CLEAR HORIZONS, LLC. PEACE OF MIND THROUGH ORGANIC WASTE MANAGEMENT SOLUTIONS

Date: February 17, 2009

Subject: Response to PSC Notice of Investigation of ARTs
Docket: 5-EI-148

My name is Daniel T. Nemke. I am the General Manager of Clear Horizons LLC, a developer of biogas energy systems. Clear Horizons is located at 5070 N. 35th Street, Milwaukee, WI 53209.

In 2004, I joined Pieper Electric, Inc. to assist in evaluating the opportunity for installing farm-based anaerobic digester systems. After evaluating the market and developing the business plan, Clear Horizons LLC was created.

In 2006, Clear Horizons installed its first biogas plant at the Crave Brothers Farm in Waterloo, WI. This system was expanded to over double its original size in 2008. It is also the first project in Wisconsin to be certified by the State Electrical Inspector. Clear Horizons managed all aspects of the construction project, is the sole owner of the system, and currently operates and manages the system. This unique experience has provided us with a detailed knowledge of the costs associated with not only constructing a digester system, but also the costs to properly operate and maintain the system.

My background from the mining industry was to provide financial analysis on the impact changes or upgrades would have to the overall financial performance of the plant. I used that experience as the basis for evaluating and developing financial models for the construction and operation of biogas plants. The models we have developed clearly outline the influence of capital cost, operation/maintenance expense, and utility tariffs on the overall financial performance of the system. These models have been verified with data collected from the Crave Digester Project.

ART Experience to Date in Wisconsin and Elsewhere

Q1. Wisconsin utilities for whom the Commission has previously approved an experimental ART are asked to respond to Questions 1.a. through 1.e.

A1. Not Applicable

Q2. Research and Experience Outside Wisconsin
a. Can you identify any research or reference documents that you believe will enhance the Commission's understanding of ART design issues and/or the actual documented effects of ARTs outside Wisconsin? Please provide enough information for Commission staff to locate such documents; it is not necessary to provide copies.

5070 N. 35th Street Milwaukee, WI 53209
Ph: (866) 326-1100
Fax: (414) 462-6667

A2a. 1.) Michigan House Bill No. 5218 Introduced by Rep. Kathleen Law on September 15, 2007.

2.) Arizona Corporation Commission Docket E-01345A-07 RES Implementation Plan (Pages 78-82 for ART Summary Tables)

3.) Vermont CowPower Program (www.cvps.com/cowpower)

4.) Please reference the information collected by the Wisconsin Distributed Resource Collaborative (WIDRC) regarding ART's. Larry Krom could provide access to what has been done/proposed in the United States as well as the programs that have been enacted in Europe.

Costs of Producing Electricity from Renewable Resources
Q3. What might it cost the typical customer of a Wisconsin electric utility to construct/install a new renewable energy system using each of the following technologies? What might the typical customer's lifetime operation and maintenance costs be? Please be explicit about sources of data, assumptions, and how costs might vary based on system size, location, or other variables.

a. Solar Photovoltaics (PV)

A3a. No Comment

b. Wind

A3b. No Comment

c. Landfill Gas

A3c. No Comment

d. Biogas other than Landfill Gas

A3d. Installation cost for an anaerobic digester is approximately $4.5 million/MW. This cost assumes 10% substrate addition to boost generation capacity.

The typical variable operation and maintenance costs are approximately $600,000/MW per year over a 20 year life. Of the $600,000, the maintenance of the engine/generator is approximately 40%, digester, pumping, and separation systems are about 40%, and operation is about 20%. The estimate is based on our first-hand experience operating and maintaining the digester system at Crave Brothers Farm in Waterloo, WI.

5070 N. 35th Street Milwaukee, WI 53209
Ph: (866) 326-1100
Fax: (414) 462-6667

Currently, these costs remain relatively linear as systems scale up. With large scale commercialization of this technology, our anticipation is that these costs would decrease if the operation and maintenance was done by a company that specializes in the operation and maintenance of these systems. There would be economies in inventorying and purchasing spare parts, maintenance labor would decrease as expert knowledge is gained with the equipment, and multiple plants could be operated by one person.

e. Biomass

A3e. No Comment

f. Hydroelectric

A3f. No Comment

g. Any other renewable electricity technologies for which data are available

A3g. No Comment

Q4. How much energy (in kilowatt-hours (kwh) will be produced over the useful life of a typical customer-owned renewable energy system in Wisconsin using each of the following technologies? Please be explicit about sources of data, assumptions, and how production might vary based on system size, location, or other variables.
a. Solar

A4a. No Comment

b. Wind

A4b. No Comment

c. Landfill Gas

A4c. No Comment

d. Biogas other than Landfill Gas

A4d. A typical 500 kW system will achieve a capacity factor of approximately 85%. This will produce 3,723,000 kWh per year. Over a 20 year life, this system will produce 74,460,000 kWh of energy. As systems increase in size and multiple generators are utilized, the capacity factor will increase to approximately 90%.

