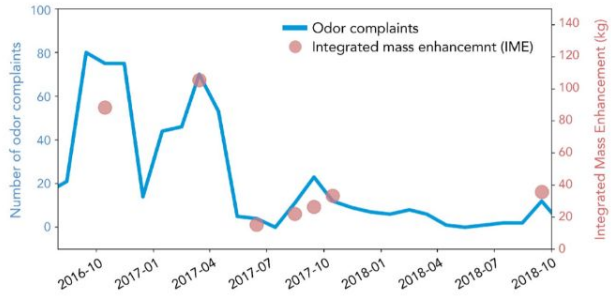
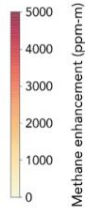


Reduction in methane emissions from intermediate cover verified by airborne monitoring

Before infrastructure improvements

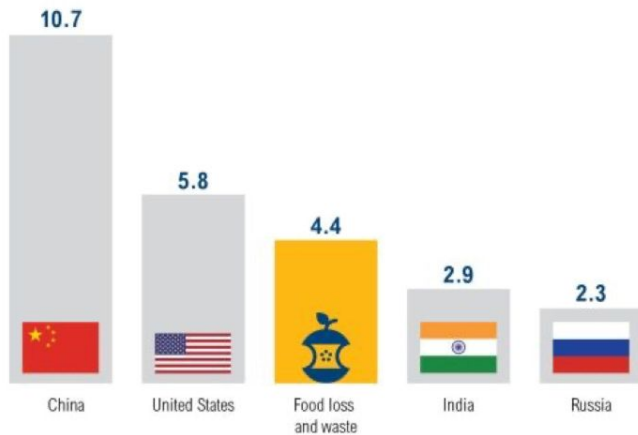


After infrastructure improvements



LANDFILL METHANE IS JUST THE TIP OF THE WASTEBERG

If Food Loss and Waste Were its own Country,
it Would Be the Third-Largest Greenhouse Gas Emitter



GT CO₂E (2011/12)*

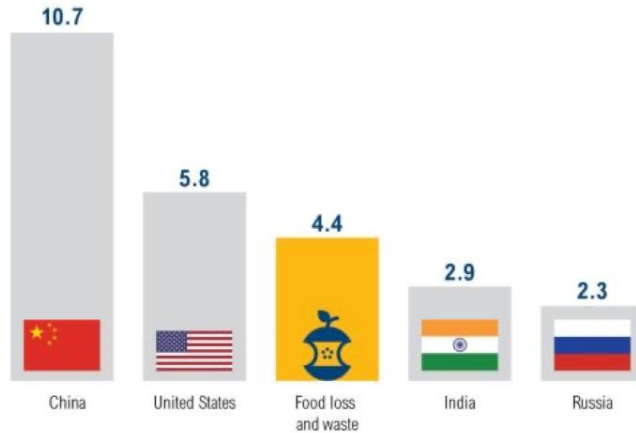
* Figures reflect all six anthropogenic greenhouse gas emissions, including those from land use, land-use change, and forestry (LULUCF). Country data is for 2012 while the food loss and waste data is for 2011 (the most recent data available). To avoid double counting, the food loss and waste emissions figure should not be added to the country figures.

Source: CAIT, 2015; FAO, 2015. Food wastage footprint & climate change. Rome: FAO.



WORLD RESOURCES INSTITUTE

If Food Loss and Waste Were its own Country, it Would Be the Third-Largest Greenhouse Gas Emitter



GT CO₂E (2011/12)*

* Figures reflect all six anthropogenic greenhouse gas emissions, including those from land use, land-use change, and forestry (LULUCF). Country data is for 2012 while the food loss and waste data is for 2011 (the most recent data available). To avoid double counting, the food loss and waste emissions figure should not be added to the country figures.

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 WORLD RESOURCES INSTITUTE



WATCH LIVE

New report finds 1 in 4 LA residents go hungry; food insecurity remains undercounted nationally

Plus, the starkest difference is felt in Los Angeles County.



By Denise Dador

Thursday, April 27, 2023



Este artículo se ofrece en [Español](#) →



EMBED <>

MORE VIDEOS ▾

USC researchers suggest the government's recent tally on food insecurity in the U.S. may be as much as a third higher than the USDA is reporting.

LOS ANGELES (KABC) -- America is a country rich in food, but more and more people do not have access to proper nutrition. University of Southern California researchers suggest the government's recent tally on food insecurity in the U.S. may be as much as a third higher than the USDA is reporting.



