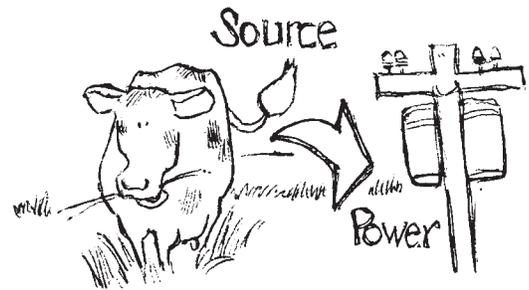




Manure Management



EPA's State and Local Climate Change Program helps build awareness, expertise, and capacity to address the risk of climate change at the state and local levels. The program provides guidance and technical information to help state and local agencies prepare inventories of greenhouse gas emissions, develop action plans to reduce emissions, and educate their constituents. By emphasizing the many economic and environmental benefits of greenhouse gas reductions, the program encourages state and local decisionmakers to implement voluntary measures to reduce their greenhouse gas emissions.

Manure Management

The decomposition of animal waste in an anaerobic (oxygen-free) environment produces methane, a powerful greenhouse gas. Manure storage and treatment systems account for about 9 percent of total U.S. methane emissions, and about 31 percent of methane emissions from the agricultural sector.

Over a 100-year time span, methane is 21 times more effective than carbon dioxide at trapping heat in the atmosphere and is responsible for about 10 percent of the warming caused by U.S. greenhouse gas emissions.

Liquid-based manure management systems, such as manure ponds, anaerobic lagoons, and holding tanks, account for more than 80 percent of total methane emissions from animal wastes. The other treatment system—solid manure management

practices such as spreading manure on fields—produces insignificant amounts of the gas but can lead to increased nutrient runoff, affecting water quality.

From 1990 to 1996, emissions from manure management increased by 11 percent as farm animal populations grew and farmers expanded their use of liquid manure management systems. Given the trend toward larger and more specialized livestock production, liquid manure management is expected to continue increasing in the future.

Odor control and water quality protection have become priority issues in manure management, particularly as residential development expands in rural areas. These concerns have led a growing number of farms to consider installing anaerobic digester systems. An anaerobic digester is a container, such as a covered lagoon, designed to hold decomposing manure under warm, oxygen-free conditions that promote the growth of naturally occurring bacteria. These bacteria digest the manure, producing methane and an effluent that farmers can use in place of untreated manure.

The methane produced by digesters, known as biogas, can be captured cost-effectively (depending on farm size and other factors) and used as an energy source. Biogas recovery systems trap the gas in covered manure lagoons or other manure digesters, collect it in perforated pipes, and transmit it to an electric generator or boiler. Alternatively, the gas may simply be flared for odor control.

Farmers can use biogas to produce electricity, heat, hot water, and refrigeration for use on the farm, while reducing odors, methane emissions, and surface and groundwater contamination. They also can sell the electricity to utilities and

BENEFITS OF BIOGAS SYSTEMS

- Reduce odors.
- Provide high-quality fertilizer.
- Reduce surface and groundwater contamination.
- Destroy pathogens and weed seeds.
- Reduce atmospheric emissions of methane, a powerful greenhouse gas.
- Provide on-farm energy.
- Create jobs related to the design, operation, and manufacture of energy recovery systems and lead to the advancement of U.S. agribusiness.

the digested solids (a high-quality fertilizer) to other farmers, home gardeners, and others, creating new sources of income for themselves. For example, Craven Farms of Cloverdale, Oregon, annually produces \$24,000 of electricity and \$30,000 of digested solids with its biogas system. Maximizing farm resources in this way may help farmers remain competitive and environmentally sustainable in today's livestock industry.

Digested wastes are biologically stable when compared with untreated manure, and they mineralize so that they have a higher ammonium content, which allows predictable crop uptake. When properly applied, digested manures reduce the likelihood of surface or groundwater pollution. Digesters also can reduce pathogen populations in manure, destroy weed seeds, and control odors.

