



Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: 12-0819-EL-EEC

Mercantile Customer: POET Biorefining - Marion LLC

Electric Utility: Ohio Edison Company

Program Title or Description: Bin Circulating Fans , Dryer Improvements and Ferasure Enhancement Projects

Rule 4901:1-39-05(F), Ohio Administrative Code (O.A.C.), permits a mercantile customer to file, either individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the electric utility's programs. The following application form is to be used by mercantile customers, either individually or jointly with their electric utility, to apply for commitment of such programs in accordance with the Commission's pilot program established in Case No. [10-834-EL-POR](#)

Completed applications requesting the cash rebate reasonable arrangement option (Option 1) in lieu of an exemption from the electric utility's energy efficiency and demand reduction (EEDR) rider will be automatically approved on the sixty-first calendar day after filing, unless the Commission, or an attorney examiner, suspends or denies the application prior to that time. Completed applications requesting the exemption from the EEDR rider (Option 2) will also qualify for the 60-day automatic approval so long as the exemption period does not exceed 24 months. Rider exemptions for periods of more than 24 months will be reviewed by the Commission Staff and are only approved up the issuance of a Commission order.

Complete a separate application for each customer program. Projects undertaken by a customer as a single program at a single location or at various locations within the same service territory should be submitted together as a single program filing, when possible. Check all boxes that are applicable to your program. For each box checked, be sure to complete all subparts of the question, and provide all requested additional information. Submittal of incomplete applications may result in a suspension of the automatic approval process or denial of the application.

Any confidential or trade secret information may be submitted to Staff on disc or via email at ee-pdr@puc.state.oh.us.

Section 1: Mercantile Customer Information

Name: POET Biorefining - Marion LLC

Principal address: 1660 Hillman - Ford Rd. Marion OH 43302

Address of facility for which this energy efficiency program applies: Same

Name and telephone number for responses to questions: Cliff Brannon #740-383-9761

Electricity use by the customer (check the box(es) that apply):

- ☒ The customer uses more than seven hundred thousand kilowatt hours per year at the above facility. (Please attach documentation.)
- ☐ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.)

Section 2: Application Information

A) The customer is filing this application (choose which applies):

- ☐ Individually, without electric utility participation.
- ☒ Jointly with the electric utility.

B) The electric utility is: Ohio Edison Company

C) The customer is offering to commit (check any that apply):

- ☐ Energy savings from the customer's energy efficiency program. (Complete Sections 3, 5, 6, and 7.)
- ☐ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)
- ☒ Both the energy savings and the capacity savings from the customer's energy efficiency program. (Complete all sections of the Application.)

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (check those that apply):

- ☒ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)). **If Checked, Please see Exhibit 1 and Exhibit 2**
- ☐ Installation of new equipment to replace equipment that needed to be replaced. The customer installed new equipment on the following date(s): ____.
- ☐ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): ____.
- ☒ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by the energy efficiency program:

- 1) If you checked the box indicating that the project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) - (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: 235,735 kWh

- 2) If you checked the box indicating that the customer installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: ____ kWh

Please describe any less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 3) If you checked the box indicating that the project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by less efficient new equipment) - (kWh used by higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____ kWh

Please describe the less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

Dryer Improvements - This project allowed for the complete removal of the drag conveyor. Energy savings were determined by taking the complete load of the conveyor which operated 8760 hrs/yr. The second part of the project was installing sensors that allow the speed of the fans to be reduced from 95% full load to 70 % full load. Using a EPRI VFD chart, the load reduction was determined for each of the 8,760 hrs/yr that the dryers are in operation resulting in 340,294 kWh/yr annual savings.

Fermasure Enhancement - Energy savings for this project was determined upon an increase efficiency on a kwh per gallon produced basis. Using journal and actual ethanol production of the plant, a conservative estimate of a 1.5% with overall production increase was determine to be achieved without the addition of any electric load. The new, reduced energy usage per gallon produced shows an avoidance of additional energy use. Had the project not been completed , the only way to achieve post-project production levels would have been to increased energy levels through additional load or run time. This project resulted in 976,145 kWh/yr annual savings.

Section 4: Demand Reduction/Demand Response Programs

A) The customer's program involves (check the one that applies):

- ☒ Coincident peak-demand savings from the customer's energy efficiency program.
- ☐ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)
- ☐ Potential peak-demand reduction (check the one that applies):
 - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.
 - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.

B) On what date did the customer initiate its demand reduction program?

09/01/2011

C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

39 kW

Section 5: Request for Cash Rebate Reasonable Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

☐ Option 2: An exemption from the energy efficiency cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

B) The value of the option that the customer is seeking is:

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts):

☒ A cash rebate of \$80,501. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

Option 2: An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

☐ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for _____ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

OR

☐ A commitment payment valued at no more than \$_____. (Attach documentation and calculations showing how this payment amount was determined.)

