



**Case No.:** \_\_\_\_-\_\_\_\_-EL-EEC

**Mercantile Customer:** University of Cincinnati

**Electric Utility:** Duke Energy

**Program Title or  
Description:** Boiler Fans 3 and 4 VFD's

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](mailto:ee-pdr@puc.state.oh.us).

## Section 1: Mercantile Customer Information

Name: **University of Cincinnati**

Principal address: **51 Goodman Drive Ste 260, Cincinnati, Ohio 45221**

Address of facility for which this energy efficiency program applies:

**3150 Eden Avenue, Cincinnati, Ohio 45221**

**3000 Glendora, Cincinnati, Ohio 45219**

Name and telephone number for responses to questions:

**Grady Reid, Jr. 513-287-1038**

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. (Refer to Appendix A for 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: **Duke Energy**

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)).

**The following new equipment was installed starting November 2008 and was finished June 2009.**

**1 VFD on 200 HP Boiler #3 ID Fan Motor**

**1 VFD on 75 HP Boiler #4 ID Fan Motor**

- ☐ 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: 154,632 kWh**

**Refer to Appendix B for calculations and supporting documents**

- 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.

- 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.

- 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?  
**The following new equipment was installed starting November 2008 and was finished June 2009.**
- C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

**41.8 kW**

**Refer to Appendix B for calculations and supporting documentation.**

## **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 **\$6,250.00. Refer to Appendix C for documentation.** (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: 12.01 Refer to Appendix D for calculations and supporting documents.  
(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 **\$120,635**.

The utility's program costs were **\$3,796**.

The utility's incentive costs/rebate costs were **\$6,250**.

**Refer to Appendix D for calculations and supporting documents.**

## **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.

### **Refer to Rebate Offer Letter following this application**

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.



DUKE ENERGY CORPORATION  
Mercantile Self Direct Program  
139 East Fourth Street  
Cincinnati, OH 45202  
513 419 5572 fax

December 7, 2011

Mr. Maurice DuPont  
University of Cincinnati  
3000 Glendora Ave  
Cincinnati, Ohio 45221

Subject: Your Application for a Duke Energy Mercantile Self-Direct Rebate

Dear Name: Mr. DuPont

Thank you for your Duke Energy Mercantile Self Direct rebate application. As noted in the Energy Conservation Measure (ECM) chart on page two, a total rebate of \$6,250.00 has been proposed for your variable frequency drive projects completed in the 2009 calendar year. All Self Direct Rebates are contingent upon approval by the Public Utilities Commission of Ohio (PUCO).

At your earliest convenience, please indicate if you accept this rebate by

- providing your signature on page two
- completing the PUCO-required affidavit on page three.

Please return the documents to my attention via fax at 513-419-5572 or e-mail to SelfDirect@Duke-Energy.com. Upon receipt, Duke Energy will submit the necessary documentation to PUCO. Following PUCO's approval, Duke Energy will remit payment.

At Duke Energy, we value your business and look forward to working with you on this and future energy efficiency projects. We hope you will consider our Smart \$aver® incentives, when applicable. Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Grady Reid, Jr.'.

Grady Reid, Jr  
Product Manager  
Mercantile Self Direct Rebates

cc: Michael Pahutski, Duke Energy  
Deanna Bowden, Duke Energy  
Rob Jung, WECC

Please indicate your response to this rebate offer within 30 days of receipt.

☒ Rebate is accepted.

☐ Rebate is declined.

By accepting this rebate, University of Cincinnati affirms its intention to commit and integrate the energy efficiency projects listed on the following pages into Duke Energy's peak demand reduction, demand response and/or energy efficiency programs.

Additionally, University of Cincinnati also agrees to serve as joint applicant in any future filings necessary to secure approval of this arrangement as required by PUCO and to comply with any information and reporting requirements imposed by rule or as part of that approval.

Finally, University of Cincinnati affirms that all application information submitted to Duke Energy pursuant to this rebate offer is true and accurate. Information in question would include, but not be limited to, project scope, equipment specifications, equipment operational details, project costs, project completion dates, and the quantity of energy conservation measures installed.

If rebate is accepted, will you use the monies to fund future energy efficiency and/or demand reduction projects?

☒ YES

☐ NO

If rebate is declined, please indicate reason (optional):

*Maurice DuPont* Maurice DuPont 12/15/11

Customer Signature

Printed Name

Date

### Proposed Rebate Amounts

Measure ID	Energy Conservation Measure (ECM)	Proposed Rebate Amount
ECM-1	Boiler ID Fan VFD (Boiler 3)	\$4,500.00
ECM-2	Boiler ID Fan VFD (Boiler 4)	\$1,750.00
ECM-3		
ECM-4		
ECM-5		
Total		\$6,250.00



## Public Utilities Commission

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

Case No.: \_\_\_\_ - \_\_\_\_ -EL-EEC

State of Ohio :

Maurice DuPont, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

University of Cincinnati

[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.
3. I am aware of fines and penalties which may be imposed under Ohio Revised Code Sections 2921.11, 2921.31, 4903.02, 4903.03, and 4903.99 for submitting false information.

Maurice DuPont UTILITY ENGINEER  
Signature of Affiant & Title

Sworn and subscribed before me this 15 day of December,  
2011 Month/Year

Janice Adams  
Signature of official administering oath

Janice Adams - Assistant To  
Print Name and Title

**JANICE ADAMS**  
Notary Public, State of Ohio  
My Commission Expires 08-28-2016

My commission expires on \_\_\_\_\_



Appendix A

10002117 01  
UNIVERSITY OF CINCINNATI  
3001 VINE  
CINCINNATI, OH 45219

<b>Date</b>	<b>Days</b>	<b>Actual KWH</b>
10/28/2011	29	9,780,527
9/29/2011	30	13,461,678
8/30/2011	29	15,433,477
8/1/2011	32	14,691,650
6/30/2011	29	12,713,072
6/1/2011	30	10,078,207
5/2/2011	32	9,178,830
3/31/2011	29	8,604,173
3/2/2011	29	10,900,746
2/1/2011	32	7,985,074
12/31/2010	31	7,686,691
11/30/2010	33	7,269,725
<b>Total</b>		<b>127,783,850</b>

**See Appendix B At The End**

## Appendix C -Cash Rebate Calculation

### VFD

Measure	Quantity	Cash Rebate Rate	Rebate	Cash Rebate
200 HP Boiler #3 ID Fan Motor	1	50% of incentive that would be offered by the Smart \$aver Custom program	\$4,500	<b>\$4,500</b>
75 HP Boiler #4 ID Fan Motor	1	50% of incentive that would be offered by the Smart \$aver Custom program	\$1,750	<b>\$1,750</b>
			<b>Total</b>	<b>\$6,250</b>

## Appendix D -UCT Value

**VFD**

Measure	Total Avoided Cost	Program Cost	Incentive	Quantity	Measure UCT
200 HP Boiler #3 ID Fan Motor	\$100,134	\$2,734	\$4,500	1	13.84
75 HP Boiler #4 ID Fan Motor	\$20,501	\$1,062	\$1,750	1	7.29
<b>Totals</b>	<b>\$120,635</b>	<b>\$3,796</b>	<b>\$6,250</b>	<b>2</b>	

Total Avoided Supply Costs	\$120,635	<b>Aggregate Application UCT</b>	<b>12.01</b>
Total Program Costs	\$3,796.00		
Total Incentive	\$6,250		

## Appendix B – Energy Savings Achieved

ECM	Pre-Project (at the meter)			Post-Project (at the meter)			Savings (at the meter)	
	As-Found Equipment	Total Annual kWh <sup>1</sup>	Summer Coincident kW <sup>1</sup>	New Equipment	Total Annual kWh <sup>1</sup>	Summer Coincident kW <sup>2</sup>	Energy Savings (kWh)	Demand Savings (kW) <sup>2</sup>
ECM1	200 HP Boiler #3 ID Fan Motor (No VFD)	891,551	132	VFD Added	787,966	93	103,586	39
ECM2	75 HP Boiler #3 ID Fan Motor (No VFD)	266,514	0	VFD Added	226,420	0	40,093	0
Totals							143,679	6

### Notes:

1. Energy consumption baseline, demand baseline and post-project energy consumption basis are outlined in the following pages.
2. Demand savings are returned by DSMore software as a result of energy savings allocations at the coincident hour where applicable. Post-project demand is calculated as the difference between pre-project modeled demand and the DSMore software result. ECM2 is not in operation during the coincident hour and has no coincident demand savings.

Application of 7.43% line losses yields **154,632 kWh** savings and **41.8 coincident kW** savings at the plant. These numbers also reflect minor rounding error due to the analytical mode used to model these projects in DSMore software.

DUKE ENERGY - NON-RESIDENTIAL CUSTOM PROGRAM  
ENERGY DEMAND & USAGE CALCULATIONS

Applicant: University of Cincinnati - Boiler ID Fan VFDs  
ECM: Boiler #3 ID Fan w/VFD (ECM-1)

App No.: 11-377 MSD  
Rev.: 1

1. INPUT DATA - BOILER #3 ID FAN MOTOR w/VFD (all values per pg 2 of 3 of Part 2 of the application for Boiler #3, except as otherwise noted)

Driven Equipment	Name	Boiler #3 ID Fan	Type
Quantity		1	
Brake HP (BHP) at Full Load (see note 1)		168.4	
Nameplate HP		200.0	

Current Equipment Operation without VFD - Input values for ONE driven equipment and its motor.

