

East Central Solid Waste Commission

Our Adventure in Securing Carbon Credits

February 28, 2008



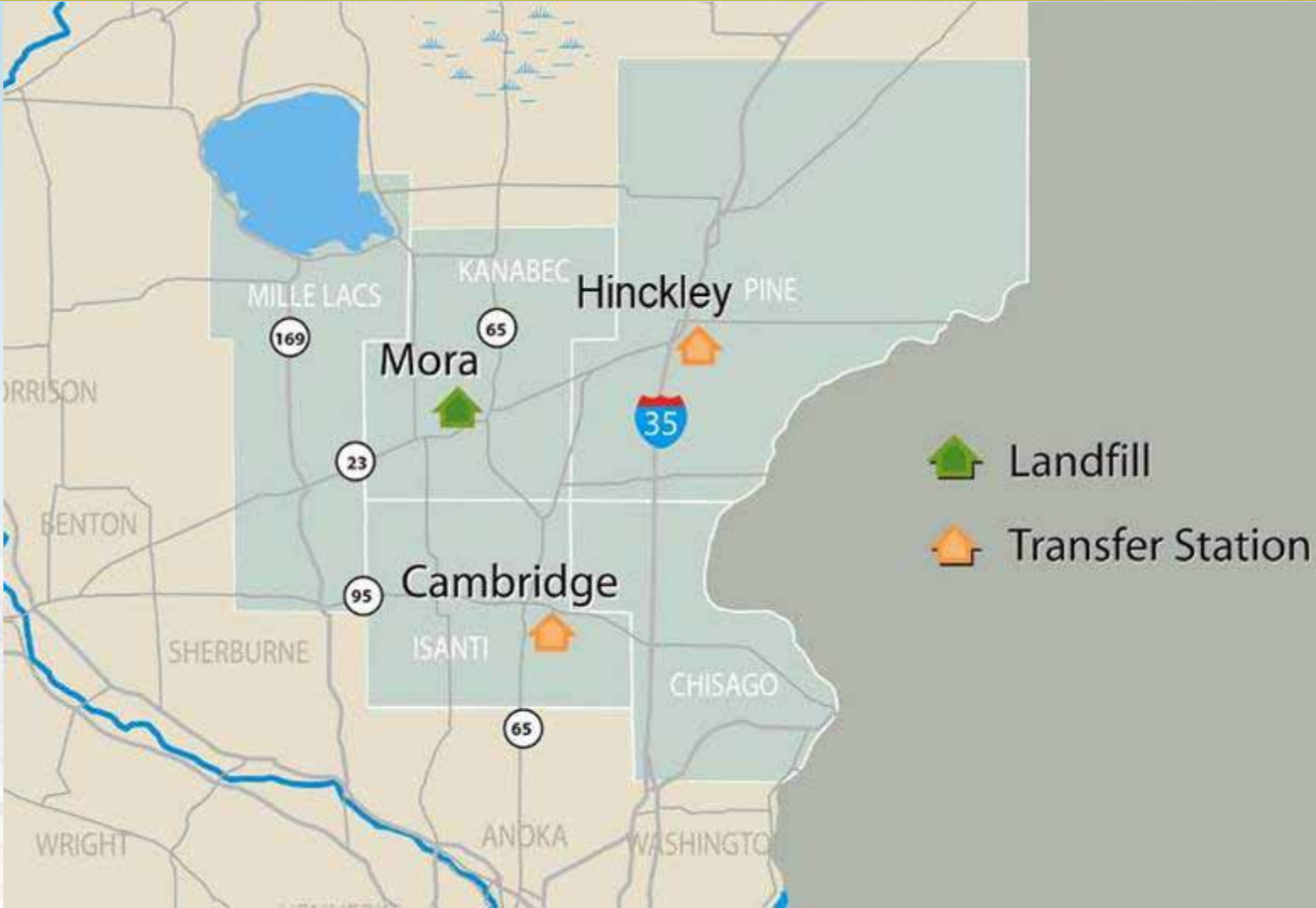
R·W·BECK

Mind Powered: Insight with Impact.