OR

- ☐ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of the customer's ongoing efficiency program. (Attach documentation that establishes the ongoing nature of the program.) In order to continue the exemption beyond the initial 24 month period, the customer will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

- ☐ Total Resource Cost (TRC) Test. The calculated TRC value is: _____(Continue to Subsection 1, then skip Subsection 2)
- ☒ Utility Cost Test (UCT) . The calculated UCT value is: **See Exhibit 3** (Skip to Subsection 2.)

Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The incremental measure costs were _____.

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were **See Exhibit 3**

The utility's program costs were **See Exhibit 3**

The utility's incentive costs/rebate costs were **See Exhibit 3**

Section 7: Additional Information

Please attach the following supporting documentation to this application:

- Narrative description of the program including, but not limited to, make, model, and year of any installed and replaced equipment.
- A copy of the formal declaration or agreement that commits the program or measure to the electric utility, including:
 - 1) any confidentiality requirements associated with the agreement;
 - 2) a description of any consequences of noncompliance with the terms of the commitment;
 - 3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;
 - 4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,
 - 5) a commitment by the customer to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.
- A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.



Public Utilities Commission

**Application to Commit
Energy Efficiency/Peak Demand
Reduction Programs
(Mercantile Customers Only)**

Case No.: 12-0819-EL-EEC

State of Ohio :

Gary Swanson , Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

POET Biorefining - Marion, LLC

[insert customer or EDU company name and any applicable name(s) doing business as]

2. I have personally examined all the information contained in the foregoing application, including any exhibits and attachments. Based upon my examination and inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete.

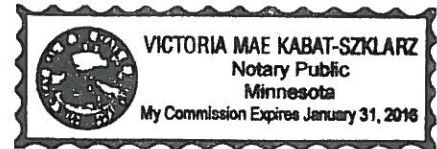
Gary Swanson *President POET (agent for POET)*
Signature of Affiant & Title

Sworn and subscribed before me this 29th day of MAY, 2012 Month/Year

Victoria Mae Kabat-Szklarz
Signature of official administering oath

VICTORIA MAE KABAT-SZKLARZ
Print Name and Title

My commission expires on 1/31/2016



Customer Legal Entity Name: POET Biorefining - Marion LLC
Site Address: POET Biorefining - Marion LLC (Marion Ethanol)
Principal Address: 1660 Hillman-Ford Road

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early?	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
				Also, please explain briefly how you determined this future replacement date.	
1	Bin Circulating Fans	An Integris Advanced Grain Monitoring System was installed to replace less complete temperature control system. The new system allows for a more precise measurement of the environmental conditions in the bins, preventing the overuse of bin circulation fans.	Program results were determined by engineering calculations based on the projected reduction in diversity factor for the upper and lower circulation fans in the bins. Projections were based on typical results seen previously in projects of this scope.	Equipment would have been replaced in approximately 10 years. This would be the time that temperature controls would typically need to be examined for replacement.	The system could have continued to implement a less precise temperature monitoring system, which would not have allowed for a reduced diversity factor of the circulating fans.
2	Dryer Improvements	The project involved installation of dryer oxygen sensors, as well as removal of the drag conveyors of the dryer. The overall result allows for the 100 HP dryer to operate at a 70% damper setting, versus a 95% damper setting.	Results were determined based on engineering calculations that were completed to determine reduced load and energy savings. Power curves provided by ASHRAE were used to determine the load reduction of a 95% to 70% change in inlet vane position.	N/A	The plant could have continued to operate the dryers without the oxygen sensors and with the drag conveyors.
3	Fermasure Enhancement	The Fermasure system was implemented into the plant. This overall system change is designed to increase the pH of the system, requiring less acid. The system also eliminates antibiotic concerns of the plant. The net result is greater overall production efficiency, leading to a reduced energy usage on a kWh per gallon-produced basis.	Results have been determined by extending the results of previous facilities to the Marion plant. Typical improvements of 1.5% production were used to project the overall savings for this plant.	N/A	The plant could have continued to operate without the Fermasure system, remaining at a lower pH with lower overall production.

Docket No. 12-0819

Site: 1660 Hillman-Ford Road

Exhibit 2

Customer Legal Entity Name: POET Biorefining - Marion LLC
 Site Address: POET Biorefining - Marion LLC (Marion Ethanol)
 Principal Address: 1660 Hillman-Ford Road

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) <i>Note 1</i>
2010	69,451,703	69,451,703	69,451,703
2009	67,416,349	67,416,349	67,416,349
Average	68,434,026	68,434,026	68,434,026

Project Number	Project Name	In-Service Date	Project Cost \$	50% of Project Cost \$	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) \$	Eligible Rebate Amount (H) \$ <i>Note 2</i>
1	Bin Circulating Fans	01/15/2011	\$65,928	\$32,964	235,735	235,735	-	\$18,859	\$14,144
2	Dryer Improvements	09/01/2011	\$27,436	\$13,718	340,294	340,294	39	\$27,224	\$13,718
3	Fermasure Enhancement	01/15/2011	\$105,278	\$52,639	976,145	976,145	-	\$78,092	\$52,639
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
Total			\$198,642		1,552,174	1,552,174	39	\$124,174	\$80,501

Docket No. 12-0819

Site: 1660 Hillman-Ford Road

Notes

(1) Customer's usage is adjusted to account for the effects of the energy efficiency programs included in this application. When applicable, such adjustments are prorated to the in-service date to account for partial year savings.

