

EPA LMOP Session: Partnership Opportunities



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LMOP Update

Lauren Aepli and Ellen Meyer

U.S. Environmental Protection Agency
Landfill Methane Outreach Program



LMOP & LFG Energy Project Trends

LMOP's 25th Anniversary!

U.S. EPA's Landfill Methane Outreach Program (LMOP):

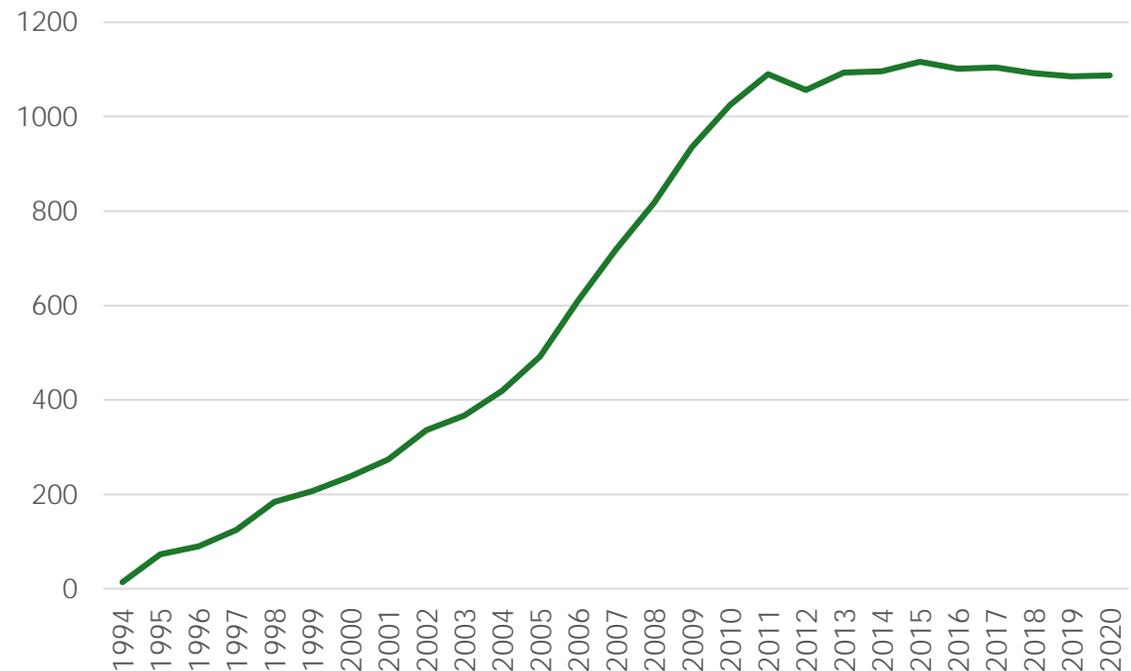
- Established in 1994
- Voluntary program that creates partnerships among landfill owners and operators, states, municipalities, energy users and providers, and the LFG industry and communities

Mission: To work cooperatively with industry and stakeholders to reduce or avoid methane emissions from landfills by encouraging the recovery and beneficial use of biogas generated from organic municipal solid waste.

LMOP's 25th Anniversary

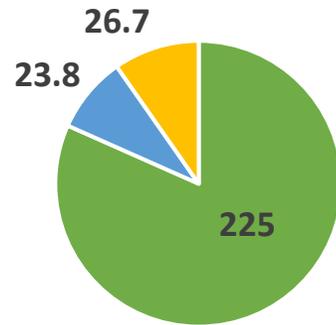
- New partnership categories: Community, State, Endorser
- In 1994:
 - 137 LFG energy projects
 - 750 possible LFG energy projects
- In 2020:
 - 564 LFG energy projects
 - 1,106 possible LFG energy projects

