



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

**Mercantile Customer:** University of Cincinnati

**Electric Utility:** Duke Energy

**Program Title or  
Description:** Water to Water Heat Pump

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)).
- 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 a new water-to-water heat pump to the chilled water and hot water system on the following date(s): June 2008 – May 2010.**

**Note, this equipment was not installed for new construction or facility expansion purposes, but is an augmentation to an existing system. It is not a replacement to an existing system. Refer to Appendix B for additional discussion.**

- 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.<sup>3)</sup> 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: **1,077,517 kWh Refer to Appendix B for calculation and supporting documents**

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?

**May 2010**

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

**137 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 **\$42,500. 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: 10.52 (Skip to Subsection 2.) Refer to Appendix D for calculations.**

#### 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 **\$720,454**.

The utility's program costs were **\$26,002**.

The utility's incentive costs/rebate costs were **\$42,500**.

**Refer to Appendix D for calculations**

### **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.



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 2/1/12

Customer Signature

Printed Name

Date

### Proposed Rebate Amounts

Measure ID	Energy Conservation Measure (ECM)	Proposed Rebate Amount
ECM-1	Installed 650 Ton Water-to-Water Heat Pump	\$42,500
Total		\$42,500



**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  
Signature of Affiant & Title

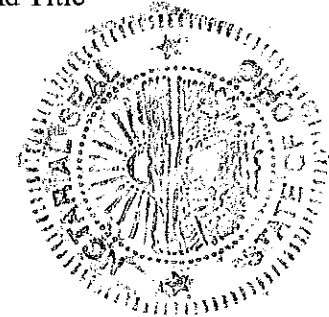
Sworn and subscribed before me this 1st day of February,  
2012 Month/Year

Jan Adams  
Signature of official administering oath

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

Print Name and Title

My commission expires on 8/28/16



Appendix A - University of Cincinnati

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**

<b>Measure</b>	<b>Quantity</b>	<b>Commitment Payment/Rebate Rate</b>	<b>Rebate</b>	<b>Total Cash Rebate</b>
Installed 650 Ton Water-toWater Heat Pump	1	50% of incentive that would be offered by the Smart \$aver Custom program	\$ 42,500.00	\$ <b>42,500.00</b>

**Appendix D -UCT Value**

***Water - to - Water Heat Pump***

<b>Measure</b>	<b>Total Avoided Cost</b>	<b>Program Cost</b>	<b>Incentive</b>	<b>Quantity</b>	<b>Measure UCT</b>
Water-to-Water Heat Pump	\$720,454	\$26,002	\$42,500	1	<b>10.52</b>
<b>Totals</b>	<b>\$720,454</b>	<b>\$26,002</b>	<b>\$42,500</b>	<b>1</b>	

Total Avoided Supply Costs	\$720,454			<i>UCT</i>	<b>10.52</b>
Total Program Costs	\$26,002				
Total Incentive	\$42,500				

## Appendix B – Energy Savings Achieved

This project involves the installation of an electric-powered water-to-water heat pump that serves as an ancillary heat recovery device. That is, this equipment is not the main source of heating or cooling for the building, but supplements the heating and cooling systems when it is in operation. The unit, commonly referred to as a heat recovery chiller (HRC), has an evaporator connected to the building's hydronic chilled water loop (in this case, the building main chilled water loop) and a condenser connected to the building's hydronic heating loop (in this case, the loop used for reheat). Like any chiller, the evaporator and condenser sections are connected via refrigerant loops that include expansion valves and compressors.

The chilled water created by the evaporator section serves to offset the amount of chilled water the central chillers must produce to satisfy comfort cooling needs. However, the hot water produced by the condenser section serves to offset the amount of steam required to heat the building reheat loop. Because a portion of the HRC unit's electric consumption is devoted to the replacement of steam and not purely to electrical energy savings, both the installation cost and electric consumption of the device are allocated according to the ratio of chilled water-to-hot water BTUs produced by the unit. Electric savings are claimed for the difference between the pre-project main chiller electric consumption and the post-project HRC energy consumption allocated to chilled water production. The following summarizes this approach with attached pages detailing the underlying assumptions.

