

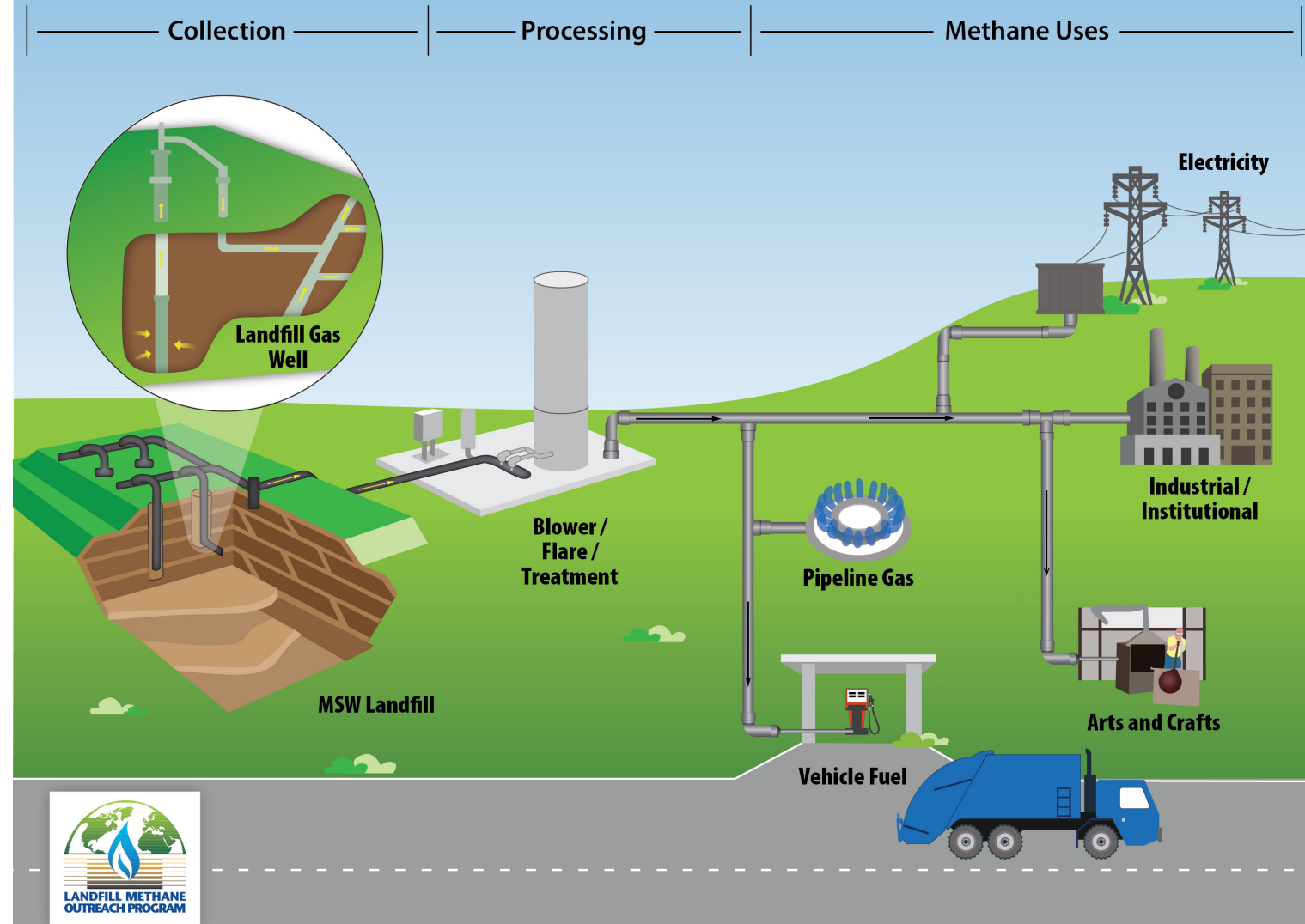


New Policies And Programs Impacting Landfill Methane Reduction and Avoidance

Lauren Aepli and Klara Zimmerman
U.S. Environmental Protection Agency

Agenda

- Introduction and LMOP Services
- New Initiatives and Policies
- Congressional Funding Actions
- Inflation Reduction Act Tax Credits
- Questions



Introduction and LMOP Services



About LMOP

- Established in December 1994
- Voluntary program that creates partnerships among states, energy users/providers, the landfill gas (LFG) industry and communities

Mission: Work cooperatively with industry & waste officials to reduce or avoid landfill methane emissions by encouraging the recovery & beneficial use of biogas generated from organic municipal solid waste.



**LANDFILL METHANE
OUTREACH PROGRAM**

Partnerships and Connections

- 1,000+ Partners: Industry, Energy, Community, State, and Endorser
 - Online directory with description, service or equipment type (Industry only), and points of contact
- LMOP sends listserv messages about landfill RFPs for LFG energy, funding opportunities from EPA and other topics related to LFG