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment	Motor output HP as % of Nameplate HP	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)		
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
100	%	168.4	84%	95	%	132.20	6,744	744	672	528	720	744	312	96	672	288	552	672	744	6,744
	%	0.0	#DIV/0!		%	#DIV/0!														0
	%	0.0	#DIV/0!		%	#DIV/0!														0
	%	0.0	#DIV/0!		%	#DIV/0!														0
Not Running		0.0	0%	NA	%	0.00	2,016	0	0	216	0	0	408	648	72	432	192	48	0	2,016
				Totals		8,760	744	672	744	720	744	720	744	720	744	720	744	720	744	8,760

DUKE ENERGY - NON-RESIDENTIAL CUSTOM PROGRAM  
ENERGY DEMAND & USAGE CALCULATIONS

Applicant: University of Cincinnati - Boiler ID Fan VFDs  
ECM: Boiler #3 ID Fan w/VFD (ECM-1)

App No.: 11-377 MSD  
Rev.: 1

Proposed Equipment Operation with VFD - Input values for ONE driven equipment and its motor.

Efficiency of VFD	95	%
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% of Full Load BHP of Driven Equipment	BHP of Driven Equipment t @ Actual	Motor output HP as % of Motor Nameplate	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	168.4	84%	95	139.16	792	144	144	96	72	48	0	0	0	0	48	96	144	792
90 %	151.5	76%	95	125.24	2136	360	336	192	240	240	0	0	0	0	192	240	336	2136
80 %	134.7	67%	93	113.72	2184	240	192	120	192	240	168	0	288	144	144	192	264	2184
70 %	117.8	59%	90	102.82	1104			72	144	144	96	0	216	96	96	144		1008
60 %	101.0	51%	85	93.32	528			48	72	72	48	96	168	48	72			624
50 %	84.2	42%																0
40 %	67.3	34%																0
30 %	50.5	25%																0
20 %	33.7	17%																0
10 %	16.8	8%																0
Not Running	0.0	0%	NA	0.00	2,016	0	0	216	0	0	408	648	72	432	192	48	0	2,016
				<b>Totals</b>	<b>8,760</b>	<b>744</b>	<b>672</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>8,760</b>

DUKE ENERGY - NON-RESIDENTIAL CUSTOM PROGRAM  
ENERGY DEMAND & USAGE CALCULATIONS

Applicant: University of Cincinnati - Boiler ID Fan VFDs  
ECM: Boiler #3 ID Fan w/VFD (ECM-1)

App No.: 11-377 MSD  
Rev.: 1

**2. CALCULATIONS OF ENERGY USAGE FOR BOILER #3 ID FAN MOTOR w/VFD**

% of Full Load Capacity of Driven Equipment	Energy Demand (kw)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Maximum
100%	139	139	139	139	139	139	0	0	0	139	139	139	139
90%	125	125	125	125	125	125	0	0	0	125	125	125	125
80%	114	114	114	114	114	114	114	0	114	114	114	114	114
70%			103	103	103	103	0	103	103	103	103		103
60%			93	93	93	93	93	93	93	93			93
50%													0
40%													0
													0
20%													0
10%													0
Maximum	139	139	139	139	139	114	93	114	114	139	139	139	139

% of Full Load Capacity of Driven Equipment	Energy Usage (kw-hr)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100%	20,039	20,039	13,359	10,019	6,680	0	0	0	0	6,680	13,359	20,039	110,212
90%	45,087	42,081	24,046	30,058	30,058	0	0	0	0	24,046	30,058	42,081	267,515
80%	27,293	21,834	13,646	21,834	27,293	19,105	0	32,751	16,376	16,376	21,834	30,022	248,364
70%			7,403	14,806	14,806	9,871	0	22,209	9,871	9,871	14,806		103,644
60%			4,479	6,719	6,719	4,479	8,958	15,677	4,479	6,719			58,230
50%													0
40%													0
30%													0
20%													0
10%													0
Total	92,418	83,954	62,934	83,437	85,555	33,455	8,958	70,638	30,726	63,691	80,057	92,142	787,966

DUKE ENERGY - NON-RESIDENTIAL CUSTOM PROGRAM  
ENERGY DEMAND & USAGE CALCULATIONS

Applicant: University of Cincinnati - Boiler ID Fan VFDs  
ECM: Boiler #4 ID Fan w/VFD (ECM-2)

App No.: 11-377 MSD  
Rev.: 1

1. INPUT DATA - BOILER #4 ID FAN MOTOR w/VFD (all values per pg 2 of 3 of Part 2 of the application for Boiler #4, except as otherwise noted)

Driven Equipment	Name	Boiler #4 ID Fan	Type
Quantity		1	
Brake HP (BHP) at Full Load (see note 1)		63.1	
Nameplate HP		75.0	

Current Equipment Operation without VFD - Input values for ONE driven equipment and its motor.

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment	Motor output HP as % of Nameplate HP	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
						672	672	432	720	696	312	0	648	288	0	192	744	
100	%	63.1	84%	95	%	49.57	5,376											5,376
	%	0.0	#DIV/0!		%	#DIV/0!												0
	%	0.0	#DIV/0!		%	#DIV/0!												0
	%	0.0	#DIV/0!		%	#DIV/0!												0
Not Running		0.0	0%	NA	%	0.00	3,384			48	408	744	96	432	744	528	0	3,384
						Totals	8,760			744	720	744	744	720	744	720	744	8,760

DUKE ENERGY - NON-RESIDENTIAL CUSTOM PROGRAM  
ENERGY DEMAND & USAGE CALCULATIONS

Applicant: University of Cincinnati - Boiler ID Fan VFDs  
ECM: Boiler #4 ID Fan w/VFD (ECM-2)

App No.: 11-377 MSD  
Rev.: 1

Proposed Equipment Operation with VFD - Input values for ONE driven equipment and its motor.

Efficiency of VFD	95	%
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% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load	Motor output HP as % of Motor Nameplate	Motor Efficiency @ HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100	%	63.1	84%		696	144	144	96	72	48	0	0	0	0	0	48	144	696
90	%	56.8	76%		1656	288	336	144	240	240	0	0	0	0	0	72	336	1656
80	%	50.5	67%		1800	240	192	96	192	192	168	0	264	144	0	48	264	1800
70	%	44.2	59%		768			48	144	144	96	0	216	96	0	24		768
60	%	37.9	51%		456			48	72	72	48	0	168	48	0			456
50	%	31.6	42%															0
40	%	25.3	34%															0
30	%	18.9	25%															0
20	%	12.6	17%															0
10	%	6.3	8%															0
Not Running		0.0	0%			72	0	312	0	48	408	744	96	432	744	528	0	3,384
					Totals	744	672	744	720	744	720	744	744	720	744	720	744	8,760

DUKE ENERGY - NON-RESIDENTIAL CUSTOM PROGRAM  
ENERGY DEMAND & USAGE CALCULATIONS

Applicant: University of Cincinnati - Boiler ID Fan VFDs  
ECM: Boiler #4 ID Fan w/VFD (ECM-2)

App No.: 11-377 MSD  
Rev.: 1

**2. CALCULATIONS OF ENERGY USAGE FOR BOILER #4 ID FAN MOTOR w/VFD**

% of Full Load Capacity of Driven Equipment	Energy Demand (kw)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Maximum
100%	52	52	52	52	52	0	0	0	0	0	52	52	52
90%	45	45	45	45	45	0	0	0	0	0	45	45	45
80%	41	41	41	41	41	41	0	41	41	0	41	41	41
70%			37	37	37	37	0	37	37	0	37		37
60%			33	33	33	33	0	33	33	0			33
50%													0
40%													0
30%													0
20%													0
10%													0
Maximum	52	52	52	52	52	41	0	41	41	0	52	52	52

% of Full Load Capacity of Driven Equipment	Energy Usage (kw-hr)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100%	7,514	7,514	5,010	3,757	2,505	0	0	0	0	0	2,505	7,514	36,320
90%	12,850	14,991	6,425	10,708	10,708	0	0	0	0	0	3,212	14,991	73,886
80%	9,723	7,778	3,889	7,778	7,778	6,806	0	10,695	5,834	0	1,945	10,695	72,923
70%			1,758	5,275	5,275	3,516	0	7,912	3,516	0	879		28,132
60%			1,596	2,394	2,394	1,596	0	5,585	1,596	0			15,159
50%													0
40%													0
30%													0
20%													0
10%													0
Total	30,087	30,284	18,678	29,912	28,660	11,918	0	24,192	10,946	0	8,541	33,201	226,420

<b>Cell:</b> V6	
<b>Comment:</b> bchiesa:	
	The only changes made from Rev. 0 were to split up the "monthly data" worksheet into two separate worksheets (i.e., one for ECM-1 & one for ECM-2)
<b>Cell:</b> F30	
<b>Comment:</b> bchiesa:	corrected value - application shows a value of "0.95"
<b>Cell:</b> F39	
<b>Comment:</b> bchiesa:	Adjusted to take into account lower motor efficiencies when motor output is significantly below 80% of motor full load.
<b>Cell:</b> F40	
<b>Comment:</b> bchiesa:	Adjusted to take into account lower motor efficiencies when motor output is significantly below 80% of motor full load.
<b>Cell:</b> F41	
<b>Comment:</b> bchiesa:	Adjusted to take into account lower motor efficiencies when motor output is significantly below 80% of motor full load.
<b>Cell:</b> I48	
<b>Comment:</b> bchiesa:	Corrected equation in this cell
<b>Cell:</b> J48	
<b>Comment:</b> bchiesa:	Corrected equation in this cell
<b>Cell:</b> K48	
<b>Comment:</b> bchiesa:	Corrected equation in this cell
<b>Cell:</b> L48	
<b>Comment:</b> bchiesa:	Corrected equation in this cell
<b>Cell:</b> M48	
<b>Comment:</b> bchiesa:	Corrected equation in this cell
<b>Cell:</b> N48	
<b>Comment:</b> bchiesa:	Corrected equation in this cell
<b>Cell:</b> O48	
<b>Comment:</b> bchiesa:	

Corrected equation in this cell

**Cell:** P48

**Comment:** bchiesa:

Corrected equation in this cell

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**Comment:** bchiesa:

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# Ohio Mercantile Self Direct Program

## Application Guide & Cover Sheet

Questions? Call 1-866-380-9580 or visit [www.duke-energy.com](http://www.duke-energy.com).