(2) The eligible rebate amount is based upon 75% of the rebates offered by the FirstEnergy Commercial and Industrial Energy Efficiency programs or 75% of \$0.08/kWh for custom programs for all energy savings eligible for a cash rebate as defined in the PUCO order in Case NO.10-834-EL-EEC dated 9/15/2010, not to exceed the lesser of 50% of the project cost or \$250,000 per project. The rebate also cannot exceed \$500,000 per customer per year, per utility service territory.

Commitment
Payment
\$

\$0

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost \$/MWh (B)	Utility Avoided Cost \$ (C)	Utility Cost \$ (D)	Cash Rebate \$ (E)	Administrator Variable Fee \$ (F)	Total Utility Cost \$ (G)	UCT (H)
1	236	\$ 308	\$ 72,672	\$ 1,182	\$14,144	\$0	\$ 15,326	4.7
2	340	\$ 308	\$ 104,906	\$ 1,182	\$13,718	\$0	\$ 14,900	7.04
3	976	\$ 308	\$ 300,926	\$ 1,182	\$52,639	\$0	\$ 53,821	5.59
						\$0		
						\$0		
						\$0		
						\$0		
Total	1,552	\$ 308	478,504	3,546	\$80,501	\$0	84,047	5.7

Notes

(A) From Exhibit 2, = kWh saved / 1000

(B) This value represents avoided energy costs (wholesale energy prices) from the Department of Energy, Energy Information Administration's 2009 Annual Energy Outlook (AEO) low oil prices case. The AEO represents a national average energy price, so for a better representation of the energy price that Ohio customers would see, a Cinergy Hub equivalent price was derived by applying a ratio based on three years of historic national average and Cinergy Hub prices. This value is consistent with avoided cost assumptions used in EE&PDR Program Portfolio and Initial Benchmark Report, filed Dec 15, 2009 (See Section 8.1, paragraph a).

(C) = (A) * (B)

(D) Represents the utility's costs incurred for self-directed mercantile applications for applications filed and applications in progress. Includes incremental costs of legal fees, fixed administrative expenses, etc.

(E) This is the amount of the cash rebate paid to the customer for this project.

(F) Based on approximate Administrator's variable compensation for purposes of calculating the UCT, actual compensation may be less.

(G) = (D) + (E) + (F)

(H) = (C) / (G)

POET Biorefining - Marion LLC ~ POET Biorefining - Marion LLC (Marion Ethanol)

Docket No. 12-0819

Site: 1660 Hillman-Ford Road

PROJECT #1

RECOMMENDATION:

Bin Temperature Monitoring System - The three big bins have a new temperature monitoring system installed in 2011 to allow for more precise monitoring of the bins and to reduce over-usage of the fans. This was completed in 2011.

Energy Rates	
Energy Charge	\$0.05118 \$/kWh (On-Peak) \$0.05118 \$/kWh (Off-Peak)

Existing Operation	Qy	HP	Eff	Hours	Diversity	kWh
Lower Fans	4	50	94%	8760	75%	470,458
Upper Fans	4	25	93%	8760	75%	236,747
Total						707,204
New Operation	Qy	HP	Eff <td>Hours</td> <td>Diversity</td> <td>kWh</td>	Hours	Diversity	kWh
Lower Fans	4	50	94%	8760	50%	313,659
Upper Fans	4	25	93%	8760	50%	157,831
Total						471,470

Savings (kWh)	23,572
Cost Savings	\$12,065.69
Total Cost	\$5,928.00
Rebate	18,859
Payback after rebate	3.9

PROJECT #2

Dryer Improvements

Customer Name: POET

Location: Marion, OHIO

Date Installed: 2011

RECOMMENDATION:

Dryer Improvements - the customer would like to install a O2 sensor and remove three conveyors to make the dryer system more efficient. The O2 sensor will allow the unit to operate at 70% damper setting vs 95%. This project was completed in 2011.

Total Motor size = 100000 H.P.
 Motor Type = Old
 Existing Control = Fan Init Varies
 Number of Motors = 1
 Load Profile =

Motor Efficiency = 95.6%
 Electric Demand Rate = \$0.00/kWh
 Electricity Rate = \$0.0512/kWh

