Cow Power

Animal Waste
To
Electricity

We Work 24/7
History and Construction of a Digester
• Incorporated in 1972
• 22 Shareholders
• Capacity of 600 Head of Cattle
• 3 Employees
Hampton Feedlot, Inc
Hampton Alternative Energy Products, LLC

- Operates under MO DNR CAFO Permit
- 5,400 Head Capacity
- HFL has 5 Shareholders
- HAEP has 3 Shareholders
- Current Population 3,000+ Head
- HFL has 6 Employees
- HAEP has 3 Employees
Research

• Multiple Digester Vendors were Contacted
• Jimmy Story, Missouri Enterprise, Assisted
• Digesters are Utilized in the Dairy Industry
• Ray Blakely, Blakely & Assoc., Assisted in the Electrical Design and Utility Requirement Compliance
Funding Partners

• Chariton County Commission; Tony McCollum, Presiding Commissioner
• Goppert Financial, Norborne MO
• Missouri Department of Natural Resources
• MASBDA
• EIERA
• Missouri Dept. of Economic Development
• USDA
Research for Funding Assistance

• Jimmy Story, Missouri Enterprise
• Moberly Area Economic Development
Milestones

• Bid – December 2010
• Construction Started – Spring 2011
• Start-up – December 2011 – August 2012
• Electrical Generation August 2012
Construction

- Modifications to 4 Containment Barns
- 3,000 lf of Waste Piping
- Six 35,000 Gallon Digester Tanks
- 40 x 60 Insulated Digester Building
- 300 KWh Engine Generator
- 40 x 140 Insulated Dryer Building
- 15KV Underground Electrical Distribution System
Utility Partner

- Kansas City Power and Light
Benefits

• Waste from 2,400 Head of Cattle will be Processed Through the Digester System Producing Green Energy
• Solid Waste from 2,400 Head of Cattle will be Destroyed in the Digester or Separated and Dried to a Fertilizer Product
• The Liquid Effluent will be Recycled through the Gas Scrubbing Equipment and Digester System
Benefits

• The Life of the Lagoon System will be Extended
• HAEP will Provide Green Energy for the Feed Lot Consumption
• Surplus Electricity will be Sold to the Utility Partner
• 5 New Jobs will be Created
Manufactured in Missouri
Additional Benefits to Missouri

- The Tanks were Fabricated at J. L. Houston Company in Hopkins, Missouri
- The Engine Generator was Fabricated at Martin Machinery, LLC in Latham, Missouri
- The Construction Provided Temporary Jobs in an Economically Challenging Time in Rural Missouri
Fabricated in Missouri
Challenges

• First in Missouri to Develop an Anaerobic Digester System for Animal Waste
• One of the First Anaerobic Digester Systems in the Nation for Beef Cattle
• Finding Contractors that Understood the Technology
• Negotiating a Power Purchase Agreement and Interconnection Agreement
Challenges

- Procurement of a Construction Permit
- Manpower Available to Small Producers for Paperwork, Daily Communication with Multiple Entities
- Getting People to Understand that this was an Industrial Application and the Attitude that it was Good Enough Because it was Just for a Feed Lot.
Surprises

• Multi Government Agencies that Worked Well Together
• Support from the General Public
• Reactions from Visitors that are Surprised with the Complex Piping, Electrical, Equipment and Automation in Just a Feed Lot.
Think Green with a Natural Fertilizer
Construction of a Digester from an Owner’s Point of View
Researching all the different technologies.

There are multiple technologies available.

- Plug Flow
- Modified Plug Flow
- Induced Blanket Reactor
- Induced Bed Reactor
Considerations

It will take in-depth study to determine the correct application for the type of facility.
• What are you starting with?
• Do you have existing facilities or are you starting new?
• What type of waste stream are you dealing with?
• What are you trying to achieve?
Is it Feasible?

Having the right people together to determine feasibility

- Third party verification
- Trust in the people you are paying to prove your project is feasible
- The need for multiple disciplines to make sure the feasibility is valid
See What You Will be Purchasing

Having the ability and the time to travel and look at different technologies

• When spending the expected amount of capital, you will need to have time to travel and look at different technologies.

• From Missouri, it is at least a day drive to get to different technology facilities.
Understanding what each technology offers in benefits to your project

- The people you will hire for research is important.
- The owner or owners looking at the project will need technology, mechanical and financial background to be able to encompass the entire research needing done.
Determining what is a complete project to different companies

• Turn-key in the digester industry is not what the construction industry calls turn-key.
• Find out how each company fills the gaps at all interface connections.
• Make sure if the company you deal with says it is turn-key, that it is.
Having the people on board to pull together the planning for the project

- The research team needs a diverse knowledge and experience.
- The project manager must have the ability to see problems occurring and have the correct people to address the problem.
- The construction manager must have the knowledge to prevent sub-standard building practices.
• The people above have to have the ability to correct problems as they see fit without the owner wanting to solve the problem themselves.

• The people in the background – the lawyer, the accountant, and the engineer must have the ability to anticipate potential problems.
Finding the financing ability for a large project
Having an asset base large enough to begin the project

- Funding for a digester can be huge to a small operator.
- Have the ability to cash flow the project until funding becomes available.
- Be willing to risk assets to complete a cutting edge project.
Finding ways to leverage your asset base

- If the funding is not readily available, can you leverage your assets with your banker to fund you?
- The feasibility study, business plan and marketing plan can do this for you. All three plans are a necessity to do this correctly.
Finding the subsidy funding to implement the project

- You will need a team of individuals to assist you in finding subsidy funding.
- There are multiple sources of funding, your team will have to do in-depth study to find the mix you need.
- Contrary to most peoples’ beliefs, government agencies will work together.
Having the people in place to document the project for the funding agencies

- You may need to hire people to do some of your documentation.
- You may have people on staff that can already do the job.
- Documentation is critical and time consuming for up to 5 years.
Finding the construction firms to build your project
Where are the construction companies that can complete the job?

- If your digester company is not providing a true turn-key project, you will have to find companies to build it.
- Some smaller local companies may be able to do all or part of the project but may not truly understand the project.
- You may have to look for larger firms if you are building a more intricate plant.
How do you control the construction project from an investor standpoint

- If your project is turn-key, you still need to have personnel in place to oversee the project.
- The owner must have someone with the ability to see problems developing and change directions. This could be either themselves, a construction manager or an engineer.
How do you bring a project to completion

• The owners personnel must know when a contractor is just making more work for themselves.

• At what point is the project complete and/or have you started another phase.
What does it take to run the project after completion?
How do you train your people onsite to do their job

• The owners staff must be trained by the company that sold the digester.
• The owner’s staff must have the ability to understand the tasks and the ability to execute them.
• Detailed record-keeping is a must.
What level of person does it take to run the digester

- The operator needs to have an attention for details, be analytical and willing to continually work to optimize production.
How do you get your employees to understand they have gone from running a feedlot or dairy to running an industrial manufacturing plant?
• The staff running the facility must change their thinking from agriculture to industry
• They must understand that a digester is a giant cow’s rumen controlled by a computer. As with a computer the input determines the output.
• The digester can be a dangerous environment and must not be taken lightly
• Maintenance is a huge issue that will either make the plant successful or destroy it
• It is a computerized waste treatment plant that is no different than you will find in a city or industrial setting and must be treated that way
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