CALIFORNIA'S HEALTHY SOILS INITIATIVE

California's Healthy Soils Initiative is a collaboration of state agencies and departments, led by the California Department of Food and Agriculture, to promote the development of healthy soils. A combination of innovative farm and land management practices contribute to building adequate soil organic matter that can increase carbon sequestration and reduce overall greenhouse gases.

"As the leading agricultural state in the nation, it is important for California's soils to be sustainable and resilient to climate change.... the Administration will work on several new initiatives to increase carbon in soil and establish long term goals for carbon levels in all California's agricultural soils. CDFA will coordinate this initiative under its existing authority provided by the Environmental Farming Act."

EDMUND G. BROWN JR.
GOVERNOR OF CALIFORNIA

WHY SOILS?



Improve plant health and crop yields*

Soil organic matter suppresses disease organisms and increases plant nutrient availability and uptake.



Increase water retention and infiltration*

Healthy soil can hold up to 20 times its weight in water. Increasing soil organic matter 1% can increase soil available water holding capacity by 3.7%.



Prevent erosion and reduce sediment and dust*

Soil organic matter helps build soil aggregate stability and structure and make it more resistant to wind or water erosion.



Sequester carbon and reduce greenhouse gas emissions*

Soils contain approximately 75% of the carbon pool on land—three times more than the amount stored in living plants and animals.



Improve water quality*

Increasing soil organic matter increases infiltration and biological activity that make soil a more effective filter.



Improve biological diversity and wildlife habitat*

At least a quarter of the world's biodiversity lives in the soil; healthy soils improve habitats and other natural resources.

* Click to see supporting research.

San Francisco Chronicle

SFCHRONICLE.COM AND SFGATE.COM | Sunday, October 19, 2014 | PRINTED ON RECYCLED PAPER | \$1.00

CLIMATE CHANGE



Photos by Leah Mills / The Chronicle

Compost gets carbon out of air and into soil

By Carolyn Lochhead

A compost experiment that began seven years ago on a Marin County ranch has uncovered a disarmingly simple and benign way to remove carbon dioxide from the air, holding the potential to turn the vast rangeland of California and the world into a weapon against climate change.

The concept grew out of a unique Bay Area alignment of a biotech fortune, a world-class research institution and progressive-minded Marin ranchers. It has captured the attention of the White House, the Brown administration, the city of San Francisco, officials



Recology spokesman Robert Reed holds a handful of compost, made from Bay Area food scraps and yard trimmings, at Jepson Prairie Organics near Vacaville. Top: John Wick walks through invasive weeds on his Nicasio ranch.

in Brazil and China, and even House Republicans, who may not believe in climate change but like the idea that "carbon farming" could mean profits for ranchers.

Experiments on grazing lands in Marin County and the Sierra foothills of Yuba County by UC Berkeley bio-geochemist Wheeler Silver showed that a one-time dusting of compost substantially boosted the soil's carbon storage. The effect has persisted over six years, and Silver believes the carbon will remain stored for at least several decades.

The experiments were instigated by John Wick and his

Compost continues on A12

SB 1383 (SENATOR RICARDO LARA, 2016)

SHORT-LIVED CLIMATE POLLUTANTS (“CLIMATE SUPER POLLUTANTS”)

Los Angeles Times

SEPT. 15, 2016, 12:09 P.M.

Vowing to protect the lungs of Californians, Gov. Brown signs law cracking down on soot and methane



John Stryker

Twitter Facebook



Gov. Jerry Brown signs SB 1383, a law to regulate new industries on soot and other pollutants, in an event in Long Beach. [John Stryker/Los Angeles Times](#)

Likening the challenge of climate change to that of the biblical flood that prompted Noah to build an ark, Gov. Jerry Brown signed into law Monday an aggressive new plan to tackle pollutants like methane and soot.

“When Noah wanted to build his ark, most of the people laughed at him,” said Brown during an event in Long Beach. “We’ve got to build our ark too, by stopping climate change, by stopping dangerous pollutants.”

Senate Bill 1383, introduced in the weeks after lawmakers traveled to Paris last year for the United Nations conference on climate change, sets new state goals for cutting so-called “short lived” climate pollution from methane, soot and hydrofluorocarbons.

Monday’s event was the third signing ceremony for bills related to climate change, with Brown having already approved a broad expansion of climate goals and new efforts aimed at helping low-income communities.