VFD Efficiency = 96%
 Hours of Operation =

System Rated Flow	Operating Time	Existing	Proposed VFD	Full-Load Power kW	Existing Motor Input Power	Proposed Motor Input Power	kWh Power Savings	Hours Per Year	kWh/yr Energy Savings
0%	0%	0%	0%	0.0	0.0	0.0	0.0	0	0
20%	0%	43%	3%	156.1	67.9	5.0	62.9	0	0
25%	0%	48%	4%	156.1	74.3	6.2	68.1	0	0
30%	0%	51%	5%	156.1	79.5	8.2	71.3	0	0
35%	0%	54%	7%	156.1	83.8	11.1	72.7	0	0
40%	0%	56%	9%	156.1	87.5	14.9	72.6	0	0
45%	0%	58%	12%	156.1	90.8	19.8	71.0	0	0
50%	0%	60%	16%	156.1	94.0	25.8	68.2	0	0
55%	0%	62%	20%	156.1	97.4	33.0	64.4	0	0
60%	0%	65%	26%	156.1	101.3	41.5	59.8	0	0
65%	0%	68%	32%	156.1	105.8	51.3	54.5	0	0
70%	0%	70%	39%	156.1	110.4	62.6	48.8	8,760	427,170
75%	0%	76%	46%	156.1	118.2	75.4	42.8	0	0
80%	0%	81%	55%	156.1	126.5	89.8	36.7	0	0
85%	0%	88%	65%	156.1	136.1	105.8	30.8	0	0
90%	0%	90%	76%	156.1	148.9	123.6	25.2	3,760	221,157
95%	0%	105%	88%	156.1	163.4	143.3	20.2	0	0
100%	0%	116%	101%	156.1	180.6	164.8	15.8	0	0

Savings is the difference

ECONOMIC EVALUATION:

Total Cost Saved =

Estimated Installed Drive Cost =

kWh Saved

kWh Savings =

Simple Payback =

Savings \$

Rebate =

Proposed Payback =

(Max 50%)

*This calculation is for VFDs. Other types of adjustable speed drives may have different prices and characteristics, but will show the same trends.

*VFD pricing courtesy of General Electric, Current as of 2006.

*VFD efficiency accurate for Siemens SFB-2 as of 2007.

*Motor efficiencies courtesy of Mahanovsk, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004".

*Load profiles derived from ENR research and observation.

*Power curves courtesy of Mahanovsk, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004; Olson, M. "VFD's Save Energy: Cut Costs in Paint Spray Booths", ABB Motors 2003; Theisen, J. "Upgrading the Efficiency of

*Before implementation, existing system needs to be verified for compatibility with an adjustable speed drive.

Prepared by:

Gary A. Swanson Energy Management Solutions, Inc.

Phone #: 612-919-7975

Email: gswanson@emenergy.com

Drag Conveyor Removal Savings:	1,346 kWh
Total Savings	11,791 kWh
Total Cost	\$ 27,435.84

Full Drag Conv	328,503 kWh
Total Savings	340,294 kWh



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Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	POET Biorefining
Site Name:	Marion (Bin Circulating Fans)
Completed by (Name):	Gary Swanson
Date completed:	1/15/2011

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * \$0.08
Bin Circulating Fans	235,735	18858.80
Total Project Energy Savings kWh	235,735	
Total Custom Prescriptive Rebate Amount \$		\$ 18,858.80

Notes about this rebate calculation:

Calculations were completed by a PE, making conservative prejections as to the reduction of the overall diversity factor of the bin circulating fans (the percentage of the fans that are operating simulataneously) during the course of normal plant operation. These diversity factors were used to project before and after project energy usage of the fans, the difference being the energy saved by the controls project.



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Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	POET Biorefining
Site Name:	Marion (Dryers)
Completed by (Name):	Gary Swanson
Date completed:	9/1/2011

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * \$0.08
Dryer Improvements	340,294	27223.52
Total Project Energy Savings kWh	340,294	
Total Custom Prescriptive Rebate Amount \$		\$ 27,223.52

Notes about this rebate calculation:

Calculations for this project were two-fold. First, the scope of the project allowed for the complete removal of the drag conveyor. Energy savings of this aspect were determined by taking the complete load of the conveyor and the fact that it ran 8,760 hours per year. The second part of the project related to the dryer fans themselves. The sensor allowed the speed of the fans to be reduced from 95% full load to 70% full load. Using an EPRI VFD chart, the load reduction was determined for each of the 8,760 hours per year that the dryers are in operation.



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Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	Fermasure Enhancement #3
Site Name:	POET Biorefining
Completed by (Name):	Gary Swanson
Date completed:	1/15/2011

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * \$0.08
Fermasure Enhancement	976,145	78091.60
Total Project Energy Savings kWh	976,145	
Total Custom Prescriptive Rebate Amount \$		\$ 78,091.60

Notes about this rebate calculation:

Energy savings for this project was determined based upon an increased efficiency on a kWh per gallon produced basis. Using journal studies and actual ethanol production of the plant, a conservative estimate of a 1.5% overall production increase was determined to be achieved without the addition of any electric load. The new, reduced energy usage per gallon produced shows an avoidance of additional energy use. Had the project not been completed, the only way to achieve post-project production levels would have been to increase energy levels through additional load or run time.



INDUSTRIES

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Improving Ethanol Fuel Processes — Without Using Antibiotics



A farm worker in Grenada balances sugarcane just cut in the field.