Email this form along with completed Mercantile Self Direct Prescriptive or Custom applications, proof of payment, energy savings calculations and spec sheets to [SelfDirect@Duke-Energy.com](mailto:SelfDirect@Duke-Energy.com). You may also fax to 1-513-419-5572.

Mercantile customers, defined as using at least 700,000 kWh annually are eligible for the Mercantile Self Direct program. Please indicate mercantile qualification:

- ☒ a single Duke Energy Ohio account  
☐ multiple accounts in Ohio (energy usage with other utilities may be counted toward the total)

Please list Duke Energy account numbers below (attach listing of multiple accounts an/or billing history for other utilities as required):

Account Number	Annual Usage	Account Number	Annual Usage
1000-2117-01-6	108,524,021 kWh		

Self Direct rebates are available for completed Custom projects that have not previously received a Duke Energy Smart \$aver® Custom Incentive. Self Direct incentives are applicable to Prescriptive measures that were installed more than 90 days prior to submission to Duke Energy and have not previously received a Duke Energy Prescriptive rebate.

Self Direct Program requirements dictate that certain projects that may be Prescriptive in nature under the Smart \$aver program must be evaluated using the Custom process. Use the table on page two as a guide to determine which Self Direct program fits your project(s). Apply for Self Direct projects using the appropriate application forms in conjunction with this cover sheet. Where Mercantile Self Direct Prescriptive applications are listed, please refer to the measure list on that application. If your measure is not listed, you may be eligible for a Self Direct Custom rebate. Self Direct Custom applications, like Smart \$aver Custom applications, should include detailed analysis of pre-project and post-project energy usage and project costs. Please indicate which type of rebate applications are included in the table provided on page two.

Please check each box to indicate completion of the following program requirements:

<input checked="" type="checkbox"/> All sections of appropriate application(s) are completed	<input checked="" type="checkbox"/> Proof of payment.*	<input checked="" type="checkbox"/> Manufacturer's Spec sheets	<input checked="" type="checkbox"/> Energy model/calculations and detailed inputs for Custom applications
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\* If a single payment record is intended to demonstrate the costs of both Prescriptive & Custom projects, please include an additional document with an estimated breakout of costs for each Prescriptive and Custom energy conservation measure.

Application Type	Replaced equipment at end of lifetime or because equipment failed**	Replaced fully operational equipment to improve efficiency***	New Construction
Lighting	MSD Custom Part 1 <input type="checkbox"/> Custom Lighting Worksheet <input type="checkbox"/>	MSD Prescriptive Lighting <input type="checkbox"/>	MSD Prescriptive Lighting <input type="checkbox"/>
		MSD Custom Part 1 <input type="checkbox"/> Custom Lighting Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> Custom Lighting Worksheet <input type="checkbox"/>
Heating & Cooling	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Prescriptive Heating & Cooling <input type="checkbox"/>
			MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>
Window Films, Programmable Thermostats, & Guest Room Energy Management Systems	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General and/or EMS Worksheet(s) <input type="checkbox"/>	MSD Prescriptive Heating & Cooling <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General and/or EMS Worksheet(s) <input type="checkbox"/>
Chillers & Thermal Storage	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Prescriptive Chillers & Thermal Storage <input type="checkbox"/>
			MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>
Motors & Pumps	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Prescriptive Motors, Pumps & Drives <input type="checkbox"/>
			MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>
VFDs	Not Applicable	MSD Prescriptive Motors, Pumps & Drives <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom VFD Worksheet <input type="checkbox"/>
		MSD Custom Part 1 <input checked="" type="checkbox"/> MSD Custom VFD Worksheet <input checked="" type="checkbox"/>	
Food Service	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Prescriptive Food Service <input type="checkbox"/>
			MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>
Process	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	MSD Prescriptive Process <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>
		MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>	
Energy Management Systems	MSD Custom Part 1 <input type="checkbox"/> MSD Custom EMS Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom EMS Worksheet <input type="checkbox"/>	MSD Custom Part 1 <input type="checkbox"/> MSD Custom EMS Worksheet <input type="checkbox"/>
Behavioral*** & No/Low Cost	MSD Custom Part 1 <input type="checkbox"/> MSD Custom General Worksheet <input type="checkbox"/>		

\*\* Under the Self Direct program, failed equipment and equipment at the end of its useful life are evaluated differently than early replacement of fully functioning equipment. **All equipment replacements due to failure or old age will be evaluated via the Custom program.**

\*\*\* Please ensure that you include the age of the replaced equipment for measures classified as "Early Replacement" in your application as well as the estimated date that you would have otherwise replaced the existing equipment if you had not chosen a more energy efficient option.

\*\*\*\* Behavioral energy efficiency and demand reduction projects must be both measurable and verifiable. Provide justification with your application.

# **Mercantile Self Direct Nonresidential Custom Rebate Application PART 1**



Proposed energy efficiency measures may be eligible for Self-Direct Custom rebates if they clearly reduce electrical consumption and/or demand as compared to the appropriate baseline.

Before you complete this application, please note the following important criteria:

- Submitting this application does not guarantee a rebate will be approved.
- Rebates are based on electricity conservation only.
- Electric demand and/or energy reductions must be well documented with auditable calculations.
- Incomplete applications cannot be reviewed; all fields are required.

Refer to the complete list of Instructions and Disclaimers, beginning on page 6.

## **Notes on the Application Process**

If you have any questions concerning how to complete any portion of the application or what supplementary information is required, please contact your Duke Energy Ohio, Inc account manager or the Duke Energy Smart Saver® team at 1-866-380-9580.

Every application must include calculations of the baseline electrical usage and the electrical usage of the proposed high-efficiency equipment/system. Monthly calculations are best. You, the Duke Energy Ohio customer, or your equipment vendor / engineer should perform these calculations and submit them to Duke Energy for review. *We strongly encourage the use of modeling software (such as eQuest or comparable) for complex projects.*

Upon receipt of your application, an acknowledgement email will be sent to you with an estimated response time based on an initial assessment of your application. The application review may include some communication to resolve any questions about the project or to request additional information. Applications that are received complete without missing information have a faster review time.

There are two ways to submit your completed application.

Email your scanned form to: [SelfDirect@duke-energy.com](mailto:SelfDirect@duke-energy.com)

Or, fax your form to 513-419-5572

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**1. Contact Information (Required)**

Duke Energy Customer Contact Information					
Company Name	University of Cincinnati				
Address	51 Goodman Drive, Ste 260				
Project Contact	Maurice DuPont				
City	Cincinnati	State	OH	Zip Code	45221
Title	Utility Engineer				
Office Phone	513-556-1537	Mobile Phone	513-502-2185	Fax	513-556-4322
E-mail Address	dupontmh@uc.edu				

Equipment Vendor / Contractor / Architect / Engineer Contact Information					
Company Name	CBT Cincinnati				
Address	737 W. 6 <sup>th</sup> Street				
City	Cincinnati	State	OH	Zip Code	45201
Project Contact					
Title					
Office Phone	888-492-2244	Mobile Phone		Fax	
E-mail Address	sales@cbtcompany.com				
Describe Role	equipment vendor				

Payment Information					
Payee Legal Company Name (as shown on Federal income tax return):	University of Cincinnati Consolidated Utilities				
Mailing Address	3000 Glendor Ave				
City	Cincinnati	State	OH	Zip Code	45221
Type of organization (check one) <input type="checkbox"/> Individual/Sole Proprietor <input type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Unit of Government <input checked="" type="checkbox"/> Non-Profit (non-corporation)					
Payee Federal Tax ID # of Legal Company Name Above:	31-6000989				
Who should receive incentive payment? (select one) <input checked="" type="checkbox"/> Customer <input type="checkbox"/> Vendor (Customer must sign below)					
If the vendor is to receive payment, please sign below: I hereby authorize payment of incentive directly to vendor:					
Customer Signature _____ Date ____/____/____ (mm/dd/yyyy)					

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**2. Project Information (Required)**

A. Please indicate project type:

- ☒ New Construction
- ☐ Expansion at an existing facility
- ☐ Replacing equipment due to equipment failure
- ☐ Replacing equipment that is estimated to have remaining useful life of 2 years or less
- ☐ Replacing equipment that is estimated to have remaining useful life of more than 2 years
- ☐ Behavioral, operational and/or procedural programs/projects

B. Please describe your project, or attach a detailed project description that describes the project.

The addition of (1) variable frequency drive (VFD) devices to existing boiler #3 induced-draft (ID) fan in the University of Cincinnati Medical Campus Utility Plant.