Unlike some other renewable technologies, with anaerobic digestion, biogas generation occurs continuously. The capacity factor of this technology is similar to typical baseload generation technology. It is independent of location, weather conditions, sunlight or wind.

e. Biomass

A4e. No Comment

f. Hydroelectric

A4f. No Comment

g. Any other renewable electricity technologies for which data are available

A4g. No Comment

ART Policy Issues

Q5. What should the goals and objectives of an ART policy be?
a. What would you consider to be the primary purpose of an ART policy? Is the primary purpose to accelerate renewable energy installations, lower the cost of renewable energy, help utilities meet renewable portfolio standard (RPS) obligations, increase the diversity of installed renewables, reduce greenhouse gas emissions, or something else?

A5a. Accelerate Renewable Energy Installations. By accelerating installations, it will accomplish the other objectives of lowering cost, meeting the RPS, and reducing greenhouse gas emissions. It will also lead to job creation and energy independence. The ART policy should also be technology specific to encourage multiples types of renewable energy.

b. Considering the primary purpose of the ART policy, what short- and long-term goals might be appropriate? In other words, how should the success of an ART policy be measured?

A5b. It should be measured by the amount of energy generated per year from renewable resources in the short-term and include job creation and energy independence metrics over the longer-term. If the ART is effective, it will meet the objective of significantly increasing the number of renewable energy installations. If the ART is not set at the level that justifies the development, this objective will not be reached.

5070 N. 35th Street Milwaukee, WI 53209
Ph: (866) 326-1100
Fax: (414) 462-6667

c. Should the Commission establish ARTs for all electric utilities regulated by the Commission, all investor-owned utilities or all Class A utilities? Why or why not?

A5c. All utilities. From a developer's perspective, this allows for the installation of renewable energy at any location in the State with a known ART rather than focusing on only those areas with an ART. Also, if all utilities are not part of the program, some of the best resources may be in a territory that is not part of the ART and may not be developed.

d. What role, if any, should small, customer-owned renewables play in helping utilities meet RPS obligations? Should utilities seek to meet RPS obligations at the lowest possible price, or should other factors be considered? What ART structure would best complement an RPS?

A5d. The renewable installations should count towards an RPS if practical for the utility to count them. As it relates to developing an ART, RPS compliance is not the main objective of developing an ART.

As far as lowest possible price, it depends on how that is defined. If additional factors such as the cost of carbon and the cost of fuel are considered, what may be the lowest cost today could be one of the highest costs in a few years. For example, most renewable generation technologies will not be feasible at the cost of coal-fired generation currently. If carbon regulation was adopted, the cost of carbon capture and sequestration/mitigation could drive up the cost of coal-fired generation to be as much or more than the cost of renewable generation. There will be a short-term financial cost to investing in renewable energy, but it should be offset by long-term reductions in generation cost as well as an improved environment, the creation of a renewable energy industry, and independence to outside variable costs such as carbon and oil.

Again, RPS compliance is not the main objective of developing an ART, so that would be an ancillary benefit to developing an ART. The ART should not be structured from the perspective of RPS compliance.

e. What role, if any, should small, customer-owned renewables play in helping utilities reduce greenhouse gases? Should utilities seek to reduce greenhouse gases at the lowest possible price, or should other factors be considered? What ART structure would best incentivize the reduction of greenhouse gases?

A5e. Again, renewable energy may help utilities reduce greenhouse gas emissions, but that should not be the main objective of the ART.

If the Utilities want to reduce greenhouse gas emissions at the lowest possible price, biogas energy systems are typically the lowest cost option due to the fact that in

addition to carbon credits generated by offsetting the emissions from coal-fired plants, these plant also generate carbon credits through the collection and destruction of methane gas which is 21 times more harmful than carbon dioxide. From a kWh perspective, biogas has a much more significant role in reducing greenhouse gas emissions than wind or solar.

If the terms of the ART are to include the carbon credits generated by the capture and destruction of methane, the ART payments need to reflect the anticipated cost of carbon and be set at a level that makes these projects feasible for development.

