

# Alternative Technologies/Uses for Manure Fact Sheet

## COMPOSTING

**Description:** Composting is the aerobic decomposition of manure or other organic materials in high temperatures. When manure is put through this process, the resulting product, compost, is an odorless, low-moisture-content, fine-textured material that can be used in bulk as a fertilizer or bagged and sold for use in nurseries and gardens.

### Incentives for Using This Technology:

- Composting reduces manure volume and weight – which improves handling.
- Manure that has been composted is a more stable nutrient form.
- Less nutrients are likely to be transported by runoff or leaking in this form.
- Composting can reduce manure odor.
- Compost kills weed seeds, fly larvae and pathogens.
- Compost improves the moisture retention of light soils.
- Composting produces heat, which can be collected and used later.

## PELLETIZING

**Description:** Pelletizing, also known as extrusion, converts fresh manure into a dry, pathogen-free, easy-to-handle, finished product that can be used as a fertilizer, soil amendment or energy fuel. The manure is compacted at high temperatures and pressures, then compressed in a die to form pellets.

### Incentives for Using This Technology:

- Pelletizing provides farmers with an animal-waste option.
- Pellets can be used on-site or sold off-site to fertilizer or fuel markets.
- On-site pelletizing systems allow farmers to process and use animal waste on the farm.
- Because pellets take up a much smaller volume than manure does, they can be easily stored and transported.

## GASIFICATION

**Description:** Gasification is a process that uses heat to convert animal manure into a clean gas form. It is a two-step process; the first step – pyrolysis – vaporizes the volatile components of the manure. The resulting product, called char, is gasified in step two, which creates the clean fuel gas.

### Incentives for Using This Technology:

- Animal manure becomes an energy source.
- Converting manure into heat or electricity creates new jobs, provides new income, gives farmers a new option for waste disposal and significantly reduces runoff.
- Gasification produces cheaper fuel than fossil fuel.
- Gasification produces a product that's versatile. It can be used in gas turbines, fuel cells and reciprocating engines.

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## **COFIRING**

**Description:** Cofiring is the simultaneous combustion of a supplementary fuel, such as manure, with a base fuel, such as wood or coal. The end product of cofiring is electricity.

### **Incentives for Using This Technology:**

- Cofiring increases fuel diversity for utilities.
- Converting manure into heat or electricity creates new jobs, provides new income, gives farmers a new option for waste disposal and significantly reduces runoff.
- Cofiring is more economic than traditional coal firing.
- Compared to traditional coal firing, cofiring with manure reduces fossil-fuel-derived carbon dioxide emissions.

## **ANAEROBIC DIGESTION**

**Description:** Anaerobic digestion is the decomposition of manure in an oxygen-free environment. The two most common systems are anaerobic digesters and anaerobic lagoons. Anaerobic digesters break down the manure much like a digestive track breaks down food. The manure turns into biogas – a combination of methane, carbon dioxide, nitrogen, hydrogen, carbon monoxide, oxygen and hydrogen sulfide. The lagoons function similarly, with one exception, the lagoons are usually not covered to collect the gas.

### **Incentives for Using This Technology:**

- Anaerobic digesters reduce unpleasant odors.
- Anaerobic digesters produce a high-quality fertilizer.
- Manure that goes through this process is uniform and easy to spread during land application.
- Heated anaerobic digesters reduce the amount of pathogens in the manure.
- Biogas recovered from this process can be used to generate electricity on-farm or for sale.

## **METHANOL**

**Description:** Methanol is a simple alcohol that exists as a liquid in its normal state and burns like gasoline. Manure can be turned into methanol by converting it into a synthesis gas stream which is manufactured into a usable form of methanol.

### **Incentives for Using This Technology:**

- Methanol is a liquid and can be stored, transported and used as easily as gasoline and diesel.
- Methanol burns more completely than gas and diesel, producing less carbon monoxide emission.
- Converting manure into heat or electricity creates new jobs, provides new income, gives farmers a new option for waste disposal and significantly reduces runoff.
- Use of methanol reduces dependence on nonrenewable-energy sources.

This material was compiled from an EPA report “*Alternative Technologies/Uses for Manure.*” The full report can be found online at [http://www.epa.gov/npdes/pubs/cafo\\_report.pdf](http://www.epa.gov/npdes/pubs/cafo_report.pdf).