Landfill Methane Outreach Program Listserv Messages

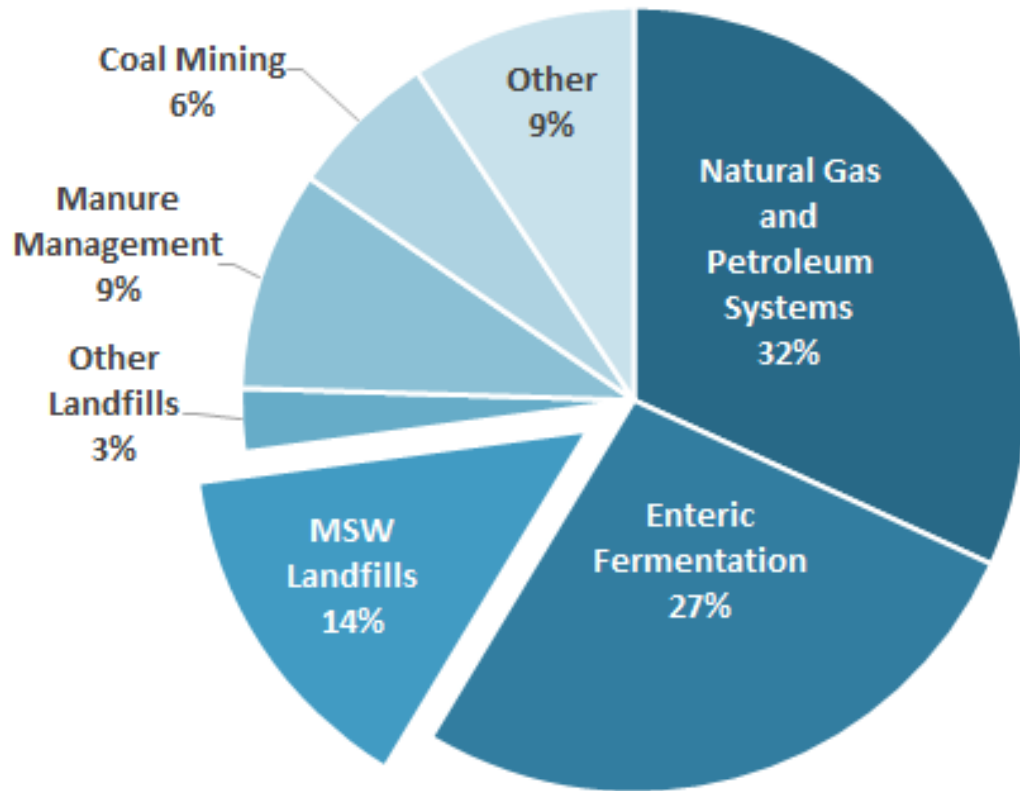
LMOP periodically notifies interested stakeholders about pertinent landfill-related information via its listserv. See below for recent listserv messages.

- [RFP for LFG Energy Project at SECCRA Landfill, PA \(pdf\)](#) (245.98 KB)
November 14, 2022
- [EPA Request for Applications - MSW Landfill Air Emissions Research \(pdf\)](#) (441.32 KB)
November 9, 2022
- [EPA's July 14th Webinar on Organic Waste Postponed \(pdf\)](#) (594.27 KB)
July 6, 2022
- [EPA Requests Information for New Materials Management Initiatives \(pdf\)](#) (394.87 KB)
June 29, 2022
- [June 14th Webinar about EPA Solid Waste Funding Opportunities \(pdf\)](#) (787.24 KB)
June 8, 2022
- [Webinars about New EPA Solid Waste Funding Opportunities: May 24 & 25 \(pdf\)](#) (907.84 KB)
May 24, 2022
- [NW Natural RFP for RNG – Deadlines in May \(pdf\)](#) (482.47 KB)
April 20, 2022

LMOP Listserv

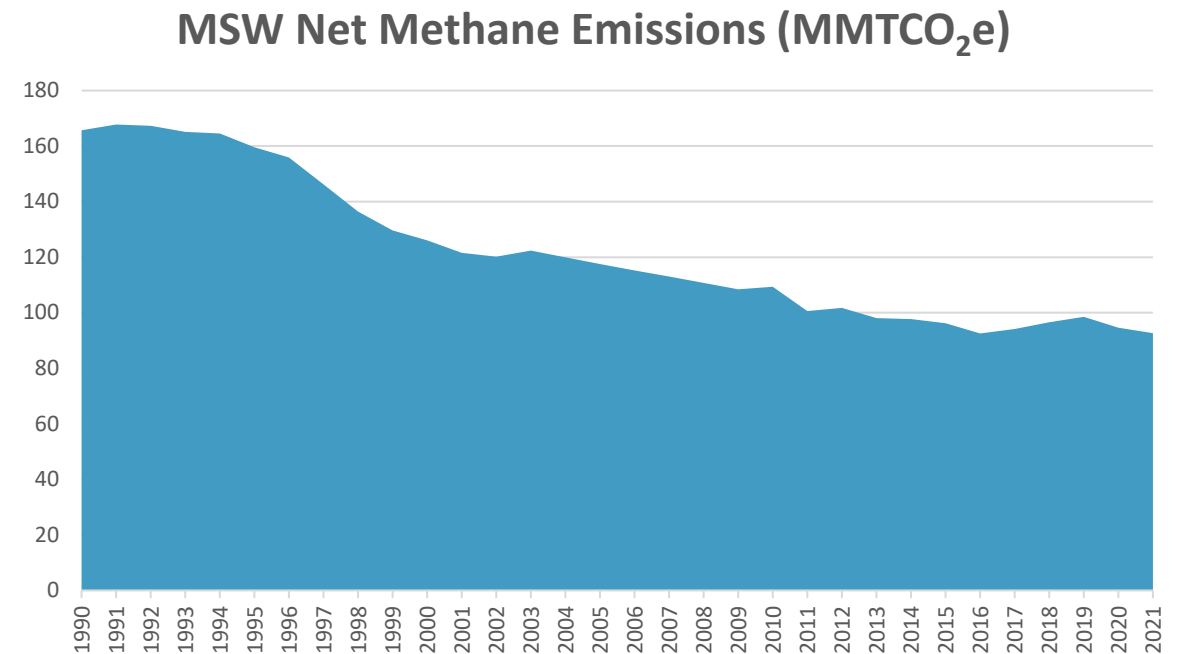
[Sign up to receive LMOP listserv messages.](#)

