Ohio | Public Utilities Commission

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

Case No.: 12-0261 **-EL-EEC**

Mercantile Customer:	POET Biorefining-Marion LLC
Electric Utility:	Ohio Edison Company
Program Title or Description:	Above industry std ECMs for new facility.

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):

10/28/2008.

☐ 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: _____ 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: 8,428,862 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.

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?

10/28/2008

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

547 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 $229,018. (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.

Ohio | Public Utilities Commission

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

Case No.: 12-0261 **-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.

President (EMS) - Agent for POET.

Signature of Affiant & Title

Sworn and subscribed before me this 19th day of January, 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

VICTORIA MAE KABAT-SZKLARZ
Notary Public
Minnesota
My Commission Expires January 31, 2016

Exhibit 1

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? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	High Efficiency Motors	Installed premium-efficiency motors for entire facility that was above industry standard for 2008.	Installed Premium motors vs standard motors. Calculations based on ASHRAE formula's and PE experience.	N/A	Could have installed standard efficient motors and no drives. Adding these improvements make the plant more energy efficient and competitive with the market. It also allows for more flexibiltiy and control with the drives.
2	Variable Freq Drives	Adding drives to the plant motors to save energy and have better control vs industry std constant volume. The Drives are all GE AF - 300 Model drives ranging from 1.5 HP to 75 HP.	The drives are used to tweek the operation to save energy. Also as operation and production changes the drives can lower the speed to accommodate the operations and save energy. The alternative is to use a valve or just operate at full load which both would use a lot more energy. Standard Drive calculations where used based on PE experience and Motor/Drive Master programs.	N/A	The drives were installed in place of no drives for better control and for energy savings.
3	High Eff Air Compressors	Purchased two premium energy efficient Air Compressors vs. industry standard models .	Used standard metholds for determining the savings based on engineerign practices from a PE.	N/A	POET Refinery could have purchased a singe acting piston compressor or a sliding vane compressor or old profile screw compressor instead we purchased a more efficient high profile water cooled screw compressor.
4	High Efficiency Transformers	We could have installed industry standard transformers, instead we purchased and installed high eff transformer for substation and internal use.As a result we paid and additional $20,000 for these transformers.	Calculations were based on best enegineering pratices and experience of the PE completing these forms.	N/A	The high eff transformers had better metal alloys and additional windings to provide more energy savings. This lowers the no-load losses as well as the line load losses.
5	Beer Well Drive	An adjustable speed drive was installed on the Beer Well Pump and is used to vary the flow based on operational criteria.	Used a drive spreadsheet developed from Motor/Drive master and Engineering experence as a PE.	N/A	The alternative would have been to install a std motor and valve instead we installed a vfd on the Beer Well Pump for better control and energy savings.
6	Cooling Tower Drives	Installed three cooling tower vfd drives to the the three cooling tower fan motors.	The calculations were determined by visiting the plant to see the operations and running the numbers in a spreadsheet that was based on our experence and Motor/Drive Master.	N/A	We installed the drives to provide better control for the cooling towers , which allows the plant to save energy when maxium cooling tower capacity is not needed.
7	RTO Drive	An adjustable Speed Drive was installed on the RTO (Regenerative Thermal Oxidizer) that is neeeded for emissions control. The Drive is a 800 HP combustion blower for the RTO.	Savings based on Motor Master drive calculations and best engineering pratices and experience .	N/A	The alternative would have been a motor with only vanes to control air flow. This would have used much more energy than the VFD we installed.

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) *Note 1*
2010	67,416,349	67,416,349	75,845,211
2009	68,539,717	68,539,717	76,968,579
Average	**67,978,033**	**67,978,033**	**76,406,895**

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) $ *Note 2*	Commitment Payment $
1	High Efficiency Motors	10/28/2008	$261,629	$130,815	596,708	596,708	85	$31,302	$23,477	
2	Variable Freq Drives	10/28/2008	$150,000	$75,000	1,787,535	1,787,535	140	$14,580	$10,935	
3	High Eff Air Compressors	10/28/2008	$20,000	$10,000	137,367	137,367	34	$10,989	$8,242	
4	High Efficiency Transformers	10/28/2008	$359,000	$179,500	78,998	78,998	9	$6,320	$4,740	
5	Beer Well Drive	10/28/2008	$106,000	$53,000	916,879	916,879	51	$7,500	$5,625	
6	Cooling Tower Drives	10/28/2008	$250,000	$125,000	2,110,371	2,110,371	97	$18,000	$13,500	
7	RTO Drive	10/28/2008	$325,000	$162,500	2,801,004	2,801,004	132	$224,080	$162,500	
		Total	**$1,471,629**		**8,428,862**	**8,428,862**	**547**	**$312,771**	**$229,018**	**$0**

Docket No. 12-0261
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.

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	597	$ 308	$ 183,953	$ 507	$23,477	$0	$ 23,983	**7.7**
2	1,788	$ 308	$ 551,061	$ 507	$10,935	$0	$ 11,442	**48.16**
3	137	$ 308	$ 42,347	$ 507	$8,242	$0	$ 8,748	**4.84**
4	79	$ 308	$ 24,354	$ 507	$4,740	$0	$ 5,246	**4.64**
5	917	$ 308	$ 282,655	$ 507	$5,625	$0	$ 6,132	**46.10**
6	2,110	$ 308	$ 650,585	$ 507	$13,500	$0	$ 14,007	**46.45**
7	2,801	$ 308	$ 863,494	$ 507	$162,500	$0	$ 163,007	**5.30**
Total	**8,429**	**$ 308**	**2,598,450**	**3,546**	**$229,018**	**$0**	**232,564**	**11.2**

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. 12-0261

Site: 1660 Hillman-Ford Road

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Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	POET Biorefining
Site Name:	**Marion (RTO Drive)**
Completed by (Name):	**Gary Swanson**
Date completed:	**1/1/2008**

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
Adjustable speed drive for RTO	2,801,004	224080.32
Total Project Energy Savings kWh	**2,801,004**	
Total Custom Prescriptive Rebate Amount $		**$ 224,080.32**

