

MAP

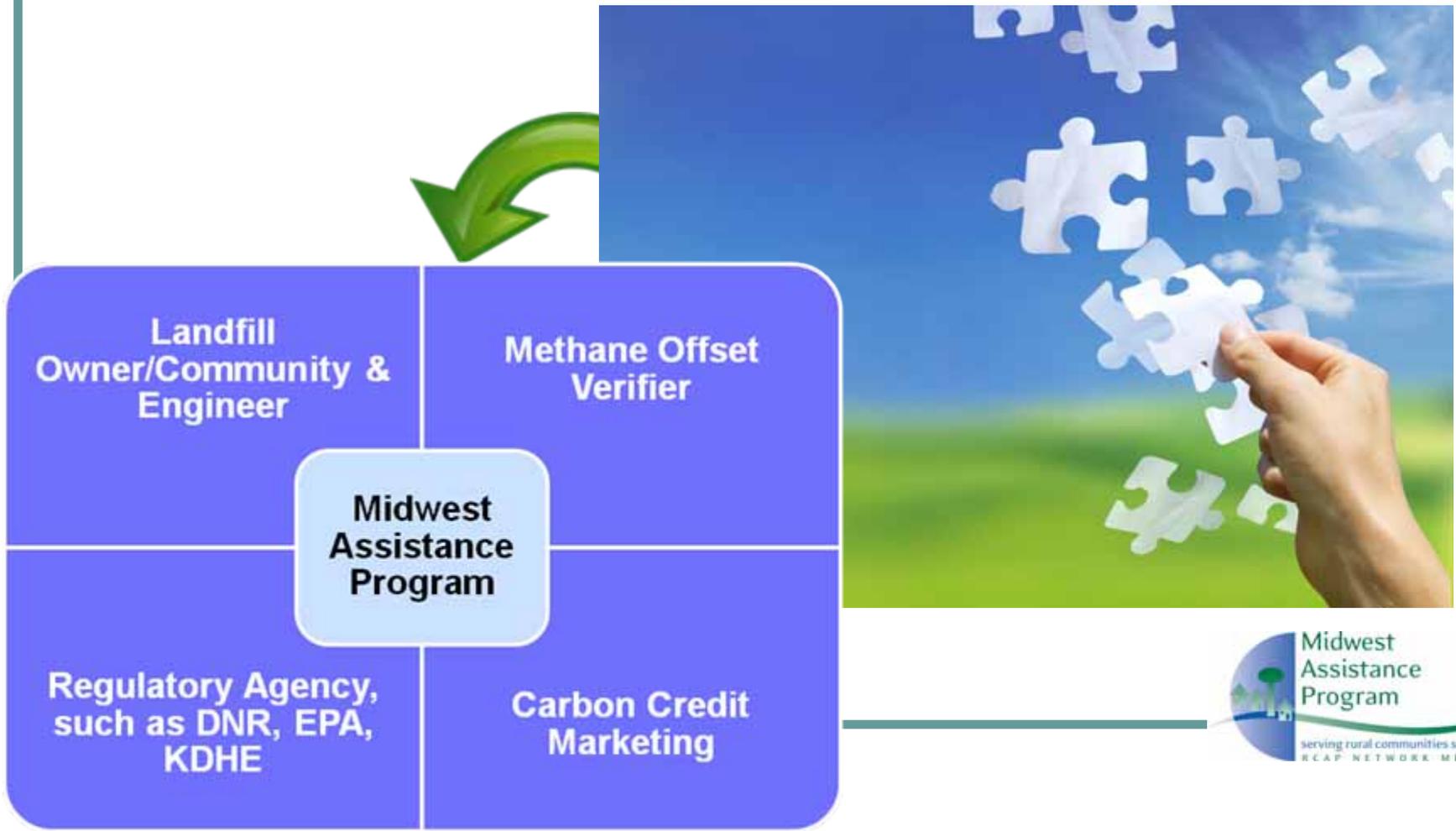
Landfill Methane Reuse & Offset Carbon Credit Project

**Kansas WORKS! Conference
March, 2009**

The Project Mission

MAP will assist communities with relatively small landfills in recovering revenue by marketing carbon credits their landfills are eligible for from destroying or reusing naturally-generated methane, a harmful greenhouse gas.