MSW Landfill Methane Emissions



From *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021*, public review draft

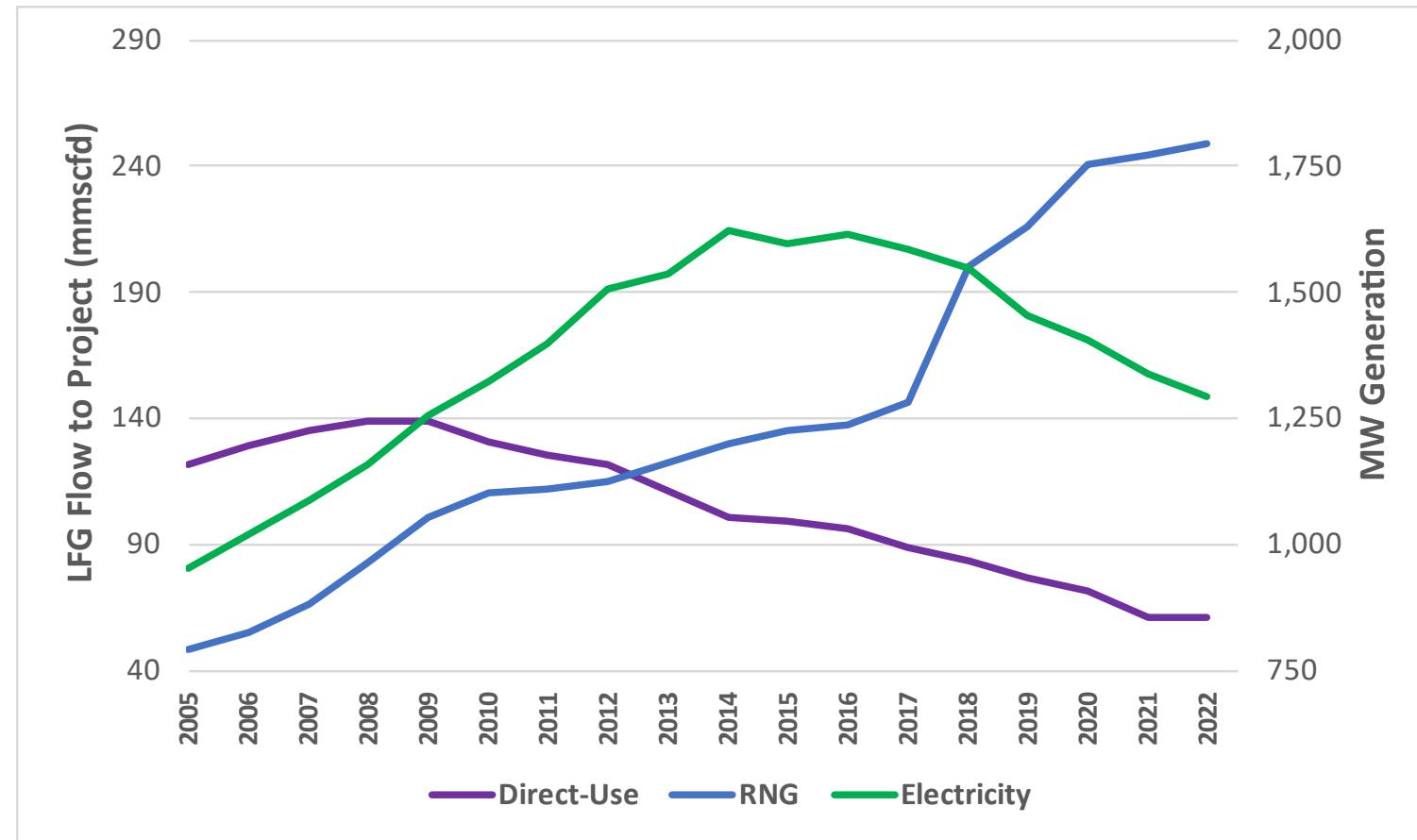
- Landfills remain third-largest source of anthropogenic methane in the United States



Preliminary data for 2021 from *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021*, Expert Review draft

LMOP and the LFG Energy Industry

- LFG-to-RNG upward trend is expected to continue
- LMOP database lists 80 RNG projects as under construction or planned for 2023–2025
- Most RNG projects provide at least some of the RNG for vehicle fuel use
- Several landfills have switched from electricity to RNG production in the last five years



Technical Assistance

- LMOP offers technical assistance to landfills and end users seeking LFG
 - Please contact us if interested in evaluation of cost and feasibility for voluntary LFG collection and energy recovery
 - We use our gas production and project cost estimate models



U.S. EPA Landfill Methane Outreach Program

Landfill Gas Energy Cost Model LFGcost-Web, Version 3.5

Summary Report

Landfill Name or Identifier: Example Landfill, USA
 LFG Energy Project Type: Onsite CNG Production and Fueling Station
 Date: Tuesday, February 14, 2023