Emissions of soot pollutants, also known as black carbon, would be

SB 1383



CALRECYCLE TIMELINE

2019: REGS ADOPTED
2022: REGS EFFECTIVE
2024: PENALTIES ON GENERATORS
2025: FULLY IN EFFECT

50%

Organic Waste
Recovery by 2020

75%

Organic Waste
Recovery by 2025

20%

Edible Food
Recovery

FOCUS ON KEEPING ORGANICS OUT OF LANDFILLS!



Opinion: Composting organic waste helps combat climate change

California goals to separate kitchen garbage will reduce methane gas in landfills



A tractor turns green waste at a composting facility in Indiana.

(Photo by Leonard Orszag, Orange County Register/OCIS)

By AL COURCHESNE |
PUBLISHED: June 16, 2023 at 8:00 a.m. | UPDATED: June 16, 2023 at 8:20 a.m.



Californians who long ago became accustomed to separating their trash and recycling their cans, bottles and paper are now being asked to separate their kitchen garbage so it can be recycled into compost. Some may be wondering, is it worth the trouble?



INVESTING IN ORGANIC WASTE DIVERSION HUGE BANG FOR THE BUCK

Agency	Subprogram	Cost per GHG (\$/MTCO _{2e})
MOST COST EFFECTIVE		
1 CA Strategic Growth Council	Sustainable Agricultural Lands Conservation Program	\$ 8.00
2 CDFA	Dairy Digester Research and Development Program	\$ 9.00
3 CalRecycle	Organics and Recycling Manufacturing Loans	\$ 10.00
4 CA Department of Forestry and Fire Protection	Forest Health Program	\$ 24.00
5 CARB	Fluorinated Gases Emission Reduction Incentives	\$ 27.00
6 CEC	Low-Carbon Fuel Production	\$ 28.00
7 CA Department of Fish and Wildlife	Wetlands and Watershed Restoration	\$ 39.00
8 CEC	Food Production Investment Program	\$ 39.00
9 CalRecycle	Food Waste Prevention and Rescue Grants	\$ 41.00
10 CalRecycle	Recycled Fiber, Plastic, and Glass Grant	\$ 52.00
11 CalRecycle	Organics Grants	\$ 53.00
12 CDFA	Alternative Manure Management Program	\$ 62.00
13 CEC	Renewable Energy for Agriculture Program	\$ 75.00
14 CA State Transportation Agency	Transit and Intercity Rail Capital Program	\$ 75.00
15 CARB	Woodsmoke Reduction	\$ 79.00
LEAST COST EFFECTIVE		
48 CNRA	Urban Greening Program	\$ 3,614.00
49 CARB	Advanced Technology Freight Demonstration Projects	\$ 4,466.00
40 CARB	Sustainable Transportation Equity Project	\$ 6,400.00
51 CA Department of Forestry and Fire Protection	Forest Carbon Plan Implementation	\$ 6,767.00
52 CA DOT	Active Transportation Program	\$ 163,934.00

Waste reduction projects could tap into \$4.6B in EPA, USDA climate grants

The EPA's massive Climate Pollution Reduction Grants program is making funding available for waste-related projects. The USDA also announced that new money is available for food waste reduction.

Published Sept. 22, 2023



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Maryland Department of the Environment

Randy Mosier



Maryland
Department of
the Environment



Maryland Commission on Climate Change (MCCC)

- Original Climate Change Commission established through Executive Order in 2007
 - Developed a 2008 Climate Action Plan that led to the 2009 GGRA
- GGRA reauthorized in 2016 with new goal of 40% GHG reduction by 2030
- MCCC codified in 2015, established a balanced, bipartisan Commission
 - Representatives from the Maryland General Assembly, state and local government, the private sector, environmental advocacy groups, labor, the general public & more
- Basic charge of the MCCC:
 - Provide recommendations on how to reduce GHG emissions and adapt to the impacts of climate change
 - Reducing leaking methane emissions has been a very high priority for the MCCC





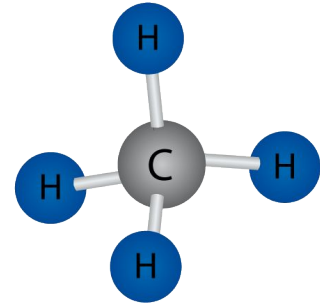
Climate Solutions Now Act of 2022

- Maryland now has the most ambitious GHG reduction goals of any state in the nation:
 - Reduce statewide GHG emissions 60% (from 2006 levels) by 2031
 - Achieve net-zero statewide GHG emissions by 2045
- 20-year global warming potential (GWP) for methane
 - More info on this on the next slide
- Landfill regulation is a critical measure for meeting the state's GHG reduction goals
- Building Energy Performance Standards
 - More on this soon



