

## SIERRA CLUB GUIDANCE: METHANE DIGESTERS AND CONCENTRATED ANIMAL FEEDING OPERATION (CAFO) WASTE

### INTRODUCTION:

The use of methane digesters to produce energy from animal manure may have a role in addressing environmental problems and meeting energy needs, but the Sierra Club opposes public subsidies to such energy generation at large concentrated animal feeding operations (CAFOs) because of the environmental and social damage associated with them: polluting our waters and our air; excessive use of antibiotics and hormones; mistreatment of animals; and harming rural communities and small farms.

### METHANE DIGESTERS: WHAT ARE THEY?

Methane digesters are anaerobic (low or no oxygen) chambers which facilitate the breakdown of manure by anaerobic bacteria with the release of methane and other gases as a byproduct of their metabolism, ammonia, nitrogen, hydrogen sulfide, and sulfur dioxide. Methane can be burned directly in stoves or burners, to heat the digester, and it can be converted to electricity. There are several different types of systems but all commercially available systems are expensive to install and require manure from a large number of animals to operate. (Fulhage et al. 1993)

### IS THERE A ROLE FOR METHANE DIGESTERS ON SMALL FARMS?

The purpose of this policy is to address the use of methane digesters to handle animal waste generated by concentrated animal feeding operations (CAFOs), as that term is used in the Clean Water Act. However, it is also necessary to consider the use of methane digesters on farms with livestock that are not CAFOs. This may include farms with large numbers of animal units but with enough pasture (the animals go to the feed) so that it is not an "animal feeding operation" (AFO - the feed is brought to the animal). It may also include farm operation where the animals are confined but where the number of animal units is below the regulatory definition of a CAFO. The Sierra Club believes that large farms with sufficient pasture are unlikely candidates for methane digesters. Therefore, this policy will use the term "small farms" to describe farms that are not CAFOs.

There is some evidence that methane digesters can offer significant manure management benefits for small farm operations (U.S. EPA Office of Air and Radiation, Spring 2002). Digesters can substantially reduce odor and releases of methane, a powerful global-warming gas; can convert nitrogen into ammonium, a form more available to plants and less likely to be carried away with runoff when the remaining waste solids are land-applied; can reduce fly infestation; and can reduce the oxygen-depletion capacity of the remaining waste although the liquid waste does still require additional treatment prior to release.

On the other hand, the land application of manure is the most environmentally responsible method of manure management where there is sufficient land to insure that manure application will not exceed soil absorption capacity and crop and pasture nutrient needs and where the land application practices do not cause a nuisance. Therefore, the Sierra Club will consider the role of

methane digesters on small farms as requiring a case-by-case evaluation. The use of public money to subsidize methane digesters on small farms requires public participation, community support, transparency and accountability.

## DO DIGESTERS MITIGATE THE ENVIRONMENTAL IMPACTS OF CAFOS?

CAFO waste streams are so large and contaminated that methane digesters mitigate only a small fraction of their environmental damage. Equipment costs (U.S. EPA Office of Air and Radiation, Winter 2002) and maintenance for conversion to energy are high. The biogas must have ammonia, moisture, and particulate pollution (dust) removed, and then be compressed. It requires additional cleaning if it is to be sent into a natural gas pipeline.

Most environmental damage caused by CAFOs, however, remains unabated. Excess nutrients which run off from waste lagoons or land-applied waste residuals suffocate the life out of our waters. The volume of solid waste remaining is not significantly diminished and requires proper disposal (Iowa State University et al. 2002). The solid waste is often land applied as "fertilizer" or "soil conditioner" but can pose problems because anaerobic digestion does not remove antibiotics and heavy metals passed by dosed swine and poultry. In addition, although pathogen numbers decrease, the decrease may be ephemeral as the pathogens regrow (Gibbs et al. 1997). Numerous studies have demonstrated that these toxic and pathogenic contaminants are entering the environment in substantial concentrations (Giger et al. 2003, Huang et al. 2001, Kolpin et al. 2002, Union of Concerned Scientists et al. 2002). Further, digesters pose a risk of explosion and create both nitrogenous and sulfurous gases which may be emitted. In sum, the potential for methane digesters to partially mitigate some of the extensive and pervasive damage caused by CAFOs does not justify the use of this technology as a basis to support the development of new CAFOs. Existing CAFOs may reduce the problems they are currently causing by use of methane digesters. However, they should be installed at the cost of the CAFO owner and not from public subsidy.

## HOW CAN THIS TECHNOLOGY BE UTILIZED ON SMALLER FARMS?

While focusing primarily on serving CAFOs, the joint US EPA - USDS - DOE AgStar program and a number of commercial providers have assisted in the development and installation of digesters on smaller farms. Where methane digesters are able to operate on small, non-CAFO operations where antibiotic use is limited to treatment of disease rather than to promote faster weight gain, where animals are free of growth hormones, and where toxic and pathogenic byproducts of the digesters are controlled, there is a potential for methane digesters to provide beneficial waste treatment. In such situations we should seriously consider supporting smaller farms which are working towards adopting these potentially sustainable practices by ensuring that they have fair access to methane digester technology.