Outputs:		Go to Report
Type of Output		Output Data
Economic Analysis:		
Design project size (ft³/min LFG)		600
Generating capacity for projects generating electricity (kW)		--
Average project size for projects NOT generating electricity: [based on actual LFG use]	(million ft ³ /yr LFG)	157.67
	(ft ³ /min LFG)	299.98
Average project size for projects generating electricity (kWh/yr)		--
Average project size for CHP projects producing hot water/steam (million Btu/yr)		--
Total installed capital cost for year of construction (\$)		\$5,485,500
Annual costs for initial year of operation (\$)		\$313,577
Internal rate of return (%)		49%
Net present value at year of construction (\$)		\$5,352,286
Years to Breakeven*		3

Data and Information Sharing

Data

- Downloadable spreadsheets of LFG energy projects or MSW landfills that may have energy potential
- Revised national map of landfills and projects with new layers for environmental justice demographic data and Tribal areas

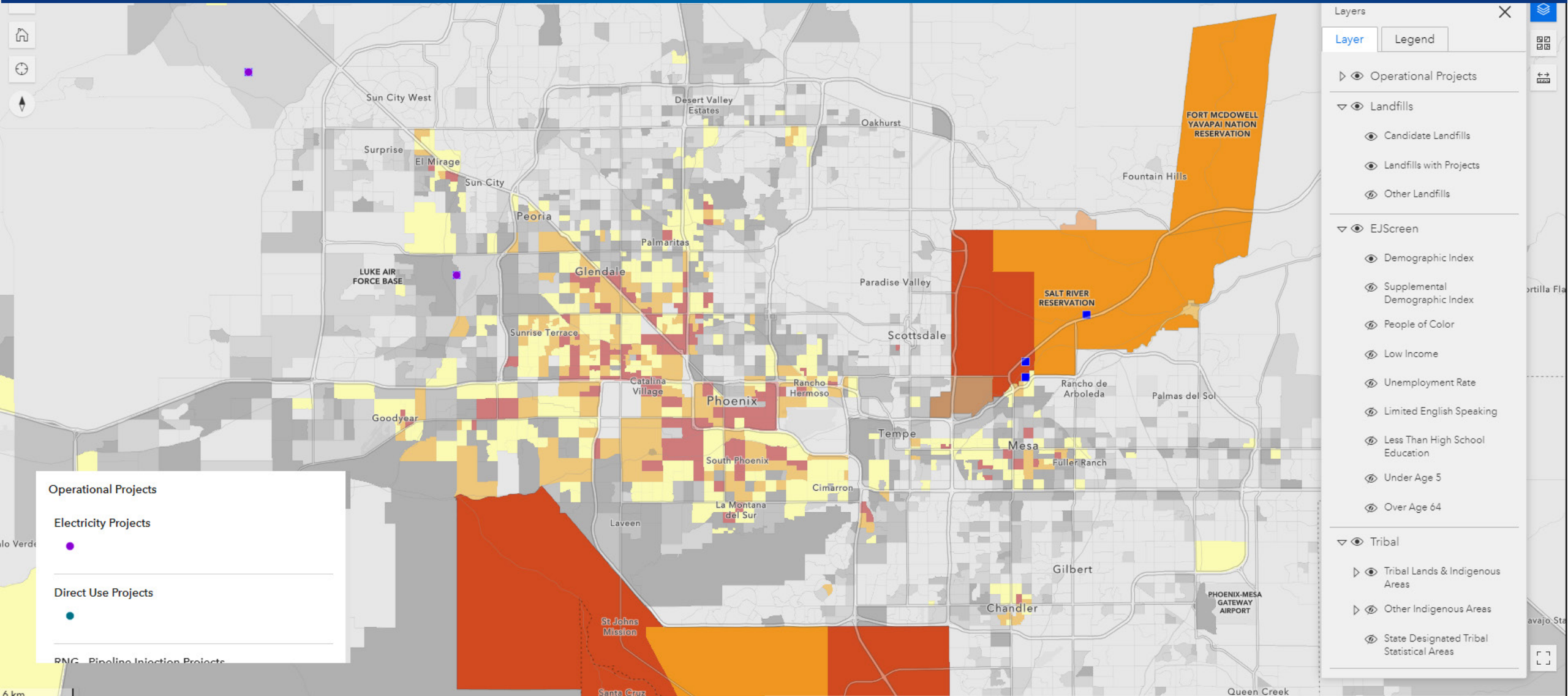
Documents

- *An Overview of Renewable Natural Gas from Biogas*
- *LFG Energy Project Development Handbook*
- *Downstream Management of Organic Waste in the United States: Strategies for Methane Mitigation*