Notes about this rebate calculation:

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

RTO DRIVES

RECOMMENDATION: **Adjustable Speed Drives - The RTO had a drive to adjsut the combusiong air to optimize the RTO. The fan varies from 50% to 100 %. This was part of the original construction in 2008.**

Total Motor size =		800.00	H.P.	Motor Efficiency =	95.4%	VFD Efficiency =	96%
Motor Type=	1	Old		Electric Demand Rate =	$0.00 kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0556 kWh		
Number of Motors =		1					
Load Profile	2						

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	625.6	625.6	19.9	605.7	0	0
25%	0%	100%	4%	625.6	625.6	24.7	600.8	0	0
30%	0%	100%	5%	625.6	625.6	32.8	592.8	0	0
35%	0%	100%	7%	625.6	625.6	44.4	581.2	0	0
40%	0%	100%	9%	625.6	625.6	59.8	565.7	0	0
45%	0%	100%	12%	625.6	625.6	79.4	546.1	0	0
50%	10%	100%	16%	625.6	625.6	103.5	522.1	876	457,327
55%	10%	100%	20%	625.6	625.6	132.4	493.2	876	432,035
60%	10%	100%	26%	625.6	625.6	166.4	459.2	876	402,262
65%	10%	100%	32%	625.6	625.6	205.8	419.8	876	367,729
70%	10%	100%	39%	625.6	625.6	251.0	374.6	876	328,158
75%	10%	100%	46%	625.6	625.6	302.2	323.4	876	283,268
80%	10%	100%	55%	625.6	625.6	359.8	265.7	876	232,782
85%	10%	100%	65%	625.6	625.6	424.2	201.4	876	176,419
90%	10%	100%	76%	625.6	625.6	495.6	130.0	876	113,903
95%	5%	100%	88%	625.6	625.6	574.3	51.3	438	22,476
100%	5%	100%	101%	625.6	625.6	660.6	(35.1)	438	(15,356)
	100%								
								Total	**2,801,004**

ECONOMIC EVALUATION:

Total Cost Saved =	$155,736	
Estimated Installed Drive Cost =	$325,000	
kWh Saved	2,801,004	
kW Savings =	130.03	
Proposed Rebate Rate ($/kWh) (check with local electric utility)	$ 0.06	
Simple Payback =	2.1	Years
Savings $	$ 155,736	
Rebate =	$168,060	
Proposed Payback =	1.0	Years

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping the Efficiency of
*Before implementation, existing system needs to be verified for compatibility with an adjustable speed drive.

Prepared by: *Gary A. Swanso* ***Energy Management Solutions, Inc.*** ***Phone #:*** *612-819-7975* ***Email:*** gswanosn@emsenergy.com

FirstEnergy

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Project Name:	POET Motors and Drives
Site Name:	POET Biorefining - Marion
Completed by (Name):	Gary Swanson
Date completed:	12/15/2011

Variable Frequency Drive Rebate Form

VFD and Controlled Motor Nameplate DATA											
Motor Application	**VFD Manufacturer**	**VFD Model Number**	**Unique Motor ID(s)**	**Motor Location**	**Enclosure type: TEFC or ODP**	**Annual Hours of Operation[2]**	**Load Factor (LF)[3]**	**Motor Model Number**	**Motor HP**	**Motor Nominal Efficiency**	**Total Motor Incentive [1] $**
4 Process Pumps	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS145SAA221	1.5	86.5	**180**
1 Process Pump	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS184SAB208B	5	89.5	**150**
2 Process Pumps	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS213SAB208A	7.5	91.7	**450**
4 Process Pumps	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS284SAB208B	25	93.6	**3,000**
4 Process Pumps	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS326SAA308D1	30	93	**3,600**
1 Process Pump	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS364SAA308D	40	94.1	**1,200**
										Incentive through 10/11/2011 @ $35/hp	**8,580**

(1) VFD incentives (through 10/11/2011) are calculated at a flat rate of $35 per horsepower controlled, up to a maximum of 500 hp controlled per VFD.
When a single VFD is used to control two motors in a lead/lag (standby, redundant) configuration, use only the horsepower rating of one motor to figure controlled horsepower. For instance, if a single VFD controls two 30hp motors with only one operating at a time, the incentive calculation should be based on 30 hp: 30hp x $35/hp = $900.

(2) For VAV fan motors, enter 2790 annual hours of operation. For HVAC pump motors, enter 5520 annual hours of operation. For all other motor usage, please estimate your annual hours of operation and attach an explanation of how you determined this value.

(3) For all motor and VFD applications, use the Load Factor (LF) default value of 0.80, unless data is available to support the use of a motor-specific LF other than 0.80. Please attach an explanation, including your analysis and/or data used, to support motor-specific LF value.

FirstEnergy

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Project Name:	POET Motors and Drives
Site Name:	POET Biorefining - Marion
Completed by (Name):	Gary Swanson
Date completed:	12/15/2011

Variable Frequency Drive Rebate Form

VFD and Controlled Motor Nameplate DATA											
Motor Application	**VFD Manufacturer**	**VFD Model Number**	**Unique Motor ID(s)**	**Motor Location**	**Enclosure type: TEFC or ODP**	**Annual Hours of Operation[2]**	**Load Factor (LF)[3]**	**Motor Model Number**	**Motor HP**	**Motor Nominal Efficiency**	**Total Motor Incentive [1] $**
1 Process Pump	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS326LAA205	50	95	**1,500**
2 Process Pumps	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS365SAA208D1	75	95.4	**4,500**
3 CT Fans	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS447SAA208C	200	96.5	**18,000**
1 Process Pump	GE	AF300-G11	N/A	Various	TEFC	8760	0.8	5KS449SAA208D	250	96.2	**7,500**
Incentive through 10/11/2011 @ $35/hp											**31,500**

(1) VFD incentives (through 10/11/2011) are calculated at a flat rate of $35 per horsepower controlled, up to a maximum of 500 hp controlled per VFD.
When a single VFD is used to control two motors in a lead/lag (standby, redundant) configuration, use only the horsepower rating of one motor to figure controlled horsepower. For instance, if a single VFD controls two 30hp motors with only one operating at a time, the incentive calculation should be based on 30 hp: 30hp x $35/hp = $900.