Methane Potency

- Climate Solutions Now Act of 2022 directs MDE to use the 20-year time horizon when considering the GWP of GHGs
- The 20-year GWP is now the standard measurement for evaluating progress towards Maryland's GHG reduction goals
- Methane is a super potent GHG
 - 28 times the warming impact of CO₂ over 100 years
 - Over 80 times the warming impact of CO₂ over 20 years





Maryland's 2020 GHG Inventory

MDE recently released the MD GHG Emissions Inventory for 2020

- The state reached 30% reduction from 2006
- New goals
 - 60% reduction by 2031
 - Net-zero by 2045

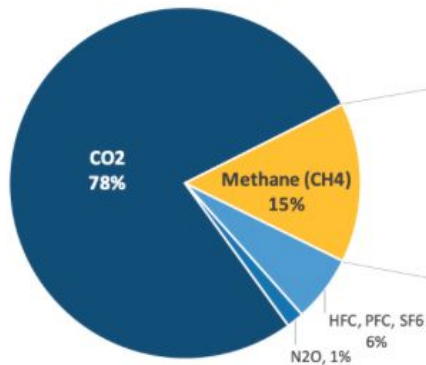
Methane makes up 15% of the state's GHG emissions

- Using the 20-year Global Warming Potential
- Methane = 84 times the warming impact of CO₂

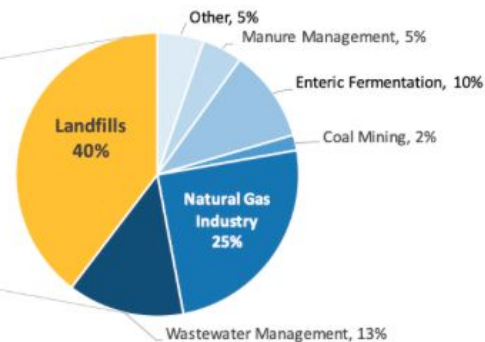
Landfills make up 40% of the state's methane emissions

- The largest methane emission source in the inventory

2020 MD Greenhouse Gas Emissions, % by gas
(total of 85.1 MMTCO₂e, using 20-year GWP)



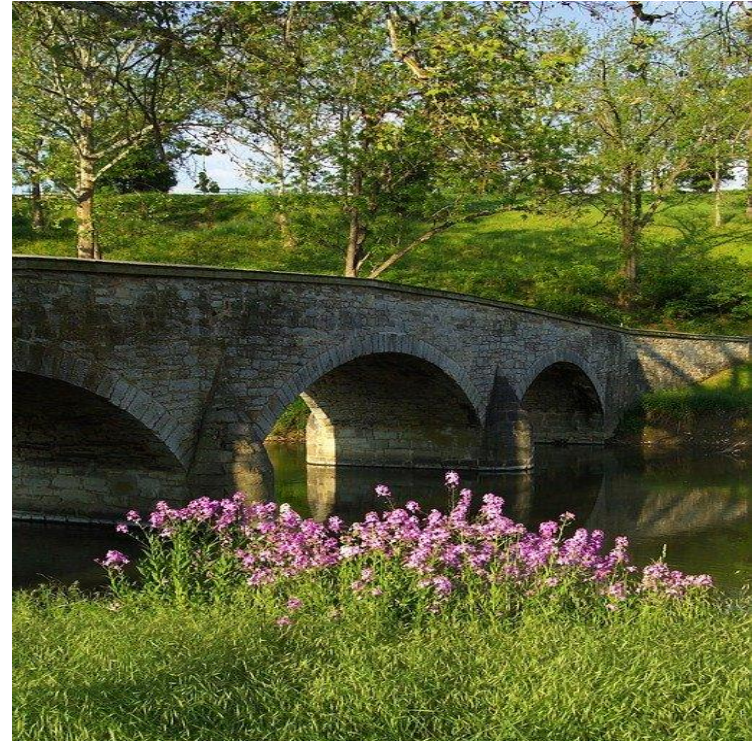
2020 MD Methane Emissions, % by source
(total of 12.5 MMTCO₂e, using 20-year GWP)