Presentation Outline

- Commission background
- Landfill gas history
- Impact of leachate recirculation
- Gas-to-energy opportunities
- Carbon credits

East Central Solid Waste Commission



East Central Landfill

- Began Operation in 1972
- Unlined Area closed 1991 (10 acres)
- Lined Area and MSW Composting: 1991
- MSW Composting failed: 1994-1999
- Private to public operation: 2002
- Currently 76,000 tons/year
- 5 lined phases
- 18 acres open, vertical expansion
- Remaining Life: 25+ years
- Permitting Expansion
- Integrated System



2003 Facility Status

- Landfill Gas
 - About 1 million cy in-place
 - Passive LFG control
 - Off-site migration
 - Odors



LFG System Improvements

- Migration Control installation in 2003
- Active system conversion in 2005
- Connection to:
 - Vertical wells - Closed and Lined
 - Recirculation system
 - Leachate cleanouts/SSRs
- Voluntary Odor and Migration Control
- Currently 800 cfm

Migration Control Blower







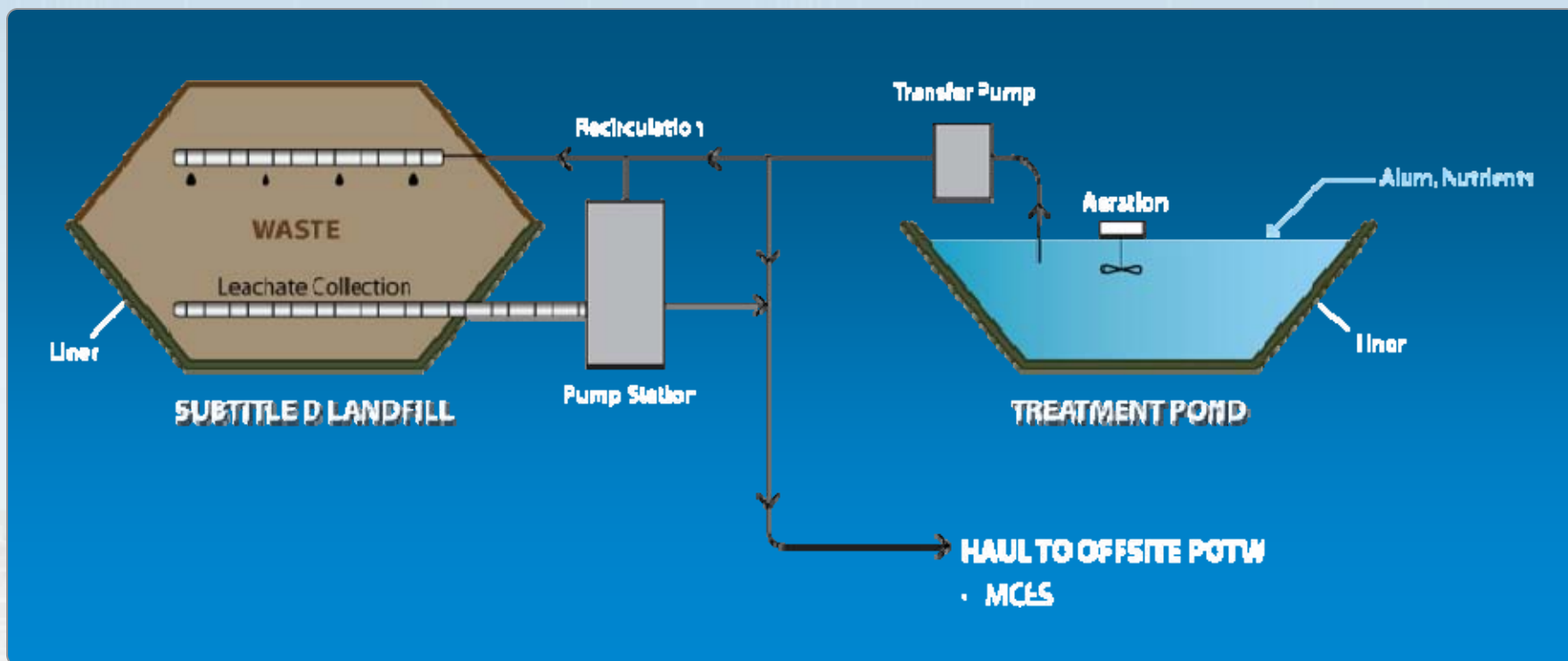


Infamous Flow Meter

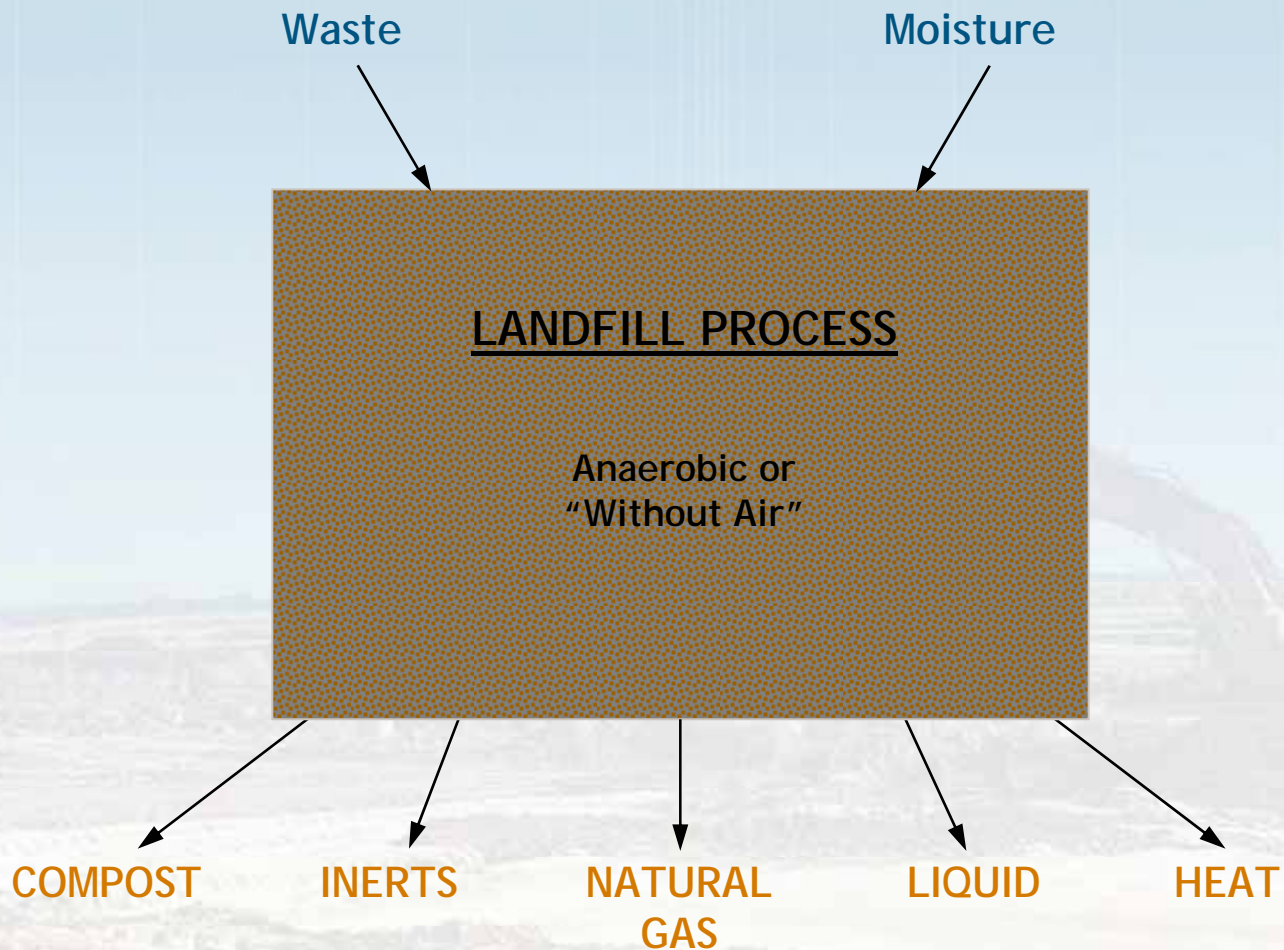


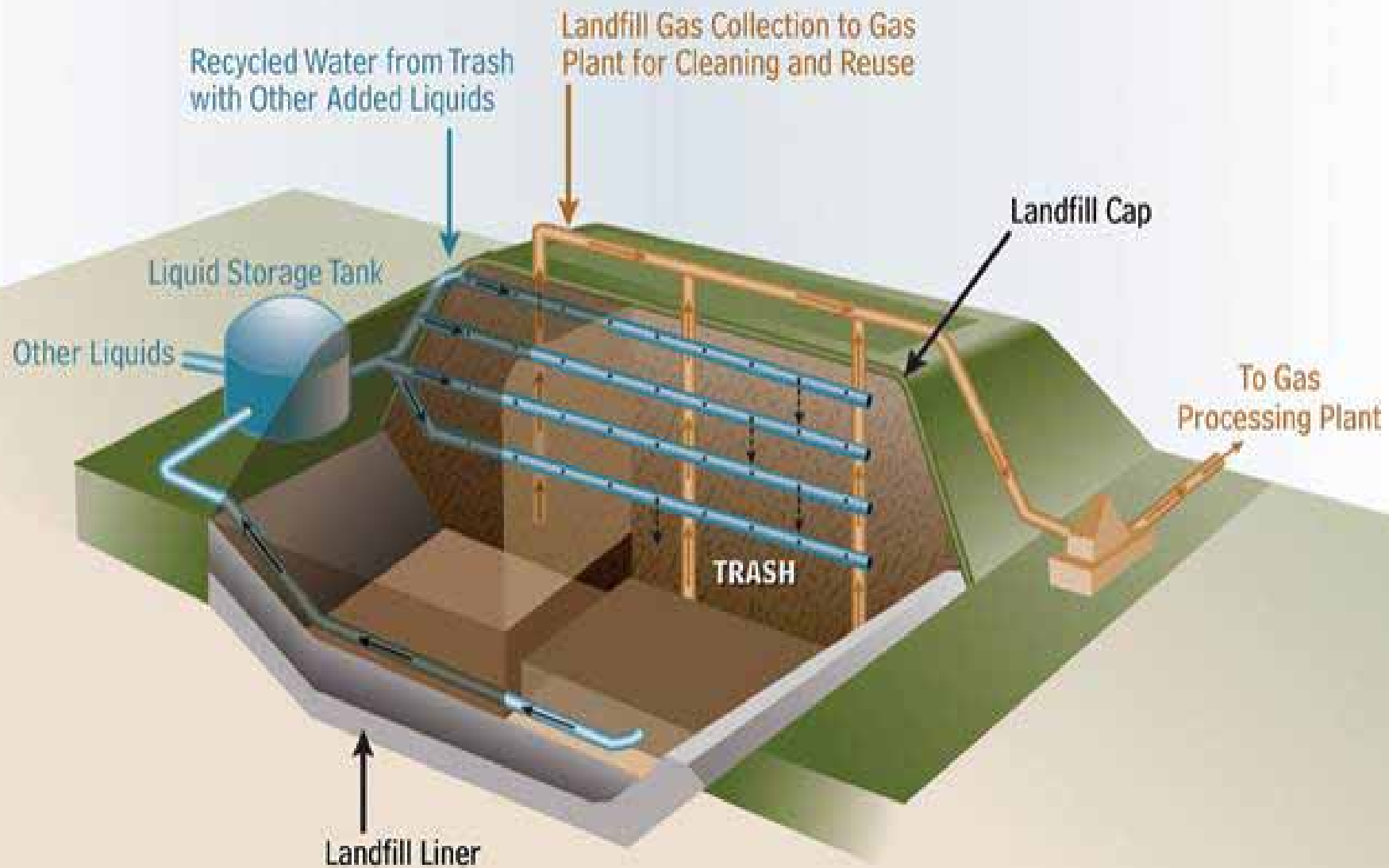


Leachate Management



What is Leachate Recirculation?