(2) For VAV fan motors, enter 2790 annual hours of operation. For HVAC pump motors, enter 5520 annual hours of operation. For all other motor usage, please estimate your annual hours of operation and attach an explanation of how you determined this value.

(3) For all motor and VFD applications, use the Load Factor (LF) default value of 0.80, unless data is available to support the use of a motor-specific LF other than 0.80. Please attach an explanation, including your analysis and/or data used, to support motor-specific LF value.

VFD - Marion

HP	QTY	Eff.	Total HP	Existing kWh Usage	Proposed kWh Usage	kWh Savings	Cost Savings	$/HP incentive	Total $ Incentive
1.5	4	86.5	6	45,329	21,365	23,964	$ 1,226.96	$ 30.00	$ 180
5	1	86.5	5	36,508	17,207	19,301	$ 988.20	$ 30.00	$ 150
7.5	2	86.5	15	106,897	50,384	56,513	$ 2,893.47	$ 30.00	$ 450
25	4	89.5	100	698,179	329,073	369,106	$ 18,898.23	$ 30.00	$ 3,000
30	4	89.5	120	843,221	397,436	445,785	$ 22,824.18	$ 30.00	$ 3,600
40	1	91.7	40	277,788	130,930	146,858	$ 7,519.13	$ 30.00	$ 1,200
50	1	91.7	50	345,765	162,970	182,795	$ 9,359.12	$ 30.00	$ 1,500
75	2	91.7	150	1,027,509	484,297	543,213	$ 27,812.49	$ 30.00	$ 4,500
TOTAL				**3,381,197**	**1,593,662**	**1,787,535**	**$ 91,521.78**		**$ 14,580**

Total Project Cost: **$ 150,000**

Simple Project Payback: **1.48**

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		1.50	H.P.	Motor Efficiency =	86.5%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		4						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	5.2	5.2	0.2	5.0	0	0
25%	0%	100%	4%	5.2	5.2	0.2	5.0	0	0
30%	0%	100%	5%	5.2	5.2	0.3	4.9	0	0
35%	0%	100%	7%	5.2	5.2	0.4	4.8	0	0
40%	5%	100%	9%	5.2	5.2	0.5	4.7	438	2,054
45%	5%	100%	12%	5.2	5.2	0.6	4.5	438	1,985
50%	5%	100%	16%	5.2	5.2	0.8	4.3	438	1,899
55%	5%	100%	20%	5.2	5.2	1.1	4.1	438	1,797
60%	10%	100%	26%	5.2	5.2	1.3	3.8	876	3,352
65%	10%	100%	32%	5.2	5.2	1.7	3.5	876	3,072
70%	10%	100%	39%	5.2	5.2	2.0	3.1	876	2,752
75%	10%	100%	46%	5.2	5.2	2.4	2.7	876	2,388
80%	10%	100%	55%	5.2	5.2	2.9	2.3	876	1,979
85%	10%	100%	65%	5.2	5.2	3.4	1.7	876	1,522
90%	10%	100%	76%	5.2	5.2	4.0	1.2	876	1,015
95%	5%	100%	88%	5.2	5.2	4.7	0.5	438	228
100%	5%	100%	101%	5.2	5.2	5.4	(0.2)	438	(78)
	100%								
								Total	**23,964**

ECONOMIC EVALUATION:

Existing kWh Usage:	45,329
Proposed kWh Usage:	21,365
kWh Saved:	23,964

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		5.00	H.P.	Motor Efficiency =	89.5%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		1						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	4.2	4.2	0.1	4.0	0	0
25%	0%	100%	4%	4.2	4.2	0.2	4.0	0	0
30%	0%	100%	5%	4.2	4.2	0.2	4.0	0	0
35%	0%	100%	7%	4.2	4.2	0.3	3.9	0	0
40%	5%	100%	9%	4.2	4.2	0.4	3.8	438	1,654
45%	5%	100%	12%	4.2	4.2	0.5	3.6	438	1,598
50%	5%	100%	16%	4.2	4.2	0.7	3.5	438	1,530
55%	5%	100%	20%	4.2	4.2	0.9	3.3	438	1,447
60%	10%	100%	26%	4.2	4.2	1.1	3.1	876	2,700
65%	10%	100%	32%	4.2	4.2	1.3	2.8	876	2,474
70%	10%	100%	39%	4.2	4.2	1.6	2.5	876	2,216
75%	10%	100%	46%	4.2	4.2	2.0	2.2	876	1,923
80%	10%	100%	55%	4.2	4.2	2.3	1.8	876	1,594
85%	10%	100%	65%	4.2	4.2	2.8	1.4	876	1,226
90%	10%	100%	76%	4.2	4.2	3.2	0.9	876	818
95%	5%	100%	88%	4.2	4.2	3.7	0.4	438	184
100%	5%	100%	101%	4.2	4.2	4.3	(0.1)	438	(63)
	100%								
								Total	**19,301**

ECONOMIC EVALUATION:

Existing kWh Usage:	36,508
Proposed kWh Usage:	17,207
kWh Saved:	19,301

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping the Efficiency of
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Prepared by: *Gary A. Swanson* ***Energy Management Solutions, Inc.*** ***Phone #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		7.50	H.P.	Motor Efficiency =	91.7%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		2						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	12.2	12.2	0.4	11.8	0	0
25%	0%	100%	4%	12.2	12.2	0.5	11.7	0	0
30%	0%	100%	5%	12.2	12.2	0.6	11.6	0	0
35%	0%	100%	7%	12.2	12.2	0.8	11.4	0	0
40%	5%	100%	9%	12.2	12.2	1.1	11.1	438	4,844
45%	5%	100%	12%	12.2	12.2	1.5	10.7	438	4,680
50%	5%	100%	16%	12.2	12.2	2.0	10.2	438	4,478
55%	5%	100%	20%	12.2	12.2	2.5	9.7	438	4,237
60%	10%	100%	26%	12.2	12.2	3.2	9.0	876	7,905
65%	10%	100%	32%	12.2	12.2	3.9	8.3	876	7,245
70%	10%	100%	39%	12.2	12.2	4.8	7.4	876	6,489
75%	10%	100%	46%	12.2	12.2	5.8	6.4	876	5,631
80%	10%	100%	55%	12.2	12.2	6.9	5.3	876	4,666
85%	10%	100%	65%	12.2	12.2	8.1	4.1	876	3,589
90%	10%	100%	76%	12.2	12.2	9.5	2.7	876	2,395
95%	5%	100%	88%	12.2	12.2	11.0	1.2	438	539
100%	5%	100%	101%	12.2	12.2	12.6	(0.4)	438	(184)
	100%								
								Total	**56,513**

