Ohio | Public Utilities Commission

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

Case No.: 18-1808-EL-EEC

Mercantile Customer: **GE Aircraft Engines**

Electric Utility: **Duke Energy**

Program Title or Description: **North Utility Plant Phase 1: Building 200**

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

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

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

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

Section 1: Mercantile Customer Information

Name: **GE Aircraft Engines**

Principal address: **1 Neumann Way**
Trenton, OH 45215-1915

Address of facility for which this energy efficiency program applies:

1 Neumann Way
Cincinnati, OH 45215-1915

Name and telephone number for responses to questions:

Andrew Taylor, (317) 838-2096

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)).

Replacing standalone chilled water, hot water, and associated pumping systems for multiple buildings with a centralized "North Utility Plant" in phases. Phase 1 of this project involves the centralization of related systems for Building 200.

□ 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: 830,253 kWh
Refer to Appendix B for calculations and supporting document

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.

Annual savings: _____kWh

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 centralized system solution was installed in October 2017.

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

8.0 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 **$27,584. Refer to Appendix C for documentation.** (Rebate shall not exceed 50% project cost.

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 **9.50** (Skip to Subsection 2.) **Refer to Appendix D for calculations and supporting documents.**

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 **$480,388.**

The utility's program costs were **$23,004.**

The utility's incentive costs/rebate costs were **$27,584.**

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 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.

Acct # 84500860		
GE AIRCRAFT ENGINES		
1 Neumann Way		
Cincinnati, OH 45215-1915		
Date	Days	Actual KWH
12/03/2018	33	12,184,321
10/30/2018	29	11,501,982
10/01/2018	30	13,392,126
08/30/2018	29	13,262,974
08/02/2018	32	14,306,377
07/02/2018	29	12,887,365
06/01/2018	30	12,481,567
05/09/2018	32	11,197,206
04/03/2018	29	11,197,206
03/02/2018	29	11,139,357
02/01/2018	32	12,442,199
01/03/2018	30	11,427,313
Total		**147,419,993**

Appendix B - GE Aircraft Engines Energy Savings Achieved

	Baseline Used			Post Project Actual				Savings	
	Description	Annual kWh	Summer Coincident kW	Description	Annual kWh	Summer Coincident kW	Hours of Operation	Annual kWh	Summer Coincident kW
ECM - 1	Standalone chiller and pumping system for Building 200	3,326,353	559	North Utility Plant Phase 1: Centail chiller and pumping system for Building 200	2,496,100	551	8,760	830,253	8.0
Notes:	Energy consumption baseline, demand baseline and post project energy consumption basis are outlined in the following pages.								
	After consideration of line losses, total energy savings are 890,031 kWh and 8.4 summer coincident kW. These values may also reflect minor DSMore modeling software rounding error.								

Appendix C -Cash Rebate Calculation

GE Aircraft Engines North Utility Plant Phase 1

Measure	Quantity	Cash Rebate Rate	Cash Rebate
North Utility Plant Phase 1: Centail chiller and pumping system for Building 200	1	50% of incentive that would be offered by the Smart $aver Custom program	$27,584
			$27,584

Appendix D -UCT Value

GE Aircraft Engines North Utility Plant Phase 1

Measure	Total Avoided Cost	Program Cost	Incentive	Quantity	Measure UCT
NUP Phase 1	$480,388	$23,004	$27,584	1	9.50
Totals	**$480,388**	**$23,004**	**$27,584**	**1**	

Total Avoided Supply Costs	$480,388	***Aggregate Application UCT***	***9.50***
Total Program Costs	$23,004		
Total Incentive	$27,584		

Smart $aver® Incentive Program
phone: 866.380.9580
fax: 980.373.9755
customprocessing@duke-energy-energyefficiency.com

11/28/2018

Andy Long
GE AIRCRAFT ENGINES - 8450086001
1 NEUMANN WAY
CINCINNATI OH 45215-1915

Subject: Your Application for a Duke Energy Mercantile Self-Direct Rebate CMO18-0000151895