Q6. What are desirable and appropriate design structures?
a. Should the ART directly target *new* capacity and *new* generation?

A6a. It should be retroactive for the past 3-5 years to reward the early adopters of renewable energy systems and those that have worked to improve their efficiency and reduce their cost.

b. How can ART payment levels be structured such that producers are not undercompensated or overcompensated over the duration of the contract?

A6b. With each technology, identify the cost of production and the variables that have a significant impact on the cost of production and use this information as a benchmark for developing an ART. In an effort to keep the ART simple in structure and minimize administrative costs, the ART levels should be fixed over a specific duration such as 15 years for biogas to allow for security in revenue when making the investment. The ART could be reviewed every 2 years and adjusted based on market conditions for new projects, but the changes to the ART should not be retroactive to previously installed projects under the ART since this could add a significant level of risk to the developer of the project.

c. Is long-term forecasting of renewable technology economics reliable enough to offer price guarantees? How should long-term forecasting affect ART structures?

A6c. The capital cost, operation and maintenance costs are fairly predictable over the technology's life. The ART duration should match either the useful life of the project or a long enough duration to allow the project to maintain a positive cash flow. From a developer's perspective, a price guarantee of at least 15 years would provide the security of a revenue stream that is often required to obtain project financing.

d. How should the availability of financial incentives for renewable technologies through the Focus on Energy program and voluntary utility programs affect decisions regarding ART payment amounts?

5070 N. 35th Street Milwaukee, WI 53209
Ph: (866) 326-1100
Fax: (414) 462-6667

A6d. If the ART was properly structured, the financial incentives offered by these groups could be eliminated and their focus shifted back to energy efficiency. Renewable energy projects typically are much more sensitive to the revenue and operating costs than the capital cost. By granting a portion of the capital cost, it typically has a minimal effect on the project's financial performance.

Q7. Other Policy Questions

a. Are there any legal issues which constrain the Commission's ability to develop and implement an ART policy?

A7a. No comment.

b. What effects might ARTs have on jobs, fossil fuel imports, and agriculture?

A7b. ART's will have significant impacts on jobs creation, aiding in making agriculture mores sustainable, assisting with rural development, and reducing our dependence on fossil fuels. There are studies from European counties such as Germany and Denmark that attribute a significant increase in job creation directly linked to the adoption of ARTs. Wisconsin is uniquely positioned to capitalize on its extensive agriculture industry as a significant source of renewable energy. This will assist in diversifying the revenue sources of farms, improving their sustainability and ensuring their future in this state. This will also reduce our imports of fossil fuels with less generation capacity required from coal and natural gas. Focus on Energy would be a resource for exact metrics the impacts of renewable energy development will have on the economy, job creation, and reduced dependence on fossil fuels.

c. Should utilities allow customers to voluntarily choose to purchase electricity generated from a specific technology (e.g., solar PV)?

A7c. As a utility customer, I would like the opportunity to support a specific technology. The CowPower program in Vermont is a great example of this concept. This program allows customers to buy electricity that is generated from farm biogas projects. This would also improve the buy-in of customers to support renewable energy if they could directly support a particular technology rather than knowing that currently the voluntary programs primarily support utility wind development.

ART Design Issues

Q8. Overall Tariff Structure

a. Should ARTs offer a fixed price (e.g., l0/kWh), a fixed premium (e.g., 4$/kWh above the Locational Marginal Price), a hybrid of the two structures, or some other structure?

A8a. From our perspective, we would prefer a fixed price since we could estimate the system revenue over the term of the project versus being subject to market rates which may or may not meet the projections.

b. How might an ART be designed to incorporate components of both a fixed price structure and a fixed premium structure?

A8b. There could be two choices depending on risk tolerance. The downside is the increased administration of the various ART's. The administration would be much simpler if it was a fixed tariff.

c. Should customers be able to choose between a fixed rate and a fixed premium when signing an ART contract?

A8c. See answer to A8b.

Q9. Program Size Limitations

a. Should the Commission limit the total program size of all ART offerings for the state as a whole, for individual utilities, and/or for specific technologies? If so, why?

A9a. The program should not be limited by installed capacity since it makes planning and development difficult when the owner is unsure if the project will qualify by the time they are able to build. There is not a visible ending point that can be planned around. If it is to be limited, it should be time constrained so there is a finite date that an owner could plan around.

b. If the Commission limits total program size, what should the basis be for such limits? Should limits on ARTs be based on participation levels, installed capacity, actual generation, RPS obligations, costs, or something else? Should limits on ARTs be fixed amounts or proportional to total capacity, generation, costs, etc.?

