

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Implementation of the Alternative Energy Portfolio Standards Act of 2004 : Docket No. M-00051865
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COMMENTS OF ENVIRONOMICS LLC (waste2profits.com)

Safe, Reliable, Undeletable Manure Power with Multiple Environmental Benefits

Thank you for the privilege of testifying before you today. I support the Alternative Energy Portfolio Standard Act. It is good for the Commonwealth and potentially good for my clients. Farmers either with or considering manure digesters constitute the largest percentage of my clientele. My comments relate to how cost recovery, net metering, interconnection issues affect my clients. These topics control farmer decisions whether to assist the Commonwealth to achieve renewable energy goals. Ironically, when farmers are permitted to participate, Commonwealth air and water quality will be protected in ways unfathomable by the drafters of the bill. Feel free to contact me at 917.359.5616.

Environomics LLC is a national manure digester consultant to animal production facilities. Since 1986 we have advised producers on digestion system issues. I supervised construction startup and public relations for the Seven Valleys Valley pork digester in the 80's and 90's, continue to advise Harlan Keener's Lancaster hog and food waste digester, have executed dozens of feasibility studies including the Adams county community digester study and have fortunately had several of my digester proposals funded by DEP. I am an animal scientist with an environmental science graduate degree who first produced cattle feedlot biogas in 1969, and since have supervised construction and consulted on several dozen digesters throughout the United States, Canada and three continents.

I named the company ENVIRONOMICS in 1986 because I observed manure managers will likely become even better environmental stewards if there are economic incentives to do so.

SUMMARY

Biogas produced from digesting manure from 100 cows has about the same energy content as 1 barrel of oil. Those familiar with the farm know that manure is renewable and undepletable. While energy from a digester is renewable, farm waste digestion is actually a manure waste treatment system that pays for itself.

This Commission has an opportunity to greatly leverage the intent of ACT 213. However, there are issues critical to farm decisions whether to involve their undepletable manure in achieving the Act's goals for renewable energy generation.

Other countries and competing states have benefited from farm digesters as an environmental treatment system, renewable energy source. Public policy must support the efforts. Public policy must come from the perspective of the greatest public good.

Power generating manure digestion systems permit Commonwealth farmers to pay for the treatment of their manure. Cost to utilities is negligible. Value to the common good is immense: reduced farm odors, cleaner waterways, continuation of green open spaces and the economic benefits to rural communities of financially viable agriculture enterprises.

Farms must be able to economically and in a timely fashion install systems to net meter the power they generate.

I follow with justifications for rulings to specifically favor Pennsylvania farm renewable energy and farm waste management.

RECOMMENDATIONS

The hearing is to seek technical input for rules implementing the Alternative Energy Portfolio Standards Act. Initially, I will offer my recommendations and follow with discussion of the key issues leading to these recommendations. In my opinion the Commission, in its discretion, should:

- 1 Acknowledge that energy choices have many economic growth, environmental protection and national security implications,
- 2 Recognize farm manure digestion systems, while assisting in the achievement of commonwealth renewable energy goals, also significantly improve environmental quality on farms by permitting economic installation of manure treatment systems,
- 3 Recognize that (at no additional cost) ACT 213 has the potential for immense positive environmental impacts in addition to those contemplated in the ACT,
- 4 Review actions associated with ACT 213 for their impact on manure managers' decisions to install renewable energy waste treatment systems.
- 5 Act to resolve issues:
 - 5.1 Re: Net Metering: confirm ACT 213 definition of Net Metering as “(T)he means of measuring the difference between the electricity supplied by an electrical utility and the electricity generated by a customer-generator, when the renewable energy system is *intended primarily to offset part or all of the customer-generator’s requirements for electricity*” means **all** meters measuring customer energy needs (my emphasis).
 - 5.2 Re: Cost Recovery, Standby, Demand Charges: acknowledge farm self digestion has little financial impact on utilities; that societal benefits outstrip any impact.
 - 5.3 Re: Interconnection: adopt the comprehensive, technically defensible yet simplified 28 page Standard Interconnect Requirements (SIR) of the State of New York.
 - 5.4 Re: Expedited design review: provide for qualified professional electrical engineers to propose certified manure digestion system cogeneration designs for review and approval by utilities.
 - 5.5 Re: Expedite design: provide for utility conveyance of materials necessary for certified professional electrical engineering of the cogeneration protective relay system.
 - 5.6 Re: Timely design review: provide for timely review of certified engineered designs.
 - 5.7 Re: Disputes: assure utility requirements are technically based by providing a mechanism for review of utility requirements.
 - 5.8 Re: Energy, Capacitance, Environmental attributes: state farms retain ownership.
 - 5.9 Re: RUS: rural electric coops should be encouraged to participate in developing rules associated ACT 213.