Dear Andy Long,

Thank you for your Duke Energy Mercantile Self Direct rebate application. As noted in the Energy Conservation Measure (ECM) chart on page 2, a total rebate of $27,584.00 has been proposed for your project completed in the 2017 calendar years. **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 2
- completing the PUCO-required affidavit on Page 3

Please return the documents to my attention via fax at 513.629.5572 or email to customprocessing@duke-energy-energyefficiency.com. Upon receipt, Duke Energy will submit the necessary documentation to PUCO. Following PUCO's approval, Duke Energy will remit payment.

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,

Andrew Taylor
Program Manager
Custom Incentives

cc: Michelle Kolb
Kelly Rogers

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

☐ Rebate is accepted. ☐ Rebate is declined.

By accepting this rebate, GE AIRCRAFT ENGINES - 8450086001 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, GE AIRCRAFT ENGINES - 8450086001 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, GE AIRCRAFT ENGINES - 8450086001 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

Customer Signature	Printed Name	Date

Proposed Rebate Amounts

Measure ID	Energy Conservation Measure	Proposed Rebate Amount
ECM-1	North Utility Plant Phase 1: Building 200	$27,584.00 per project X 1
	Total	**$27,584.00**

Ohio | Public Utilities Commission

(Mercantile Customers Only)

Application to Commit
Energy Efficiency/Peak Demand Reduction Programs

Case No.: 18-1808-EL-EEC

State of OHIO :

GARY A. SWANSON, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

GE AIRCRAFT Engines

[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 offines 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.

(Agent For GE)

SIGNATURE OF AFFIANT & TITLE

Sworn and subscribed before me this 28 day of November 2018

DAY MONTH YEAR

SIGNATURE OF OFFICIAL ADMINISTERING OATH

Kelly E Rogers, Notary

PRINT NAME AND TITLE

My commission expires on 1/31/19

DATE

KELLY E. ROGERS
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan. 31, 2019

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

☒ Rebate is accepted. ☐ Rebate is declined.

By accepting this rebate, GE AIRCRAFT ENGINES - 8450086001 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, GE AIRCRAFT ENGINES - 8450086001 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, GE AIRCRAFT ENGINES - 8450086001 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

Customer Signature	Printed Name	Date
(Agent for GE)	Gary A. Swanson	11/28/18

Proposed Rebate Amounts

Measure ID	Energy Conservation Measure	Proposed Rebate Amount
ECM-1	North Utility Plant Phase 1: Building 200	$27,584.00 per project X 1
	Total	**$27,584.00**

Mercantile Self Direct
Nonresidential Custom Rebate Application
PART 1

Ohio Mercantile Self Direct Program

Application Guide and Cover Sheet

Questions? Call 866.380.9580 or visit 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. You may also fax to 513.629.5572.

Mercantile customers, defined as using at least 700,000 kilowatt-hours (kWh) annually or having an account in multiple locations are eligible for the Mercantile Self Direct program. Indicate which applies:

☒ a single Duke Energy Ohio account with 700,000 kWh annual usage
☐ an account with multiple locations

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

Account Number	Annual Usage	Account Number	Annual Usage
84500860013	148,246,985		

Self Direct rebates are available for completed Custom projects that have not previously received a Duke Energy Smart $aver® Custom Incentive. Self Direct rebates 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 rules allow for, though do not require, certain projects that are Prescriptive in nature under the Smart $aver program to be evaluated using the Custom process in the Self Direct program. Use the list on page two as a guide to determine which Self Direct program best fits your project(s). Apply for Self Direct projects using the appropriate application forms in conjunction with this cover sheet.

Self Direct program rules also allow for behaviorally based and/or no cost and low cost projects to receive rebates.