The federal AgSTAR program estimates that some 3,000 livestock facilities across the United States could install cost-effective biogas recovery systems, with a potential to recover 426,000 metric tons of methane.

The Federal Role

The federal AgSTAR Program, a joint initiative of the U.S. Environmental Protection Agency, the U.S. Department of Energy, and the U.S. Department of Agriculture, shows dairy and pork producers how to manage manure profitably while protecting the environment. AgSTAR provides technical support, software tools, and information on biogas digesters and has supported the development of national standards for commercial-scale anaerobic digestion systems.

To ensure that methane recovery systems are correctly designed, installed, maintained, and operated, the U.S. Department of Agriculture's Natural Resources Conservation Service and EPA have developed Conservation Practice Standards for methane recovery systems. These standards, which are available in the current edition of the AgSTAR Handbook, provide technical guidance to livestock producers, designers, engineers, and installers of methane recovery systems to reduce risk of technical failure or system under-performance.

The USDA Environmental Quality Incentive Program provides cost-sharing for agricultural improvements in targeted regions to help meet water quality and other environmental objectives. Funding is available for animal waste management facilities. Fifty percent of the funding for the program is targeted at natural resource concerns relating to livestock production.

In addition, the U.S. Department of Energy supports biogas projects through the Regional Biomass Energy Program (RBEP) in five regions of the continental United States. The program provides cost-sharing and other support to improve state, local government, and industry capabilities and effectiveness in the production and use of biomass energy resources, including agricultural biogas. The RBEPs also publish a biogas handbook that provides information on the various uses of biogas, gas handling, clean-up, health and safety issues, economics, and sources of equipment and expertise.

State Experience with Manure Management

A number of states support agricultural biogas systems through grants, cost-sharing, low-interest loans, demonstration projects, or information and technical assistance programs.

Illinois

Illinois offers a 50-50 cost-share (up to \$550,000 per grant) to farmers who install eligible anaerobic biogas electricity systems. The grant program, established under utility restructuring legislation passed in December 1997, is funded through a surcharge or "systems benefit charge" on electricity provided by investor-owned utilities.

The biogas grants are available for systems purchased or constructed after January 1, 1998. Experimental or untested designs are not eligible for funding.

Apex Pork, a farm in Galesburg, Illinois, installed an innovative digester system to treat manure from 8,600 pigs. The biogas is used in a boiler, and excess gas is flared to control odors.

North Carolina

Farmers who want to install anaerobic digesters may apply to the North Carolina Energy Division for low-interest loans and other assistance. The loan program provides up to \$500,000 per project at four percent interest for seven years.

The grants program offers limited funding but helps farmers secure outside financing. The state also sponsors demonstration projects on an individual basis.

The AgSTAR program's demonstration farm at Barham Farm in Zebulon, North Carolina, uses a biogas system to control odors and produce hot water and electricity. The system recovers 28,000 cubic feet of biogas per day, providing 90 kilowatts of electricity during on-peak day periods and nighttime boiler operation for heating needs.

For More Information

The AgSTAR Program shows dairy and pork producers how to manage manure profitably while protecting the environment.

Tel: 800-95-AgSTAR

Website: <http://www.epa.gov/outreach/agstar/index.htm>

USDA's Environmental Quality Incentives Program offers financial, educational, and technical help to farmers and ranchers in designated priority areas.

Website: <http://www.nhq.nrcs.usda.gov/OPA/FB96OPA/eqipfact.html>

The U.S. Department of Energy's Regional Biomass Energy Program provides cost-sharing for a wide range of biomass projects, including agricultural biogas systems.

Tel: 202-586-1480

Website: <http://rredc.nrel.gov/biomass/doe/rbep/>

The National Food and Energy Council provides educational materials, training courses, and direct technical assistance to members, including help with biogas systems.

Tel: 573-875-7155

Website: <http://www.nfec.org/>

EPA's State and Local Climate Change Program helps states and communities reduce emissions of greenhouse gases in a cost-effective manner while addressing other environmental problems.

Website: <http://www.epa.gov/globalwarming/> and click on "Public Decision Makers" under the "Visitors Center."