

# INVESTING IN RENEWABLE ENERGY



## BIOMASS FUELS CREATE ENERGY AND REDUCE ENVIRONMENTAL IMPACTS

### Project Description:

Coaltec examined the feasibility of utilizing poultry litter as a renewable fuel for gasification to produce heat and specifically electrical power.

The components of the project consisted of:

- A test burn to confirm the ability of the process to deliver the desired results;
- Data collection to determine the volume of material available and potential applications;
- A representative project design of a gasification plant; and
- The analysis of the potential impact on the service area in Minnesota.

### Benefits:

- Energy produced from poultry litter reduces the need for other energy sources.
- Gasification air emissions are low.
- Current land application methods are creating huge issues in many poultry growing regions. Eliminating the need to land apply has a major or positive environmental advantage.
- Additional economical benefits to the host farm—heating of poultry houses, disposal of mortalities—and less expensive litter handling and disposal.
- The ash produced is a dry, fine material that retains phosphorus and potassium nutrients, but not pathogens and odors. This makes it easier to handle and transport for land application.



**Grantee:** Coaltec Energy USA, Inc., Carterville, Ill.

**Web site:** [coaltecenery.com](http://coaltecenery.com)

#### Additional Team Members:

West Michigan Turkey

Dr. Wiltowski, Southern Illinois University (SIU)

Agricultural Utilization Research Institute (AURI), Crookston, Minn.

**Project Dates:** 2005-2007

**Project Funding:** \$450,000

**Project ID:** RD-26

**Deliverable:** Commercial scale test of turkey litter gasification

**Mission:** Promote the use of renewable energy

**Contact:** Renewable Development Fund

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## Objectives:

This new technology and its application were designed to give value to its users: poultry producers. This technology is easy to operate and requires minimal attention, thus not only providing a theoretical economic benefit, but one that can be realized by the owner.

## Methodology:

The testing facility was a commercial sized gasification unit. This unique approach provided answers to questions typically left unanswered by laboratory testing, thus reducing the risks of advancing to commercialization. Data collected was sufficient to develop a design for a commercial gasification facility.

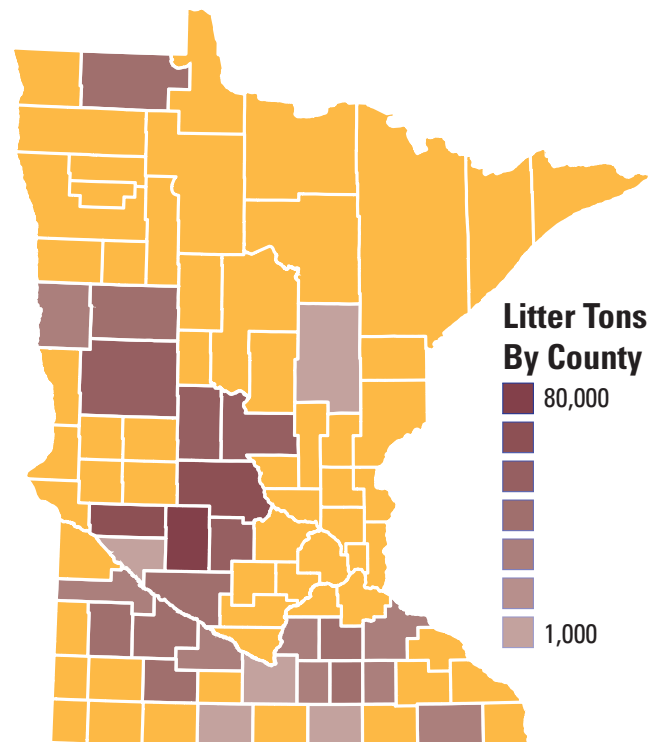
Fuel cost is a major component in any energy project. Biomass fuels may be basically free at the source, but since they are lower in energy content and density, the cost of handling and transportation is exacerbated. Therefore, it is critical to minimize the handling and transportation of the fuel, to keep costs low. This is done through small scale, distributive facilities rather than large centralized systems.

## Outcome and Lessons Learned:

- The gasifier can be used to supply heat to the poultry houses, which not only eliminates the cost of propane but also lowers moisture content; thus reducing ammonia levels and benefiting the animal's health.
- The gasifier can easily control NOx formation. Particulate matter is not an issue, unlike an incinerator.
- There are approximately 45 million turkeys grown annually in Minnesota. Every 1,000 birds produce 12 tons of litter each year. Almost 40 million of those birds are on farms that are large enough to potentially site a facility—or are in a cluster of farms that could supply a localized central facility.
- Approximately 15,000 tons of litter per year are required to develop a facility that produces enough electricity to be economically viable (typically between 1 and 3MW).
- There is a potential to develop about 30MW of power in Minnesota.
- While there has not been a maximum fuel volume identified, this technology, like most, has a size range that is most likely to provide the greatest benefit. Typically, if the volume is over 150,000 tons per year, there are other technologies available.
- The system has operated on fuels with a heat content as low as 2,700 BTU per pound, but to produce sustainable energy at an economic level, typically the fuel needs to contain a minimum of 3,750 BTU per pound. A case study done in August 2006 showed that turkey litter fuel has 4,700 BTU per pound of energy.

## Executive Summary:

With the help of Xcel Energy's Renewable Development Fund, Coaltec Energy was successful in researching the feasibility of utilizing a gasification system fueled by poultry litter as an economically suitable method of producing energy. It not only shows an economic benefit, it also provides an overall benefit to the business. This technology is easy to operate and requires minimal attention, giving poultry producers time to concentrate on their core business, not working on energy systems.



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