- **CHALLENGE:** Energy
- **INDUSTRY:** Renewable Energy
- **LOCATION:** Wilmington, DE

MAP THIS STORY

Improving Fossil Fuel Alternatives

To help satisfy the world's need for locally sourced, cost-effective fossil fuel alternatives, DuPont designed a fermentation technique during the ethanol fuel process to help create high-performance biofuel from prevalent agricultural feed stocks like corn and sugarcane. Thanks in part to scientific innovations like this, the U.S. and Brazil are now the largest producers and exporters of ethanol. The fermentation process comes with a major challenge: eliminating bacteria that can stress or kill the yeast and reduce ethanol yields. Though antibiotics have long been the common remedy, antibiotic use is suspected of contributing to the development of antibiotic-resistant strains of bacteria, and regulatory agencies are considering restrictions on them.



Quick Facts

500 million gallons of extra ethanol can get you to the moon and back nearly 22,000 times.

DuPont answered this challenge with FermaSure® XL — a more sustainable ethanol fuel production process that rapidly attacks and decreases harmful bacteria while increasing ethanol fermentation rates and efficiency without the use of antibiotics. Its active ingredient, chlorine dioxide, has been used for decades in drinking water disinfection treatments . . . even in mouthwash. FermaSure® XL doesn't inhibit yeast growth, reproduction, or fermentation.

Customers who have used FermaSure® XL in their fermentation process can experience a 5% improvement in ethanol fuel production. In the U.S. alone, that could lead to more than 500 million gallons of extra ethanol produced every year — the fuel equivalent of driving to the moon and back nearly 22,000 times. And FermaSure® XL has achieved Generally Recognized as Safe (GRAS) regulatory status, enabling corn-based biofuel producers to use their co-products —

distiller's grain and yeast — as antibiotic-free feed for beef and dairy cattle. Around the world, and across multiple industries, DuPont is producing solutions that provide for a more sustainable future.

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Ethanol additive safer, effective

By JACQUI FATKA

BACTERIA in fermentation processes compete with yeast for glucose and other nutrients. Bacteria produce organic acids that can stress or kill the yeast and, ultimately, reduce ethanol yields in the fermentation process.

Antibiotics are one of the most common ways to treat or control bacteria infections, but there is a growing concern among end users over antibiotic use and the antibiotic residue left in the distillers grains produced as a co-product of the ethanol fermentation process.

DuPont is now marketing FermaSure — its patent-pending, 15% stabilized chlorine dioxide solution — for fuel and industrial ethanol fermentation applications.

The active ingredient in FermaSure, chlorine dioxide, has been used for decades in drinking water disinfection treatments. It is also now used in other industries, including for food production facility sanitizing and even in mouthwash, explained Eric Sumner, market development manager for DuPont's FermaSure.

FermaSure is a selective oxidizer that rapidly attacks bacteria that are harmful in fermentation without attacking the yeast, enzymes or other desirable mash components. It selectively inhibits growth of acid-producing bacteria, minimizing the accumulation of lactic and acetic acids and enabling the yeast to produce ethanol more efficiently. FermaSure doesn't inhibit yeast growth or reproduction, so it does not affect the performance of enzymes.

Sumner explained that customers typically see an ethanol yield improvement of 0.1% by weight, and in extreme cases, that can get as high as a 3.0%. The typical result is an overall 1-3% yield improvement, which can produce an additional 1 million to 3 million gallons annually at a 100 million-gallon-per-year plant.

At a market price of \$1.70/gal. of ethanol, this creates additional revenue of \$1.7 million to \$5.1 million per year, more than covering the costs of the product.

Not only does FermaSure provide yield advantages, but the market has clearly called for "cleaner" distillers grains. Foreign markets and even specific domestic end users (i.e., poultry) are seeking antibiotic-free feed products.

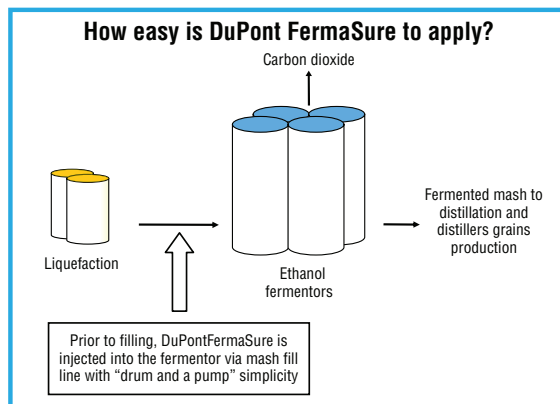
Sumner said FermaSure minimizes sulfuric acid usage, which, in turn, reduces the amount of sulfur present in distillers grains, a growing health concern with using the ingredient.

Plant use

Sumner said 17 ethanol plants are currently using the technology of the approximately 170 ethanol plants nationwide. He expects that number to grow to 40 plants by the end of the year.

FermaSure is simple to use and requires minor equipment additions, including a pump and line and controls back into the main plant's distributed control system.