MAP's role—tie the pieces together



Landfill basics

Landfills generate greenhouse gases (GHG), primarily methane.

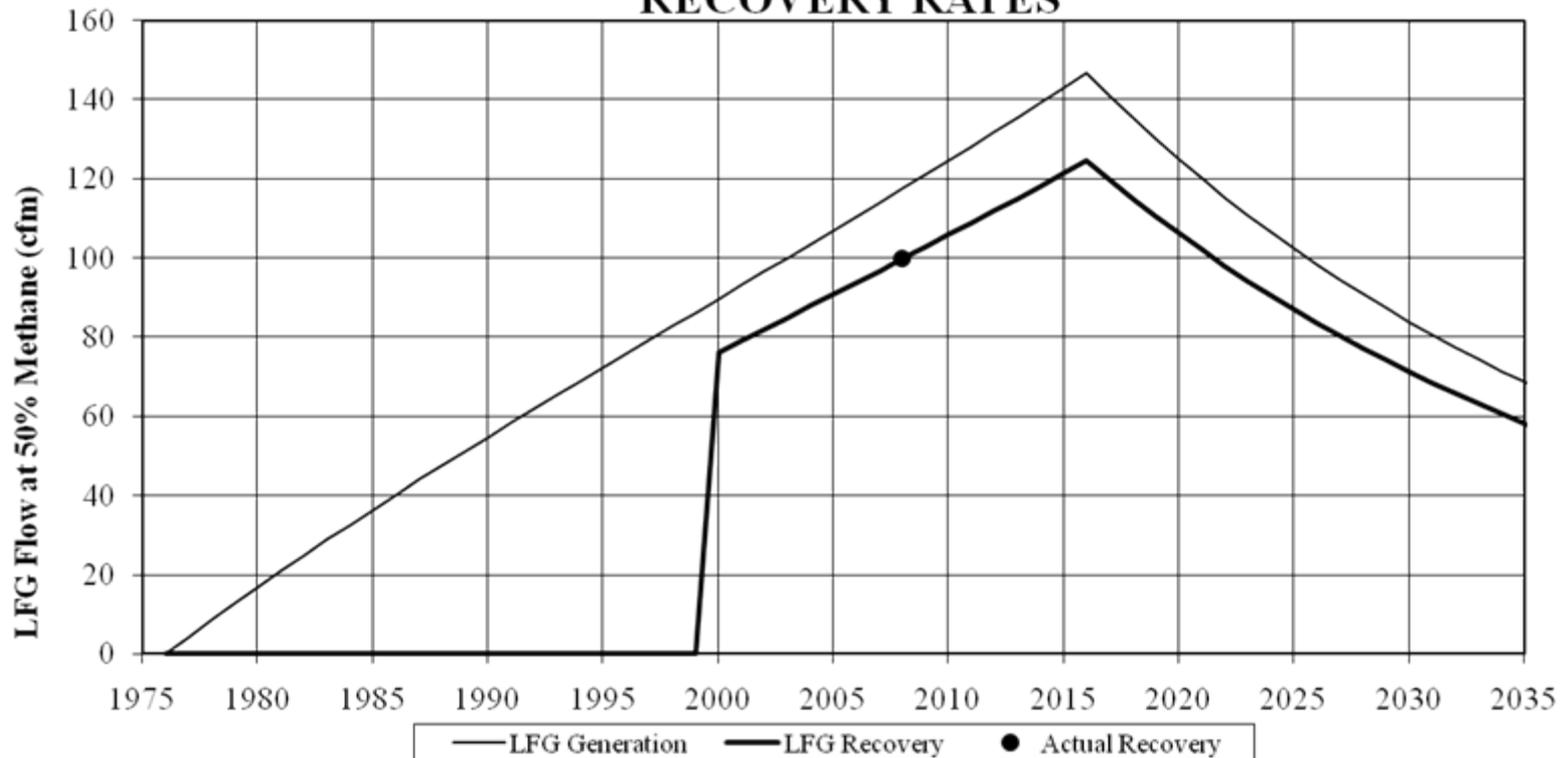
(3% of United States GHG, 5% worldwide)