Item	Value	Math
<b>Total Annual HRC Electric Input (kWh)</b>	2,734,848	A
<b>Total Annual HRC Hot Water Output (mmBTU)</b>	28,429	B
<b>Total Annual HRC Chilled Water Output (mmBTU)</b>	28,412	C
<b>Ratio of HRC Chilled Water Output to Total Output</b>	49.98%	$D = C / (B+C)$
<b>Electric Input Allocated to Chilled Water (kWh)</b>	1,366,939	$E = A * D$
<b>Ton-hours of Main Plant Chilled Water Displaced by HRC</b>	2,367,625	$F = C * (1 \text{ million BTU/mmBtu}) / (12000 \text{ BTU/ ton-hr})$
<b>Total Annual Main Plant Electric Input Displaced (kWh)</b>	2,367,625	$G = F * 1 \text{ kw/ton}$
<b>Annual Electric Savings (kWh, at the meter)</b>	1,000,686	$H = G - E$

Monthly energy savings were apportioned as outlined in attached documentation. DSMore software was utilized to return demand savings, resulting in a coincident demand savings at the meter of 127 kW.

Application of 7.43% line losses yields **1,077,517 kWh** savings and **137 coincident kW** savings at the plant. This number also reflects insignificant rounding error due to modeling this project in DSMore software.



**MSB Water to Water Heat Pump Study**  
(for rebate application)

Revised 10-Jan-12

**Operating Details**

Item	Full Load GPM	EWT, F	LWT, F	Avg delta T, F	BTUH	Tons
<b>Hot Season</b>						
Condenser	1004	110	130	20.0	10,040,000	837
Evaporator	1560	55	45	10.0	7,800,000	650
<b>Cold Season</b>						
Condenser	1047	130	150	20.0	10,470,000	873
Evaporator	1560	60	50	10.0	7,800,000	650

<b>Power Input</b>	<b>Hot season</b>	<b>Cold season</b>
Heat Pump, kW	661	779 (rated)
kW/Ton	1.017	1.198 (calculated)

Note:  
EWT = entering water temperature  
LWT = leaving water temperature

<< << **Load & Savings Schedule: AS PROVIDED BY M. DUPONT, UNIV. OF CIN.** >>

<< **APPORTIONED AND NET SAVINGS USED FOR DSMORE MODELING** >>

Typical Month	Estimated Average Load	Estimated Hours	mmBTU output	Input Elec, kWh	Input Elec, mmBTU	Condenser Savings, mmBTU	Evaporator Savings, mmBTU	Stm Savings, klb	Chw Savings, ton-hr	Typical Month	Apportioned Input Elec, kWh	Evaporator Savings, Ton hr=kWh	Net Monthly CHW Savings, kWh	Net Monthly CHW Savings, kW (ave)
Jan	90%	700	6,596.1	490,770	1,675.0	4,921.1	4,914.0	4,921.1	409,500	Jan	245,208	409,500	164,292	234.7
Feb	85%	600	5,339.7	397,290	1,356.0	3,983.7	3,978.0	3,983.7	331,500	Feb	198,502	331,500	132,998	221.7
Mar	75%	500	3,926.3	292,125	997.0	2,929.2	2,925.0	2,929.2	243,750	Mar	145,957	243,750	97,793	195.6
Apr	65%	400	2,610.4	171,860	586.6	2,023.8	2,028.0	2,023.8	169,000	Apr	86,018	169,000	82,982	207.5
May	55%	300	1,656.6	109,065	372.2	1,284.4	1,287.0	1,284.4	107,250	May	54,588	107,250	52,662	175.5
Jun	50%	200	1,004.0	66,100	225.6	778.4	780.0	778.4	65,000	Jun	33,084	65,000	31,916	159.6
Jul	40%	100	401.6	26,440	90.2	311.4	312.0	311.4	26,000	Jul	13,234	26,000	12,766	127.7
Aug	45%	250	1,129.5	74,363	253.8	875.7	877.5	875.7	73,125	Aug	37,219	73,125	35,906	143.6
Sep	55%	350	1,932.7	127,243	434.3	1,498.4	1,501.5	1,498.4	125,125	Sep	63,687	125,125	61,438	175.5
Oct	65%	450	3,062.5	227,858	777.7	2,284.8	2,281.5	2,284.8	190,125	Oct	113,846	190,125	76,279	169.5
Nov	75%	550	4,318.9	321,338	1,096.7	3,222.2	3,217.5	3,222.2	268,125	Nov	160,553	268,125	107,572	195.6
Dec	85%	650	5,784.7	430,398	1,468.9	4,315.7	4,309.5	4,315.7	359,125	Dec	215,043	359,125	144,082	221.7
<b>Total</b>		<b>5,050</b>	<b>37,762.9</b>	<b>2,734,848</b>	<b>9,334.0</b>	<b>28,428.8</b>	<b>28,411.5</b>	<b>28,428.8</b>	<b>2,367,625</b>	<b>Total</b>	<b>1,366,939</b>	<b>2,367,625</b>	<b>1,000,686</b>	