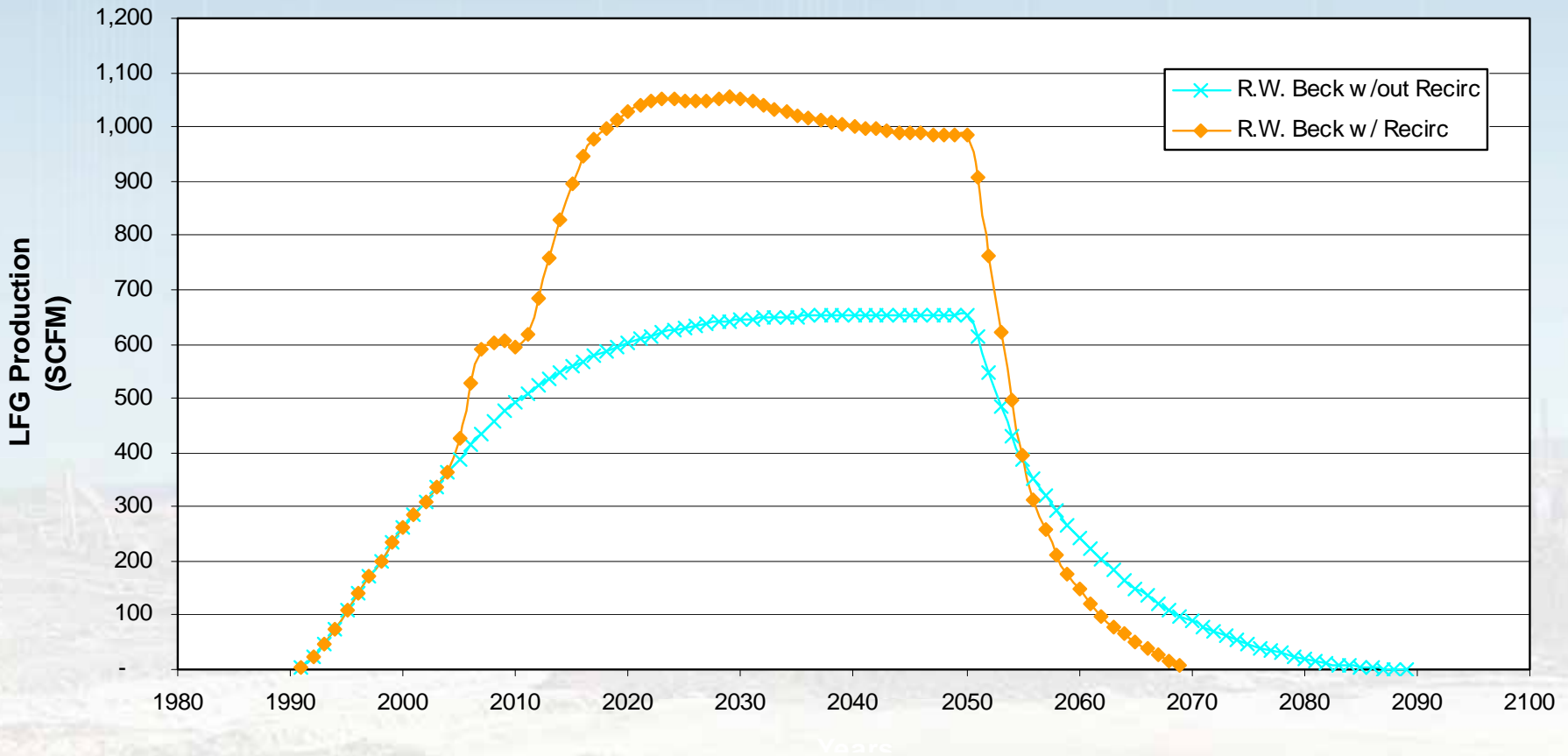




Benefits of Recirculation

- Increased waste stabilization rate
- Reduced long-term pollution risk
- Leachate volume storage/reduction
 - 40-100 gal/ton
- Additional leachate treatment
- Accelerated waste settlement
- Reduced leachate management costs
- Enhanced gas generation