C. When did you start and complete implementation?

Start date 11/2008 (mm/yyyy) End date 06/2009 (mm/yyyy)

D. Are you also applying for Self-Direct Prescriptive incentives and, if so, which one(s)<sup>1</sup>?

E. Please indicate which worksheet(s) you are submitting for this application (check all that apply):

- ☐ Lighting
- ☒ Variable Frequency Drive (VFD)
- ☐ Compressed Air
- ☐ Energy Management System (EMS)
- ☐ General (for projects not easily submitted using one of the above worksheets)

F. Please tell us if there is anything about your electrical energy projections (either for the baseline or the proposed project) that you are either unsure about or for which you have made significant assumptions. Attach additional sheets as needed.

Required: Attach a supplier or contractor invoice or other equivalent information documenting the Implementation Cost for each project listed in your application. (Note: self-install costs cannot be included in the Implementation Cost)

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<sup>1</sup> If your project involves some equipment that is eligible for prescriptive incentives and some equipment that is likely eligible for custom incentives, and if it is feasible to separate the equipment for the energy analysis, then the equipment will be evaluated separately. If it is not feasible to separate the equipment for analysis, then the equipment will be evaluated together in the custom application.

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**3. Signature** (Required – must be signed by Duke Energy customer)

**Customer Consent to Release of Personal Information**

I, (insert name) Maurice DuPont, do hereby consent to Duke Energy disclosing my Duke Energy Ohio, Inc Account Number and Federal Tax ID Number to its subcontractors solely for the purpose of administering Duke Energy Ohio's Mercantile Self-Direct Program. I understand that such subcontractors are contractually bound to otherwise maintain my Duke Energy Ohio, Inc Account Number and Federal Tax ID Number in the strictest of confidence.

I realize that under the rules and regulations of the public utilities commission, I may refuse to allow Duke Energy Ohio, Inc to release the information set forth above. By my signature, I freely give Duke Energy Ohio, Inc permission to release the information designated above.

**Application Signature**

I certify that I meet the eligibility requirements of the Duke Energy Ohio, Inc Mercantile Self Direct Custom Incentives Program and that all information provided within this application is correct to the best of my knowledge. I agree to the terms and conditions set forth for this program. I certify that the numbers, energy savings, and responses shown on this form are correct. Further, I certify that the taxpayer identification number is current and correct. I am not subject to backup withholding because: (a) I am exempt from backup withholding; or (b) I have not been notified by the IRS that I am subject to backup withholding as a result of a failure to report all interest or dividends; or (c) the IRS has notified me that I am no longer subject to backup withholding. I am a U.S. citizen (includes a U.S. resident alien).

\_\_\_\_\_  
Duke Energy Ohio, Inc Customer Signature

Print Name    Maurice DuPont

Date    4-Nov-11

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



## Checklist for completing the Application

INCOMPLETE APPLICATIONS WILL RESULT IN DELAYS IN DUKE ENERGY PROCESSING YOUR APPLICATION AND NOTIFYING YOU CONCERNING ANY REBATES. Before submitting the application and the required supplementary information, use the following checklist to ensure that your application is complete and the information in the application is accurate. (Note: this checklist is for your use only – do not submit this checklist with your application)

Section No. & Title	Have You:
1. Contact Information	<input checked="" type="checkbox"/> Completed the contact information for the Duke Energy customer? <input checked="" type="checkbox"/> Completed the contact information for the equipment vendor / project engineer that can answer questions about the technical aspects of the project, if that is a different person than above?
2. Project Information	<input checked="" type="checkbox"/> Answered the questions A-E, including providing a description of your project. <input checked="" type="checkbox"/> Completed and attached the lighting, compressed air, VFD, EMS and/or General worksheet(s)?
3. Signature	<input checked="" type="checkbox"/> Signed your name? <input checked="" type="checkbox"/> Printed your name? <input checked="" type="checkbox"/> Entered the date?
Supplementary information (Required)	<input checked="" type="checkbox"/> Attached a supplier or contractor's invoice or other equivalent information documenting the Implementation Cost for projects listed in your application? (Note: self-install costs cannot be included in the Implementation Cost) <input checked="" type="checkbox"/> (If submitting the General Worksheet) attached calculations documenting the energy usage and energy savings for <b>each</b> project listed in your application?

If you have any questions concerning how to complete any portion of the application or what supplementary information is required, please contact:

- your Duke Energy account manager
- or,
- the Duke Energy Smart \$aver® team at 1-866-380-9580.

# **Mercantile Self Direct Nonresidential Custom Rebate Application PART 1**



## **Instructions/Terms/Conditions**

Note: Please keep for your records- do not submit with the application

1. Energy service companies or contractors may assist in preparing the application, but an authorized representative of the customer must sign this application to be eligible to participate in the Mercantile Self Direct Program. Completion of this application does not guarantee the approval of a Self Direct Custom Rebate.
2. Once all documentation requested in this application is received by *Duke Energy Ohio, Inc.*, and any follow-up information requested by *Duke Energy* is received, the rebate amount for each Energy Conservation Measure (ECM) will be communicated to the customer. The rebate amount will be based on ECM energy savings and ECM incremental installation cost.
3. All rebates require approval by the Public Utilities Commission of Ohio. *Duke Energy Ohio, Inc.* will submit an application for rebate on the customer's behalf upon customer attestation to program terms, conditions and requirements as outlined in the rebate offer letter and upon customer completion of attestation documents required by the Public Utilities Commission of Ohio.
4. *Duke Energy Ohio, Inc.* will issue a Self Direct Custom Rebate check, based on the approved rebate amount for each ECM, upon receiving approval from the Public Utilities Commission of Ohio. *Duke Energy Ohio, Inc.* does not guarantee PUCO approval.
5. With the application, the customer must provide a list of all sites where the ECMs were installed. *Duke Energy Ohio, Inc.* requests that sites of similar size, hours of operation and energy consuming characteristics be grouped together in one application for the determination of the rebate amount. The application should identify the site where each unique ECM was installed.
6. Based on the information submitted with the application and the information gathered both before and after the initial installation of the ECM, *Duke Energy Ohio, Inc.* will calculate the rebate amount for each ECM.
7. *Duke Energy Ohio, Inc.* may conduct random site inspections of a sample of the locations where the ECMs are installed to verify installation and operability of the ECMs and to obtain information needed to calculate the Approved Incentive Amount.
8. Customers are encouraged to retain copies of all forms, invoices and supporting documentation for their records.
9. Approved rebates are valid for 6 months from the date communicated to the customer by *Duke Energy Ohio, Inc.*, subject to the expiration of measure eligibility based on project completion dates and application submission deadlines as defined by PUCO. Customers are encouraged to execute their rebate offer contracts and PUCO-required affidavits promptly to ensure eligibility is not forfeited.
10. *Duke Energy Ohio, Inc.* reserves the right to recover all unrecoverable costs associated with the project approval if the customer decides not to execute the rebate contract, after the project is approved by *Duke Energy Ohio, Inc.*
11. Projects financially supported by other funding sources will be evaluated on a case-by-case basis for potential partial funding from *Duke Energy Ohio, Inc.*
12. Participants must be *Duke Energy Ohio, Inc.* nonresidential, mercantile customers with the project sites in the *Duke Energy Ohio, Inc.* service territory.

# **Mercantile Self Direct Nonresidential Custom Rebate Application PART 1**



13. Customers or trade allies may not use any *Duke Energy* logo without prior written permission.
14. Only trade allies registered with *Duke Energy* are eligible to participate.
15. All equipment must be new. Used or rebuilt equipment is not eligible for incentives. All old existing equipment must be removed on retrofit projects.
16. Disclaimers: *Duke Energy Ohio, Inc*
  - a. does not endorse any particular manufacturer, product or system design within the program;
  - b. will not be responsible for any tax liability imposed on the customer as a result of the payment of incentives;
  - c. does not expressly or implicitly warrant the performance of installed equipment. (Contact your contractor for details regarding equipment warranties.);
  - d. is not responsible for the proper disposal/recycling of any waste generated or obsolete or old equipment as a result of this project;
  - e. is not liable for any damage caused by the installation of the equipment nor for any damage caused by the malfunction of the installed equipment; and
  - f. reserves the right to change or discontinue this program at any time. The acceptance of program applications is determined solely by *Duke Energy Ohio, Inc.*

# **Mercantile Self Direct Nonresidential Custom Rebate Application PART 1**



Proposed energy efficiency measures may be eligible for Self-Direct Custom rebates if they clearly reduce electrical consumption and/or demand as compared to the appropriate baseline.