ECONOMIC EVALUATION:

Existing kWh Usage:	106,897
Proposed kWh Usage:	50,384
kWh Saved:	56,513

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		25.00	H.P.	Motor Efficiency =	93.6%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		4						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	79.7	79.7	2.5	77.2	0	0
25%	0%	100%	4%	79.7	79.7	3.1	76.6	0	0
30%	0%	100%	5%	79.7	79.7	4.1	75.6	0	0
35%	0%	100%	7%	79.7	79.7	5.5	74.2	0	0
40%	5%	100%	9%	79.7	79.7	7.5	72.2	438	31,638
45%	5%	100%	12%	79.7	79.7	9.9	69.8	438	30,567
50%	5%	100%	16%	79.7	79.7	12.9	66.8	438	29,251
55%	5%	100%	20%	79.7	79.7	16.5	63.2	438	27,672
60%	10%	100%	26%	79.7	79.7	20.8	58.9	876	51,629
65%	10%	100%	32%	79.7	79.7	25.7	54.0	876	47,319
70%	10%	100%	39%	79.7	79.7	31.3	48.4	876	42,380
75%	10%	100%	46%	79.7	79.7	37.7	42.0	876	36,778
80%	10%	100%	55%	79.7	79.7	44.9	34.8	876	30,477
85%	10%	100%	65%	79.7	79.7	52.9	26.8	876	23,443
90%	10%	100%	76%	79.7	79.7	61.8	17.9	876	15,640
95%	5%	100%	88%	79.7	79.7	71.7	8.0	438	3,518
100%	5%	100%	101%	79.7	79.7	82.4	(2.7)	438	(1,204)
	100%								
								Total	**369,106**

ECONOMIC EVALUATION:

Existing kWh Usage:	698,179
Proposed kWh Usage:	329,073
kWh Saved:	369,106

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping the Efficiency of
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Prepared by: *Gary A. Swanson* ***Energy Management Solutions, Inc.*** ***Phone #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		30.00	H.P.	Motor Efficiency =	93.0%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		4						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	96.3	96.3	3.0	93.3	0	0
25%	0%	100%	4%	96.3	96.3	3.7	92.5	0	0
30%	0%	100%	5%	96.3	96.3	4.9	91.3	0	0
35%	0%	100%	7%	96.3	96.3	6.7	89.6	0	0
40%	5%	100%	9%	96.3	96.3	9.0	87.2	438	38,210
45%	5%	100%	12%	96.3	96.3	12.0	84.3	438	36,917
50%	5%	100%	16%	96.3	96.3	15.6	80.7	438	35,327
55%	5%	100%	20%	96.3	96.3	20.0	76.3	438	33,421
60%	10%	100%	26%	96.3	96.3	25.1	71.2	876	62,354
65%	10%	100%	32%	96.3	96.3	31.0	65.2	876	57,149
70%	10%	100%	39%	96.3	96.3	37.8	58.4	876	51,184
75%	10%	100%	46%	96.3	96.3	45.6	50.7	876	44,418
80%	10%	100%	55%	96.3	96.3	54.2	42.0	876	36,808
85%	10%	100%	65%	96.3	96.3	63.9	32.3	876	28,313
90%	10%	100%	76%	96.3	96.3	74.7	21.6	876	18,889
95%	5%	100%	88%	96.3	96.3	86.6	9.7	438	4,248
100%	5%	100%	101%	96.3	96.3	99.6	(3.3)	438	(1,454)
	100%								
								Total	**445,785**

ECONOMIC EVALUATION:

Existing kWh Usage:	843,221
Proposed kWh Usage:	397,436
kWh Saved:	445,785

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		40.00	H.P.	Motor Efficiency =	94.1%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		1						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	31.7	31.7	1.0	30.7	0	0
25%	0%	100%	4%	31.7	31.7	1.2	30.5	0	0
30%	0%	100%	5%	31.7	31.7	1.6	30.1	0	0
35%	0%	100%	7%	31.7	31.7	2.2	29.5	0	0
40%	5%	100%	9%	31.7	31.7	3.0	28.7	438	12,588
45%	5%	100%	12%	31.7	31.7	3.9	27.8	438	12,162
50%	5%	100%	16%	31.7	31.7	5.1	26.6	438	11,638
55%	5%	100%	20%	31.7	31.7	6.6	25.1	438	11,010
60%	10%	100%	26%	31.7	31.7	8.3	23.4	876	20,542
65%	10%	100%	32%	31.7	31.7	10.2	21.5	876	18,827
70%	10%	100%	39%	31.7	31.7	12.5	19.2	876	16,862
75%	10%	100%	46%	31.7	31.7	15.0	16.7	876	14,633
80%	10%	100%	55%	31.7	31.7	17.9	13.8	876	12,126
85%	10%	100%	65%	31.7	31.7	21.1	10.6	876	9,327
90%	10%	100%	76%	31.7	31.7	24.6	7.1	876	6,223
95%	5%	100%	88%	31.7	31.7	28.5	3.2	438	1,400
100%	5%	100%	101%	31.7	31.7	32.8	(1.1)	438	(479)
	100%								
								Total	**146,858**

ECONOMIC EVALUATION:

Existing kWh Usage:	277,788
Proposed kWh Usage:	130,930
kWh Saved:	146,858

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		50.00	H.P.	Motor Efficiency =	94.5%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		1						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	39.5	39.5	1.2	38.2	0	0
25%	0%	100%	4%	39.5	39.5	1.5	37.9	0	0
30%	0%	100%	5%	39.5	39.5	2.0	37.4	0	0
35%	0%	100%	7%	39.5	39.5	2.7	36.7	0	0
40%	5%	100%	9%	39.5	39.5	3.7	35.8	438	15,668
45%	5%	100%	12%	39.5	39.5	4.9	34.6	438	15,138
50%	5%	100%	16%	39.5	39.5	6.4	33.1	438	14,486
55%	5%	100%	20%	39.5	39.5	8.2	31.3	438	13,704
60%	10%	100%	26%	39.5	39.5	10.3	29.2	876	25,568
65%	10%	100%	32%	39.5	39.5	12.7	26.8	876	23,434
70%	10%	100%	39%	39.5	39.5	15.5	24.0	876	20,988
75%	10%	100%	46%	39.5	39.5	18.7	20.8	876	18,214
80%	10%	100%	55%	39.5	39.5	22.2	17.2	876	15,093
85%	10%	100%	65%	39.5	39.5	26.2	13.3	876	11,610
90%	10%	100%	76%	39.5	39.5	30.6	8.8	876	7,746
95%	5%	100%	88%	39.5	39.5	35.5	4.0	438	1,742
100%	5%	100%	101%	39.5	39.5	40.8	(1.4)	438	(596)
	100%								
								Total	**182,795**

ECONOMIC EVALUATION:

Existing kWh Usage:	345,765
Proposed kWh Usage:	162,970
kWh Saved:	182,795

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

VARIABLE FREQUENCY DRIVES

Total Motor size =		75.00	H.P.	Motor Efficiency =	95.4%		VFD Efficiency =	98%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		2						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	117.3	117.3	3.6	113.6	0	0
25%	0%	100%	4%	117.3	117.3	4.5	112.8	0	0
30%	0%	100%	5%	117.3	117.3	6.0	111.3	0	0
35%	0%	100%	7%	117.3	117.3	8.2	109.1	0	0
40%	5%	100%	9%	117.3	117.3	11.0	106.3	438	46,561
45%	5%	100%	12%	117.3	117.3	14.6	102.7	438	44,985
50%	5%	100%	16%	117.3	117.3	19.0	98.3	438	43,048
55%	5%	100%	20%	117.3	117.3	24.3	93.0	438	40,725
60%	10%	100%	26%	117.3	117.3	30.6	86.7	876	75,982
65%	10%	100%	32%	117.3	117.3	37.8	79.5	876	69,639
70%	10%	100%	39%	117.3	117.3	46.1	71.2	876	62,371
75%	10%	100%	46%	117.3	117.3	55.5	61.8	876	54,126
80%	10%	100%	55%	117.3	117.3	66.1	51.2	876	44,853
85%	10%	100%	65%	117.3	117.3	77.9	39.4	876	34,501
90%	10%	100%	76%	117.3	117.3	91.0	26.3	876	23,018
95%	5%	100%	88%	117.3	117.3	105.5	11.8	438	5,177
100%	5%	100%	101%	117.3	117.3	121.3	(4.0)	438	(1,772)
	100%								
								Total	**543,213**

ECONOMIC EVALUATION:

Existing kWh Usage:	1,027,509
Proposed kWh Usage:	484,297
kWh Saved:	543,213

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanson@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

Beer Well Pump DRIVE

RECOMMENDATION: **Adjustable Speed Drives - The Beer wlll pumps can vary flow depending on the product flowing. The Flow ranges from 60-80%. This was part of the original consturcion in 2008.**

Total Motor size =		250.00	H.P.	Motor Efficiency =	96.4%		VFD Efficiency =	96%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	5	Pump: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =	1	1						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW Power Savings	Hours Per Year	KWH/Yr. Energy Savings	Existing kWH	New kWh
0%	0%	0%	0%	0.0	0.0	0.0	0.0	0	0		
20%	0%	100%	6%	193.5	193.5	11.9	181.6	0	0		
25%	0%	100%	7%	193.5	193.5	14.2	179.3	0	0		
30%	0%	100%	8%	193.5	193.5	17.0	176.5	0	0		
35%	0%	100%	10%	193.5	193.5	20.3	173.2	0	0		
40%	0%	100%	12%	193.5	193.5	24.2	169.3	0	0		
45%	0%	100%	14%	193.5	193.5	28.9	164.6	0	0		
50%	0%	100%	17%	193.5	193.5	34.5	159.0	0	0		
55%	0%	100%	20%	193.5	193.5	41.2	152.3	0	0		
60%	0%	100%	24%	193.5	193.5	49.2	144.3	0	0		
65%	20%	100%	29%	193.5	193.5	58.8	134.7	1,752	236,001	338950.2075	102949.2102
70%	20%	100%	35%	193.5	193.5	70.2	123.3	1,752	216,000	338950.2075	122949.7532
75%	20%	100%	42%	193.5	**193.5**	**83.8**	**109.7**	1,752	192,114	338950.2075	146835.9183
80%	20%	100%	50%	193.5	193.5	100.1	93.4	1,752	163,588	338950.2075	175362.5879
85%	10%	100%	59%	193.5	193.5	119.5	73.9	876	64,759	169475.1037	104715.65
90%	10%	100%	71%	193.5	193.5	142.8	50.7	876	44,416	169475.1037	125059.3695
95%	0%	100%	85%	193.5	193.5	170.5	23.0	0	0		
100%	0%	100%	101%	193.5	193.5	203.6	(10.2)	0	0		
	100%									**1,694,751**	**777,872**
								Total	**916,879**		-916878.5482

ECONOMIC EVALUATION:

Total Cost Saved =				$46,929	
Estimated Installed Drive Cost =				$106,000	
kWh Saved				916,879	
kW Savings =				50.70	
Proposed Rebate Rate ($/kWh) (check with local electric utility)				$ 0.06	
Simple Payback =				2.3	Years
Savings $		0.06	50%	$ 46,929	
Rebate =	$	55,013	$ 53,000	$ 7,500	
Proposed Payback =				2.1	Years