1 ton methane =
21 tons carbon
dioxide equivalent
(for marketing purposes)

Methane Production

Example – SMALL LANDFILL GAS GENERATION AND RECOVERY RATES



Define “relatively small” landfill

- Sites not required by law to collect their gas
- Sites that generate $<$ or near 10,000 carbon dioxide equivalent tons of methane per year
- Typically, up to about 200 tons per day of trash
- Also consider closed sites

Carbon Credits

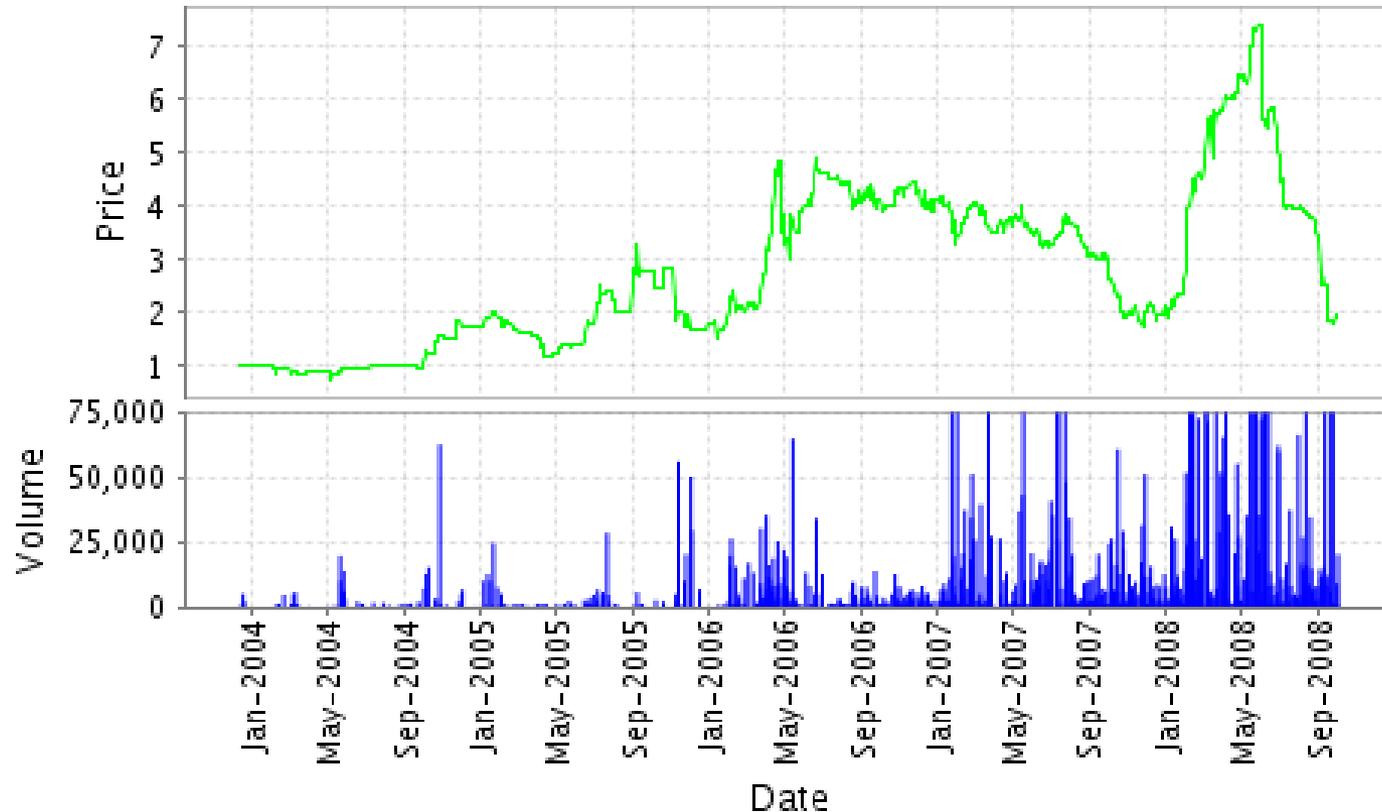
Landfills can qualify to sell credits by collecting and destroying or collecting and reusing methane so that it does not end up in the atmosphere.