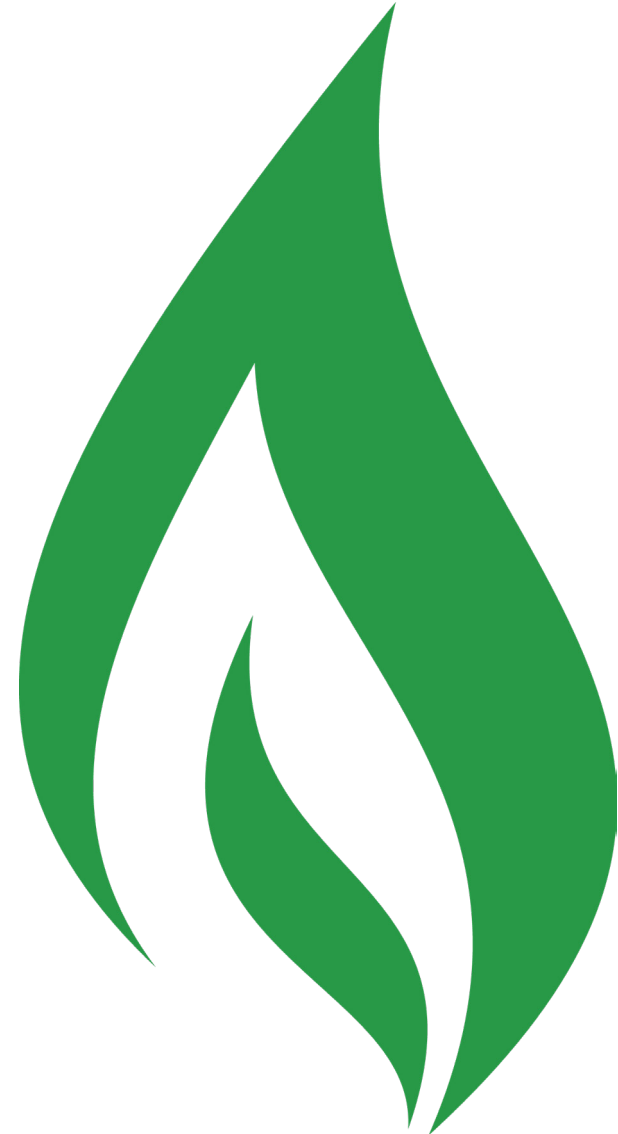
Webinars

- Past webinars posted on LMOP website: Leveraging untapped potential, LFG treatment, innovative project types
- Planning one or two webinars in 2023

LMOP Interactive National Map



New Initiatives and Policies



U.S. Methane Emissions Reduction Action Plan

- Landfill-specific goal in the Plan:
 - Increase the overall collection and destruction of U.S. landfill methane to at least 70 percent of the amount generated, by 2030
- Plan emphasizes LMOP as a key part of overall strategy to achieve this rate

www.whitehouse.gov/wp-content/uploads/2021/11/US-Methane-Emissions-Reduction-Action-Plan-1.pdf

THE WHITE HOUSE OFFICE OF DOMESTIC CLIMATE POLICY

U.S. METHANE EMISSIONS REDUCTION ACTION PLAN

CRITICAL AND COMMONSENSE STEPS TO CUT POLLUTION
AND CONSUMER COSTS, WHILE BOOSTING GOOD-PAYING
JOBS AND AMERICAN COMPETITIVENESS