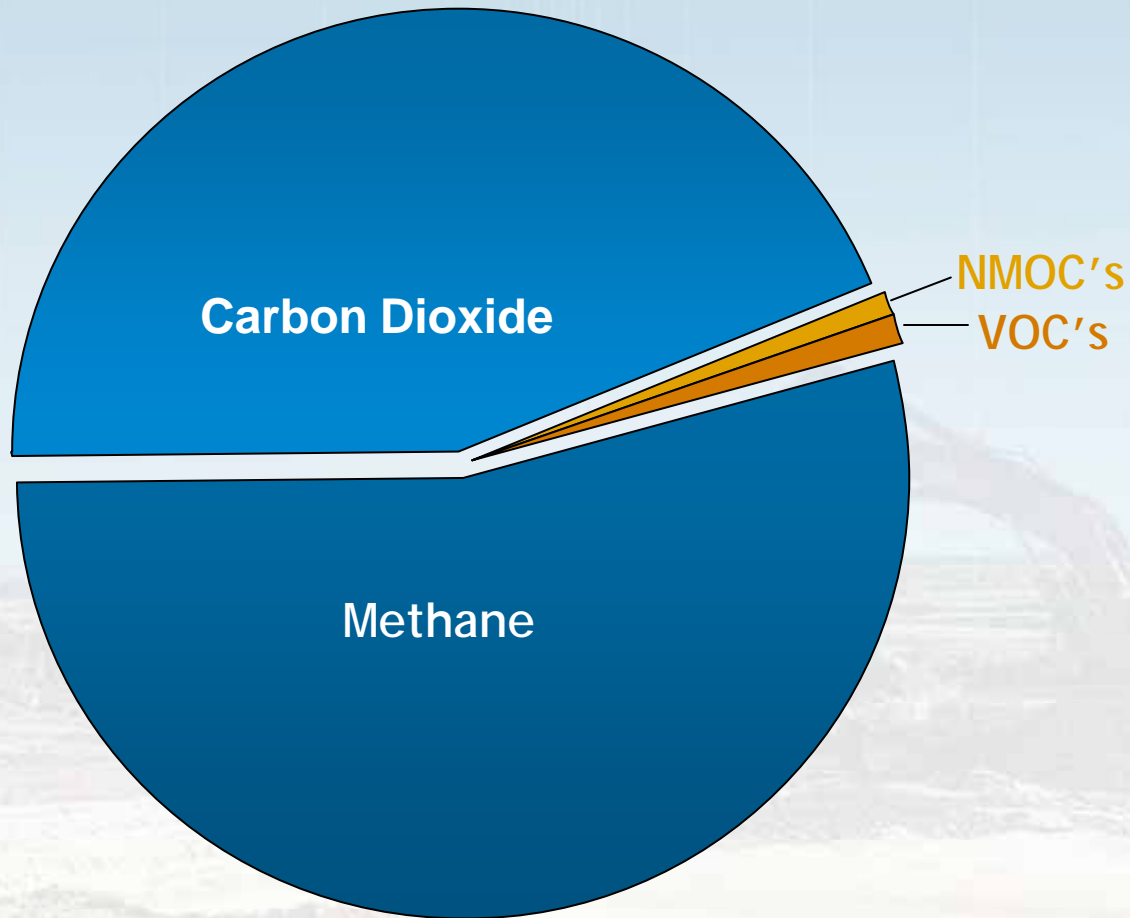
LFG Production With and Without Recirculation



Gas-to-Energy Opportunities

- Electric Generation
 - Private LFG Developers
 - SMMPA/Mora Utilities
- Direct Use
 - Wood Chip Drying

Typical Properties of LFG



Benefits of LFG-to-Energy

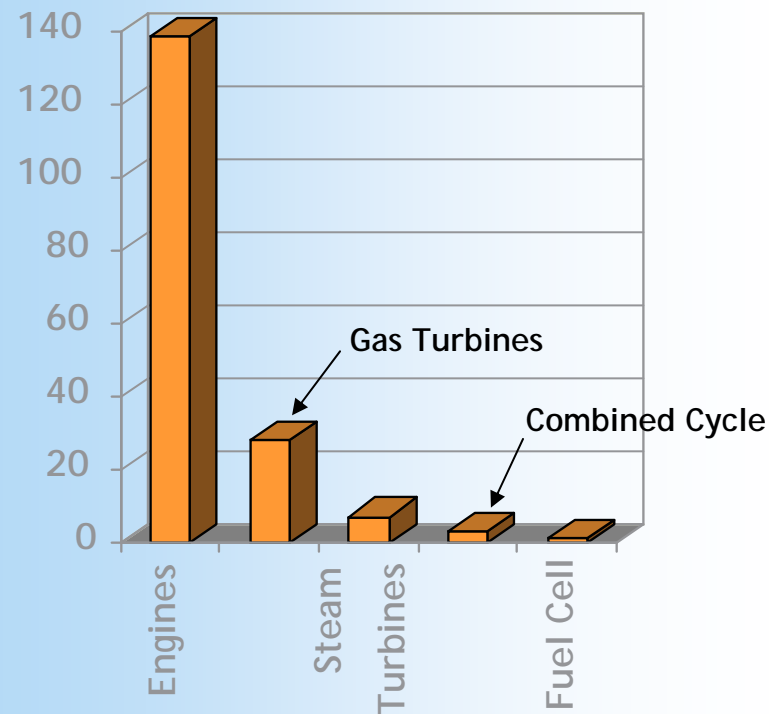
- Reduces Use of Fossil Fueled Power Plants and Their Emissions
- Inexpensive Greenhouse Gas Emission Reduction



LFG-to-Electricity

- Over 180 Plants Produce Electricity
- Total Installed Capacity > 678 MW
- Avg. Plant ~3.5 MW