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- Rebates are based on electricity conservation only.
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Or, fax your form to 513-419-5572

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**1. Contact Information (Required)**

Duke Energy Customer Contact Information						
Company Name	University of Cincinnati					
Address	51 Goodman Drive, Ste 260					
Project Contact	Maurice DuPont					
City	Cincinnati	State	OH	Zip Code	45221	
Title	Utility Engineer					
Office Phone	513-556-1537	Mobile Phone	513-502-2185	Fax	513-556-4322	
E-mail Address	dupontmh@uc.edu					

Equipment Vendor / Contractor / Architect / Engineer Contact Information						
Company Name	CBT Cincinnati					
Address	737 W. 6 <sup>th</sup> Street					
City	Cincinnati	State	OH	Zip Code	45201	
Project Contact						
Title						
Office Phone	888-492-2244	Mobile Phone		Fax		
E-mail Address	sales@cbtcompany.com					
Describe Role	Equipment vendor					

Payment Information						
Payee Legal Company Name (as shown on Federal income tax return):	University of Cincinnati Consolidated Utilities					
Mailing Address	3000 Glendora Ave					
City	Cincinnati	State	OH	Zip Code	45221	
Type of organization (check one) <input type="checkbox"/> Individual/Sole Proprietor <input type="checkbox"/> Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Unit of Government <input checked="" type="checkbox"/> Non-Profit (non-corporation)						
Payee Federal Tax ID # of Legal Company Name Above:	31-6000989					
Who should receive incentive payment? (select one) <input checked="" type="checkbox"/> Customer <input type="checkbox"/> Vendor (Customer must sign below)						
If the vendor is to receive payment, please sign below: I hereby authorize payment of incentive directly to vendor:						
Customer Signature _____ Date ____/____/____ (mm/dd/yyyy)						

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**2. Project Information (Required)**

A. Please indicate project type:

- ☒ New Construction
- ☐ Expansion at an existing facility
- ☐ Replacing equipment due to equipment failure
- ☐ Replacing equipment that is estimated to have remaining useful life of 2 years or less
- ☐ Replacing equipment that is estimated to have remaining useful life of more than 2 years
- ☐ Behavioral, operational and/or procedural programs/projects

B. Please describe your project, or attach a detailed project description that describes the project.

The addition of (1) variable frequency drive (VFD) devices to existing boiler #4 induced-draft (ID) fan in the University of Cincinnati Medical Campus Utility Plant.

C. When did you start and complete implementation?

Start date 11/2008 (mm/yyyy) End date 06/2009 (mm/yyyy)

D. Are you also applying for Self-Direct Prescriptive incentives and, if so, which one(s)<sup>1</sup>?

E. Please indicate which worksheet(s) you are submitting for this application (check all that apply):

- ☐ Lighting
- ☒ Variable Frequency Drive (VFD)
- ☐ Compressed Air
- ☐ Energy Management System (EMS)
- ☐ General (for projects not easily submitted using one of the above worksheets)

F. Please tell us if there is anything about your electrical energy projections (either for the baseline or the proposed project) that you are either unsure about or for which you have made significant assumptions. Attach additional sheets as needed.

Required: Attach a supplier or contractor invoice or other equivalent information documenting the Implementation Cost for each project listed in your application. (Note: self-install costs cannot be included in the Implementation Cost)

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**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**3. Signature** (Required – must be signed by Duke Energy customer)

**Customer Consent to Release of Personal Information**

I, (insert name) Maurice DuPont, do hereby consent to Duke Energy disclosing my Duke Energy Ohio, Inc Account Number and Federal Tax ID Number to its subcontractors solely for the purpose of administering Duke Energy Ohio's Mercantile Self-Direct Program. I understand that such subcontractors are contractually bound to otherwise maintain my Duke Energy Ohio, Inc Account Number and Federal Tax ID Number in the strictest of confidence.

I realize that under the rules and regulations of the public utilities commission, I may refuse to allow Duke Energy Ohio, Inc to release the information set forth above. By my signature, I freely give Duke Energy Ohio, Inc permission to release the information designated above.

**Application Signature**

I certify that I meet the eligibility requirements of the Duke Energy Ohio, Inc Mercantile Self Direct Custom Incentives Program and that all information provided within this application is correct to the best of my knowledge. I agree to the terms and conditions set forth for this program. I certify that the numbers, energy savings, and responses shown on this form are correct. Further, I certify that the taxpayer identification number is current and correct. I am not subject to backup withholding because: (a) I am exempt from backup withholding; or (b) I have not been notified by the IRS that I am subject to backup withholding as a result of a failure to report all interest or dividends; or (c) the IRS has notified me that I am no longer subject to backup withholding. I am a U.S. citizen (includes a U.S. resident alien).

\_\_\_\_\_  
Duke Energy Ohio, Inc Customer Signature

Print Name    Maurice DuPont

Date    4-Nov-11

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



## Checklist for completing the Application

INCOMPLETE APPLICATIONS WILL RESULT IN DELAYS IN DUKE ENERGY PROCESSING YOUR APPLICATION AND NOTIFYING YOU CONCERNING ANY REBATES. Before submitting the application and the required supplementary information, use the following checklist to ensure that your application is complete and the information in the application is accurate. (Note: this checklist is for your use only – do not submit this checklist with your application)

Section No. & Title	Have You:
1. Contact Information	<input type="checkbox"/> Completed the contact information for the Duke Energy customer? <input type="checkbox"/> Completed the contact information for the equipment vendor / project engineer that can answer questions about the technical aspects of the project, if that is a different person than above?
2. Project Information	<input type="checkbox"/> Answered the questions A-E, including providing a description of your project. <input type="checkbox"/> Completed and attached the lighting, compressed air, VFD, EMS and/or General worksheet(s)?
3. Signature	<input type="checkbox"/> Signed your name? <input type="checkbox"/> Printed your name? <input type="checkbox"/> Entered the date?
Supplementary information (Required)	<input type="checkbox"/> Attached a supplier or contractor's invoice or other equivalent information documenting the Implementation Cost for projects listed in your application? (Note: self-install costs cannot be included in the Implementation Cost) <input type="checkbox"/> (If submitting the General Worksheet) attached calculations documenting the energy usage and energy savings for <b>each</b> project listed in your application?

If you have any questions concerning how to complete any portion of the application or what supplementary information is required, please contact:

- your Duke Energy account manager
- or,
- the Duke Energy Smart \$aver® team at 1-866-380-9580.

# **Mercantile Self Direct Nonresidential Custom Rebate Application PART 1**



## **Instructions/Terms/Conditions**

Note: Please keep for your records- do not submit with the application

1. Energy service companies or contractors may assist in preparing the application, but an authorized representative of the customer must sign this application to be eligible to participate in the Mercantile Self Direct Program. Completion of this application does not guarantee the approval of a Self Direct Custom Rebate.
2. Once all documentation requested in this application is received by *Duke Energy Ohio, Inc.*, and any follow-up information requested by *Duke Energy* is received, the rebate amount for each Energy Conservation Measure (ECM) will be communicated to the customer. The rebate amount will be based on ECM energy savings and ECM incremental installation cost.
3. All rebates require approval by the Public Utilities Commission of Ohio. *Duke Energy Ohio, Inc.* will submit an application for rebate on the customer's behalf upon customer attestation to program terms, conditions and requirements as outlined in the rebate offer letter and upon customer completion of attestation documents required by the Public Utilities Commission of Ohio.
4. *Duke Energy Ohio, Inc.* will issue a Self Direct Custom Rebate check, based on the approved rebate amount for each ECM, upon receiving approval from the Public Utilities Commission of Ohio. *Duke Energy Ohio, Inc.* does not guarantee PUCO approval.
5. With the application, the customer must provide a list of all sites where the ECMs were installed. *Duke Energy Ohio, Inc.* requests that sites of similar size, hours of operation and energy consuming characteristics be grouped together in one application for the determination of the rebate amount. The application should identify the site where each unique ECM was installed.
6. Based on the information submitted with the application and the information gathered both before and after the initial installation of the ECM, *Duke Energy Ohio, Inc.* will calculate the rebate amount for each ECM.
7. *Duke Energy Ohio, Inc.* may conduct random site inspections of a sample of the locations where the ECMs are installed to verify installation and operability of the ECMs and to obtain information needed to calculate the Approved Incentive Amount.
8. Customers are encouraged to retain copies of all forms, invoices and supporting documentation for their records.
9. Approved rebates are valid for 6 months from the date communicated to the customer by *Duke Energy Ohio, Inc.*, subject to the expiration of measure eligibility based on project completion dates and application submission deadlines as defined by PUCO. Customers are encouraged to execute their rebate offer contracts and PUCO-required affidavits promptly to ensure eligibility is not forfeited.
10. *Duke Energy Ohio, Inc.* reserves the right to recover all unrecoverable costs associated with the project approval if the customer decides not to execute the rebate contract, after the project is approved by *Duke Energy Ohio, Inc.*
11. Projects financially supported by other funding sources will be evaluated on a case-by-case basis for potential partial funding from *Duke Energy Ohio, Inc.*
12. Participants must be *Duke Energy Ohio, Inc.* nonresidential, mercantile customers with the project sites in the *Duke Energy Ohio, Inc.* service territory.

# **Mercantile Self Direct Nonresidential Custom Rebate Application PART 1**



13. Customers or trade allies may not use any *Duke Energy* logo without prior written permission.
14. Only trade allies registered with *Duke Energy* are eligible to participate.
15. All equipment must be new. Used or rebuilt equipment is not eligible for incentives. All old existing equipment must be removed on retrofit projects.
16. Disclaimers: *Duke Energy Ohio, Inc*
  - a. does not endorse any particular manufacturer, product or system design within the program;
  - b. will not be responsible for any tax liability imposed on the customer as a result of the payment of incentives;
  - c. does not expressly or implicitly warrant the performance of installed equipment. (Contact your contractor for details regarding equipment warranties.);
  - d. is not responsible for the proper disposal/recycling of any waste generated or obsolete or old equipment as a result of this project;
  - e. is not liable for any damage caused by the installation of the equipment nor for any damage caused by the malfunction of the installed equipment; and
  - f. reserves the right to change or discontinue this program at any time. The acceptance of program applications is determined solely by *Duke Energy Ohio, Inc.*

**Mercantile Self Direct  
Nonresidential Custom Rebate Application  
PART 1**



**3. Signature (Required – must be signed by Duke Energy customer)**

**Customer Consent to Release of Personal Information**

I, (insert name) Maurice DuPont, do hereby consent to Duke Energy disclosing my Duke Energy Ohio, Inc Account Number and Federal Tax ID Number to its subcontractors solely for the purpose of administering Duke Energy Ohio's Mercantile Self-Direct Program. I understand that such subcontractors are contractually bound to otherwise maintain my Duke Energy Ohio, Inc Account Number and Federal Tax ID Number in the strictest of confidence.