A9b. The ART's should be limited based on time rather than capacity. Again, planning against a finite date is much easier than the moving target of capacity. If the ART's are structured properly, the capacity could be predicted with a reasonable amount of accuracy.

c. If program size limits are imposed, should enrollment be on a "first come, first served" basis or based on some other criteria?

A9c. Again, we would prefer a time based limit versus a capacity based limit.

Q10. Covered Renewable Energy Technologies

a. Are there any specific technologies for which all utilities should be required to offer an ART?

A10a. Biogas, landfill gas, wind, solar, and biomass.

b. On what basis should the Commission decide whether it is appropriate to offer an ART for a given technology?

A10b. Does the technology meet the objective of the program? If so, it should be considered.

c. Should the ART be technology-specific or apply to a generic definition of renewables?

A10c. It should be technology specific and based on the production cost of each technology. A generic tariff would typically favor one technology when the state should be looking to have a diverse mixture of renewable energy projects.

Q11. Individual Project Size Limitations
a. What project size limits, if any, are appropriate for each technology, and why?

A11a. 5 MW for biogas since most projects that would benefit from an ART are smaller than this limit. Also, over this limit, the technology should start to reach a point of being sustainable without an ART.

b. Should project size limits be uniform across utilities?

A11b. Yes. From a planning and development perspective, the more uniform the program is, the easier it is to plan and develop projects.

Q12. Contract Duration
a. Should utilities offer the same duration for all ART contracts regardless of the technology?

A12a. The contract duration should be technology specific and related to its design life or time required to achieve a payback.

b. What is the optimum duration for ART contracts and why?

A12b. For biogas, it should be at least 15 years to correspond to the design life of the engine/generator and cover the duration for financing.

Q13. Cost Recovery
a. Why and under what circumstances might it be appropriate for ART costs to be recovered through ordinary rates paid by all customers or a class of customers? For purposes of answering this question, assume "ART costs" means all costs arising from the administration of the ART.

A13a. Most costs for administration of other utility tariffs are recovered through the rates. This should be treated in the same manner.

b. Why and under what circumstances might it be appropriate for ART costs to be recovered through a utility's voluntary renewable energy program?

A13b. It would place an even higher burden on those that are attempting to support the development of renewable energy if they also had to absorb the entire cost of ART administration. All ratepayers are benefiting from the energy created by the ART even if they do not participate in a voluntary renewable energy program.

By placing the entire burden on those that are attempting to support renewable energy, the costs may get high enough to discourage them from participating. It would be disappointing to see a model created that would further limit the development of renewable energy by reducing participation levels since customers that ordinarily would have supported this program no longer can afford to do so.

c. Should utilities have the discretion to choose the best means of cost recovery for each specific tariff, or should the Commission seek a uniform approach?

A13c. The Commission should seek a uniform approach.

Q14. Renewable/Environmental Attributes
a. Should ownership of associated renewable and environmental attributes (such as Renewable Energy Credits or greenhouse gas offsets) be consistent across all ARTs in Wisconsin?

A14a. It should be technology specific.

b. Should ARTs be established with separate prices depending on which party owns the renewable and environmental attributes?

A14b. The rights to the renewable attributes should be clearly defined in the ART. If the utility gets all the renewable and environmental attributes, the ART levels should be set high enough to make the projects feasible. Having separate prices would give developers options, but it also makes administration of the ART more complex.

Q15. Basis for Setting Tariff Price
a. For a given technology, should there be any differentiation in ART prices based on design characteristics (e.g., vertical versus horizontal axis wind turbines), fuel source (e.g., biomass crops versus wood waste), or location (e.g., terrestrial versus offshore wind)?

A15a. Having that level of detail in an ART structure would significantly increase the time it would take to develop an ART program and make administration much more difficult. ART levels for different technologies should be sufficient.

b. For a given technology, should ART prices decline as project size increases? If so, should size bands be created or should the price decline in linear proportion to size? How might the Commission decide on appropriate size bands?

A15b. Typically, there are economies of scale when project sizes increase. ARTs developed by other countries and proposed by other states have bands for the technologies. For biogas energy systems, we would like to see bands of <850 kW, 850 kW to 2 MW, and 2MW to 5 MW.

c. Should ART payment levels include any form of a capacity payment in addition to energy payments? Does your answer vary by technology? Could an auction or tender-based system for renewable capacity payments (similar to Forward Capacity Markets) help increase economic efficiency and/or reduce risk on behalf of the investor?