Must NOT be under NSPS or regulatory requirement for gas collection & destruction.

Value of Carbon Credits

CCX Carbon Financial Instrument (CFI) Contracts Daily Report



How does that relate to Methane?

Site Example from EPA LMOP

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	LFG Generation		Collection System Efficiency (%)	LFG Recovery			
			(scfm)	(mmcf/day)		(scfm)	(mmBtu/hr)	Tonnes CH4 (CO2e/yr)	(MW Potential)
2007	16,678	382,559	114	59.9	85%	97	2.9	10,855	0.27
2008	17,012	399,237	118	61.8	85%	100	3.0	11,192	0.28
2009	17,352	416,249	121	63.6	85%	103	3.1	11,530	0.29
2010	17,699	433,601	125	65.5	85%	106	3.2	11,871	0.30
2011	18,053	451,300	128	67.4	85%	109	3.3	12,214	0.31
2012	18,414	469,353	132	69.3	85%	112	3.4	12,560	0.32

= \$\$ Value

Chicago Climate Exchange recent pricing:

Jan 2008 = \$2.45/ton

example @ 10,000T CO₂/yr = \$24,500

Apr 2008 = \$6.30-6.40/ton

example @ 10,000T CO₂/yr = \$63,000-\$64,000

July 2008 = \$4.70-4.85/ton

example @ 10,000T CO₂/yr = \$47,000-\$48,500

Oct 2008 = \$1.80-\$1.90/ton

example @ 10,000T CO₂/yr = \$18,000-\$19,000

Additional Consideration

- Renewable Energy Credit (REC)
 - Landfills can also market additional credit if the methane is used as an energy source
 - Use for facility heaters, boilers, power source
 - Put onto local power grid
 - Various other options – good reference is on EPA LMOP site www.epa.gov/lmop/proj