Number of LMOP Partners

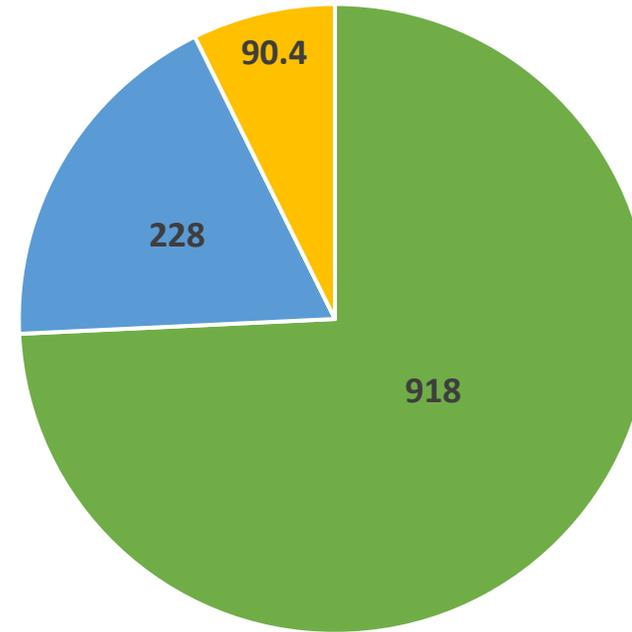


LMOP's 25th Anniversary

Total LFG Flow to Project by Category (mmscfd)



~275 total
in 1994



~1,236 total
in 2019

Electricity

Direct-Use

RNG

LMOP Partners

There are more than 1,000 LMOP Partners

Benefits of LMOP Partnership:

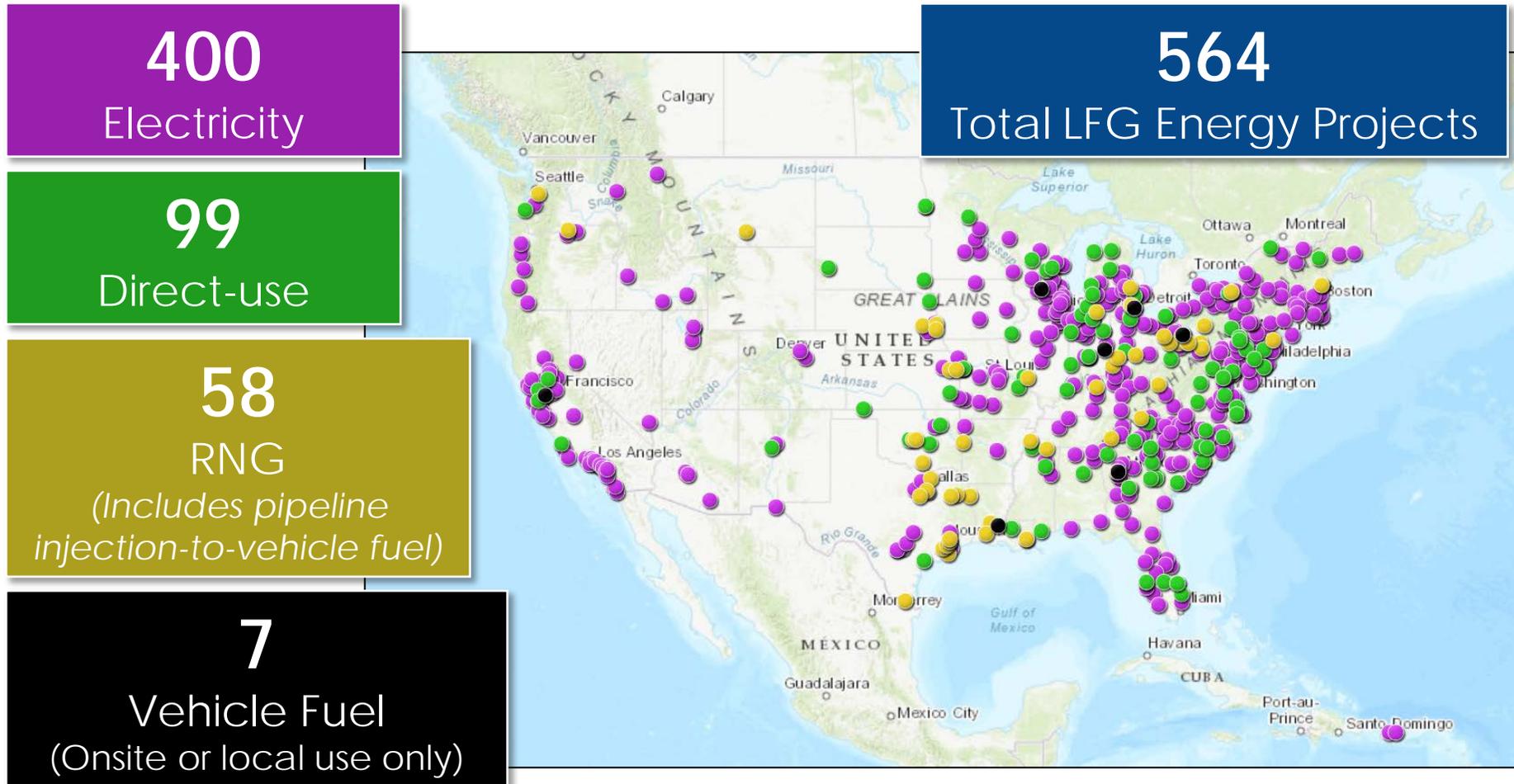
- Topical listserv messages
- Answers to technical questions
- Technical and outreach publications, tools and resources
- Project and candidate landfill data
- Support for ribbon-cutting materials
- Use of the LMOP logo (in accordance with guidelines)