The product is added as a slug dose directly



to the fermentor at the beginning of fill (Figure). Sumner explained that the fermentor is filled, and the yeast is added with other nutrients to complete the fermentation process.

Use also has shown less unscheduled maintenance and cleanup from process upsets, with less downtime.

Kansas State to unveil swine building

THE Kansas State University department of animal sciences and industry will unveil a new growing and finishing swine building as part of the 2008 Swine Day Nov. 20 in Manhattan, Kan.

Fund-raising for the \$650,000 building began three years ago, and all funds came from donations to support research and teaching efforts in swine production, said Joel DeRouchey, livestock specialist with Kansas State Research & Extension.

The new 75 x 208 ft. building replaced an older facility, DeRouchey said. It complements several existing buildings that make up the swine unit, including a headquarters building that contains classrooms, plus farrowing and nursery, gestation and metabolism and breeding barns.

"The new facility will house pigs indoors and remove extra pigs not used for research and teaching off of dirt lots. That will help reduce pathogen loads, decrease odor and generally aid the health of Kansas State's swine herd," said extension swine specialist Jim Nelssen.

The new building will expand the university's research capabilities, DeRouchey said.

"This building, which features a computerized feeding system, allows us to take pigs

all the way from weaning to market in this facility," Nelssen said. "Students will train in a state-of-the-art, modern facility. They will have exposure to not only the newest technology (in the new building) but also some of the technology that has been used in the industry for awhile in some of our older buildings."

The building will hold up to about 1,000 head in four separate rooms, he added.

The facility was built by Henning Construction Co. of Johnston, Iowa. Kansas State Research & Extension specialists Pat Murphy and Joe Harner worked with the builders on the ventilation and waste management designs, respectively.

Primary donors to the new swine building include the Kansas Pork Assn. through increased sponsored research, the Kansas State University Livestock & Meat Industry Council and Lonza, a chemical company.

More information on Kansas State's Swine Day and the opportunity to view the new growing and finishing building is available online at www.asi.ksu.edu by clicking on Research and Extension and on Swine Day.

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Mercantile Customer Project Commitment Agreement
Cash Rebate Option

THIS MERCANTILE CUSTOMER PROJECT COMMITMENT AGREEMENT ("Agreement") is made and entered into by and between Ohio Edison Co., its successors and assigns (hereinafter called the "Company") and POET Biorefining- Marion LLC, Taxpayer ID No. #20-8120912 its permitted successors and assigns (hereinafter called the "Customer") (collectively the "Parties" or individually the "Party") and is effective on the date last executed by the Parties as indicated below.

WITNESSETH

WHEREAS, the Company is an electric distribution utility and electric light company, as both of these terms are defined in R.C. § 4928.01(A); and

WHEREAS, Customer believes that it is a mercantile customer, as that term is defined in R.C. § 4928.01(A)(19), doing business within the Company's certified service territory; and

WHEREAS, R.C. § 4928.66 (the "Statute") requires the Company to meet certain energy efficiency and peak demand reduction ("EE&PDR") benchmarks; and

WHEREAS, when complying with certain EE&PDR benchmarks the Company may include the effects of mercantile customer-sited EE&PDR projects; and

WHEREAS, Customer has certain customer-sited demand reduction, demand response, or energy efficiency project(s) as set forth in attached Exhibit 1 (the "Customer Energy Project(s)") that it desires to commit to the Company for integration into the Company's Energy Efficiency & Peak Demand Reduction Program Portfolio Plan ("Company Plan") that the Company will implement in order to comply with the Statute; and

WHEREAS, the Customer, pursuant to the Public Utilities Commission of Ohio's ("Commission") September 15, 2010 Order in Case No. 10-834-EL-EEC, desires to pursue a cash rebate of some of the costs pertaining to its Customer Energy Project(s) ("Cash Rebate").

WHEREAS, Customer's decision to commit its Customer Energy Project(s) to the Company for inclusion in the Company Plan has been reasonably encouraged by the possibility of a Cash Rebate.

WHEREAS, in consideration of, and upon receipt of, said cash rebate, Customer will commit the Customer Energy Project(s) to the Company and will comply with all other terms and conditions set forth herein.

NOW THEREFORE, in consideration of the mutual promises set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties, intending to be legally bound, do hereby agree as follows:

1. **Customer Energy Projects.** Customer hereby commits to the Company and Company accepts for integration into the Company Plan the Customer Energy Project(s) set forth on attached Exhibit 1. Said commitment shall be for the life of the Customer Energy Project(s). Company will incorporate said project(s) into the Company Plan to the extent that such projects qualify. In so committing, Customer acknowledges that the information provided to the Company about the Customer Energy Project(s) is true and accurate to the best of its knowledge.
 - a. By committing the Customer Energy Project(s) to the Company, Customer acknowledges and agrees that the Company shall control the use of the kWh and/or kW reductions

resulting from said projects for purposes of complying with the Statute. It is expressly agreed that Customer may use any and all energy related and other attributes created from the Customer Energy Project(s) to the extent permitted by state or federal laws or regulations, provided, and to the extent, that such uses by Customer do not conflict with said compliance by the Company.