I realize that under the rules and regulations of the public utilities commission, I may refuse to allow Duke Energy Ohio, Inc to release the information set forth above. By my signature, I freely give Duke Energy Ohio, Inc permission to release the information designated above.

**Application Signature**

I certify that I meet the eligibility requirements of the Duke Energy Ohio, Inc Mercantile Self Direct Custom Incentives Program and that all information provided within this application is correct to the best of my knowledge. I agree to the terms and conditions set forth for this program. I certify that the numbers, energy savings, and responses shown on this form are correct. Further, I certify that the taxpayer identification number is current and correct. I am not subject to backup withholding because: (a) I am exempt from backup withholding; or (b) I have not been notified by the IRS that I am subject to backup withholding as a result of a failure to report all interest or dividends; or (c) the IRS has notified me that I am no longer subject to backup withholding. I am a U.S. citizen (includes a U.S. resident alien).

Maurice DuPont  
Duke Energy Ohio, Inc Customer Signature

Print Name Maurice DuPont

Date 4-Nov-11

Remit to: PO BOX 630505  
Cincinnati OH 45263-0505  
Phone: 513-621-9050 Fax: 513-621-0929



INVOICE	
5878021	
Invoice Date	Page
2/26/2009 11:34:20	1 of 1
ORDER NUMBER	
1415311	

**\*\*DIRECT SHIPMENT\*\***

**Bill To:**  
UNIVERSITY OF CINCINNATI  
PO BOX 212000  
CINCINNATI, OH 45221-0001

**Ship To:**  
CONSOLIDATED UTILITIES  
DOCK EAST CAMPUS UTILITY PLANT UC  
3220 EDEN AVE  
CINCINNATI, OH 45221-0390

5105789898

Ordered By: Zondra Hall

**Customer ID: 203989**

PO Number		Terms Description	Net Due Date	Disc Due Date	Discount Amount
B09-4500034275		2% 10 days net 30	03/28/09	03/08/09	1,695.38
Order Date	Pick Ticket No	Account Manager	Taken by		
10/28/2008 13:52:31	4839540	Cincinnati House	BCG		
Quantities					
Ordered	Shipped	Remaining	UOM Unit Size	Item ID Item Description	Extended Price
Carrier: MOTOR FREIGHT					Tracking #:
1.000	1.000	0.000 EA	1.0	200HP CUSTOM DRIVE PACKAGE AB CUSTOM INVERTER PACKAGE FROM LDS	50,738.0000 50,738.00
1.000	1.000	0.000 EA	1.0	75HP CUSTOM DRIVE PACKAGE AB 75 HP CUSTOM INVERTER PACKAGE	34,031.0000 34,031.00
Total Lines: 2					
					<b>SUB-TOTAL:</b> 84,769.00
					<b>TAX:</b> 0.00
					<b>AMOUNT DUE:</b> 84,769.00

**RECEIVED**  
MAR 02 2009  
ACCOUNTS PAYABLE

ORIGINAL

## ELECTRICAL MATERIALS

452232743



Invoice Information  
Type Number Level Date  
CJ 235695 01 4/15/09  
Customer PO/JOBS  
B09-4500034273  
Side Salesperson  
ARNEY EVERHART  
Side Salesperson  
IKE KINNETT

DOCK EAST CAMPUS UTILITY  
UNIVERSITY OF CINCINNATI  
3220 EDEN AVENUE  
CINCINNATI OH 45221  
FDL/235695 3911J

OH 45221-2000

5105796579

Remit check to The F.D. Lawrence Electric Co L-6136 CINCINNATI OH 45270-6136									
Line	Product Description/Customer Designation	Ordered	Backord	Shipped	Qty	Unit Price	UM	Dis	Net Amount
2	SQD MODEL 6 LV MOTOR CONTROL CENTER MARK: MCC-5, MCC-2	2		2	999	N/C	E	1.0	.00
3	SQD LOT PRICE	1		1	999	42684.61	E	1.0	42684.61
									2.3350
<div style="border: 1px solid black; padding: 10px; margin: 0 auto; width: 80%;">RECEIVED APR 20 2009 ACCOUNTS PAYABLE</div>									
If your account is current and this invoice is paid by: 5/10/09 TAKE DISCOUNT OF						426.85			
						0111 OHIO/HAM CO EXEMPT			
							Net		42,684.61
							Tax		.00
							Total		42,684.61

These goods were produced in compliance with all applicable requirements of section 6,7, and 12 of the Fair Labor Standards Act as amended and orders of regulation and orders of the United States Department of Labor issued under Section 14 thereof.

Returned merchandise or claims are subject to the conditions shown on sales tickets.

Merchandise shall not be returned without prior approval.

A charge of 1.5% monthly of 18% per annum will be added to all past due balances.

# Change Order

Division of Administration and Finance  
Planning + Design + Construction  
P.O. Box 210186 • Cincinnati, Ohio 45221-0186



Project Name	UC Purchase Order No.	B09-4500034803
East Campus Power Plant Closed Loop		
Cooling Water System & Ash Removal System	Project No.	07081D
Improvements		
	Type of Contract	Electrical
County	Hamilton	
	Change Order No.	Boiler Room MCC Upgrade REVISED
Contractor Name		
Glenwood Electric Inc.	Date	3/13/2009

Basis of Change Order	Encumbrance		
<input type="checkbox"/> Error/Omission	<input type="checkbox"/> Differing Condition		
<input checked="" type="checkbox"/> Owner Request	<input type="checkbox"/> Field Resolution		
<input type="checkbox"/> Value Engineering	<input type="checkbox"/> Other		
	Number	<input type="checkbox"/> SF	<input type="checkbox"/> LF
	Number	<input type="checkbox"/> SF	<input type="checkbox"/> LF
Current Completion Date	November 10, 2009	State Funds	
Contract Days Changed	0	Local Funds	535106P22008A6
Revised Completion Date	November 10, 2009	Change Order Total	\$100,074.21

Description / Justification (attach additional pages as necessary)

Labor and material associated with the Boiler Room MCC Upgrade to install new owner supplied MCC panels for the control of boilers in the East Campus Utility Plant. Material cost breakdown is attached. This price has been revised to complete all the work during normal working hours (not overtime) during the plant shut down scheduled for the first week of May.

This Change Order identifies and provides full and complete satisfaction for all direct and indirect costs, including interest and all related extensions to the time for Contract Completion, for the described changes in the Scope of the Work.

## Contractor Acceptance

Name Glenwood Electric Inc.  
Address 2107 Lawn Avenue  
Cincinnati, OH 45212

Signature \_\_\_\_\_ Date \_\_\_\_\_

## Associate Recommendation

Name N/A  
Address \_\_\_\_\_  
\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

## Construction Manager Recommendation (if applicable)

Name N/A  
Address \_\_\_\_\_  
\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

## University Approval

(Vendor cannot invoice until receipt of University approved form A-600 "Cancellation or Change Order")

Sr. Staff Engineer/Project Manager	Date	University Project Administrator	Date
------------------------------------	------	----------------------------------	------

# Change Order Detail Summary

Division of Administration and Finance  
Planning + Design + Construction  
P.O. Box 210186 • Cincinnati, Ohio 45221-0186



Project No.	<u>07081D</u>	Date	<u>3/13/2009</u>
Project Name	<u>East Campus Power Plant Closed Loop</u> <u>Cooling Water Sys &amp; Ash Removal Sys.</u>	Description	<u>Boiler Room MCC Upgrade REVISED</u>
County	<u>Hamilton</u>	UC Purchase Order No.	<u>B09-4500034803</u>
Contractor Name and Address	<u>Glenwood Electric Inc.</u> <u>2107 Lawn Avenue</u> <u>Cincinnati, OH 45212</u>	Change Order No.	<u>2</u>
		Type of Contract	<u>Electrical</u>