MDE's Regulatory Approach

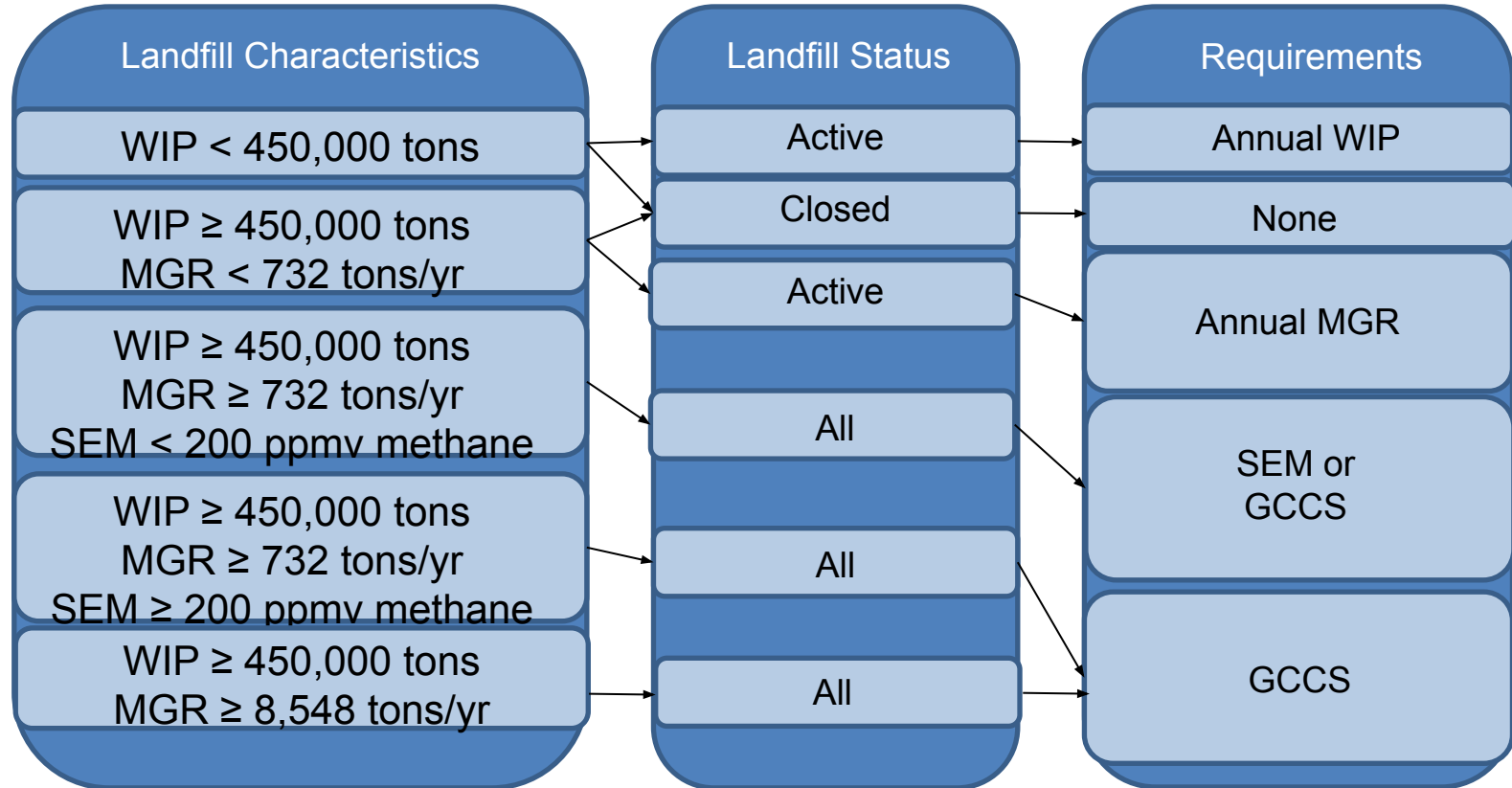
- Two basic drivers:
 - The new federal New Source Performance Standards (NSPS) and Emission Guidelines (EG) for MSW landfills
 - The need for additional requirements to minimize leaking methane emissions as part of the State's climate change efforts
- MDE looked at prior and current regulatory efforts on MSW landfills in other states