- b. The Company acknowledges that some of Customer's Energy Projects contemplated in this paragraph may have been performed under certain other federal and/or state programs in which certain parameters are required to be maintained in order to retain preferential financing or other government benefits (individually and collectively, as appropriate, "Benefits"). In the event that the use of any such project by the Company in any way affects such Benefits, and upon written request from the Customer, Company will release said Customer's Energy Project(s) to the extent necessary for Customer to meet the prerequisites for such Benefits. Customer acknowledges that such release (i) may affect Customer's cash rebate discussed in Article 3 below; and (ii) will not affect any of Customer's other requirements or obligations.
 - c. Any future Customer Energy Project(s) committed by Customer shall be subject to a separate application and, upon approval by the Commission, said projects shall become part of this Agreement.
 - d. Customer will provide Company or Company's agent(s) with reasonable assistance in the preparation of the Commission's standard joint application for approval of this Agreement ("Joint Application") that will be filed with the Commission, with such Joint Application being consistent with then current Commission requirements.
 - e. Upon written request and reasonable advance notice, Customer will grant employees or authorized agents of either the Company or the Commission reasonable, pre-arranged access to the Customer Energy Project(s) for purposes of measuring and verifying energy savings and/or peak demand reductions resulting from the Customer Energy Project(s). It is expressly agreed that consultants of either the Company or the Commission are their respective authorized agents.
2. **Joint Application to the Commission.** The Parties will submit the Joint Application using the Commission's standard "Application to Commit Energy Efficiency/Peak Demand Reduction Programs" ("Joint Application") in which they will seek the Commission's approval of (i) this Agreement; (ii) the commitment of the Customer Energy Project(s) for inclusion in the Company Plan; and (iii) the Customer's Cash Rebate.

The Joint Application shall include all information as set forth in the Commission's standard form which, includes without limitation:

- i. A narrative description of the Customer Energy Project(s), including but not limited to, make, model and year of any installed and/or replaced equipment;
 - ii. A copy of this Agreement; and
 - iii. A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results.
3. **Customer Cash Rebate.** Upon Commission approval of the Joint Application, Customer shall provide Company with a W-9 tax form, which shall at a minimum include Customer's tax identification number. Within the greater of 90 days of the Commission's approval of the Joint Application or the completion of the Customer Energy Project, the Company will issue to the

Customer the Cash Rebate in the amount set forth in the Commission's Finding and Order approving the Joint Application.

- a. Customer acknowledges: i) that the Company will cap the Cash Rebate at the lesser of 50% of Customer Energy Project(s) costs or \$250,000; ii) the maximum rebate that the Customer may receive per year is \$500,000 per Taxpayer Identification Number per utility service territory; and iii) if the Customer Energy Project qualifies for a rebate program approved by the Commission and offered by the Company, Customer may still elect to file such project under the Company's mercantile customer self direct program, however the Cash Rebate that will be paid shall be discounted by 25%; and
 - b. Customer acknowledges that breaches of this Agreement, include, but are not limited to:
 - i. Customer's failure to comply with the terms and conditions set forth in the Agreement, or its equivalent, within a reasonable period of time after receipt of written notice of such non-compliance;
 - ii. Customer knowingly falsifying any documents provided to the Company or the Commission in connection with this Agreement or the Joint Application.
 - c. In the event of a breach of this Agreement by the Customer, Customer agrees and acknowledges that it will repay to the Company, within 90 days of receipt of written notice of said breach, the full amount of the Cash Rebate paid under this Agreement. This remedy is in addition to any and all other remedies available to the Company by law or equity.
4. **Termination of Agreement.** This Agreement shall automatically terminate:
- a. If the Commission fails to approve the Joint Agreement;
 - b. Upon order of the Commission; or
 - c. At the end of the life of the last Customer Energy Project subject to this Agreement.

Customer shall also have an option to terminate this Agreement should the Commission not approve the Customer's Cash Rebate, provided that Customer provides the Company with written notice of such termination within ten days of either the Commission issuing a final appealable order or the Ohio Supreme Court issuing its opinion should the matter be appealed.

5. **Confidentiality.** Each Party shall hold in confidence and not release or disclose to any person any document or information furnished by the other Party in connection with this Agreement that is designated as confidential and proprietary ("Confidential Information"), unless: (i) compelled to disclose such document or information by judicial, regulatory or administrative process or other provisions of law; (ii) such document or information is generally available to the public; or (iii) such document or information was available to the receiving Party on a non-confidential basis at the time of disclosure.
- a. Notwithstanding the above, a Party may disclose to its employees, directors, attorneys, consultants and agents all documents and information furnished by the other Party in connection with this Agreement, provided that such employees, directors, attorneys, consultants and agents have been advised of the confidential nature of this information and through such disclosure are deemed to be bound by the terms set forth herein.