A. Labor Summary (excluding fringe benefits). Check box for overtime rate.*				
<input type="checkbox"/>	<u>320.00</u> hours	x	<u>28.72</u> /hour	= <u>9,190.40</u>
<input type="checkbox"/>	<u>629.00</u> hours	x	<u>26.11</u> /hour	= <u>16,423.19</u>
<input type="checkbox"/>	<u>210.00</u> hours	x	<u>19.06</u> /hour	= <u>4,002.60</u>
<input type="checkbox"/>	_____ hours	x	_____ /hour	= _____
<input type="checkbox"/>	_____ hours	x	_____ /hour	= _____
<input type="checkbox"/>	_____ hours	x	_____ /hour	= _____
				Total (A) \$ <u>29,616.19</u>
B. Fringes:				
	<u>320.00</u> hours	x	<u>21.00</u> /hour	= <u>6,720.00</u>
	<u>629.00</u> hours	x	<u>20.10</u> /hour	= <u>12,642.90</u>
	<u>210.00</u> hours	x	<u>16.60</u> /hour	= <u>3,486.00</u>
	_____ hours	x	_____ /hour	= _____
	_____ hours	x	_____ /hour	= _____
	_____ hours	x	_____ /hour	= _____
				Total (B) \$ <u>22,848.90</u>
C. Equipment Rental (attach itemized quotes / invoices)				Total (C) \$ _____
D. Owned Equipment (attach itemized supporting documentation)				Total (D) \$ _____
E. Trucking (attach itemized supporting documentation)				Total (E) \$ _____
F. Overhead (A+B+C+D+E) x <u>15.00%</u> **				Total (F) \$ <u>7,869.76</u>
G. Material (attach itemized supporting documentation)				Total (G) \$ <u>30,641.70</u>
H. Profit (A+B+C+D+E+F+G) x <u>10.00%</u>				Total (H) \$ <u>9,097.66</u>
I. Subcontractor (attach Change Order Detail Summary and quotes / invoices)				Total (I) \$ _____
J. Contractor mark-up on Subcontractor (I x <u>5.00%</u> )**				Total (J) \$ _____
K. Miscellaneous				
1. Additional bond/insurance cost			\$	_____
2. Fees for permits, licenses, inspection, tests, etc. (attach supporting documentation)			\$	_____
3. Overnight lodging, travel and food (prior approval from University required)			\$	_____
				Total (K) \$ _____
<b>Grand Total (A+B+C+D+E+F+G+H+I+J+K)</b>				<b>\$ <u>100,074.21</u></b>

\* Enter Overtime labor rates separately from regular labor rates.

\*\* Percentage shown is maximum allowed on contracts awarded under the Standard Requirements, 2007 Edition. For contracts awarded under the Standard Conditions (May 2003 Lead Contractor or March 2000 Construction Manager), the maximum allowable percentage is 10 for each category.

## Change Order Pricing - Supplemental Sheet

### Material Pricing Sheet

Project:	<u><b>U.C. MSB Expansion CARE</b></u> <u><b>231 Albert Sabin Way</b></u> <u><b>Cincinnati, Ohio 45267</b></u>	UC Purchase Order No.:	<u><b>B094500034803</b></u>
		Project Number:	<u><b>07081D</b></u>
County:	<u>Hamilton</u>	Type of Contract:	<u>Electrical Work</u>
Contractor:	<u><b>Glenwood Electric Inc.</b></u> <u><b>2107 Lawn Avenue</b></u> <u><b>Cincinnati, Ohio 45212</b></u>	Change Order No.:	<u>Boiler Rm MCC Upgrade</u>
		Date:	<u>5-Mar-09</u>

#### Description of Change:

labor and material associated with the Boiler Room MCC Upgrade.

#### Materials:

Quantity	Description	Unit	Unit Price	Extended Amount
2100'	3/4" rigid metal conduit & fittings	LOT	3200	\$ 3,200.00
110'	1" rigid metal conduit & fittings	LOT	300	\$ 300.00
100'	1 1/4" rigid metal conduit & fittings	LOT	350	\$ 350.00
260'	3" rigid metal conduit & fittings	LOT	3221	\$ 3,221.00
120'	2" rigid metal conduit & fittings	LOT	700	\$ 700.00
60'	24" X 24" wireway	LOT	4500	\$ 4,500.00
LOT	supports for conduits & wireway (unistrut, rod, etc.)	LOT	1175	\$ 1,175.00
10590'	#14 THHN CU stranded wire	M	44.89	\$ 475.39
7990'	#12 THHN CU stranded wire	M	64.95	\$ 518.95
240'	#10 THHN CU stranded wire	M	99.77	\$ 23.94
215'	#8 THHN CU stranded wire	M	177.74	\$ 38.21
130'	#6 THHN CU stranded wire	M	267.93	\$ 34.83
805'	#4 THHN CU stranded wire	M	426.4	\$ 343.25
180'	#2 THHN CU stranded wire	M	655.28	\$ 117.95
225'	#1/O THHN CU stranded wire	M	971.48	\$ 218.58
270'	#3/O THHN CU stranded wire	M	1568.2	\$ 423.41
1555'	#350 MCM THHN CU stranded wire	M	321.62	\$ 5,001.19
55	Butt Splices & cold shrink	LOT	1500	\$ 1,500.00
1000'	Beldon Cable #9182	LOT	670	\$ 670.00
1000'	Beldon Cable #8760	LOT	220	\$ 220.00
LOT	Concrete: cut & patch floor, new pads	LOT	5000	\$ 5,000.00
LOT	Misc. materials	LOT	2610	\$ 2,610.00
<b>Total Materials:</b>				<b>\$ 30,641.70</b>

**Boiler #3 VFD**  
East Campus Utility Plant  
University of Cincinnati  
Project Description

The East Campus Utility plant at the University of Cincinnati houses a coal-fired boiler known as Boiler #3. The induced-draft (ID) fan motor that is rated at 200 HP was originally a constant volume fan operating whenever the boiler itself was in operation. The ID fan is connected to the boiler via ductwork downstream of the boiler. Its primary function is to exhaust combustion gases from the boiler to baghouse and the stack. The Variable Frequency Drive (VFD) was added to save energy and gain better control of the boiler operation. The estimated electric savings (see spreadsheet, Part 2) show a simple payback of slightly over 4 years.

**Boiler #4 VFD**  
East Campus Utility Plant  
University of Cincinnati  
Project Description

The East Campus Utility plant at the University of Cincinnati houses a coal-fired boiler known as Boiler #4. The induced-draft (ID) fan motor that is rated at 75 HP was originally a constant volume fan operating whenever the boiler itself was in operation. The ID fan is connected to the boiler via ductwork downstream of the boiler. Its primary function is to exhaust combustion gases from the boiler to baghouse and the stack. The Variable Frequency Drive (VFD) was added to save energy and gain better control of the boiler operation. The estimated electric savings (see spreadsheet, Part 2) show a simple payback of slightly over 4 years.



The VFD Worksheet is part 2 of the application. Do not submit this file without submitting a completed Part1 Custom Application document file, which can be found at [www.duke-energy.com](http://www.duke-energy.com).

Before you complete this application, please note the following important criteria:

- Submitting this application does not guarantee an incentive will be approved.
- Rebates are based on electricity conservation only.
- Electric demand and/or energy reductions must be well documented with auditable calculations.
- Incomplete applications will not be reviewed; all fields are required.

Refer to the complete list of Instructions and Disclaimers, found in the Mercantile Self Custom Application Part 1 document.

Please enter your information and data into the cells that are shaded.  
Cells in white are locked and cannot be written over.

**Duke Energy Customer Contact Information (Match the information in Application Part 1):**

Name	Maurice DuPont
Company	University of Cincinnati

**Equipment Vendor / Project Engineer Contact Information**

Name	
Company	Cincinnati Belting & Transmission (CBT Cincinnati)

**Location of Proposed VFD Project**

Site Name	Medical (East) Campus Utility Plant
Electric Account Number(s)	1000-2117-01-6
Site Address	3150 Eden Avenue, Cincinnati, OH 45221

Before proceeding with the custom application, please verify that your project is not on the Self-Direct Prescriptive application.

The prescriptive incentive applications can be found at:

<http://www.duke-energy.com/ohio-large-business/smart-saver/mercantile-self-direct.asp>

Prescriptive rebate amounts are pre-approved.



Use one worksheet for each type of motor or fan that is being evaluated for a VFD

<b>Driven Equipment</b>	<b>Name</b>	Boiler #3 ID Fan	<b>Type</b>	Fan
<b>Quantity</b>		1		
<b>Brake HP (BHP) at Full Load</b> (see note 1)		168.4		
<b>Nameplate HP</b>		200.0		

<b>App No.</b>	
<b>Rev.</b>	

Current Equipment Operation without VFD - Input values for ONE driven equipment and its motor.

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Nameplate HP	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	168.4	84%	95 %	132.20	6,744	744	672	528	720	744	312	96	672	288	552	672	744	6,744
	0.0	0%	%	#DIV/0!														0
	0.0	0%	%	#DIV/0!														0
	0.0	0%	%	#DIV/0!														0
Not Running	0.0	0%	NA %	0.00	2,016	0	0	216	0	0	408	648	72	432	192	48	0	2,016
<b>Totals</b>					<b>8,760</b>	<b>744</b>	<b>672</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>8,760</b>

Proposed Equipment Operation with VFD - Input values for ONE driven equipment and its motor.

<b>Efficiency of VFD</b>	0.95 %
--------------------------	--------

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Motor Nameplate	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	168.4	84%	95 %	132.20	792	144	144	96	72	48	0	0	0	0	48	96	144	792
90 %	151.5	76%	95 %	118.98	2136	360	336	192	240	240	0	0	0	0	192	240	336	2136
80 %	134.7	67%	95 %	105.76	2184	240	192	120	192	240	168	0	288	144	144	192	264	2184
70 %	117.8	59%	95 %	92.54	1104			72	144	144	96	0	216	96	96	144		1008
60 %	101.0	51%	95 %	79.32	528			48	72	72	48	96	168	48	72			624
50 %	84.2	42%	%	#DIV/0!														0
40 %	67.3	34%	%	#DIV/0!														0
30 %	50.5	25%	%	#DIV/0!														0
20 %	33.7	17%	%	#DIV/0!														0
10 %	16.8	8%	%	#DIV/0!														0
Not Running	0.0	0%	NA %	0.00	2,016	0	0	216	0	0	408	648	72	432	192	48	0	2,016
<b>Totals</b>					<b>2,016</b>	<b>0</b>	<b>0</b>	<b>216</b>	<b>0</b>	<b>0</b>	<b>408</b>	<b>648</b>	<b>72</b>	<b>432</b>	<b>192</b>	<b>48</b>	<b>0</b>	<b>2,016</b>

Detailed Project Description Attached?  (Required)

#### 1 Brake HP (BHP) at Full Load

The "full load" operating condition is the condition at which the driven equipment operates for the base condition (i.e., without the VFD)

#### 2 Annual hours that motor runs

If the % operating loads do not vary between months, then enter the total annual hours that the motor will run at full load, partial load and hours not operating.