49.98%

	<b>Steam</b>	<b>Chill Water</b>	<b>Electric</b>	<b>Total</b>
<b>Total Annual Savings (Cost)</b>	<b>\$ 651,020</b>	<b>\$ 554,024</b>	<b>\$ (219,882)</b>	<b>\$ 985,163</b>

**Installation Cost \$ 1,645,634**  
**Simple Payback, years 1.670**

 = cold season  
 = hot season

**\* Fully Loaded Rate Summary**

Electric per kWh	\$0.0804
Steam per klb	\$22.90
Chw per ton-hr	\$0.2340

**Conversion Factors**

Steam	BTU/lb	1000
Chilled Water	BTU/ton-hr	12,000
Electric	BTU/kWh	3413



# 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 checked="" type="checkbox"/> MSD Custom General Worksheet <input checked="" 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 type="checkbox"/> MSD Custom VFD Worksheet <input 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 checked="" type="checkbox"/> MSD Custom General Worksheet <input checked="" 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 \$aver® 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, Suite 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	
E-mail Address	dupontmh@uc.edu				

Equipment Vendor / Contractor / Architect / Engineer Contact Information					
Company Name	Johnson Controls Inc.				
Address	7863 Palace Drive, Suite A				
City	Cincinnati	State	OH	Zip Code	45249
Project Contact					
Title					
Office Phone	513-605-6300	Mobile Phone		Fax	
E-mail Address					
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 Avenue				
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) water-to-water heat pump to the campus chilled water and heating hot water system (see attached description in file "WTWHP Descript.docx").

C. When did you start and complete implementation?

Start date 06/2008 (mm/yyyy) End date 05/2010 (mm/yyyy)

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

No self-direct prescriptives applied for.

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.

The attached spreadsheet file shows a "Load & Savings Schedule" table. In this table the Hours and % Load columns are assumed values for the purpose of estimating a simple payback period.

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)

---

<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 21-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

## **Water-to-Water Heat Pump**

University of Cincinnati  
Mercantile Self-Direct Rebate Application  
Project Description

The installation of the York water-to-water heat pump (WTWHP) in the basement of the University of Cincinnati CARE/Crawley building was completed in 2010. CARE/Crawley is a 250,000 sq ft research building on the Medical (East) Campus. The WTWHP is a water-cooled chiller that produces hot water at a specified design temperature using heat extracted from a low-temperature source, that is, chilled water returning from the research buildings to the campus utility plants.

These research buildings on the Medical Campus require steam for heating and processes and chilled water for cooling year- round. Steam is used to heat circulating hot water in heat exchangers apart from the WTWHP, which is then pumped throughout the buildings to be used for heating and reheat in the research lab and offices spaces. Reheat is the method which adds a small amount of heat to ventilation air in the offices and labs that has been cooled to 55° F to remove humidity and achieve space cooling.

Chilled water is used for both process cooling and comfort cooling/dehumidification. Process cooling involves using chilled water in a heat exchanger (not the WTWHP) which is connected to a circulating system for walk-in refrigerators. The primary method of comfort cooling is with chilled water coils in large air handling units that serve the buildings occupied spaces.

The WTWHP will operate approximately 9 months during the year. The return chilled water from the research buildings flows through the WTWHP evaporator and heat is extracted. The chilled water return which is now at a lower temperature is then diverted to the chilled water supply piping connected to the buildings. The extracted heat is used to raise the temperature of the heating system water flowing through the condenser.

The WTWHP uses a motor-driven compressor to complete the refrigeration cycle. The evaporator is rated at 650 tons. The input demand is about 779 kW at full load, which includes a circulating pump. The attached spreadsheet file "WTWHP rebate calcs.xlsx" shows design parameters for the machine along with an assumed operating schedule for "summer" and "winter" conditions. This schedule was used to calculate an estimated simple payback in years using steam, chilled water and electric costs. These cost rates are what is charged University of Cincinnati's General Funds buildings.

Also attached are two additional files. The first is titled "WTWHP specs.pdf" showing the serial number and various design parameters of this unit. The second is titled "WTWHP cost.pdf" showing the breakdown of costs associated with purchasing and installing this unit.