- b. A Party receiving such Confidential Information shall protect it with the same standard of care as its own confidential or proprietary information.
 - c. A Party receiving notice or otherwise concluding that Confidential Information furnished by the other Party in connection with this Agreement is being sought under any provision of law, to the extent it is permitted to do so under any applicable law, shall endeavor to: (i) promptly notify the other Party; and (ii) use reasonable efforts in cooperation with the other Party to seek confidential treatment of such Confidential Information, including without limitation, the filing of such information under a valid protective order.
 - d. By executing this Agreement, Customer hereby acknowledges and agrees that Company may disclose to the Commission or its Staff any and all Customer information, including Confidential Information, related to a Customer Energy Project, provided that Company uses reasonable efforts to seek confidential treatment of the same.
6. **Taxes.** Customer shall be responsible for all tax consequences (if any) arising from the payment of the Cash Rebate.
7. **Notices.** Unless otherwise stated herein, all notices, demands or requests required or permitted under this Agreement must be in writing and must be delivered or sent by overnight express mail, courier service, electronic mail or facsimile transmission addressed as follows:

If to the Company:

FirstEnergy Service Company
 76 South Main Street
 Akron, OH 44308
 Attn: Victoria Nofziger
 Telephone: 330-384-4684
 Fax: 330-761-4281
 Email: vmnofziger@firstenergycorp.com

If to the Customer:

POET Biorefining – Marion LLC.
 1660 Hillman –Ford Rd
 Marion, OH 43302
 Attn: Cliff Brannon
 Telephone : 740-383-9761
 Fax : 740-383-4700
 Email : cliff.brannon@POET.com

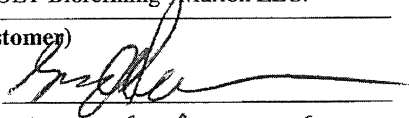
or to such other person at such other address as a Party may designate by like notice to the other Party. Notice received after the close of the business day will be deemed received on the next business day; provided that notice by facsimile transmission will be deemed to have been received by the recipient if the recipient confirms receipt telephonically or in writing.

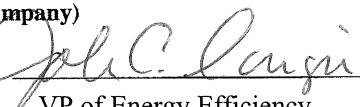
8. **Authority to Act.** The Parties represent and warrant that they are represented by counsel in connection with this Agreement, have been fully advised in connection with the execution thereof, have taken all legal and corporate steps necessary to enter into this Agreement, and that the undersigned has the authority to enter into this Agreement, to bind the Parties to all provisions herein and to take the actions required to be performed in fulfillment of the undertakings contained herein.
9. **Non-Waiver.** The delay or failure of either party to assert or enforce in any instance strict performance of any of the terms of this Agreement or to exercise any rights hereunder conferred, shall not be construed as a waiver or relinquishment to any extent of its rights to assert or rely upon such terms or rights at any later time or on any future occasion.
10. **Entire Agreement.** This Agreement, along with related exhibits, and the Company's Rider DSE, or its equivalent, as amended from time to time by the Commission, contains the Parties' entire understanding with respect to the matters addressed herein and there are no verbal or collateral representations, undertakings, or agreements not expressly set forth herein. No change in, addition to, or waiver of the terms of this Agreement shall be binding upon any of the Parties unless the same is set forth in writing and signed by an authorized representative of each of the Parties. In

the event of any conflict between Rider DSE or its equivalent and this document, the latter shall prevail.

11. **Assignment.** Customer may not assign any of its rights or obligations under this Agreement without obtaining the prior written consent of the Company, which consent will not be unreasonably withheld. No assignment of this Agreement will relieve the assigning Party of any of its obligations under this Agreement until such obligations have been assumed by the assignee and all necessary consents have been obtained.
12. **Severability.** If any portion of this Agreement is held invalid, the Parties agree that such invalidity shall not affect the validity of the remaining portions of this Agreement, and the Parties further agree to substitute for the invalid portion a valid provision that most closely approximates the economic effect and intent of the invalid provision.
13. **Governing Law.** This Agreement shall be governed by the laws and regulations of the State of Ohio, without regard to its conflict of law provisions.
14. **Execution and Counterparts.** This Agreement may be executed in multiple counterparts, which taken together shall constitute an original without the necessity of all parties signing the same page or the same documents, and may be executed by signatures to electronically or telephonically transmitted counterparts in lieu of original printed or photocopied documents. Signatures transmitted by facsimile shall be considered original signatures.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers or representatives as of the day and year set forth below.

POET Biorefining Marion LLC.
(Customer)
By: 
Title: President/CEO (Agent for POET)
Date: 6/14/12

Ohio Edison Company
(Company)
By: 
Title: VP of Energy Efficiency
Date: 7-23-12

This foregoing document was electronically filed with the Public Utilities

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in

Case No(s). 12-0819-EL-EEC

Summary: Application to Commit Energy Efficiency/Peak Demand Reduction Programs of Ohio Edison Company and POET Biorefining - Marion LLC electronically filed by Ms. Jennifer M. Sybyl on behalf of Ohio Edison Company and POET Biorefining - Marion LLC