



Hometown BioEnergy: On Peak Power Generation from Waste

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Presentation Outline

- Project Owner
- Project Development
- Description of Project
- Revenue Streams
- Challenges in Development
- Complex Operations: Feedstock Focus
- Conclusion

Project Owner

- Minnesota Municipal Power Agency (MMPA)
 - Avant Manages MMPA
- 300 MW Power Supplier
 - 25% Renewable Energy By 2025
- 12 Member Communities
 - MMPA Desires to Support its Member Communities

Project Development: A Synthesis of Partnerships

- Anaerobic Digestion Technology
- Permitting
- Engineering & Design
- Procurement
- Construction
- Commissioning

Description of Hometown BioEnergy

- Anaerobic Digestion Facility
 - Annual Capacity 45,000 Dry Tons Agricultural and Food Processing Waste
 - Xergi: Technology Provider
- 8 MW Electric Generation
- Liquid Fertilizer and Dried Digestate Production

Facility Overview



Key to Facility Features

- | | | |
|----------------------------|-------------------------|-------------------------------------|
| 1. Admin Building | 10. Make-Up Water Tank | 19. Stormwater Infiltration Pond |
| 2. Process Building | 11. Genset Blowers | 20. Electrical Enclosures |
| 3. Liquid Biomass Pre-Tank | 12. Flare | 21. Electrical Transformer |
| 4. Digester No. 1 | 13. Flare Blowers | 22. Lagoon Valve Shed |
| 5. Digester No. 2 | 14. Fire Pump Enclosure | 23. By-Product Storage Lagoon No. 1 |
| 6. Gas Holder No. 1 | 15. Fire Water Tank | 24. By-Product Storage Lagoon No. 2 |
| 7. Gas Holder No. 2 | 16. Dump Coolers | |
| 8. Gas Holder No. 3 | 17. Hot Water Tank | |
| 9. Gas Cleaners | 18. Biofilter | |

Hometown BioEnergy



Receiving Hall



Automated Monorail Crane



Feeding Modules



Digesters and Gas Storage



Generators



Dryer and Load Out



Revenue Streams

- On-Peak Electricity
 - Storage of Gas
- Feedstock Tipping Fees
 - Related to Energy Value
- Liquid Fertilizer
- Dried Material
 - Boiler Fuel
 - Soil Amendment
 - Bedding Material

Challenges in Development

- Implementing European Technology in US
 - Engineers and Contractors Unfamiliar with Technology
- Educating Community About Project
- Construction Schedule
 - Started December 2012
 - Biogas Production October 2013
 - Electricity Production December 2013

Complex Operations

- Make and Sell Three Products
 - Electricity
 - Fertilizer
 - Dried Digestate
- Assemble Waste from Multiple Sources

Waste Sources

- Solids, Semisolids, and Liquids
- Agricultural Wastes
 - Corn Silage
 - Manures (incl. cow, horse, hog, poultry)
- Food Processing Wastes
 - Meat and rendering waste
 - Dairy processing waste
 - Grain processing waste
 - Vegetable & canned food waste
 - Greases

Waste to Energy: The Way of the Future

- Using waste as feedstock is sustainable
 - Full circle: from the earth, to the earth
 - Waste producers and haulers ‘go green’

Feedstock Partnerships

- We build partnerships with
 - Waste generators
 - Waste collectors
 - Commercial haulers
- Relationship creates value for both partners

Conclusion

- Unlikely that One Firm Possesses All Resources Needed for Success
- Joint Ventures are Likely Forms of Development
- Successful Ongoing Operations are Built on Strong Partnerships



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