**MSB Water to Water Heat Pump Study**  
(for rebate application)

Revised 10-Jan-12

**Operating Details**

Item	Full Load GPM	EWT, F	LWT, F	Avg delta T, F	BTUH	Tons
<b>Hot Season</b>						
Condenser	1004	110	130	20.0	10,040,000	837
Evaporator	1560	55	45	10.0	7,800,000	650
<b>Cold Season</b>						
Condenser	1047	130	150	20.0	10,470,000	873
Evaporator	1560	60	50	10.0	7,800,000	650

<b>Power Input</b>	<b>Hot season</b>	<b>Cold season</b>
Heat Pump, kW	661	779 (rated)
kW/Ton	1.017	1.198 (calculated)

Note:  
EWT = entering water temperature  
LWT = leaving water temperature

**Load & Savings Schedule**

Typical Month	Estimated Average Load	Estimated Hours	mMBTU output	Input Elec, kWh	Input Elec, mMBTU	Condenser Savings, mMBTU	Evaporator Savings, mMBTU	Stm Savings, klb	Chw Savings, ton-hr
Jan	90%	700	6,596.1	490,770	1,675.0	4,921.1	4,914.0	4,921.1	409,500
Feb	85%	600	5,339.7	397,290	1,356.0	3,983.7	3,978.0	3,983.7	331,500
Mar	75%	500	3,926.3	292,125	997.0	2,929.2	2,925.0	2,929.2	243,750
Apr	65%	400	2,610.4	171,860	586.6	2,023.8	2,028.0	2,023.8	169,000
May	55%	300	1,656.6	109,065	372.2	1,284.4	1,287.0	1,284.4	107,250
Jun	50%	200	1,004.0	66,100	225.6	778.4	780.0	778.4	65,000
Jul	40%	100	401.6	26,440	90.2	311.4	312.0	311.4	26,000
Aug	45%	250	1,129.5	74,363	253.8	875.7	877.5	875.7	73,125
Sep	55%	350	1,932.7	127,243	434.3	1,498.4	1,501.5	1,498.4	125,125
Oct	65%	450	3,062.5	227,858	777.7	2,284.8	2,281.5	2,284.8	190,125
Nov	75%	550	4,318.9	321,338	1,096.7	3,222.2	3,217.5	3,222.2	268,125
Dec	85%	650	5,784.7	430,398	1,468.9	4,315.7	4,309.5	4,315.7	359,125
<b>Total</b>		<b>5,050</b>	<b>37,762.9</b>	<b>2,734,848</b>	<b>9,334.0</b>	<b>28,428.8</b>	<b>28,411.5</b>	<b>28,428.8</b>	<b>2,367,625</b>

	<b>Steam</b>	<b>Chill Water</b>	<b>Electric</b>	<b>Total</b>
Total Annual Savings (Cost) \$	651,020	\$ 554,024	\$ (219,882)	<b>\$ 985,163</b>

Installation Cost \$ 1,645,634  
Simple Payback, years **1.670**

 = cold season  
 = hot season

**\* Fully Loaded Rate Summary**

Electric per kWh	\$0.0804
Steam per klb	\$22.90
Chw per ton-hr	\$0.2340

**Conversion Factors**

Steam	BTU/lb	1000
Chilled Water	BTU/ton-hr	12,000
Electric	BTU/kWh	3413

**Costs (refer to expense sheet)**

Item	Final Cost	Changes	Bid	Soft Costs for (4) Projects
Electrical	\$ 166,958	\$ 49,958	\$ 117,000	
HVAC	\$ 479,294	\$ 89,511	\$ 389,783	
Equipment	\$ 715,492	\$ 65,492	\$ 650,000	
Subtotal	\$ 1,361,744	\$ 204,961	\$ 1,156,783	
Associate				\$ 221,534
PDC				\$ 55,992
Asbestos Mon.				\$ 2,650
Miscellaneous				\$ 3,714
Subtotal	\$ 70,973	<<<<< divided by 4 >>>>>		\$ 283,890
Grand Total	\$ 1,432,717			

**Installation, Operation and Maintenance Instructions  
for  
York® YK Compound  
Centrifugal Chiller System with R134a**