Source: <https://pixabay.com/photos/antietam-maryland-burnside-bridge-80552/>



Flowchart of Requirements for MSW Landfills





Estimated Emission Reductions

- Factors to consider when estimating methane gas emissions from landfills...
 - Landfill gas generation is a function of temperature, waste composition, landfill size, waste compaction, liners and covers, moisture content, pH level, etc.
 - Rate of landfill gas generation occurs in four phases – generation is greatest 5-7 years after waste is placed (Phase II), gas is produced for several decades (Phase III), and exponentially declines after cessation of waste placement (Phase IV)
- MDE anticipates a reduction in methane gas emissions as a result of increased monitoring, minimizing and fixing leaks, and increased methane capture
- MDE estimates a 25-50% reduction in landfill gas emissions (CO_2 and CO_2e methane – using a GWP of 28) from landfills subject to the proposed regulation when fully implemented

Clean Water Fund

Emily Ranson



Methane Solutions

A “yes and” approach to reducing methane emissions through food waste diversion

Emily Ranson
Chesapeake Director
Clean Water Fund
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Creative Solutions

- » Organic Diversion through large-scale generators
 - o Including diversion for human consumption, animal feed, source reduction
 - o Composting & anaerobic digestion
- » Behavior change through school food waste reduction
 - o Grants to fund infrastructure and education
- » Encouraging more procurement of compost as soil amendment

Creative Solutions

- » On-Farm Compost
 - o Facilitates substitution of synthetic fertilizer
 - o Encourages distributed network and small business development
 - o Farmers already compost manure
 - enables farmers to also accept off-site food scraps



Unique Allies

- » Food insecurity groups, Farmer, Environmentalists, Educators & Students, Small businesses



Challenge: No one regulator sees all benefits of composting

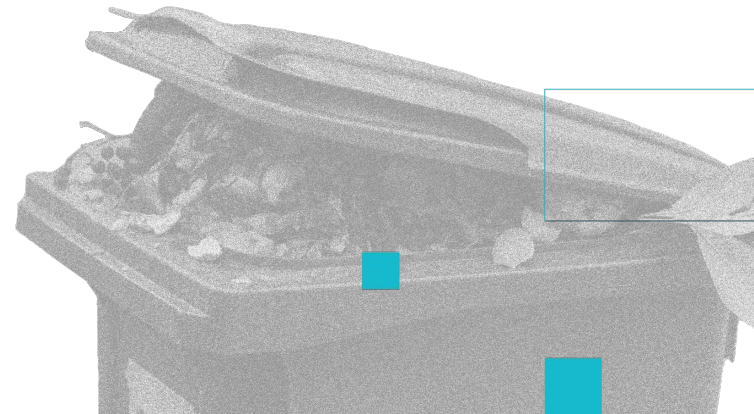
- o Agriculture
 - Compost as revenue stream
 - Soil health
 - Reducing farm costs □ compost as substitute for synthetic fertilizer
- o Air emissions □ Climate change
 - Through organic diversion from landfills
 - Through carbon sequestration in soils
 - Through shorter transportation demands if using distributed network (like smaller, on-farm sites)
- o Small business development
 - Allowing small business to enter increasingly consolidated waste market

Opportunities Abound!

- » Climate Pollution Reduction Grant: Priority Climate Action Plan & Implementation Grants
- » State and local climate action plans
- » State and local regional waste planning
- » Food and organic waste diversion that reaches everyone
- » Stronger state standards - better control waste in place emissions

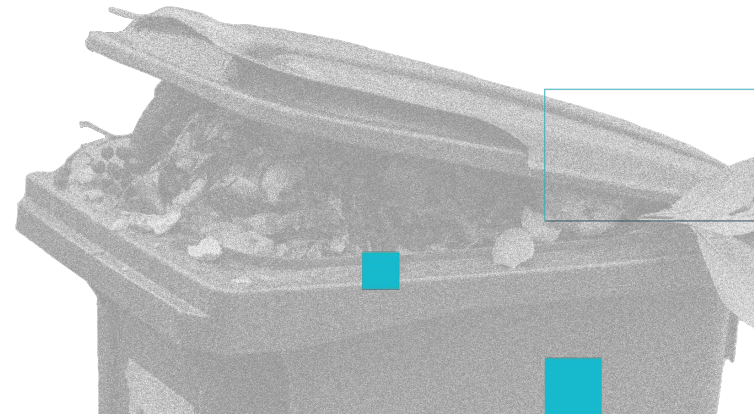
Discussion & Audience Questions

Please type your questions into the Q&A feature in Zoom.



Next Steps

- Additional webinars
- Guide on CPRG organic waste and landfill methane strategies



Thank You!

Slides and resources will be shared via email,
and you can reach us at:

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