SUPPORTING BACKGROUND

PENNSYLVANIA AGRICULTURE

Manure is undepletable and continuously renewed by a key contributor to the Commonwealth economy: animal agriculture. In Pennsylvania there are about 1.2 million pigs, 1.7 million cattle and calves, and over 20 million layers. Strict manure management rules are warranted and in place. Most farmers are good environmental stewards. Fund availability restricts installation of environmental protection measures.

ENVIRONMENTAL RECOGNITION

Manure digestion systems reduce environmental risks in the Commonwealth.

Digestion greatly reduces odors associated with manure. Whereas, in earlier times manure related odors were part of being in the country, today opposition to smells are growing. Nuisance lawsuits can be expensive and disruptive to the social fabric of the community. While some odor control options **consumed** energy, methane generating systems **produce energy**. University of Florida reports odor reduction greater than 90% in digested material. Harlan Keener, surrounded by Lancaster, has not had a single odor complaint since installing his digestion system in the 1980's.

Digestion controls methane emissions. Lagooned undigested manure, especially when properly stored, will release to the atmosphere, methane, a powerful greenhouse gas.

Digestion greatly reduces viability of pathogenic indicator organisms. Cornell and I have observed and reported >99% reductions in viable pathogens in material treated in a digester.

Herbicide usage can be greatly reduced as a result of digestion. Use of manure as a nutrient source assures recycling of weedseeds. Farms using digested material are able to eliminate one whole herbicide application.

Digestion nearly eliminates flies.

HISTORICAL PENNSYLVANIA DIGESTERS

Manure digestion systems have long been in use in the Commonwealth. Mason Dixon Farms, Gettysburg, installed their first digester and cogeneration system in 1979. It functions still. Mason Dixon is installing their 4th system. Rocky Knoll installed its digester in 1985. It continues to treat wastes and sell generated power.

DIGESTION SYSTEM DESCRIPTION

Manure is placed in large steel, concrete or earthen vessels containing naturally occurring organism breaking down manure components with "smell potential" into methane rich biogas. Generators are coupled to engines fueled with this biogas. Costs for large facilities may be \$600 per cow installed. Cost per cow goes up as animal numbers go down.

FARM FINANCIAL BENEFIT

Power bills may be \$50-70 per cow year. Fuels may be an additional \$10-15/cow year. Legal fees for odor and nuisance lawsuits are unpredictable and offensive.

FARM UTILITY SHARED GOALS

I am the veteran of working relations with dozens of utilities, some cheerful. Other experiences have been varying degrees of problematic. Ironically, utility staff and the farm digester owners share objectives:

- Both want safety with no compromise; farmer's children play with linemen's children,
- Both want line quality; farms have power quality sensitive equipment and utilities have responsibility before this commission,
- Both want system reliability; farms don't service debt if the system isn't functioning.

RELIABILITY

Reliability of generation is not an issue, so long as time proven technologies are employed. The Keener, Rocky Knoll system has generated over 90% of the available time since installation. Matlink in New York, Haubenschild in Minnesota and Langerwerf in California are closer to 95%. Mason Dixon is likely in the same range. These facilities treated >99% of the manure since installation.

FARM ENERGY USAGE PATTERNS

In my opinion, Net Metering of contiguous meters will be the most advantageous means for farms to derive the financial benefit necessary to economically justify installing a manure digestion system.

To understand the importance of net metering, farms energy usage patterns need to be understood. The following are examples of generalized but reasonably accurate values. Farms will vary. In the interest of time, I will discuss dairy operations only.

Manure derived biogas will permit generation of 3 to 3.5 kWh of power per cow day nearly year around. Energy usage varies seasonally. Though covering nearly all their energy usage during crucial summer peak use periods, there is an overall annual surplus production. Pennsylvania dairy farms use about 2 kWh of power per cow day on an annualized average. Winter will be 80%-85% of the annual average. July through parts of September values may be 130% to 140% of the annual average power consumption, or approximating 3 kWh power consumption per cow day. To derive greatest value from self generation and to absorb disparities between summer and winter power consumption, surplus power production should be carried over from month to month with a "truing up" on an annualized basis.

Another important pattern to understand is power consumption distribution on the farm. Often different meters service each part of the farm. Dairy farm power is consumed predominately in the milking, freestall barn area, and manure handling system perhaps, 60%-70%. Of the remaining, (depending on the farm design) as much as 30%-35% is consumed in the feed commodity area, with the remaining power consumed in various other buildings.

Farmwaste electrical generation equipment will be located away from a sizeable portion of the farm power usage. Unless all the farm meters are considered in net metering, substantial quantities of benefit will be lost.

RECOMMENDATIONS

FARM WASTE ENERGY: UNIQUE CLASSIFICATION

Farm waste digester electrical generation is a unique category of renewable energy. Not only are there environmental benefits associated with use of a non-depletable fuel, but also the very fuel generation offers immense environmental benefit as a waste treatment. Farm waste electrical generation should be in a unique category with specific language removing barriers to waste treatment energy generation.

