

West Michigan Regional Liquid Livestock Manure Processing Center

Feasibility Study Presentation

April 19, 2005



Product Market Factor Analysis – Methane Gas

Introduction

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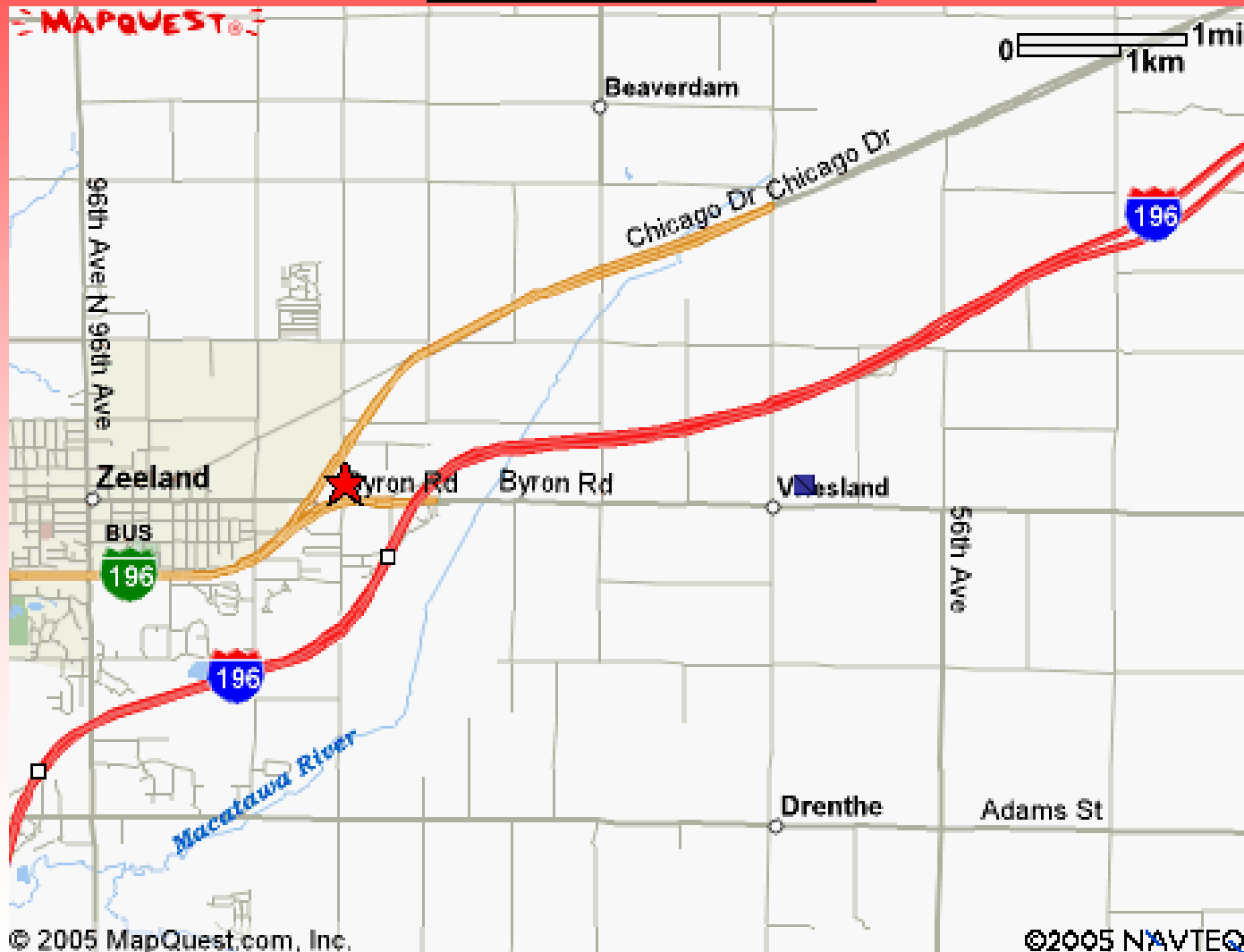


1. Overview of Existing Gas Transportation Infrastructure

- **6 mile long private gas pipeline from Adams Street & 56th Avenue to the east side of Zeeland**
- **Allows the Manure Processing Center to locate in a rural, low density area AND have access to end users of gas**



1. Overview of Existing Gas Transportation Infrastructure



1. Overview of Existing Gas Transportation Infrastructure

- **Who are the infrastructure participants?**
 - **Waste Management of Michigan, Inc.**
 - **Provides landfill gas from its Autumn Hills Recycling & Disposal Facility**
 - **North American Natural Resources, Inc.**
 - **Receives the landfill gas, then cleans, dries, and compresses it into the pipeline**



1. Overview of Existing Gas Transportation Infrastructure

- **Who are the infrastructure participants? (Continued)**
 - **Zeeland Farm Services, Inc. / Zeeland Farm Soya**
 - **Owns and operates the 6 mile pipeline to transfer the gas to it's facilities**
 - **Currently uses the gas for steam production**
 - **Adding electricity generation in 2005**
 - **Local community – land owners & government**