#### 3 Monthly hours that each motor runs

If the % operating loads vary between months (due to weather conditions or seasonal load), fill in the expected hours that the motor will run each month at full load, partial load and hours not operating.



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Rev.	0

**Operating Hours** (see note 4)

24 x 7	Weekday		Saturday		Sunday		Weeks of Use in Year (see note 5)	Total Annual Hours of Use
	Start Hour	End Hour	Start Hour	End Hour	Start Hour	End Hour		
	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	40	6,744

**Energy Savings**

	Existing (no VFD)	Proposed (VFD)	Savings	Describe how energy numbers were calculated
Annual Electric Energy	890,097 kWh	732,595 kWh	157,502 kWh	Forming the products of the kW demand and operating hours for each applicable % k
Electric Demand (kilowatts)	132 kW	132 kW	0 kW	
Calculations attached	Yes	Yes		

**Simple Payback**

Average electric rate (\$/kWh) on the applicable accounts (see note 6)	\$0.10
Estimated annual electric savings	\$15,750
Other annual savings in addition to electric savings, such as operations, maintenance, other fuels	
Incremental cost to implement the project (equipment & installation) (see note 7)	\$122,179.00
Copy of vendor proposal is attached (see note 8)	Yes
Simple Electric Payback in years (see note 9)	7.75729832
Total Payback in years	7.75729832

**4 Operating Hours**

Describe when the equipment is typically used. If the project is proposed for more than one site, provide any variations in operating hours between the sites on a separate sheet.

**5 Weeks of Use in Year**

If the equipment is not in use 52 weeks during the year (for example, during holiday or summer break), provide an explanation of when usage is not expected and why:

Usage may not be expected during summer months when gas boilers are operated instead of

**6 Average electric rate (\$/kWh)**

If you do not know your average electric rate, use \$0.10/kWh.

**7 Incremental cost to implement the project**

Costs exclude self installation costs.

Retrofit projects, incremental cost is the total cost of the proposed project. New construction or where the existing equipment must be replaced anyway, then incremental cost is the premium of the proposed high efficiency project over baseline.

**8 Copy of vendor invoice is attached**

Vendor invoices detailing costs of the project are always required.

New construction projects or where the existing equipment must be replaced anyway, vendor proposal of baseline must also be attached.

**9 Simple Electric Payback**

If the simple payback on the project is less than 1 year, the rebate structure is affected.

Please check that the electric rate is accurate based on history.



The VFD Worksheet is part 2 of the application. Do not submit this file without submitting a completed Part1 Custom Application document file, which can be found at [www.duke-energy.com](http://www.duke-energy.com).

Before you complete this application, please note the following important criteria:

- Submitting this application does not guarantee an incentive will be approved.
- Rebates are based on electricity conservation only.
- Electric demand and/or energy reductions must be well documented with auditable calculations.
- Incomplete applications will not be reviewed; all fields are required.

Refer to the complete list of Instructions and Disclaimers, found in the Mercantile Self Custom Application Part 1 document.

Please enter your information and data into the cells that are shaded.  
Cells in white are locked and cannot be written over.

**Duke Energy Customer Contact Information (Match the information in Application Part 1):**

Name	Maurice DuPont
Company	University of Cincinnati

**Equipment Vendor / Project Engineer Contact Information**

Name	
Company	Cincinnati Belting & Transmission (CBT)

**Location of Proposed VFD Project**

Site Name	Medical (East) Campus Utility Plant
Electric Account Number(s)	1000-2117-01-6
Site Address	3150 Eden Avenue, Cincinnati, OH 45221

Before proceeding with the custom application, please verify that your project is not on the Self-Direct Prescriptive application.

The prescriptive incentive applications can be found at:

<http://www.duke-energy.com/ohio-large-business/smart-saver/mercantile-self-direct.asp>

Prescriptive rebate amounts are pre-approved.



Use one worksheet for each type of motor or fan that is being evaluated for a VFD

<b>Driven Equipment</b>	<b>Name</b>	Boiler #4 ID Fan	<b>Type</b>	Fan
<b>Quantity</b>		1		
<b>Brake HP (BHP) at Full Load</b> (see note 1)		63.1		
<b>Nameplate HP</b>		75.0		

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Current Equipment Operation without VFD - Input values for ONE driven equipment and its motor.

% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Nameplate HP	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	63.1	84%	95 %	49.57	5,376	672	672	432	720	696	312	0	648	288	0	192	744	5,376
	0.0	0%	%	#DIV/0!														0
	0.0	0%	%	#DIV/0!														0
	0.0	0%	%	#DIV/0!														0
Not Running	0.0	0%	NA	0.00	3,384	72	0	312	0	48	408	744	96	432	744	528	0	3,384
<b>Totals</b>					<b>8,760</b>	<b>744</b>	<b>672</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>720</b>	<b>744</b>	<b>8,760</b>

Proposed Equipment Operation with VFD - Input values for ONE driven equipment and its motor.

<b>Efficiency of VFD</b>	0.95 %
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% of Full Load BHP of Driven Equipment	BHP of Driven Equipment @ Actual Load (BHP)	Motor output HP as % of Motor Nameplate	Motor Efficiency @ Motor Output HP (%)	Motor Electrical Power Draw (kw)	Annual hours that motor runs (see note 2)	Monthly hours that each motor runs (see note 3)												Yearly Total (hr)
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
100 %	63.1	84%	95 %	49.57	696	144	144	96	72	48	0	0	0	0	0	48	144	696
90 %	56.8	76%	95 %	44.62	1656	288	336	144	240	240	0	0	0	0	0	72	336	1656
80 %	50.5	67%	95 %	39.66	1800	240	192	96	192	192	168	0	264	144	0	48	264	1800
70 %	44.2	59%	95 %	34.70	768			48	144	144	96	0	216	96	0	24		768
60 %	37.9	51%	95 %	29.74	456			48	72	72	48	0	168	48	0			456
50 %	31.6	42%	%	#DIV/0!														0
40 %	25.3	34%	%	#DIV/0!														0
30 %	18.9	25%	%	#DIV/0!														0
20 %	12.6	17%	%	#DIV/0!														0
10 %	6.3	8%	%	#DIV/0!														0
Not Running	0.0	0%	NA	0.00	3,384	72	0	312	0	48	408	744	96	432	744	528	0	3,384
<b>Totals</b>					<b>3,384</b>	<b>72</b>	<b>0</b>	<b>312</b>	<b>0</b>	<b>48</b>	<b>408</b>	<b>744</b>	<b>96</b>	<b>432</b>	<b>744</b>	<b>528</b>	<b>0</b>	<b>3,384</b>

Detailed Project Description Attached? ☒ Yes (Required)

#### 1 Brake HP (BHP) at Full Load

The "full load" operating condition is the condition at which the driven equipment operates for the base condition (i.e., without the VFD)

#### 2 Annual hours that motor runs

If the % operating loads do not vary between months, then enter the total annual hours that the motor will run at full load, partial load and hours not operating.

#### 3 Monthly hours that each motor runs

If the % operating loads vary between months (due to weather conditions or seasonal load), fill in the expected hours that the motor will run each month at full load, partial load and hours not operating.



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**Operating Hours** (see note 4)

24 x 7	Weekday		Saturday		Sunday		Weeks of Use in Year (see note 5)	Total Annual Hours of Use
	Start Hour	End Hour	Start Hour	End Hour	Start Hour	End Hour		
	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	32	

**Energy Savings**

	Existing (no VFD)	Proposed (VFD)	Savings	Describe how energy numbers were calculated
Annual Electric Energy	333,786 kWh	219,993 kWh	113,793 kWh	Timing the products of the kW demand and operating hours for each applicable % k
Electric Demand (kilowatts)	50 kW	50 kW	0 kW	
Calculations attached	Yes	Yes		

**Simple Payback**

Average electric rate (\$/kWh) on the applicable accounts (see note 6)	\$0.10
Estimated annual electric savings	\$11,379
Other annual savings in addition to electric savings, such as operations, maintenance, other fuels	\$0.00
Incremental cost to implement the project (equipment & installation) (see note 7)	\$105,479.00
Copy of vendor proposal is attached (see note 8)	Yes
Simple Electric Payback in years (see note 9)	9.269375093
Total Payback in years	9.269375093

**4 Operating Hours**

Describe when the equipment is typically used. If the project is proposed for more than one site, provide any variations in operating hours between the sites on a separate sheet.

**5 Weeks of Use in Year**

If the equipment is not in use 52 weeks during the year (for example, during holiday or summer break), provide an explanation of when usage is not expected and why:

Usage may not be expected during summer months when additional gas boilers are operated

**6 Average electric rate (\$/kWh)**

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**7 Incremental cost to implement the project**

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