

Why Harvest Landfill Gas?



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Swarupa Ganguli

Project Manager

U.S. Environmental Protection Agency

Landfill Methane Outreach Program (LMOP)





EPA's Landfill Methane Outreach Program

- Established in 1994
- Voluntary program that creates alliances among states, energy users/providers, the landfill gas industry, and communities

Mission: To reduce methane emissions by lowering barriers and promoting the development of cost-effective and environmentally beneficial landfill gas energy (LFGE) projects.





Why EPA is Concerned about Landfill Gas

- Why is methane a greenhouse gas?
 - Methane absorbs terrestrial infrared radiation (heat) that would otherwise escape to space (GHG characteristic)
- Methane as GHG is over 20 times more effective in trapping heat in the atmosphere than CO₂
- Methane is more abundant in the atmosphere now than anytime in the past 400,000 years and 150% higher than in the year 1750
- Landfills were the second largest human-made source of methane in the United States in 2006, accounting for 23% generated.





Landfill Gas and *Green Power*

A Winning Combination

- Dual benefit → destroys methane and other organic compounds in LFG
- Offsets use of nonrenewable resources (coal, oil, gas) reducing emissions of
 - SO_2 , NO_x , PM, CO_2
- LFG is a recognized renewable energy resource
 - Green-e, EPA Green Power Partnership, 28 states, Sierra Club, NRDC
- LFG is generated 24/7 and projects have online reliability over 90%
- LFG can act as a long-term price and volatility hedge against fossil fuels





LFG Electricity Emission Reduction Benefits (lb/MWh)

Emission Type	NO_x	SO₂	Mercury
Weighted Average for All LFG Electricity Generating Technologies	2.13	0.17	3.40 x 10⁻⁶
National Grid Average for Emitting Sources	2.83	7.47	35.5 x 10⁻⁶
National Grid Average for All Sources	2.10	5.44	26.9 x 10⁻⁶

Sources: LFG from AP-42; Grid averages from eGRID





Local Economic Benefits

- LFG as a business development or retention strategy
- Job creation during construction and operation
- Local contractor use (concrete, grading, electrical, mechanical)
- Collateral benefits (lodging, food)





Corporate Interest in LFG Energy

- Pipelines stretching – Honeywell connected to WM landfill by 23-mile pipeline
- LFG a cheaper fuel source and long term hedge against energy price volatility
 - General Motors' current 4 direct-use projects save the company a total of over \$2 million/yr
 - BMW expanded its project based on success and is saving over \$1 million/yr
 - NASA saving taxpayers more than \$350,000/yr
- Requests from >20 large, national companies to identify landfill opportunities
- Siting new facilities near landfills
 - Multiple requests received in the last year to find appropriate sites for NEW brick plants, greenhouses, etc.





Potential LFG Revenue

- Electric projects
 - Sale of electricity
 - Sale of Renewable Energy Certificates (RECs)
 - Premium pricing for renewables through RPS/RPG or voluntary green power markets
 - Tax credits & incentives
 - Clean Renewable Energy Bonds (CREBs)
- Direct-use projects
 - Sale of LFG
- Both
 - Greenhouse gas emissions trading
 - Energy cost savings





GHG Emissions

- Landfills are valued provider of GHG offsets to the market.
- Can provide additional revenue stream for LF owners
- Voluntary Markets
 - Currently where most GHG activity occurs
 - Very active. The average price in 2007 was approximately \$6.00 per ton of CO₂e
 - 100 cfm average flow over 1 year results in approximately 10,000 tons of CO₂e reduction (voluntary GCCS)
- Compliance Markets
 - Rapidly evolving, may become the dominant market





LFG and RECs

- Renewable Energy Certificates (RECs).
REC = 1 MW hour of renewable energy
- Used by utilities to meet RPS requirements
- Companies looking to reduce their environmental footprint purchase RECs from power producers using LFG
 - DuPont – 170 million kWh from biomass & LFG
 - Pitney Bowes – 10% of electricity from wind & LFG
 - Staples – 46 million kWh/year of RECs, 90% from biomass & LFG