NOVEMBER 2021

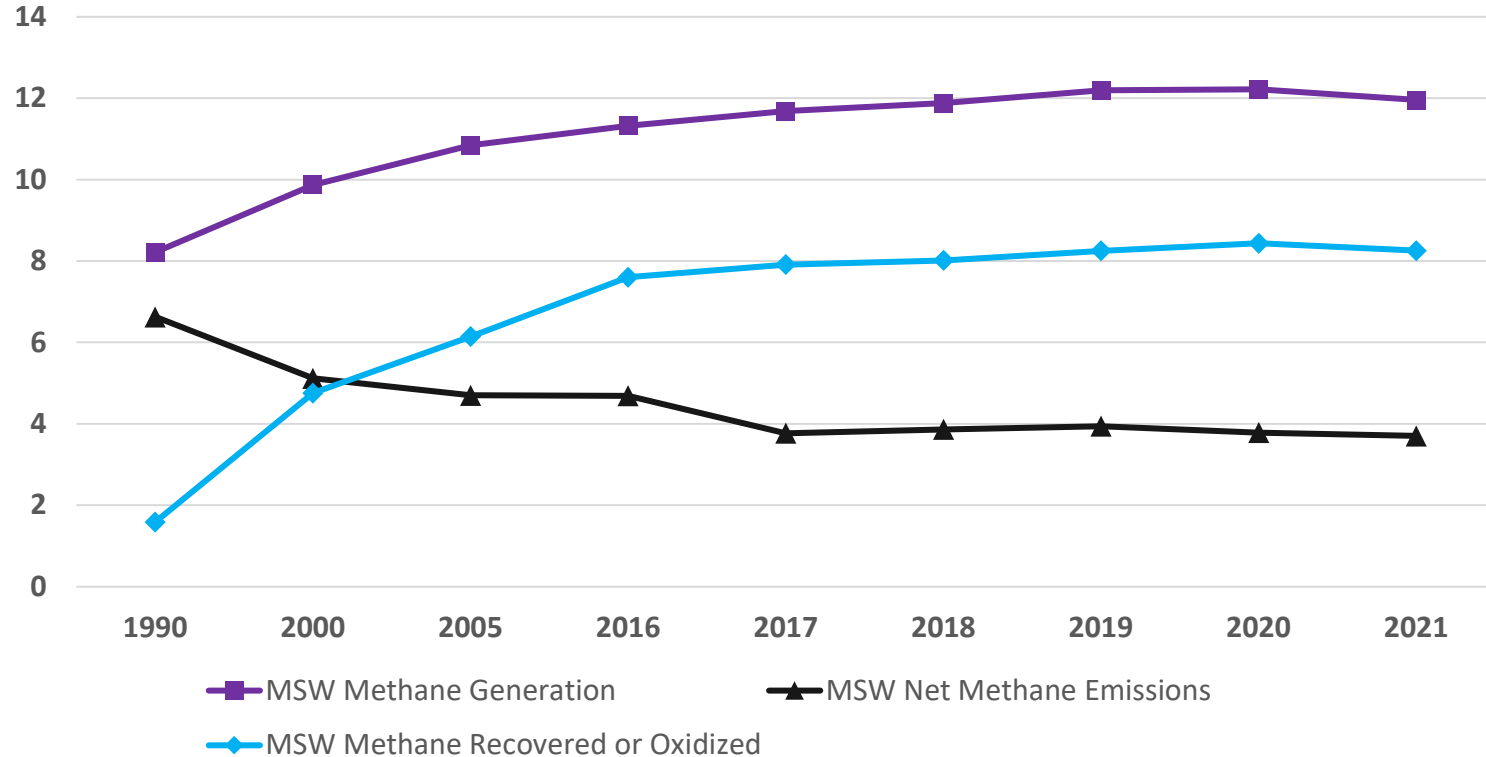


THE WHITE HOUSE
WASHINGTON

whitehouse.gov

U.S. MSW Landfill Methane Generation & Emissions

MSW Landfill Methane Generation, Recovery/Oxidation, and Emissions (MMT)



- After significant reductions through 2017, landfill methane emissions have stayed relatively constant since
- Further reductions in emissions are expected as lowered NSPS/EG regulatory threshold takes effect
- Primary goal of LMOP is to encourage non-regulated landfills to take voluntary action to reduce methane emissions

Global Methane Pledge (GMP)

- United States and ~150 other countries have signed the Pledge to reduce global methane emissions at least 30% from 2020 levels by 2030
- GMP Waste Pathway Components:
 - Enhancing Measurement and Tracking
 - Scaling up Subnational Action
 - Reducing Food Loss and Waste
 - Regional Platforms
 - Mobilizing Investment



GLOBAL METHANE ASSESSMENT: 2030 BASELINE REPORT

WHY ACT NOW: A NEW ERA FOR
ACCELERATED IMPLEMENTATION



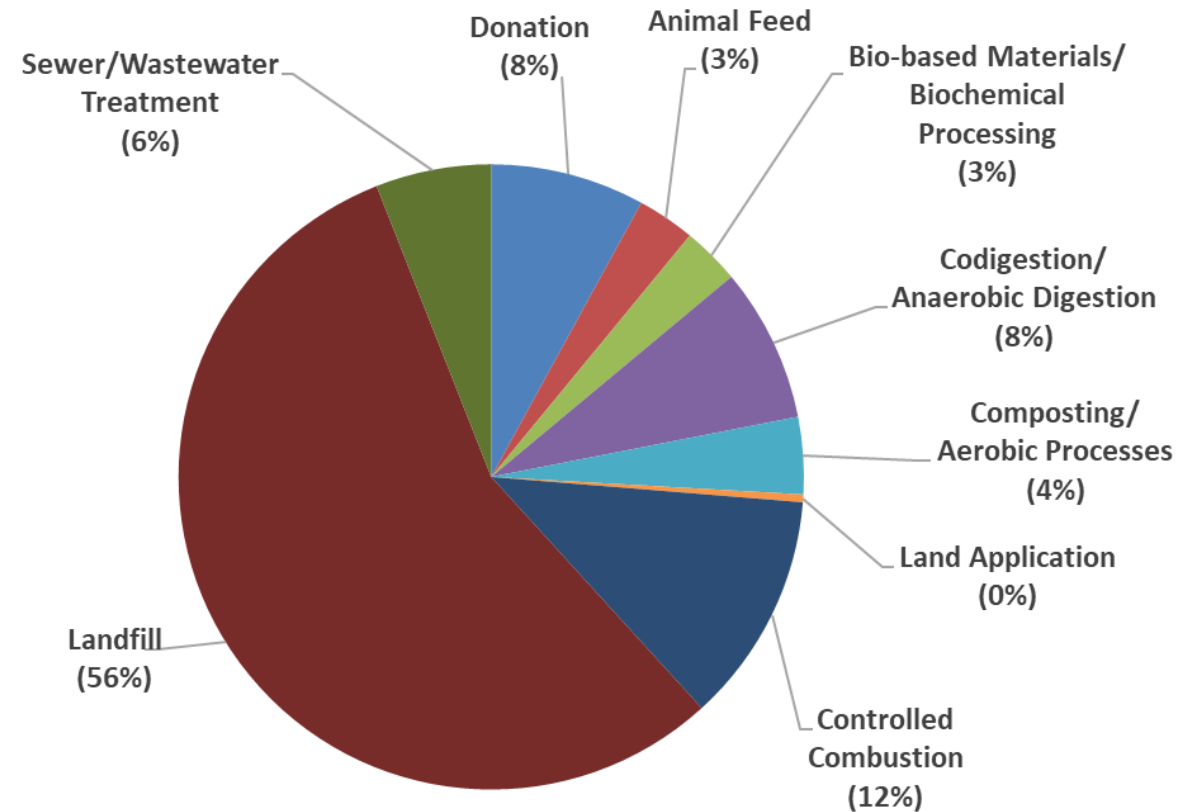
Food Loss and Waste Goal

- Interagency agreement to reduce food loss and waste by 2030
 - Focus is on households, retail, and food service sectors
- >85% of GHG emissions from landfilled food waste result from activities prior to disposal
- 30 to 40% of the food supply is not eaten in the United States
- Food Loss and Waste 2030 Champions program recognizes leaders in the food waste reduction effort
- Excess Food Opportunities Map creates connections between food waste generators and organizations that can use it



