

# Energy Recovery from Kansas “Organic-Rich” Waste Streams

*by:*

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*presented to:*

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# What are these “organic-rich” wastes?

- Mixed municipal solid waste (60-80%)
- Dairy and feedlot manure, poultry litter
- Waste tires
- Packing plant paunch, etc.
- Food waste (grocery stores, institutions, mfg, etc.)
- Saw dust/wood scraps
- Agricultural crop residues
- Construction/demolition waste
- Septic tank liquids, porta-potty waste, etc.

# WORKS! Conference Sessions on Energy Recovery from Waste

- Expanded from recycling, composting, and HHW management to include energy from waste in 2009
- Participants in Energy Sessions
  - Cargill Beef
  - Frito-Lay
  - Universities (KSU, NE, MO)
  - USDA
  - Western Plains Energy
  - Forget-Me-Not Dairy
  - KLA Dairy Council
  - Seaboard Foods
  - National Beef
  - Many consultants and others

# Factors that Affect Project Feasibility

- #1 – Low current price of energy (natural gas and electricity)
- High capital costs of waste processing systems
- Limited interest of electric utilities
- High system maintenance cost
- Uncertain business future
- Tax incentives and grants

Most are waiting and watching

# Waste-to-Energy Technologies

- Landfill gas generation and recovery
- Anaerobic digesters to produce methane
- Biomass gasifiers
- Wood waste boilers
- Cement kilns



# Landfill Gas Management

## Flares & Vents



# Gas Recovery Systems



# Deffenbaugh Gas Plant

## Johnson County



# Waste Management Electricity

## Rolling Meadows



# Caterpillar, Electric Engine

## Rolling Meadows - Topeka



# An Example of Landfill Gas Recovery and Utilization

## Waste Management/Rolling Meadows/Topeka Gas to Electricity Plant

- Startup – January 2010
- Gas consumed through October 31, 2012
  - 2.9 billion cubic feet
  - 1800 cubic feet per minute
- Electricity produced
  - 131 million kWh (expanding)

# Liquids Addition to MSW Landfills to Enhance Gas Generation and Landfill Stabilization

- Seward County
- Deffenbaugh, Johnson County
- Waste Connections (Plumb Thicket), Harper County
- Waste Connections, Finney County

About 10 million gallons since began in 2011  
50,000 tons

# Seward County



# Deffenbaugh



# Oil & Gas Drilling Waste Waste Connections - Harper County



# Waste Connections Harper County





# Ash Grove Cement - Chanute



# Ash Grove Cement - Chanute





# ICM Biomass Gasifier

## Harvey County Landfill



### Pilot Project

1000-2000 tons/yr

Wood chips

Wheat straw

MSW

Tires

Manure

# Western Plains Energy (Ethanol Plant)

## \$40 Million Biogas Digester, Oakley

- \$5 million USDA grant
- \$15 million Kansas ARRA funds
- Primary waste-feed lot manure  
Also grain dust, food waste

Operational in 2013

# Western Plains Ethanol Plant (Oakley)

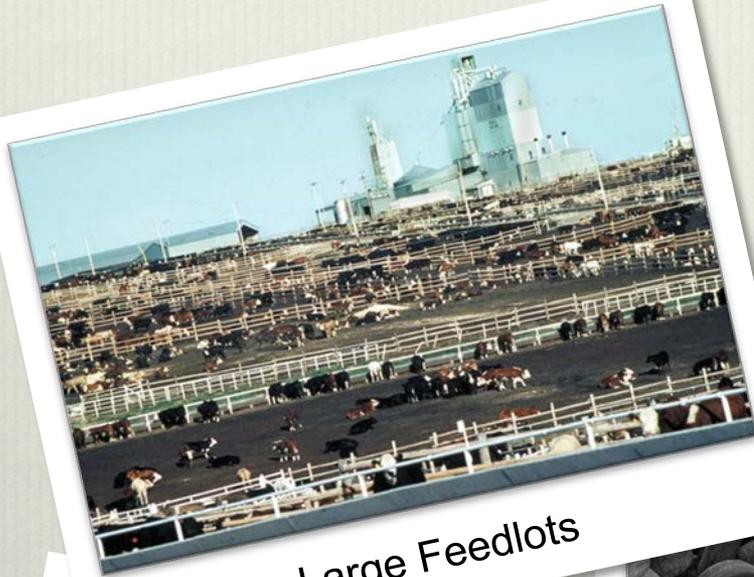


# Johnson Co. Wastewater Treatment Plant

## Anaerobic Digester – ARRA Funding



# Untapped Waste Resources



Large Feedlots



Large Dairies



Waste Tire Piles and Monofills



Beef Packing Plants



Sawdust Piles