NET METERING

State by state comparisons of Net Metering rules are found on the web. I particularly call your

attention to the State of New York Net Metering having to do with farm digesters. The rule has specific farm waste orientations in recognition of the unique contribution digesters make to the environmental well being of the State. Monthly the meter numbers are “trued up” determining net values, with the farm paying for power purchased or the utility issuing a forward credit for surplus power sent to the grid. At the end of the year, surplus power is purchased at avoided cost rates.

METERING

New York Farm waste electrical generation facilities may choose to install single meters (with reverse capability) or two meters. Fortunately, meters are available to record usage from all of these various locations for a tally of power consumption reported monthly by dial-up telemetry.

COST RECOVERY, STANDBY, DEMAND CHARGES

Currently, standby charges will jeopardize farmwaste renewable power generation financially viability. The Commonwealth will lose the renewable energy and overarching environmental benefit of manure digestion.

Farm digesters, so long as they are permitted to do so, clearly will contribute towards achieving ACT 213 renewable power generation goals. Farm digester output is but a part of the 18% renewable energy target, a small part. Lost farm electric sale revenues will not hurt those who depend on utility dividend checks. EDC cost recovery will be impacted infinitesimally. What will impact the public are the major side environmental benefits of installing these systems. The benefits of ACT 213 are more overarching.

There should be no standby, demand or cost recovery charges so long as the digestion system cogeneration system meets or exceeds 90% of its projected 12 month production. In many cases, the digestion generation down time is less than the utility downtime. There should be no double standard for performance reliability.

New York farm waste digestion electrical generation systems are exempt from Standby Charges. Some New York farm waste electrical generation facilities are exempt from Demand Charges.

INTERCONNECTION

All biogas fueled generation systems should install IEEE standard generation and interconnect equipment to assure safety and grid power quality. Utilities should technically justify requirements.

Much can be learned from case studies of other states. Twenty-eight pages contain the entire New York Standard Interconnection Requirements (SIR) and Application process for New Distributed Generators 2MW or less. Initial New York SIR procedural and technical rules were a great improvement over the utility-to-utility requirements, but were still so challenging as to lead to frustration and postponement or cancellation of untold numbers of farm biogas projects. New York evolved the Standard Interconnect Requirement (SIR) rules until they are now reasonable and workable. Interconnect protection is consistent with IEEE Std. 1547. The SIR has specific farm waste orientations in recognition of the unique contribution digesters make to the environmental well being of the State. In my opinion the largest deterrents to the early New York SIR's were arguments over technical requirements and costs of dedicated equipment, unbased technical requirements and protracted time allotments for utility response.

To expedite installations, licensed professional engineers should be permitted to certify designs, which are then reviewed by utility staff on a set timetable.

SIZE AND EQUIPMENT LIMITATIONS

Size and equipment limitations imposed by utilities should be technically justified. Commission appointed staff should resolve disputes.

DISPUTE RESOLUTION

A clear mechanism should be established to resolve utility digester disputes.

FARM RETAINED TITLES AND RIGHTS OF OWNERSHIP

Language should clearly state farms hold title to and retain the right to convey ownership, as they wish, of the capacity as well as the energy they self generate in their waste treatment system.

Title of environmental attributes remains with the farm generators and are not apriori the possession of the utility within which the farm operates. Language should be clear these attributes are saleable by the farm as they wish.

RURAL UTILITIES

Rural electric coops and the Maryland and Ohio field staff that support them should be encouraged to fully participate in farm waste digestion electrical generation, as an acknowledgement of the RUS statement the “RUS and the current Administration are totally committed to the promotion of renewable energy sources” including “Anaerobic digesters at dairy & swine farms”.

(<http://www.usda.gov/rus/electric/engineering/sem2002/ashurst.pdf>). The USDA-RUS and the National Rural Electric Cooperative Association (NRECA) were involved in finalizing the IEEE Std P1547 standard for distributed generation interconnect. The RUS Northern Division headquarters in Washington and their Maryland and Ohio field staff should be encouraged to comply with the eventual SIR.

DEMAND SIDE MANAGEMENT

Farm generated renewable energy is largely consumed on the farm. Consequently, the farm is removing both energy consumption and demand from the grid, in addition to being renewable. As farms hold title to and largely use the power directly, this power does not enter utility books for sale. Conservation and renewable energy generation that takes place in a utility service district should be acknowledged in an annual report to the Commission.

IN CLOSING

There is an opportunity to greatly leverage the renewable and alternative energy intent of ACT 213 by assuring Pennsylvania farms view methane digestion as an option to treat their manure. Farms, however, will have to view favorable cost recovery, net metering and interconnection issues before deciding to generate renewable alternative energy.

Environomics LLC is grateful for this opportunity to comment and looks forward to cooperating as the Commission develops rules to implement ACT 213.

Respectfully submitted,

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