**University of Cincinnati**

**CYKKRKQP8G4-CUCUGS**

**08-132556-01**

*SN = SDVM-232750*

Summer

Hot Season

ISSUE DATE: 8/07  
PROJECT - 06-4050  
SALES ENGINEER - AMAR FARJO/JOHN SCHROEDER  
CUSTOMER - UNIVERSITY OF CINCINNATI

PROGRAM: LTC  
REV: v1.76.yau  
DATE: 07/16/08  
PAGE: 1 OF 1

MODEL	CYKRRKQP8G4-CUCUF	(MOTOR HS SPECIFIED BY USER)
(MOTOR LS SPECIFIED BY USER)		
RATED CAPACITY (TONS)	650	SPECIFIED CAPACITY (TONS) 650
REFRIGERANT	134A	
OPTISOUND CONTROL-LS	YES	OPTISOUND CONTROL-HS NO
INPUT POWER-LS (KW)	353	GEAR CODE-LS RL (SPEC)
INPUT POWER-HS (KW)	308	GEAR CODE-HS NB (SPEC)
TOTAL INPUT POWER (KW)	661	FLA-LS 503
TOTAL FULL LOAD (KW/TON)	1.017	FLA-HS 439
VOLTAGE/HZ-LS	460/60	LRA-LS 3810
VOLTAGE/HZ-HS	460/60	LRA-HS 3810
ECONOMIZER	YES (30IN)	

LS-STARTER TYPE (0)  
HS-STARTER TYPE (0)

	EVAPORATOR	CONDENSER
FLUID	WATER	WATER
TUBE	272*	261*
PASSES	2*	2*
FOUL FACTOR	0.00010*	0.00025*
FLUID ENT TEMP (F)	55.00	110.00*
FLUID LEV TEMP (F)	45.00*	130.00
FLUID FLOW (GPM)	1560.0*	1004.0*
FLUID PRDROP (FT)	9.2	6.4
FLUID INTERMEDIATE TEMP (F)		89.00

(\*) DESIGNATES SPECIFIED INPUT  
(LS) DESIGNATES LOW STAGE COMPRESSOR  
(HS) DESIGNATES HIGH STAGE COMPRESSOR

MATERIALS AND CONSTRUCTION PER MECHANICAL SPECIFICATIONS - FORM 160.73-EG1

winter

Cold Season

ISSUE DATE: 8/07  
PROJECT - 06-4050  
SALES ENGINEER - AMAR FARJO/JOHN SCHROEDER  
CUSTOMER - UNIVERSITY OF CINCINNATI

PROGRAM: LTC  
REV: v1\_76.yau  
DATE: 07/16/08  
PAGE: 1 OF 1

MODEL	CYKKRKQP8G4-CUCUF		
(MOTOR LS SPECIFIED BY USER)		(MOTOR HS SPECIFIED BY USER)	
RATED CAPACITY (TONS)	650	SPECIFIED CAPACITY (TONS)	650
REFRIGERANT	134A		
OPTISOUND CONTROL-LS	YES	OPTISOUND CONTROL-HS	NO
INPUT POWER-LS (KW)	410	GEAR CODE-LS	RL (CALC)
INPUT POWER-HS (KW)	369	GEAR CODE-HS	NB (CALC)
TOTAL INPUT POWER (KW)	779	FLA-LS	584
TOTAL FULL LOAD (KW/TON)	1.198	FLA-HS	525
VOLTAGE/HZ-LS	460/60	LRA-LS	3810
VOLTAGE/HZ-HS	460/60	LRA-HS	3810
ECONOMIZER	YES (30IN)		

LS-STARTER TYPE (0)

HS-STARTER TYPE (0)

FLUID	EVAPORATOR		CONDENSER	
	WATER		WATER	
TUBE	272*		261*	
PASSES	2*		2*	
FOUL FACTOR	0.00010*		0.00025*	
FLUID ENT TEMP (F)	60.00		130.00*	
FLUID LEV TEMP (F)	50.00*		150.00	
FLUID FLOW (GPM)	1560.0*		1047.0*	
FLUID PRDROP (FT)	9.0		6.6	
FLUID INTERMEDIATE TEMP (F)		102.00		

(\*) DESIGNATES SPECIFIED INPUT

(LS) DESIGNATES LOW STAGE COMPRESSOR

(HS) DESIGNATES HIGH STAGE COMPRESSOR

MATERIALS AND CONSTRUCTION PER MECHANICAL SPECIFICATIONS - FORM 160.73-EG1



**USES**

**University of Cincinnati  
Capital Finance/Planning + Design + Construction**

**UC Project Number** 07081C  
**Project Name** MSB Water to Water Heat Pump  
**UC Account Number** 000Z -  
**Primary Contact** Luken, P  
**Accountant** Morse, M  
**BOT Approval**  
**Project Group** Utility Plant Improvement Projects