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

☒ All sections of appropriate application(s) are completed	☒ Proof of payment.*	☒ Manufacturer's Spec sheets	☒ Energy model/calculations and detailed inputs for Custom applications

*If a single payment record is intended to demonstrate the costs of both Prescriptive and Custom projects, please include an additional document with an estimated breakout of costs for each Prescriptive and Custom energy conservation measure.

Mercantile Self Direct
Nonresidential Custom Rebate Application
PART 1

DUKE ENERGY.

**Behavioral energy efficiency and demand reduction projects must be both measurable and verifiable. Provide justification with your application. Rebates for such projects may be small in magnitude.

Application Type	Prescriptive Measures with Optional Custom Processing	
Heating and Cooling and Window Films, Programmable Thermostats, and Guest Room Energy Management Systems	☐ ENERGY STAR® Window/Sleeve/Room AC ☐ Central Air Unit	☐ Air Source Heat Pump Water Heater
	☐ Setback/Programmable Thermostat ☐ Guestroom Energy Management Control	☐ Window Film
Chillers	☐ Air Cooled Chiller	☐ Water Cooled Chiller
Motors, Pumps and Variable Frequency Drives (VFDs)	☐ VFD – applied to Process Pump ☐ VFD – applied to HVAC Pump	☐ VFD – applied to HVAC Fan
Food Service	☐ ENERGY STAR Hot Food Holding Cabinet ☐ Night Covers for Display ☐ ECM Cooler, Freezer, and Display Case Motors ☐ ENERGY STAR Solid or Glass Door Reach-in Freezer or Refrigerator	☐ Anti-Sweat Heater Control ☐ Cooking Equipment ☐ ENERGY STAR Ice Machine
Process Equipment	☐ Engineered Nozzle – Compressed Air ☐ Air Compressor Equipped with VFD	☐ Pellet Dryer Duct Insulation
Chiller Tune-ups	☐ Air Cooled Chiller tune-up	☐ Water Cooled Chiller tune-up

Please indicate above any Prescriptive energy conservation measures to be evaluated through the Custom process. Only Prescriptive measures listed above are eligible for this option. To receive a Self Direct Custom rebate, a detailed analysis of pre-project and post-project energy usage and project costs must be included in the application.

Although some Self Direct Prescriptive measures are eligible for evaluation through Custom processes, such an approach may not be most effective for certain measures.

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 Self Direct team at 866.380.9580.

Every application must include calculations of the baseline electrical usage and the electrical usage of the proposed high-efficiency equipment/system. These calculations are performed and submitted by the Duke Energy Ohio customer, or your designated equipment vendor / engineer. Application Part 2 worksheets and page 6 of this application contain additional guidance on acceptable calculations. *Complex or unique projects may require the use, at the applicant's expense, of modeling software.* Please contact the Duke Energy Self Direct team with questions about these requirements.

If you do not receive an acknowledgement email within 1 day of submitting an application via online, email, or fax, please call 866.380.9580. The acknowledgement email will provide 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 form and excel worksheets.

Email: Complete, sign, scan and send this application form and attachments to:
SelfDirect@duke-energy.com (note attachment size limit is applicable)

Fax: 513.629.5572

Mercantile Self Direct
Nonresidential Custom Rebate Application
PART 1

DUKE ENERGY.

1. Contact Information (Required)

Duke Energy Customer Contact Information[1]						
Company Name (as it appears on your bill)	GE Aircraft Engines					
Address	1 Neumann Way					
City	Cincinnati	State	OH	ZIP Code	45215	
Project Contact	Chris Kearns					
Office Phone	5132228843	Mobile Phone				
Email Address	chris.kearns@ge.com					

Equipment Vendor / Contractor / Architect / Engineer Contact Information					
Company Name	Energy Management Solutions Inc				
Address	684 Excelsior Blvd				
City	Excelsior	State	MN	ZIP Code	55331
Project Contact	Kelly Rogers				
Office Phone	9527677450	Mobile Phone			
Email Address	krogers@emsenergy.com				