Utilization Example: Greenhouse

Jackson County, NC
Energy Park



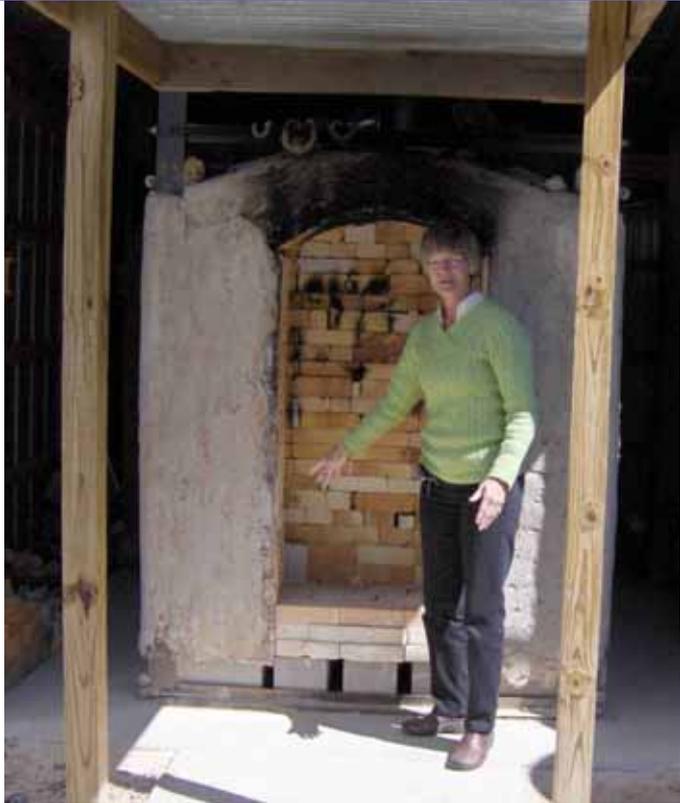


Pot own plants for \$.25 vs. buying at \$3-6 for planting. City/County/Private

LFG direct fueled boiler for greenhouse heat, approx. \$46,000

Example: Crafters Use LFG

North Carolina small closed landfill projects



Pottery kiln

Glass blower's oven



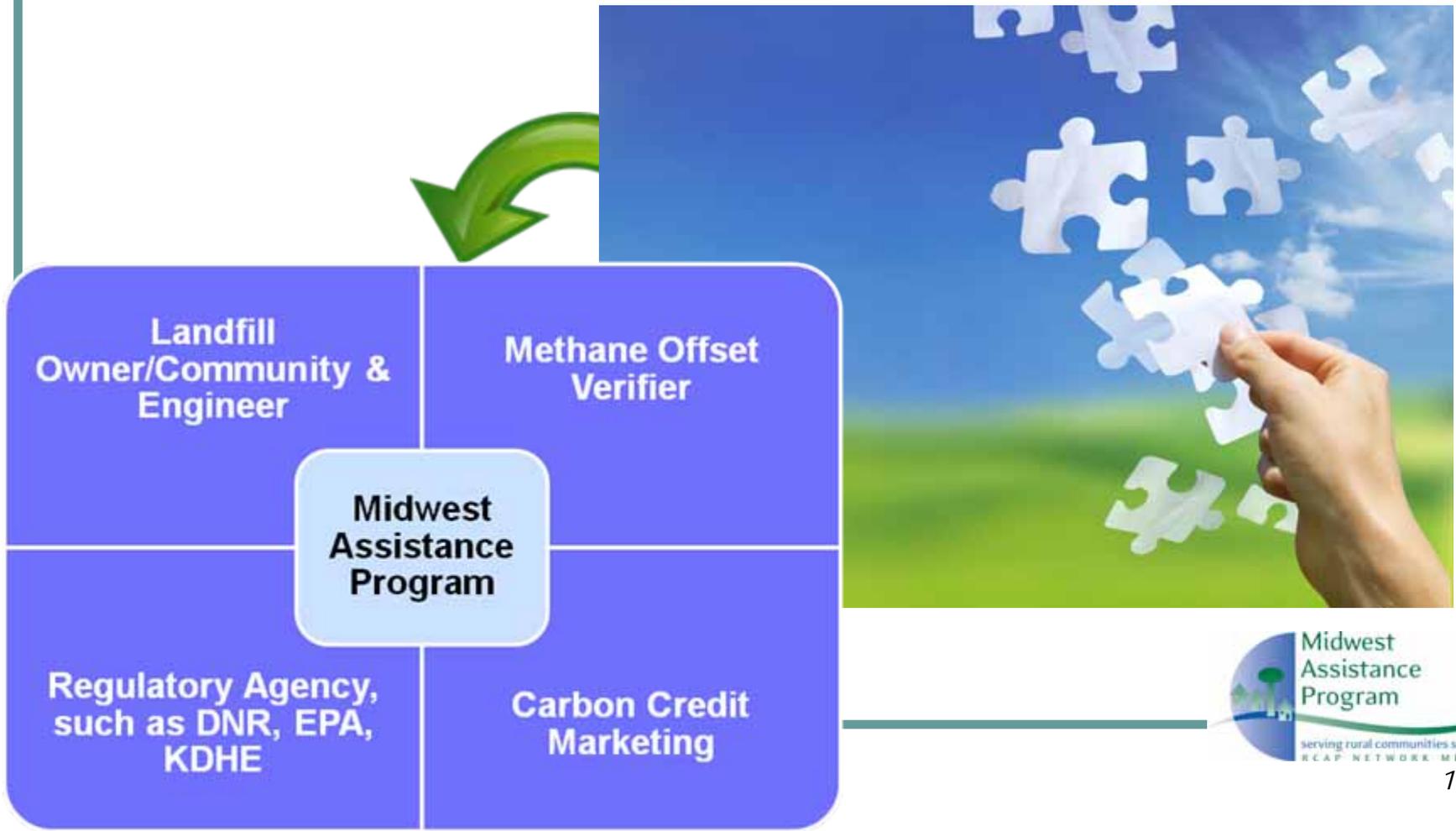
Blacksmith burner

How to Sell Carbon Credits



- Smaller generators can sell through Aggregator or Broker
- Sell Directly – membership on Exchange

MAP's role—tie the pieces together



Keys to Success

Buy-in of landfill owners, regulators, funders

Develop LFG collection system if none in use
(& renewable use?)

Ongoing verification process/project
coordination

Credits marketed = Revenues for development
of community environmental programs



Needed - \$\$\$\$\$\$