**Phase** 7 Financial Closeout  
**Primary Asset** 4390 MSB  
**CF Activation Date**  
**CF Closeout Date**  
**Debt Classification**  
**SAP Business Area** U

SOURCES SUMMARY	Total Project	Budgeted
	\$1,627,000	\$1,627,000

Use Name	Vendor	Escr Acct	Obj Code	Obj No.	Total Project	Funds Available	Awarded Contracts	Change Orders	Committed Cost	Est Add'l Cost / Comp	Est Comp Cost	Savings/ (Overrun)
ELECTRICAL	DEBRA-KUEMPEL	<input type="checkbox"/>	P401	1	\$150,000	\$100,000	\$117,000	\$49,958	\$166,958	\$0	\$166,958	(\$16,958)
HVAC	BLAU MECHANICAL, INC	<input type="checkbox"/>	P403	1	\$400,000	\$300,000	\$389,783	\$89,511	\$479,294	\$0	\$479,294	(\$79,294)
FIXED FURNSHGS-NON MODULAR	YORK INTERNATIONAL CO	<input type="checkbox"/>	P443	1	\$700,000	\$700,000	\$650,000	\$65,492	\$715,492	\$0	\$715,492	(\$15,492)
<b>SUBTOTAL FLCC/PRIME/NON-FF&amp;E</b>					<b>\$1,250,000</b>	<b>\$1,100,000</b>	<b>\$1,156,783</b>	<b>\$204,961</b>	<b>\$1,361,744</b>	<b>\$0</b>	<b>\$1,361,744</b>	<b>(\$111,744)</b>
<b>SUBTOTAL FLCC/PRIME</b>					<b>\$1,250,000</b>	<b>\$1,100,000</b>	<b>\$1,156,783</b>	<b>\$204,961</b>	<b>\$1,361,744</b>	<b>\$0</b>	<b>\$1,361,744</b>	<b>(\$111,744)</b>
<b>TOTAL FLCC</b>					<b>\$1,250,000</b>	<b>\$1,100,000</b>	<b>\$1,156,783</b>	<b>\$204,961</b>	<b>\$1,361,744</b>	<b>\$0</b>	<b>\$1,361,744</b>	<b>(\$111,744)</b>
ASSOCIATE ARCHITECT			P408	1	\$0	\$0	\$221,534		\$221,534	\$0	\$221,534	(\$221,534)
MISCELLANEOUS			P412	1	\$20,000	\$20,000	\$3,714		\$3,714	\$0	\$3,714	\$16,286
CONSTRUCTION ADMIN FEES			P420	1	\$0	\$0	\$55,992		\$55,992	\$0	\$55,992	(\$55,992)
ABATEMENT MONITORNG/TESTN			P455	1	\$0	\$165,000	\$2,650		\$2,650	\$0	\$2,650	(\$2,650)
CONTINGENCY			P900	1	\$125,000	\$110,000			\$0	\$0	\$0	\$125,000
CONTINGENCY			P900	2	\$232,000	\$232,000			\$0	\$0	\$0	\$232,000
<b>SUBTOTAL</b>			<b>P900</b>		<b>\$357,000</b>	<b>\$342,000</b>			<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$357,000</b>
<b>SUBTOTAL NON-FLCC/NON-PRIME/NON-FF&amp;E</b>					<b>\$377,000</b>	<b>\$527,000</b>	<b>\$283,890</b>		<b>\$283,890</b>	<b>\$0</b>	<b>\$283,890</b>	<b>\$93,110</b>
<b>SUBTOTAL NON-FLCC/NON-PRIME</b>					<b>\$377,000</b>	<b>\$527,000</b>	<b>\$283,890</b>		<b>\$283,890</b>	<b>\$0</b>	<b>\$283,890</b>	<b>\$93,110</b>
<b>TOTAL NON-FLCC</b>					<b>\$377,000</b>	<b>\$527,000</b>	<b>\$283,890</b>		<b>\$283,890</b>	<b>\$0</b>	<b>\$283,890</b>	<b>\$93,110</b>
<b>TOTAL</b>					<b>\$1,627,000</b>	<b>\$1,627,000</b>	<b>\$1,440,673</b>	<b>\$204,961</b>	<b>\$1,645,634</b>	<b>\$0</b>	<b>\$1,645,634</b>	<b>(\$18,634)</b>