## HOW ARE METHANE DIGESTERS REGULATED?

The federal AgStar program is aimed at reducing greenhouse gases and providing energy while protecting the environment. AgStar has developed interim standards, presently voluntary, for the construction and operation of several types of manure digesters. (USDA-NRCS Biogas Interim Standards). Though these federal standards require compliance with local and state regulations, the

adequacy and thoroughness of local and state regulations varies substantially across the nation and some states do not address digester operations at all (Iowa State University et al. 2002). This is not enough environmental protection. The Sierra Club wants the standards to become mandatory, inspections to be routine, and enforcement to be effective. We want testing and limits protective of natural resources, human health, and human quality of life to be set for metals, antibiotics, hormones, pathogens, odor-producing and air borne compounds, and other pollutants released from digester effluent, residual sludge, solid waste fertilizer, and other byproducts of both CAFOs and methane digesters.

## SHOULD CAFO-DERIVED METHANE GAS BE INCLUDED IN A RENEWABLE ENERGY PORTFOLIO?

NO. A fuel that damages the environment is not "renewable". The anaerobic decomposition of CAFO manure, like the decomposition of garbage in landfills, and waste-burning incinerators, is symptomatic of inefficient waste treatment, treatment necessitated by inefficient, wasteful industries, practices, and processes. The Sierra Club favors conservation of materials and energy, energy efficiency in processes and operations, and the recycling of materials over the thermal destruction of materials for their energy content. Small farms which utilize land sufficient to support the number of animals being raised can be operated so that the land, air, and water are not degraded and the waste can be recycled into the soil rather than accumulating and decomposing via the methane-generating anaerobic process. CAFO waste lagoons and landfills release heat, a waste of thermal energy and methane, a waste of chemical energy. Capturing energy from these processes reduces some of the environmental damage associated with these wasteful and inefficient systems but it doesn't move us towards a clean, renewable energy future which must be built upon conservation, efficiency, and material recycling.

## SHOULD DIGESTERS BE SUBSIDIZED?

Subsidies for energy production from digesters have become a frequent provision in energy legislation. Some fossil fuel use may be displaced by methane digesters but it is a small amount. Similarly, some global warming gas emissions are reduced by the use of digesters but CAFOs are a minor contributor overall (U.S. EPA, April 2004). The benefits of methane digesters in terms of energy policy are small so subsidies for CAFO digesters are not consistent with good energy policy. The fuel for digesters is primarily CAFO manure, a waste which depletes and degrades natural resources. In evaluating whether a subsidy under consideration might be supportable, one must consider whether the subsidy would produce greater environmental gains if applied, for instance, to a clean, renewable energy source.

For forward-thinking energy policy, we have to take a broader perspective. A public subsidy of \$200,000 in public money could provide about 50% of the funding necessary for a digester which could collect the methane generated by the water-flushed manure of 1,000 dairy cows, methane which would be burned for energy and would emit pollutants into the atmosphere. That same funding could pay for the installation of wind turbines which would supplant fossil fuel burning on that same farm without emitting air pollutants. That same funding could subsidize smaller dairy farms which generate dry manure rather than water-flushed manure; dry manure generates only

minimal amounts of methane. As citizens, it is our responsibility to "do the math" and to ensure that we are looking towards long-term solutions, not just short-term fixes.

#### DO WE SUPPORT LEGISLATION PROMOTING DIGESTERS?

Many states are now considering legislation which promotes renewable energy and includes methane digesters as a potential source for such energy. The Sierra Club prefers clean, renewable energy sources over CAFO waste so legislation should be evaluated to ensure that support for clean renewable fuels is strong. We also want to ensure that when methane digester energy is included in legislation, its impacts are adequately regulated and small farms are provided with fair access to the technology and to the energy grids which permit the sale of the energy. Smaller farms may require additional access and provisions to allow them effective and fair access.

Promoting the development and deployment of clean renewable energy technology is a high priority for the Sierra Club. Club entities are encouraged to advocate as much as possible for clean sources of renewable energy, and to oppose inclusion in RPS legislation and other relevant proposals of alleged sources of renewable energy that encourage or subsidize environmentally questionable practices, such as CAFOs or waste combustion.

#### SHOULD WE SUPPORT OR OPPOSE NEW DIGESTERS IN OUR OWN COMMUNITIES?

The Sierra Club opposes the development of new CAFOs, and, therefore opposes new CAFOs with methane digesters because the problems of CAFOs will greatly outweigh the potential benefits of methane digesters. However, communities with existing CAFOs face a different situation. In these communities, the decision will be a local, case-by-case decision. Local, state, and federal environmental laws should be in place to protect public health and the environment from the impacts of CAFOs. Existing CAFO owners must comply with all these laws and must have invested in the technologies needed to eliminate all forms of pollution.

Sierra Club groups and communities should work together to analyze and decide on a case-by-case basis whether the good results of installing a methane digester at a local facility outweigh the bad. Methane digesters can provide substantial relief from the odor and flies which plague nearby homes and communities (Pain et al. 1990, Wilkie 2000) as well as providing some reduction in greenhouse gases and supplanting of fossil fuel use (Martin 2003, US EPA Office of Air and Radiation 2003). Their emissions, however, must be controlled and safe operation ensured. The Club can assist communities by assuring that the public participation process is robust, that all relevant information is made available to the public, and that federal, state, and local environmental regulations will fully protect the environment and permit requirements will be met and enforced.

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