To join the Partnership, visit our website at:
www.epa.gov/lmop/join-landfill-methane-outreach-program

New Partners Who Joined in 2019

COMMUNITY PARTNER	Waste Commission of Scott County, IA
ENDORSER	Renewable Energy Institute
INDUSTRY PARTNERS	Biomass Green Fuels LLC. Capital DCS Carbonoro B.V. Enource, LLC InsightFuel Mapro International NewGen LLC TerraTek Engineering Group, PSC

U.S. LFG Energy Project Types



*LFG energy project count from LMOP's Landfill and Landfill Gas Energy Database as of March 2020

New 2019 LFG Energy Projects & Expansions



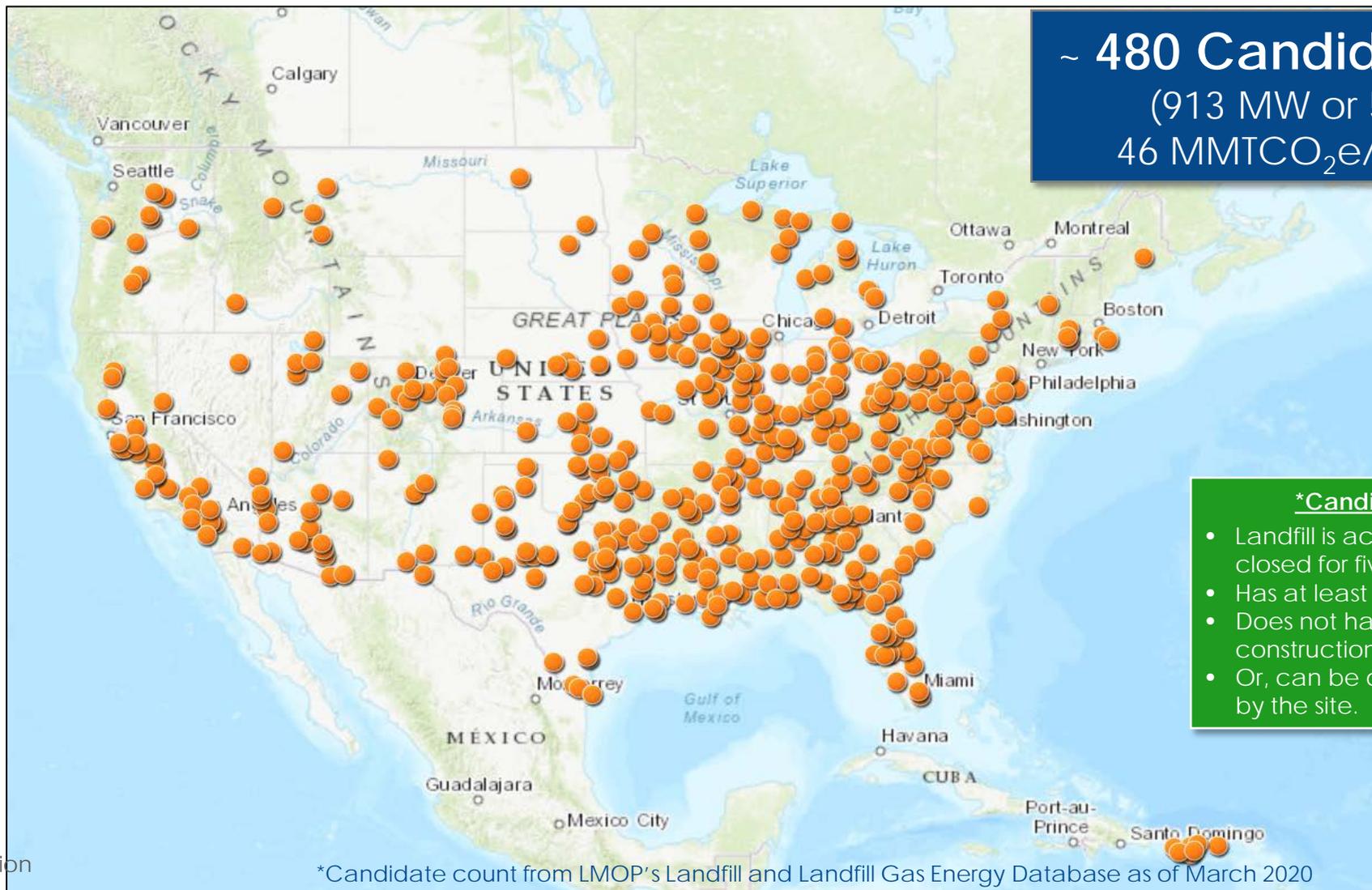
*Based on data from LMOP's Landfill and Landfill Gas Energy Database as of March 2020



