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*Supporting American Jobs!*

GILLIG

CNG

# Breaking Down the Roadblocks to Renewable Natural Gas

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LEGISLATIVE ENERGY COMMISSION

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# Company Background

- Full-Service Engineering/Architecture/Construction company founded in 1898
- 4,500 Employees and 100% Employee Owned
- Headquartered in Kansas City with 35 offices nation-wide
- 80 employee-owners in Bloomington, MN office



# My Experience

- 28 years of experience in biogas industry
- Doctoral studies in anaerobic bio-processing
- Financial evaluation, design and implementation of anaerobic systems
  - Bioremediation
  - wastewater treatment
  - energy production
- 2 patents for integration of biogas production in corn ethanol
- Developed processes for conversion of solar energy, electricity, and solid biomass to RNG
- Oversaw operation of biogas to RNG facility

# Anaerobic Digestion

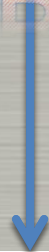


Industrial  
Co-Products



SSO

ROADBLOCK



ROADBLOCK



ROADBLOCK



Generation



Biogas  
Upgrade

# Feedstock Roadblocks

- Source Separated Organics
  - Distributed over a large geographic area
  - Low in energy density
  - Not currently aggregated
  - Degrade rapidly
  - Disposed in landfill (tipping fee)
- Industrial Co-products
  - Degrade rapidly
  - Alternative animal feed (high value)

# Feedstock Solutions

- Mandatory landfill organics diversion
- Tipping fee subsidy
- Sponsored collection program

# Cheap Energy Roadblocks

- Natural gas price - \$3.50 - \$4.00 per MMBtu
- Electricity
  - Wholesale: \$0.03/kW-hr
  - Retail (industrial): \$0.07/kW-hr
- New AD requires
  - Biogas at \$10 - \$15/MMBtuOr
  - Electricity at \$0.11 - \$0.17/kW-hr

# Cheap Energy Solutions

- Promote CNG vehicles
  - Natural gas refueling infrastructure grants
  - RNG production incentives
  - Low carbon fuel standard
- Increased renewable portfolio standard
- Empower net metering
  - Allow net metering above 40 kW (> 1 MW)
  - Remove avoided cost limitation for > 40 kW



# Technology Roadblocks

- AD for wastewater and manure treatment is a mature market
- AD of waste organics for energy production is immature in the US
- Europe has significant experience (companies and facilities)
- European technology providers are not cost effective in US market

- Support AD technology transfer from Europe
- Reduce financial risk
  - Low interest revolving fund
  - Loan guarantees
  - Grant programs
- Government takes risk
  - Public/Private Partnership
  - Municipal ownership

# Promoting RNG

- Create AD market for SSO
- Promote energy markets for RNG and biogas generated electricity
- Assist in financial risk mitigation for AD technology



**THANK YOU FOR YOUR TIME!**