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanosn@emsenergy.com

Customer Name: POET
Location: Marion, Ohio
Date: 12/15/11

Cooling Tower Fans DRIVES

RECOMMENDATION: **Adjustable Speed Drives - The cooling tower fans have drives to vary the flow when max cooling is not needed. The fan varies from 40% to 100 %. This was part of the original contruction in 2008.**

Total Motor size =		200.00	H.P.	Motor Efficiency =	96.4%		VFD Efficiency =	96%
Motor Type=	1	Old		Electric Demand Rate =	$0.00	kW	Hours of Operation =	8,760
Existing Control =	3	Fan: None		Electricity Rate =	$0.0512	kWh		
Number of Motors =		3						
Load Profile	2							

System Rated Flow	Operating Time	Percent of Full Input Power: Existing	Percent of Full Input Power: Proposed VFD	Full-Load Power KW	Existing Motor Input Power	Proposed Motor Input Power	KW 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%	100%	3%	464.3	464.3	14.7	449.6	0	0		
25%	0%	100%	4%	464.3	464.3	18.4	446.0	0	0		
30%	0%	100%	5%	464.3	464.3	24.4	440.0	0	0		
35%	0%	100%	7%	464.3	464.3	33.0	431.4	0	0		
40%	5%	100%	9%	464.3	464.3	419.9	44.4	438	183,916	203370.1245	19453.70821
45%	5%	100%	12%	464.3	464.3	405.4	59.0	438	177,545	203370.1245	25824.6269
50%	5%	100%	16%	464.3	464.3	387.5	76.8	438	169,719	203370.1245	33651.40029
55%	5%	100%	20%	464.3	464.3	366.1	98.3	438	160,333	203370.1245	43037.55647
60%	10%	100%	26%	464.3	464.3	340.8	123.5	876	298,567	406740.249	108173.2471
65%	10%	100%	32%	464.3	464.3	311.6	152.7	876	272,936	406740.249	133804.2593
70%	10%	100%	39%	464.3	464.3	278.0	186.3	876	243,565	406740.249	163175.2057
75%	10%	100%	46%	464.3	464.3	240.0	224.3	876	210,247	406740.249	196493.1425
80%	10%	100%	55%	464.3	464.3	197.2	267.1	876	172,775	406740.249	233965.126
85%	10%	100%	65%	464.3	464.3	149.5	314.8	876	130,942	406740.249	275798.2123
90%	10%	100%	76%	464.3	464.3	96.5	367.8	876	84,541	406740.249	322199.4577
95%	5%	100%	88%	464.3	464.3	38.1	426.2	438	16,682	203370.1245	186687.9592
100%	5%	100%	101%	464.3	464.3	490.3	(26.0)	438	(11,397)	203370.1245	214767.3252
	100%									**4,067,402**	**1,957,031**
								Total	**2,110,371**	**2,110,371**	

ECONOMIC EVALUATION:

Total Cost Saved =	$108,016	
Estimated Installed Drive Cost =	$250,000	
kWh Saved	2,110,371	
kW Savings =	96.51	
Proposed Rebate Rate ($/kWh) (check with local electric utility)	$ 0.06	
Simple Payback =	2.3	Years
Savings $	$ 108,016	
Rebate =	$18,000	
Proposed Payback =	2.1	Years

*This calculation is for VFD's. 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 SEB-2 as of 2007.
*Motor efficiencies courtesy of: Malinowski, J. "Energy Efficient Motors and Drives", ASHRAE Journal 1/2004 and "Toshiba Low Voltage Motor Price Guide 2004"
*Load profiles derived from EMS research and observation.
*Power curves courtesy of: Malinowski, 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, "Upping 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 #:*** *612-819-7975* ***Email:*** gswanosn@emsenergy.com

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Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	POET Biorefining
Site Name:	**Marion (Air Compressors)**
Completed by (Name):	**Gary Swanson**
Date completed:	**1/1/2008**

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
Premium-efficiency air compressors	137,367	10989.36
Total Project Energy Savings kWh	**137,367**	
Total Custom Prescriptive Rebate Amount $		**$ 10,989.36**

Notes about this rebate calculation:

MOTOR REPLACEMENT

Project Description: Replace standard efficiency motors with premium efficiency motors.

ASSUMPTIONS:

Demand Charge: $/kW

Energy Charge: $0.0512 $/kWh

Quantity	HP	Hours	LF	New Eff	Prev Eff	kW Saved	Energy Savings (kWh)
7	1	8,760	80%	86.5%	82.5%	0.29	2,051
4	1.5	8,760	80%	86.5%	84.0%	0.15	1,079
31	2	8,760	80%	86.5%	84.0%	1.59	11,152
36	3	8,760	80%	89.5%	87.5%	2.06	14,420
11	5	8,760	80%	89.5%	87.5%	1.05	7,343
12	7.5	8,760	80%	91.7%	89.5%	1.80	12,613
12	10	8,760	80%	91.7%	89.5%	2.40	16,817
13	15	8,760	80%	91.7%	90.2%	2.64	18,488
17	20	8,760	80%	93.0%	91.0%	5.99	42,007
16	25	8,760	80%	93.6%	92.4%	4.14	29,015
15	30	8,760	80%	93.0%	91.7%	5.12	35,862
13	40	8,760	80%	94.1%	93.0%	4.88	34,171
15	50	8,760	80%	94.5%	93.0%	9.55	66,922
8	60	8,760	80%	95.0%	93.6%	5.64	39,510
9	75	8,760	80%	95.4%	94.1%	7.29	51,102
9	100	8,760	80%	95.8%	94.5%	9.64	67,565
3	125	8,760	80%	95.8%	94.1%	5.28	36,971
4	150	8,760	80%	96.2%	95.0%	5.88	41,188
4	200	8,760	80%	96.5%	95.0%	9.76	68,433
TOTAL						**85.15**	**596,708**