- \$5,000-\$500,000 per site for collection system & recording components



Costs to Implement

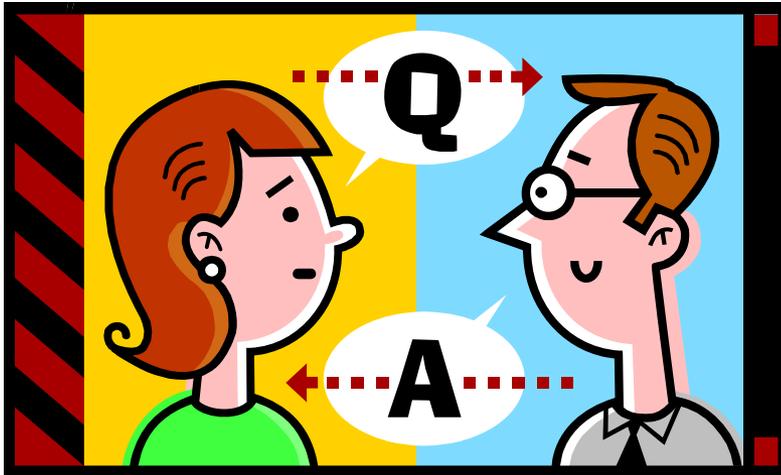
*Verification system added to flare station –
estimated <\$10,000

*Project Verification (3rd party)
First site visit \$5,000-
\$7,000

Future years verification
\$2,500-\$3,500



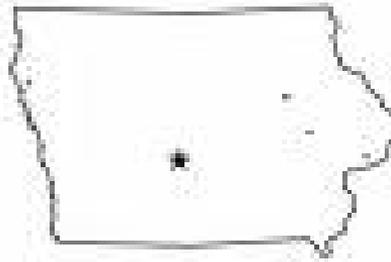
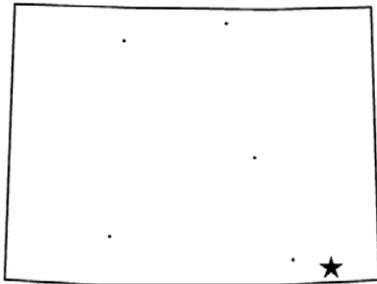
Current Status



1. Identify Sites & Gather Data
2. Work with EPA to get gas generation projections
3. Prepare Cost/Benefit analysis for each site
4. Seek funding & development scenario (investor, grant, etc.)

Locations Targeted

To Date: Kansas, Iowa, Missouri, Wyoming



Also, available to assist other states in MAP's service area:
Nebraska, North Dakota,
South Dakota, Minnesota,
Montana



Questions?



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