LFG Energy Project Snapshot



LMOP Candidate Landfills



~ 480 Candidate Landfills*
(913 MW or 507 mmscfd,
46 MMTCO₂e/year Potential)

- *Candidate Landfill Definition**
- Landfill is accepting waste or has been closed for five years or less,
 - Has at least one million tons of waste, and
 - Does not have an operational, under-construction or planned project.
 - Or, can be designated based on interest by the site.

*Candidate count from LMOP's Landfill and Landfill Gas Energy Database as of March 2020



LMOP Tools and Resources

LMOP Tools and Resources



Data

- Excel files and GIS map
- LFG energy projects
- Candidate landfills



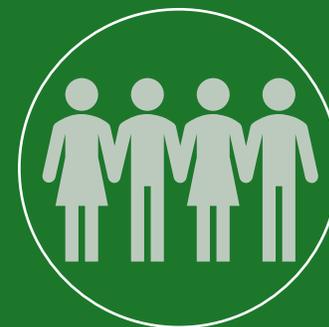
Tools

- LFGcost-Web
- RNG Flow Rate Tool
- LFG Energy Benefits Calculator
- Conversion Tool



Technical Publications

- Project Development Handbook
- Fact sheets



Network

- Webinars
- 1,000+ Partners
- Listserv messages



LMOP Project Development Handbook

2 NEW chapters available now



7. Best Practices for Landfill Gas Collection System Design and Installation



8. Best Practices for Landfill Gas Collection System Operation and Maintenance

Biogas Toolkit: Coming Soon!