Who is the primary point of contact for technical questions?[2]	Kelly Rogers

Payment Information					
If an incentive is awarded, who should receive payment?[3] ☒ Customer ☐ Vendor* (customer or customer's agent[4] must sign below) *If the payee is the vendor, they must issue a credit in the amount of the incentive to the customer on the invoice and include it with the payment request.					
Tax ID Number for Payee (provide W-9)	140689340				
Mailing Address for Payee (if different from above)					
Street	1 Neumann Way				
City	Cincinnati	State	OH	ZIP Code	45215

[1] Provided customer information should match the Duke Energy customer of record and W-9 form provided with this application. If the customer entity is a business affiliate of the Duke Energy customer of record, documentation must be provided that demonstrates the business affiliation.

[2] Note that if the vendor is the primary point of contact, the customer will still be copied on all application correspondence. If the customer does not wish to be copied, the customer must provide a signed letter of authorization on customer letterhead indicating an entity is acting as an agent for the customer. Duke Energy does not act as an agent.

[3] If payment is to be made to an entity other than the Duke Energy account holder or the vendor, a payment waiver is required and will be provided for customer signature.

[4] If an outside agent is acting on behalf of the Duke Energy customer of record, a letter of authorization on customer letterhead and signed by an authorized employee of the customer must be provided.

2. Project Information (Required)

A. Please indicate project type:
- ☐ New construction
- ☒ Expansion at an existing facility (existing Duke Energy account number)
- ☐ Replacing equipment due to equipment failure
- ☐ Replacing equipment that is estimated to have remaining useful life of two years or less
- ☐ Replacing equipment that is estimated to have remaining useful life of more than two years
- ☐ Behavioral, operational and/or procedural programs/projects

B. Please describe your project, or attach a detailed project description that describes the project.
See attached document - (3) New 1,000 ton Chillers

C. When did you start and complete implementation?
Start date 3/2016 (mm/yyyy) End date 10/2017 (mm/yyyy)

D. Are you also applying for Self Direct Prescriptive rebates and, if so, which one(s)[5]?
No

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. List all assumptions about the baseline and proposed equipment energy use and operation schedule, or attach a document listing that information. Attach specification sheets for all proposed new equipment. See attachments.

G. Attach a supplier or contractor invoice(s) and/or other equivalent information documenting the Implementation Cost for each project listed in your application.
Does the Implementation Cost include any internal labor[6]? No

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[5] If your project involves some equipment that is eligible for prescriptive rebates and some equipment that is likely eligible for custom rebates, 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.
[6] Internal labor costs cannot be counted in the Incremental Project Cost for purposes of analysis.

If yes, please specify which costs are internal labor.

3. Attestation, Terms and Conditions, and Signature (Required)

Attestation

By signing below, I agree to the following:

I, **(INSERT NAME)** Chris Kearns, do hereby consent to Duke Energy Ohio, Inc. 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 have read and agree to the below Terms and Conditions of the Duke Energy Ohio's Mercantile Self Direct Program.

I certify that I meet the eligibility requirements of the Duke Energy Ohio's Mercantile Self Direct Program, as applicable, and that all information provided within my application is correct to the best of my knowledge.

I certify that the taxpayer identification number provided in my application 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).

Instructions/Terms/Conditions

Note: Please keep for your records

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 (PUCO). *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 PUCO. *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 Rebate Amount.

8. Customers are encouraged to retain copies of all forms, invoices and supporting documentation for their records.

9. Approved rebates are valid for six 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.

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 rebates. 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 rebates;
    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.*

CUSTOMER SIGNATURE REQUIRED

By signing below, I certify that I have read and agree to the above Mercantile Self Direct Attestation and Terms and Conditions.

Customer Signature			
Print Name	Chris Kearns	Date	4/23/2018

TRADE ALLY SIGNATURE (REQUIRED ONLY IF TRADE ALLY IS PAYEE)

By signing below, I certify that I have read and agree to the above Mercantile Self Direct Attestation and Terms and Conditions.