Current U.S. Food Waste Management

- In 2016, 328 lbs of wasted food per person was landfilled, combusted, treated, digested, composted, or applied to land
 - The majority (39.6 million tons) was landfilled
- The 2030 goal is 164 lbs per person, a 50% reduction from the 2016 baseline



Percentage Distribution of Wasted Food Management, from Households, Food Retailers, Food Wholesalers, 2018.

e-RINs Pathway for RNG

- EPA proposed new pathway for e-RINs in Dec. 2022: electricity made from LFG or anaerobic digester biogas for electric vehicles
- Previously RINs were limited to RNG for transportation fuel
- Public comment period ended Feb. 10th ; EPA likely to finalize rule later in 2023; e-RINs would not be generated until 1/1/24 at the earliest
- In its proposal, EPA:
 - Estimated that current biogas-derived electricity exceeds the amount needed for vehicles through 2025
 - Projected that new biogas electricity would not be generated in 2023–2025, rather just re-directed from non-transportation uses to transportation

Congressional Funding



Bipartisan Infrastructure Law – Grants

- Initial grants focus on recycling education/outreach and solid waste infrastructure
- Provided \$275 million for Solid Waste Infrastructure for Recycling (SWIFR) grants (\$55 million/year)
 - Eligible activities include source reduction, reuse, sending waste to material recovery facilities, composting, industrial uses, and feeding animals
- Several rounds of funding anticipated over the next decade, latest application phase ended in February
- ~40% of funding will be awarded to projects that benefit disadvantaged communities

epa.gov/infrastructure/bipartisan-infrastructure-law-transforming-us-recycling-and-waste-management

Inflation Reduction Act – Grants

- New: Climate Pollution Reduction Grants
 - \$5 billion for states, air pollution control agencies, Tribes, and local governments to develop and implement strong **greenhouse gas reduction strategies**
 - 2-stage program: apply for planning grants first, then implementation grants later
 - Planning grants are specifically for developing or updating climate plans
 - Upcoming deadlines: 4/28/23 and 6/15/23
- New: Low Emissions Electricity Program
 - \$68 million to fund activities to encourage low emissions electricity generation
 - Education, technical assistance, and partnerships with consumers, low-income and disadvantaged communities, industry, and state, local, and Tribal governments

epa.gov/inflation-reduction-act/climate-pollution-reduction-grants

Inflation Reduction Act – Grants

- New: Greenhouse Gas Reduction Fund - \$27 billion
 - ~\$20 billion to provide financial and technical assistance to projects that **reduce or avoid greenhouse gas emissions**, with an emphasis on those that benefit low-income and disadvantaged communities
 - EPA expects competition process for funding to start by summer 2023
 - EPA must award funding by 9/30/2024 epa.gov/greenhouse-gas-reduction-fund
- New: Environmental & Climate Justice Block Grants - \$2.8 billion
 - Advance projects like community-led air pollution monitoring, **prevention**, and remediation; climate resiliency and adaptation; and reducing indoor air pollution.
 - Two funding opportunities' first round of funding closed 4/14/23

epa.gov/inflation-reduction-act/advancing-environmental-justice

Inflation Reduction Act – USDA REAP

- Existing: USDA Rural Energy for America (REAP)- \$2 billion total
 - Eligible entities include rural small businesses and agricultural producers
 - Promotes rural or ag-related renewable energy including digesters
 - Eligible uses include biogas systems
 - Grants and guaranteed loans
 - 1st round: \$250 million from Inflation Reduction Act in addition to \$50 million from Farm Bill
 - Grant limit has been raised to not more than 50% of the project cost
 - Grants will be awarded through 9/30/31
 - Application deadlines vary based on type of funds

rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans



Durham McCormick, Jr.
McGuireWoods LLP
LMOP Industry Partner



Inflation Reduction Act & Tax Credits – Landfill Gas Collection and Energy Projects



SWANA SOAR 2023, April 19, 2023

Inflation Reduction Act – How We Got Here

- April 22, 2021 – President Biden announced U.S. goals to reduce greenhouse gas emissions
 - 50-52 percent reduction from 2005 levels in economy-wide net greenhouse gas pollution by 2030
 - Create a carbon pollution-free power sector by 2035
 - Create a net zero emissions economy by no later than 2050
- 100 percent carbon pollution-free electricity by 2035
- Reduce carbon pollution from the transportation sector
- Address carbon pollution from industrial processes
- Build Back Better failed to get passed in 2021
- Energy provisions of BBB were pulled out and became starting point for Inflation Reduction Act

Inflation Reduction Act – Tax Credits

- Inflation Reduction Act signed into law on August 16, 2022
- Aimed at Clean Energy Technologies
- Inflation Reduction Act extends, modifies and creates new Federal Tax Credits for the Energy Sector
- New Direct Pay Structure for Tax-Exempt Entities
- Direct Pay for First 5 Years of Hydrogen and Carbon Capture Credits
- Tax Credits can now be Directly Transferred to Buyers