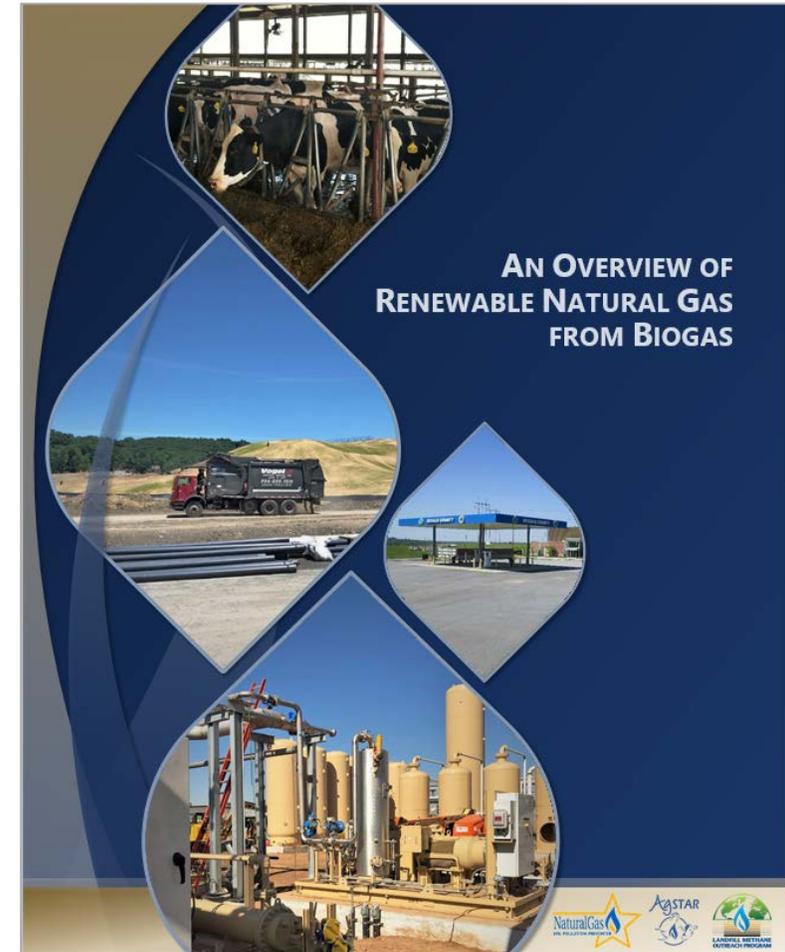
- A web-based toolkit with over 25 tools and resources to facilitate biogas project development
- Roadmap for planning and implementing biogas projects and quantifying economic and environmental impacts
- Audience: Project implementers, developers, financiers and policymakers

7 Steps for Biogas Projects



Resource Paper on RNG: Coming soon!

- Intended as a resource to promote and potentially assist in the development of RNG projects.
- Summarizes existing RNG projects in the U.S. and the potential for growth from the main biogas feedstock sources.
- Provides technical information on how raw biogas is upgraded into RNG and ultimately delivered and used by consumers.
- Addresses barriers, policies and incentives related to RNG project development.



LMOP Database of Landfills and Projects

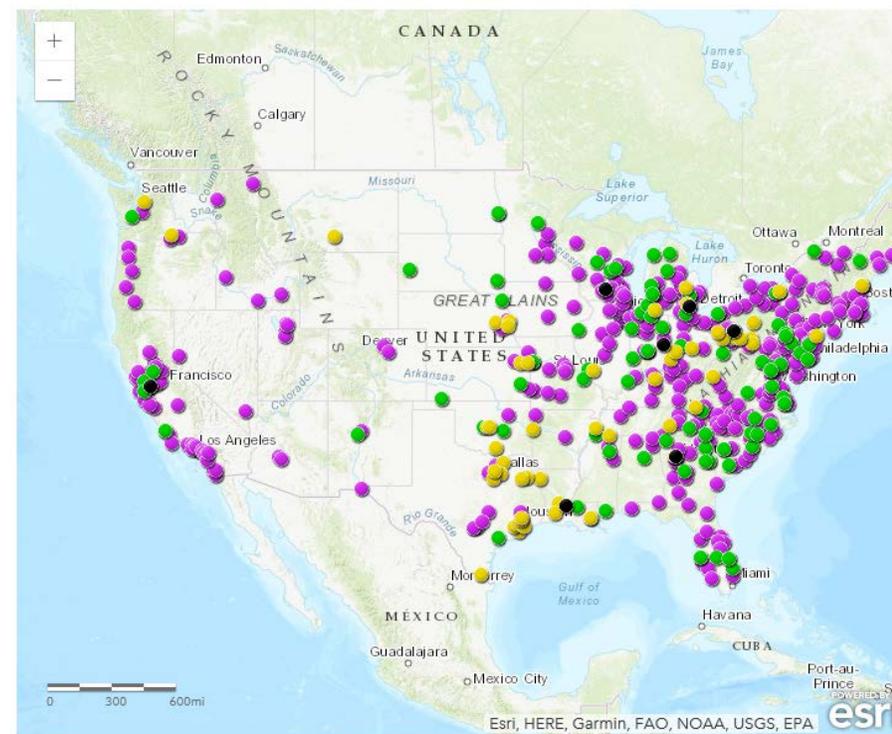
- Recognizes LMOP Partner accomplishments and leadership in LFG energy
- Highlights LMOP Partner achievements in generating renewable energy and reducing methane emissions
- Data files are available to download for 2,600+ MSW landfills and 564 operational projects