2. Potential end users of digester methane gas

<u>Company</u>	<u>Level of Interest</u>
▪ Herman Miller	Low
▪ Mead Johnson	Low to Moderate
▪ Zeeland Board of Public Works	Low
▪ Zeeland Community Hospital	Low
▪ Zeeland Farm Services (ZFS)	High



3. Methane gas value at the proposed site

- **Challenges for end users buying digester gas**
 - **Unfamiliar & less consistent source of energy**
 - **Supply less reliable than public utilities**
 - **Contains Hydrogen Sulfide – toxicity**
 - **Lower & varying BTU content per SCF**
 - **Capital required to convert / add equipment**



3. Methane gas value at the proposed site

- **Challenges for end users buying digester gas (Continued)**
 - **Long-term commitment required**
 - **Hosts with high electric load factors buy reasonably priced electric**
 - **Perception of using solid waste or manure sourced gas can be misconstrued**



3. Methane gas value at the proposed site

- **Two scenarios lead to a value of approximately \$2.80 per MMBTU to the Manure Processing Center based on current competing energy markets**
 - **Scenario #1 – Generate green power at Zeeland Farm Service’s location to utilize established electric connection infrastructure**
 - **Scenario #2 – Sold to another end user for self- generation of steam or electricity**



3. Methane gas value at the proposed site

Scenario #1 – Generate Green Power at ZFS

Potential Green Power Price / KWH	\$0.0600
Federal income tax credit	0.0037
Less gas cleaning, drying, transport	(0.0080)
Less Generator maintenance	(0.0117)
Less operations & administration	(0.0035)
Less capital cost	<u>(0.0135)</u>
Margin per KWH	\$0.0270

3. Methane gas value at the proposed site

Scenario #1 – Generate Green Power at ZFS (Cont.)

- **\$0.027 per KWH = \$2.81 per MMBTU at 9,600
BTU heat rate per KWH**
- **Equal to approximately \$380,000 per year in revenue for a 50,000 gallon per day digester**
- **Figures are based on running one CAT 3520C 1,600 KW/Hour reciprocating engine**



3. Methane gas value at the proposed site



Caterpillar 3520C 1,600 KW/H Low-BTU Gas Genset

3. Methane gas value at the proposed site

Scenario #2 - Another end user produces its own steam and / or electricity

Price paid by end user per MMBTU \$3.80

*** Less gas cleaning, drying, transport (1.00)**

Net price to Manure Center per MMBTU \$2.80

*** Note that Cleaning, drying, & transport is higher due to assuming a pipeline extension is necessary**

4. Gas sales contract / agreement arrangements

- **Agreement terms may vary widely due to their private nature**
- **Determined on a case-by-case basis by the parties involved**
- **Time periods usually 15 to 30 years long due to capital commitments**
- **Priced on MMBTUs (energy) not SCF (air quantity)**



4. Gas sales contract / agreement arrangements

- **Pricing methods**
 - **Fixed for entire term**
 - **Or derived from other energy markets**
 - **Natural gas, electricity, etc.**
- **Delivery and measurement methods well defined**
- **Seller commits to gas quality characteristics**

4. Gas sales contract / agreement arrangements

- **Strength and dependability of the agreement is determined by the strength of the parties that sign**
- **Use of bank financing can complicate terms required in the agreement**



5. Federal and Michigan tax credits

- **Jobs Creation Act of 2004**
 - **Currently offers a federal income tax credit of \$0.0095 per KW produced from digester gas**
 - **Rate adjusts annually for inflation**
 - **The credit is received for 5 consecutive years**
 - **Current legislation requires equipment in-service by 12/31/05**
 - **Congress may extend the in-service date**



5. Federal and Michigan tax credits

- **Michigan Economic Development Corporation's NextEnergy Authority**
 - **Promotes research, development, and commercialization of alternative energy through state tax credits and exemptions**
 - **100% personal property tax exemption through 2012**
 - **Relief from Single Business Tax**



5. Federal and Michigan tax credits

- **Farm Bill Section 9006 – Renewable Energy Systems and Energy Efficiency Improvements Program**
 - **\$11,400,000 for grants**
 - **Plus \$11,400,000 for guaranteed loans**
 - **Up to \$500,000 per project for renewable energy systems**
 - **May pay up to 25% of total project costs**



5. Federal and Michigan tax credits

- **Farm Bill Section 9006 (Continued)**
 - **277 grants last year in 26 states**
 - **Past recipients include anaerobic digesters, wind generation, and waste heat recovery**
 - **Applicants must have less than 500 employees and less than \$20,000,000 in annual sales**
 - **Annual application deadline of June 28**



Works Cited

- **U.S. Dept. of Energy. Methane Biogas from Digesters (2003).**
<http://www.eere.energy.gov/consumerinfo/factsheets/ab5.html>
- **House Report 108-755 – American Jobs Creation Act of 2004.** http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_public_laws&docid=f:publ357.108
- **Michigan NextEnergy Authority Certification Guidebook. (June 2003)** www.michigan.org
- **USDA Rural Development (March 2005)**
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