ENERGY SAVINGS: 85.15 kW 596,708 kWh

COST SAVINGS: $30,551

IMPLEMENTATION COST: $261,629

REBATE: $ 31,302.00

SIMPLE PAYBACK: Before Rebate = 8.6 Years

After Rebate = 7.5 Years

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Project Name:	High Eff Motor
Site Name:	POET - Marion Ethanal
Completed by (Name):	Gary Swanson
Date completed:	12/19/2011

Motor Rebate Calculation Form

Motor ID, Location, and Operation Data				Old Motor Nameplate Data								New Motor Nameplate Data								
Unique Motor ID(s)	**Number of Identical Units**	**Motor Location**	**Annual Hours of Op[2]**	**Loading (Constant, or if variable, indicate control type)**	**Load Factor (LF)[3]**	**Enclosure type: TEFC or ODP**	**Mfr.**	**Model Number**	**Motor HP**	**Nominal Efficiency**	**Speed (RPM)**	**Loading (Constant, or if variable, indicate control type)**	**Load Factor (LF)[3]**	**Enclosure type: TEFC or ODP**	**Mfr.**	**Model Number**	**Motor HP**	**Nominal Efficiency**	**Speed (RPM)**	**Total Motor Incentive[1] $**
N/A	7	Various	8760	Constant	0.80	TEFC	N/A	N/A	1	82.5	1800	Constant	0.80	TEFC	GE	5KS143SA	1	86.5	1750	**$140**
N/A	4	Various	8760	Constant	0.80	TEFC	N/A	N/A	1.5	84	1800	Constant	0.80	TEFC	GE	5KS145SA	1.5	86.5	1740	**$100**
N/A	31	Various	8760	Constant	0.80	TEFC	N/A	N/A	2	84	1800	Constant	0.80	TEFC	GE	5KS145SA	2	86.5	1730	**$1,674**
N/A	36	Various	8760	Constant	0.80	TEFC	N/A	N/A	3	87.5	1200	Constant	0.80	TEFC	GE	5KS213SA	3	89.5	1180	**$1,944**
N/A	11	Various	8760	Constant	0.80	TEFC	N/A	N/A	5	87.5	1800	Constant	0.80	TEFC	GE	5KS184SA	5	89.5	1755	**$594**
N/A	12	Various	8760	Constant	0.80	TEFC	N/A	N/A	7.5	89.5	1800	Constant	0.80	TEFC	GE	5KS213SA	7.5	91.7	1770	**$840**
N/A	12	Various	8760	Constant	0.80	TEFC	N/A	N/A	10	89.5	1800	Constant	0.80	TEFC	GE	5KS215SA	10	91.7	1765	**$840**
N/A	13	Various	8760	Constant	0.80	TEFC	N/A	N/A	15	90.2	3600	Constant	0.80	TEFC	GE	5KS254SA	15	91.7	3550	**$1,469**
																			Incentive (through 10/11/2011)	**$7,601**

Motor IDs may be specified by HVAC application type and number. Application types eligible for this incentive include:
- Chilled Water Pump (CHWP),
- Heating Hot Water Pump (HHWP),
- HVAC Fans (HVACF),
- Cooling Tower Fan (CTF), and
- Condensing Water Pump (CWP).

If the HVAC application is not listed above, please describe the application on a separate sheet and include it with your application package.

(1) Motor incentives are listed in Table 2 - Incentive levels per motor located on Motor Incentive Table tab

(2) For VAV fan motors, enter 2790 annual hours of operation. For HVAC pump motors, enter 5520 annual hours of operation. For all other motor usage, please estimate your annual hours of operation and attach an explanation of how you determined this value.

(3) For all motor applications, use the Load Factor (LF) default value of 0.80, unless data is available to support the use of a motor-specific LF other than 0.80. Please attach an explanation, including your analysis and/or data used, to support motor-specific LF value.

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Project Name:	POET Motors and Drives
Site Name:	POET Biorefining - Marion
Completed by (Name):	Gary Swanson
Date completed:	12/15/2011

Motor Rebate Calculation Form

Motor ID, Location, and Operation Data				Old Motor Nameplate Data								New Motor Nameplate Data								
Unique Motor ID(s)	**Number of Identical Units**	**Motor Location**	**Annual Hours of Op[2]**	**Loading (Constant, or if variable, indicate control type)**	**Load Factor (LF)[3]**	**Enclosure type: TEFC or ODP**	**Mfr.**	**Model Number**	**Motor HP**	**Nominal Efficiency**	**Speed (RPM)**	**Loading (Constant, or if variable, indicate control type)**	**Load Factor (LF)[3]**	**Enclosure type: TEFC or ODP**	**Mfr.**	**Model Number**	**Motor HP**	**Nominal Efficiency**	**Speed (RPM)**	**Total Motor Incentive[1] $**
N/A	17	Various	8760	Constant	0.80	TEFC	N/A	N/A	20	91	1800	Constant	0.80	TEFC	GE	5KS256SA	20	93	1770	**$1,921**
N/A	16	Various	8760	Constant	0.80	TEFC	N/A	N/A	25	92.4	1800	Constant	0.80	TEFC	GE	5KS284SA	25	93.6	1775	**$2,240**
N/A	15	Various	8760	Constant	0.80	TEFC	N/A	N/A	30	91.7	1200	Constant	0.80	TEFC	GE	5KS326SA	30	93	1175	**$2,550**
N/A	13	Various	8760	Constant	0.80	TEFC	N/A	N/A	40	93	1200	Constant	0.80	TEFC	GE	5KS364SA	40	94.1	1185	**$2,600**
N/A	15	Various	8760	Constant	0.80	TEFC	N/A	N/A	50	93	1800	Constant	0.80	TEFC	GE	5KS326LA	50	94.5	1780	**$3,450**
N/A	8	Various	8760	Constant	0.80	TEFC	N/A	N/A	60	93.6	1800	Constant	0.80	TEFC	GE	5KS364SA	60	95	1780	**$2,080**
N/A	9	Various	8760	Constant	0.80	TEFC	N/A	N/A	75	94.1	1800	Constant	0.80	TEFC	GE	5KS365SA	75	95.4	1785	**$2,610**
N/A	9	Various	8760	Constant	0.80	TEFC	N/A	N/A	100	94.5	1800	Constant	0.80	TEFC	GE	5KS405SA	100	95.8	1785	**$2,880**
																			Incentive (through 10/11/2011)	**$20,331**

Motor IDs may be specified by HVAC application type and number. Application types eligible for this incentive include:
- Chilled Water Pump (CHWP),
- Heating Hot Water Pump (HHWP),
- HVAC Fans (HVACF),
- Cooling Tower Fan (CTF), and
- Condensing Water Pump (CWP).