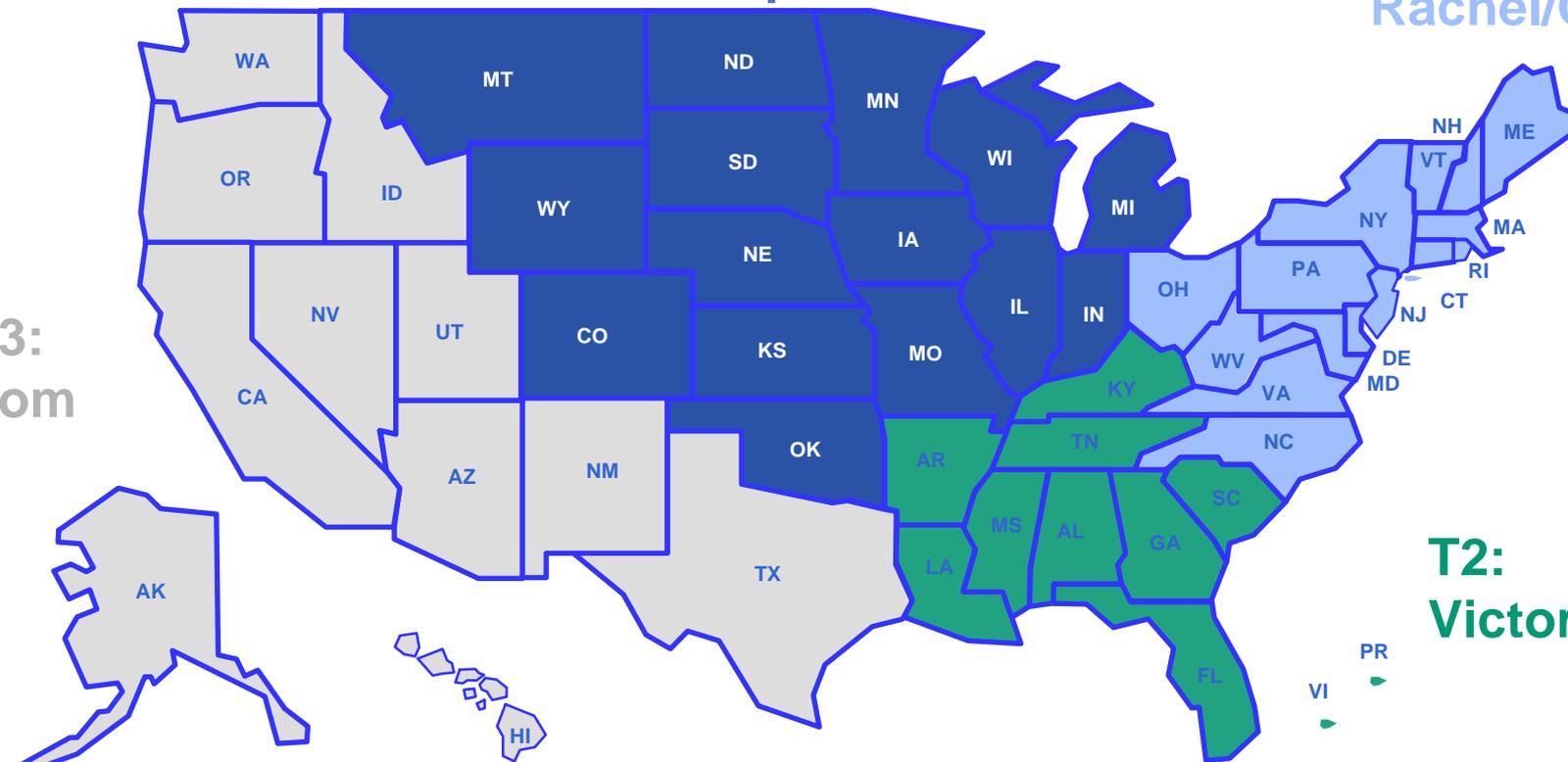
Your LMOP...

www.epa.gov/lmop

T4: Swarupa

T1:
Rachel/Chris

T3:
Tom



T2:
Victoria

Tom Frankiewicz

frankiewicz.thomas@epa.gov

(202) 343-9232

Rachel Goldstein

goldstein.rachel@epa.gov

(202) 343-9391

Victoria Ludwig

ludwig.victoria@epa.gov

(202) 343-9291

Swarupa Ganguli

ganguli.swarupa@epa.gov

(202) 343-9732

Chris Godlove

godlove.chris@epa.gov

(202) 343-9795