A15c. If the ART level is sufficient to support the project based on energy, then the owner will naturally push to have the maximum possible capacity in order to meet or exceed the financial projections for the project. Adding a capacity factor incentive would complicate the ART structure and probably have little impact on improving the capacity of the technology.

d. Should ART prices be set at a level such that a typical participating customer will earn a positive return on their investment in renewable energy? If so, what might be an appropriate return?

A15d. Yes, large scale development of renewable energy projects will not occur unless developers can achieve a reasonable return.

Based on our experience, there is an almost limitless amount of equity available for developing renewable energy projects if the investors can achieve at least a 20% return after-tax.

e. Should utilities offer separate prices for on-peak and off-peak generation or a single blended ART price? Should the utility or the customer be allowed to decide on their preferred approach?

A15e. For biogas energy projects, a fixed, single blended ART price should be established since biogas production is 24/7 and the costs associated with gas storage to take advantage of peak rates are typically not feasible. Other technologies such as solar

5070 N. 35th Street Milwaukee, WI 53209
Ph: (866) 326-1100
Fax: (414) 462-6667

would benefit from on-peak pricing since most of their energy is generated during peak hours.

Again, for the sake of making the ART program as simple as possible, the ART structure should be set for each technology and avoid multiple options.

f. Should ART contracts include an automatic adjustment in the price based on inflation?

A15f. Yes. Since operation and maintenance expenses will increase over time due to inflation, the ART should follow inflation to allow the developer a constant return.

g. If the Commission does not require utilities to offer uniform contract duration for all ARTs, should utilities offer different prices for different contract durations?

A15g. Other states have proposed different pricing for different durations. Again, in order to make the ART program as simple as possible, a contract duration for each technology should be determined and be uniform across all utilities.

h. If any fixed premium ARTs are established (rather than fixed cost ARTs), should the premium be over and above the Locational Marginal Price, or should it be tied to some other number? Since a fixed premium would result in a variable price, should there be a price cap or other measures to prevent unacceptable profits or losses?

A15h. Again, our preference is a fixed cost ART. If a fixed premium ART is established, it should have a floor on the LMP to protect the investors in the technology and could also include a cap as long as it is high enough to provide an adequate return to the investors.

i. Should ART prices be automatically reduced annually (or periodically) to reflect the maturation of technologies and the need for renewables to become cost competitive without price supports (degression)?

A15i. The ART program and tariff levels could be reviewed on a 2 year cycle to determine if the technology has evolved to the point where the ART pricing level could be decreased. This should only be applied to new/future projects and not for those already developed since this would add considerable risk to developing a project if the revenue was subject unknown reductions.

j. Are there any benefits to customers unrelated to electricity generation that should be reflected in the tariff prices?

A15j. Developing ARTs will have many benefits beyond electricity generation such as job creation, improved environmental quality by exporting digested fiber into

value-added markets and reducing the potential harm to the state's waterways, reduced dependence on imported oil and natural gas, improved reliability of the transmission system through the development of distributed generation, rural economic development, enhance local community viability through new business formation, improved sustainability of the agricultural industry, and the attraction of a significant amount of investment in the state which will lead to further industrial and service development and increase the state's tax base.

16. Other

a. Are there any other ART design considerations that you feel the Commission should consider?

A16a. Keep the program as simple as possible while recognizing the differences in cost between the various renewable technologies. For example, we would like to see the following ART design for biogas systems other than landfill biogas:

15 yr. fixed price contract
>850 kW - $0.20/kWh
850 kW ≥ 2 MW - $0.16/kWh
2 MW ≥ 5 MW - $0.12/kWh

I would strongly suggest that the Commission utilize the Wisconsin Distributed Resource Collaborative (WIDRC) as a resource for developing ART program guidelines similar to the way the group drafted the PSC 119 interconnect guidelines. This group has already done much of the research associated with developing an ART for Wisconsin and put together a preliminary draft of an ART.

We believe, and has been are initial experience, that through the technology we are applying, the processes will have substantive improvement over time. The development of the market will lead to further process improvements and efficiencies that will continue to drive down the technology cost and improve its reliability making it self-sustaining in the long term without the need for an ART or grant funding. The difficult part is that in the short-term, renewable technology needs assistance to achieve large scale commercialization in order to start reaching this vision. An ART is the type of short-term mechanism that could help all of us realize this long-term vision.

5070 N. 35th Street Milwaukee, WI 53209
Ph: (866) 326-1100
Fax: (414) 462-6667