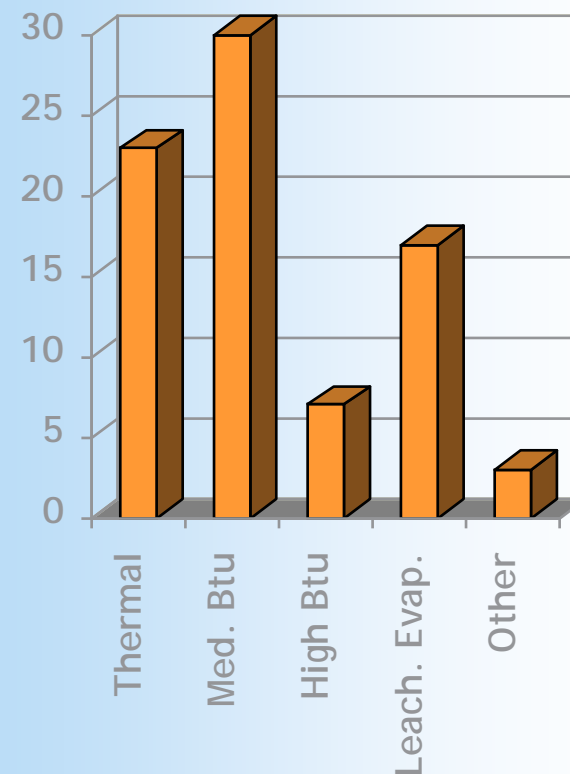
Number of Plants



Direct Use of LFG

- Over 82 Direct Use Plants in Operation
- Total Direct Sales of Fuel = 105 MMcfd

Number of Uses



SMMPA Member Cities



Why is SMMPA Interested in This Project?

- Strong commitment to distributed generation, focused on our Member communities.
- Project fits well with our renewable resource mix:
 - Landfill gas generation
 - Soy diesel biofuel
 - Small hydro-electric generation
 - Municipal solid waste (biomass)
 - Wind - SMMPA-owned and purchases
 - Renewable energy credits

Carbon Credit Trading

- ECSWC carbon offset trader on Chicago Climate Exchange (CCX)
- In final verification process
- Provides revenue to support collection system expansion and operation
- Eligibility based on voluntary status

Potential CCX Revenue

- 800 cfm flared per flow meter
- Equates to reduction of 60,000 million tons of carbon equivalent (MMTCE) per year
- Trade value \$1.80-4.50/MMTCE
- Annual Revenue: \$108,000 to \$270,000

CCX Timeline and Cost

- Application
 - January 2007 - \$1000
- Membership
 - March 2007 - \$5000 annually
- Verification
 - May 2007 - Initial \$5500; \$4000 annually
- Intended to secure credits since Fall 2005

CCX Application

- Commission vs. 5-County fuel usage
- 288 metric ton CO₂ emissions in 2005
 - Accepted as 2000 baseline
- Well below 10,000 metric ton threshold