If the HVAC application is not listed above, please describe the application on a separate sheet and include it with your application package.

(1) Motor incentives are listed in Table 2 - Incentive levels per motor located on Motor Incentive Table tab

(2) For VAV fan motors, enter 2790 annual hours of operation. For HVAC pump motors, enter 5520 annual hours of operation. For all other motor usage, please estimate your annual hours of operation and attach an explanation of how you determined this value.

(3) For all motor applications, use the Load Factor (LF) default value of 0.80, unless data is available to support the use of a motor-specific LF other than 0.80. Please attach an explanation, including your analysis and/or data used, to support motor-specific LF value.

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Project Name:	POET Motors and Drives
Site Name:	POET Biorefining - Marion
Completed by (Name):	Gary Swanson
Date completed:	12/15/2011

Motor Rebate Calculation Form

Motor ID, Location, and Operation Data				Old Motor Nameplate Data								New Motor Nameplate Data								
Unique Motor ID(s)	**Number of Identical Units**	**Motor Location**	**Annual Hours of Op[2]**	**Loading (Constant, or if variable, indicate control type)**	**Load Factor (LF)[3]**	**Enclosure type: TEFC or ODP**	**Mfr.**	**Model Number**	**Motor HP**	**Nominal Efficiency**	**Speed (RPM)**	**Loading (Constant, or if variable, indicate control type)**	**Load Factor (LF)[3]**	**Enclosure type: TEFC or ODP**	**Mfr.**	**Model Number**	**Motor HP**	**Nominal Efficiency**	**Speed (RPM)**	**Total Motor Incentive[1] $**
N/A	3	Various	8760	Constant	0.80	TEFC	N/A	N/A	125	94.1	1800	Constant	0.80	TEFC	GE	5KS444SA	125	95.8	1780	**$1,050**
N/A	4	Various	8760	Constant	0.80	TEFC	N/A	N/A	150	95	1800	Constant	0.80	TEFC	GE	5KS445SA	150	96.2	1790	**$1,520**
N/A	4	Various	8760	Constant	0.80	TEFC	N/A	N/A	200	95	1800	Constant	0.80	TEFC	GE	5KS447SA	200	96.5	1790	**$800**
			8760																	
			8760																	
			8760																	
			8760																	
			8760																	
																			Incentive (through 10/11/2011)	**$3,370**

Motor IDs may be specified by HVAC application type and number. Application types eligible for this incentive include:
- Chilled Water Pump (CHWP),
- Heating Hot Water Pump (HHWP),
- HVAC Fans (HVACF),
- Cooling Tower Fan (CTF), and
- Condensing Water Pump (CWP).

If the HVAC application is not listed above, please describe the application on a separate sheet and include it with your application package.

(1) Motor incentives are listed in Table 2 - Incentive levels per motor located on Motor Incentive Table tab

(2) For VAV fan motors, enter 2790 annual hours of operation. For HVAC pump motors, enter 5520 annual hours of operation. For all other motor usage, please estimate your annual hours of operation and attach an explanation of how you determined this value.

(3) For all motor applications, use the Load Factor (LF) default value of 0.80, unless data is available to support the use of a motor-specific LF other than 0.80. Please attach an explanation, including your analysis and/or data used, to support motor-specific LF value.

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Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	POET Biorefining
Site Name:	**Marion (Transformers)**
Completed by (Name):	**Gary Swanson**
Date completed:	**1/1/2008**

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
New Transformers	78,998	6319.84
Total Project Energy Savings kWh	**78,998**	
Total Custom Prescriptive Rebate Amount $		**$ 6,319.84**

Notes about this rebate calculation:

Custom Rebates for Transformers
Date: 2008
POET BIOREFINING
Marion, OH

Facility	Catalog Number	Phase	Size of Unit	Qty	Transformers Purchased Guaranteed Losses NLL	Transformers Purchased Guaranteed Losses LL	Other Transformers Average Losses NLL	Other Transformers Average Losses LL	Load	Savings (kWh)
Marion	9196-435457-076	3	2500 kVA	1	4297	27216	4727	28677	75%	13,366
	9196-435457-077	3	2500 kVA	8	4408	25588	4848	25888	75%	46,603
	9399-435458-004	3	5000 kVA	1	8869	30876	9756	32374	75%	17,612
	6480-265470-201	1	100 kVA	1	239	1415	263	1490	75%	703
	6437-265470-202	1	37.5 kVA	2	111	775	121	816	75%	714
	Total									**78,998**

Total Cost	**$**	**359,346**	
Incremental Cost for more efficient transformers purchased	**$**	**20,000**	
Energy Saved	**$**	**3,950**	
Potential Rebate	**$**	**4,740**	
Simple Payback without Rebate		**5.1**	Years
Simple Payback with Rebate		**3.9**	Years

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 , 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 A (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 and Annual Report.** 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 Case 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:	**If to the Customer:**
FirstEnergy Service Company	_Cliff Brannon____
76 South Main Street	____POET Biorefining – Marion, LLC.
Akron, OH 44308	____1660 Hillman-Ford_
Attn: Victoria Nofziger	____Marion, OH 43302_____
Telephone: 330-384-4684	_____740-383-9761_____
Fax: 330-761-4281	_____740-383-4700_____
Email: vmnofziger@firstenergycorp.com	____cligg.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.

(Customer)	Ohio Edison Co. **(Company)**
By: Gary Swanson	**By:** John C. Lingen
Title: President EMS (Authorized agent for POET)	**Title:** U.P. Energy Efficiency
Date: 12-15-11	**Date:** 3-5-12

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in

Case No(s). 12-0261-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