Inflation Reduction Act Overview – Key Tax Credits

- **Section 45 (PTC)** – Wind, biomass, municipal waste, landfill gas, incremental hydro, marine and hydrokinetic
 - Restored to a 100% PTC
- **Section 48 (ITC)** – Solar, geothermal, fuel cell, offshore wind and CHP
 - Restored to a 30% ITC for solar projects
 - Can elect ITC in lieu of PTC
 - Expanded to include biogas (RNG) and energy storage
- **New Section 45Y (PTC) and Section 48E (ITC)**
 - Can elect a 100% PTC or 30% ITC for zero emission electric facilities (technology neutral)
 - Through at least 2033
- **Section 45Q (PTC)** – Carbon Capture and Sequestration
 - Increased to \$85 per metric ton for direct sequestration, \$60 for enhanced oil recovery (EOR) or other commercial utilization and \$130 or \$180 for direct air capture
- **New Section 45V** – PTC for Clean Hydrogen
- **New Section 45Z** – Clean Fuels Production Credit

New Prevailing Wage & Apprenticeship (PWA) Requirements

- Tax Credit Structure requires payment of local prevailing wage and use of apprentice labor – 10% apprenticeship labor in 2022 (begin construction), 12.5% in 2023 and 15% thereafter
 - Failure results in 80% reduction to the PTC or ITC
 - Applies to construction and major maintenance/repair during PTC period or ITC recapture period
- Failures can be cured without jeopardizing PTC/ITC
- Exempt if:
 - 1) Less than 1 MW
 - 2) Begin construction before January 29, 2023
- Waiting for further IRS guidance regarding PWA compliance
 - How to document? Should this follow Davis Bacon Act?
 - Potential de minimis exemptions
 - Best practices exemptions?

New ITC for Renewable Natural Gas (48 ITC)

- 30% ITC for RNG projects
- Must begin construction before the end of 2024
- Do not need to produce electricity
- Biogas needs to have at least 52% methane by volume
- Cannot be flare gas
- Consider safe harboring projects to qualify for ITC before the end of 2024
- PWA requirements apply

New PTC for Clean Hydrogen (45V PTC)

- \$0.60 to \$3.00 per kg of hydrogen produced for the first 10 years
 - 2.5 kg of CO₂ equivalent minimum
 - 0.45 kg of CO₂ equivalent for maximum credit
- PWA requirements apply
- Must begin construction before the end of 2032
- RNG allowed for life cycle analysis
- Can elect to claim 30% ITC in lieu of 10-year PTC
- Can take direct pay for first 5 years

New PTC for Clean Fuel Production (45Z PTC)

- Applies to transportation fuel “suitable for use in a highway vehicle or aircraft”
- Up to \$1.00 credit per gallon for non-aviation fuel
- Up to \$1.75 per gallon for non-aviation fuel
- To qualify, the fuel needs an emission rate of not more than 50 kg of CO₂e per MMBTU (emission rates to be calculated in GREET) – LFG would likely qualify as would other types of biogas-derived transportation fuels
- Credits scales down for each kg of CO₂e per MMBTU above zero and below 50
- PWA requirements apply

45Q – Carbon Capture

- PTC is increased
 - \$60 per metric ton for CO₂ utilized on EOR or for a commercial purpose
 - \$85 for direct storage
 - Direct air capture qualifies for \$130 per metric ton of CO₂ (commercial utilization) or \$180 per metric ton of CO₂ (geological storage)
- Electric facilities qualifying minimum is reduced to 18,750 metric tons, but have to capture at least 75% of carbon emissions
- 12-year PTC
- First 5 years qualifies for direct pay
- Tax credit transfer rules apply
- PWA rules apply

Direct Pay

- Tax Exempt Entities can claim a refundable ITC or PTC
- 501(c)(3) entities, state or local entities (PUD, Muni), TVA, Tribal governments, Alaska native corporations, electric cooperatives
- Will file a “dummy” tax return to claim the tax credit refund
- 45Q (Carbon Capture) and Clean Hydrogen (45V) get 5 years of direct pay and don’t have to be tax exempt
- Domestic content requirements must be met for direct pay if project begins construction after 2024 or be less than 1 MW –
 - 45, 45Y, 48 and 48E credits only
 - 10% reduction in 2024, 15% reduction in 2025 and 100% after 2025 if no U.S. content
 - 100% U.S. steel and iron
 - 40% U.S.-manufactured content through 2024, then increasing to 55% in 2027 (5% annually)
 - Exception if increases cost by more than 25% or not manufactured in U.S.

Transfers of Tax Credits

- Game changer for financing – will see many renewable projects move to traditional project financing structures, with ITC/PTC revenue contracts
- Congress specified – single transfer for cash payment
 - Congress did not specify timing for payment
- Begins for 2023 tax credits
- How will markets develop?
- What will buyers require?
 - Indemnities – ITC/PTC qualification
 - Guaranties – Credit worthy sellers vs. everyone else
 - Recapture questions (disservice by Congress)
 - Tax insurance policies might play bigger role
- Traditional tax equity markets will still serve a purpose (i.e., depreciation, upfront capital payments are larger)

Key Take Aways

- 100% PTC and 30% ITC for zero emission energy projects is extended through 2033
- PWA labor requirements
- PTCs and ITCs are transferable
 - But what will market look like?
- 501(c)(3), Co-ops and Munis can qualify for direct pay
- RNG qualifies for an ITC even when the gas is not used to produce electricity (begin construction before 2025 requirement)
- Can also get a clean fuel PTC for 2025 and 2026 production
- New 10-year PTC for clean hydrogen production

Connect with Us

Lauren Aepli
aepli.lauren@epa.gov

Klara Zimmerman
zimmerman.klara@epa.gov

SOAR 2023 Exhibit Space #326

epa.gov/lmop



Questions