See the project and landfill data highlights on a map on our website: www.epa.gov/lmop

National Map of LFG Energy Projects

Landfills in 48 states and 1 U.S. territory provide LFG for producing electricity, heat, pipeline-quality gas or vehicle fuel. The interactive map below shows the locations of all currently operational LFG energy projects in the United States. [View a larger version](#) to access the map's full functionality.



● Electricity ● Direct Use ● RNG - pipeline injection ● RNG - local use

LMOP Partner Reporting 2019

- Outcome:
 - 58 LMOP Partners participated in 2019
 - LMOP received updates for **nearly 350 LFG energy projects**
 - LMOP data files on the LMOP website include these updates
- Moving forward:
 - LMOP will request data updates from Partners annually
 - Information about 2020 LMOP reporting will be provided in late summer
- Partner reporting improves the quality of the LMOP Database – **thank you for your participation!**



e-GGRT is a web-based system for annual reporting to the Greenhouse Gas Reporting Program (40 CFR Part 98)

Recognition of Participation in 2019 LMOP Partner Reporting

Ameren Corp. ♦ Anne Arundel County Bureau of WM Services, MD ♦ APTIM ♦ Aria Energy
Bartholomew County SWMD, IN ♦ Biogas Energy Solutions ♦ Biomass Green Fuels
Blue Ridge Landfill Company ♦ Broadrock Renewables ♦ Brown County Port & SWD, WI
Cape May County MUA, NJ ♦ Casella Waste Systems ♦ Catawba County, NC
Chautauqua County, NY ♦ City of Columbia, MO ♦ City of Lawton, OK ♦ City of Richmond, IN
City of Springfield, MO ♦ Coastal Environmental Partnership, NC
CommonWealth Resource Management Corp. ♦ County of Fairfax, VA ♦ County of Frederick, VA
Dalton-Whitfield Regional SWMA, GA ♦ Decatur/Morgan County Regional Landfill, AL
DTE Biomass Energy ♦ Dubuque Metropolitan Area SWA, IA ♦ East Kentucky Power Cooperative
Enerdyne Power Systems ♦ Golden Triangle Regional SWMA, MS ♦ Greenfield Energy
Greenwood County Public Works, SC ♦ Gundersen Health System ♦ Indiana DEM
JEA ♦ Johnson Controls ♦ Kimberly-Clark Corporation ♦ Landfill Gas Technologies
Lee County SWD, FL ♦ Lycoming County RMS, PA ♦ Minnesota Pollution Control Agency
Monroe County SWMD, IN ♦ Montauk Energy ♦ Morrow Renewables
Orlando Utilities Commission ♦ PEI Power ♦ Prince William County, VA
Sanitation Districts of Los Angeles County, CA ♦ Santa Cruz County, AZ ♦ Santee Cooper
Sarasota County, FL ♦ SWA of Central Ohio ♦ Southern Oklahoma Regional Disposal, OK
Tennessee Valley Authority ♦ Trans-Jordan Cities, UT ♦ Vogel Disposal Service ♦
Waste Commission of Scott County, IA ♦ Waste Management ♦ Windham SWMD, VT

Thank You!

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