Verification Process

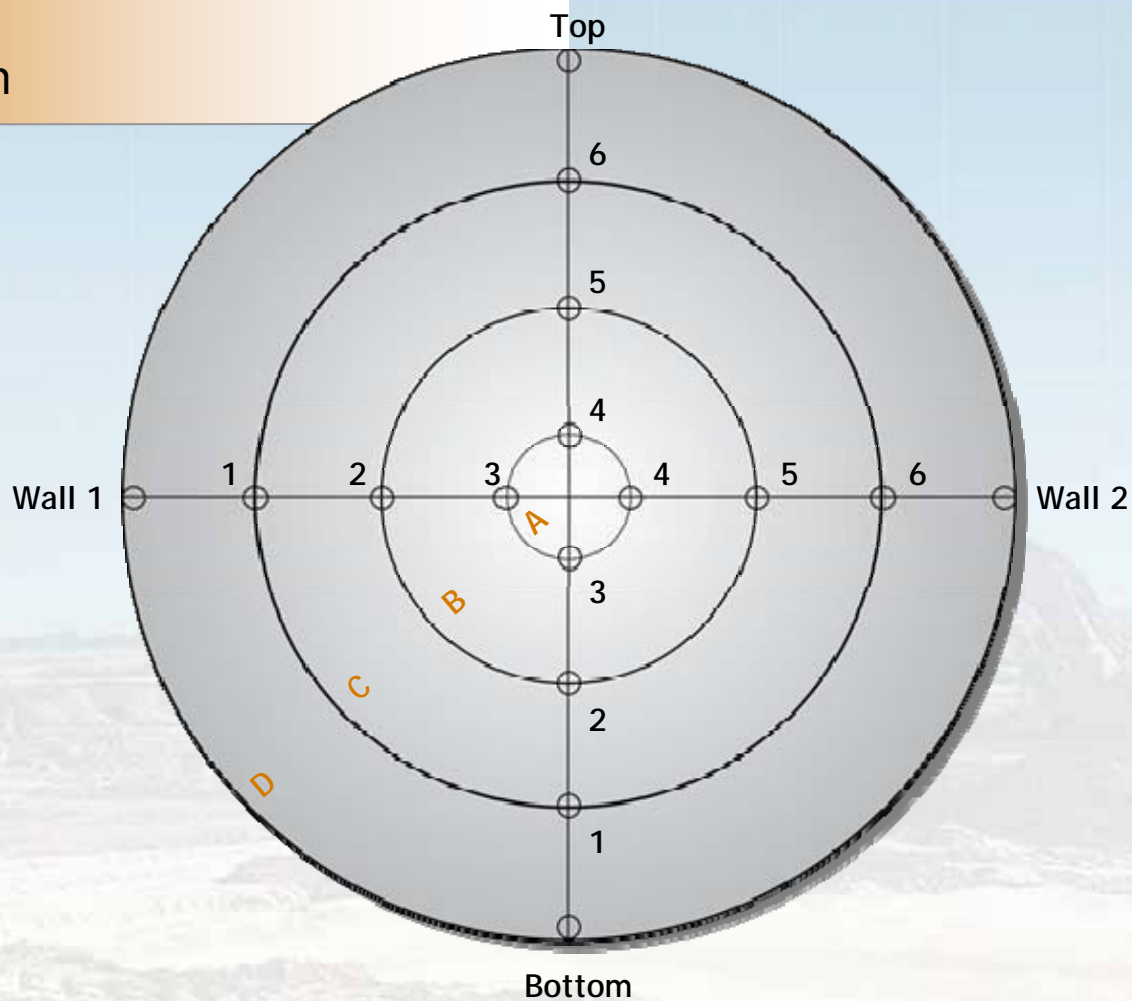
- Data Review
 - Flow/methane meter specifications and calibration records
 - In-field flow verification (**required quarterly**)
 - Historic methane/flow field data
 - Site plan
 - Evidence of rights to carbon credits
 - Regulatory evidence that LFG system is voluntary
- Site Visit

Flow Verification

- June, August, December 2007, January 2008
 - **Field calibration attempt**
- Percent Error @ 800 cfm: 16-24%
 - Need 5%
- Next Steps
 - Factory calibrate flow meter
 - Field verify on two successive months
 - Replace with new flow meter w/field verification

Horizontal & Vertical Traverse

Pipe
Cross-Section



Air Velocity Meter



Quarterly Landfill Gas Monitoring Report Verification Testing

East Central Solid Waste Commission Landfill

Mora, Minnesota

Date 1/28/2008
Tester SFC
Flow Meter Totalizer NM

Pipe Material: 8" Sch 80 CPVC
Method of Measurement: Dwyer Model 160 SS Pitot tube
Dwyer Model 400 Inclined Manometer

Trial No. 1
Ambient Air Temperature 41 °F
Time 14:15
Flow (Meter Reading) 799 scfm

Upstream of Blower

Vacuum 11 in wc
CH₄ 41 %
O₂ 1.1 %

Meniscus Zeroed at _____

Horizontal Traverse

Wall 1 1620 ft/min
1 in 1820 ft/min
2 in 1860 ft/min
3 in 1920 ft/min
4 in 1960 ft/min
5 in 1980 ft/min
6 in 1960 ft/min
Wall 2 1880 ft/min

Downstream of Blower

Pressure 7.1 in wc
Gas Temperature 89 °F

Vertical Traverse

Bottom 1900 ft/min
1 in 1940 ft/min
2 in 1980 ft/min
3 in 2000 ft/min
4 in 2000 ft/min
5 in 2020 ft/min
6 in 2000 ft/min
Top 1980 ft/min

CCX Lessons Learned

- Factory calibrate any existing equipment
- Field verify flow meter quarterly
 - East Central lost potential 2005/2006 credits
- Diligent monitoring/maintain records
- Address carbon credits in gas purchase agreement
- Future: addressing electric generation

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