Trade Ally Signature			
Print Name		Date	

CUSTOMER – AUTHORIZATION TO DESIGNATE TRADE ALLY AS PAYEE

If an incentive is awarded and the customer would like to authorize payment to the trade ally, the customer must sign below to allow release of their incentive to the trade ally.

Required: Final invoice from trade ally to customer must show the incentive credited to the customer. If the itemized invoice does not reflect a deduction of the incentive amount, the payee will be changed to the customer.

Customer Signature			
Print Name		Date	

ch2m:

CHANGE ORDER

INTEGRATED SERVICES PROGRAM

CH2M HILL AS AGENTS FOR GENERAL ELECTRIC

C.O. ISSUE DATE: 06/29/2016

PRICES IN $

P.O. ID: EBF1945-40555A GE EVENDALE - NORTH UTILITY PLANT CENTRIFUGAL CHILLERS C.O. ID: 002

ITEM	TAG NUMBER	QUANTITY	UNIT	DESCRIPTION	SHIP DATE	CTRL. ACCOUNT	UNIT PRICE	TOTAL PRICE
015	40555A-015	1	EACH	1 WATER-COOLED MAGNETIC CHILLER 1000 TONS TAG # CH-1000 ITEMS INCLUDED BY SUPPLIER: - MOTOR, 460 VOLTS, 3 PHASE, 60Hz - -MOTOR ENCLOSURE: HERMETICALLY SEALED -INVERTED PERFORMANCE TECHNOLOGY -VARIABLE SPEED DRIVE , FACTORY MOUNTED AND WIRED. NEMA 1 -SINGLE COMPRESSOR -ISOLATION VALVES -EVAPORATOR: 2 PASS --HINGED MARINE WATER BOXES, RATED FOR 150 psig WATER-SIDE PRESSURE. --VICTAULIC CONNECTION --WATER BOX HINGES --FACTORY THERMAL INSULATION FOR EVAPORATOR 3/4" INCHES --FLOW SENSORS, FACTORY MOUNTED AND WIRED. -CONDENSER: 2 PASS --HINGED MARINE WATER BOXES , RATED FOR 150 psig WATER-SIDE PRESSURE --VICTAULIC CONNECTION --WATER BOX HINGES --FLOW SENSORS, FACTORY MOUNTED AND WIRED. -UNIT WARRANTY: 18 MONTH (1 YEAR) ENTIRE UNIT LABOR AND MATERIAL (FROM DATE OF SHIPMENT) AND 10 YEAR PARTS WARRANTY -CHILLER START UP (PCAT) AND 40 HR TRAINING -FACTORY CHILLER TESTING	06/28/2016	EBF1945293189	240,785	240,785.00

ch2m:

CHANGE ORDER

INTEGRATED SERVICES PROGRAM

CH2M HILL AS AGENTS FOR GENERAL ELECTRIC

C.O. ISSUE DATE: 06/29/2016

PRICES IN $

P.O. ID: EBF1945-40555A GE EVENDALE - NORTH UTILITY PLANT CENTRIFUGAL CHILLERS C.O. ID: 002

ITEM	TAG NUMBER	QUANTITY	UNIT	DESCRIPTION	SHIP DATE	CTRL. ACCOUNT	UNIT PRICE	TOTAL PRICE
				-ADDITIONAL WATERBOX GASKET VALVES -BACnet MS/TP CARD FOR TAC INTERFACE -OPTIVIEW CONTROL PANEL (GRAPHICAL INTERFACE/CONTROLLER AT UNIT) -OPTIMIZATION SOFTWARE INCLUDED -ASSISTANCE IN DUKE REBATE APPLICATION PROCESS ITEMS INCLUDED INSTALLED BY OTHERS: -1" THICK NEOPRENE PAD ITEMS NOT INCLUDED: -REFRIGERANT MONITOR OR SCBA -RIGGING, HAULING, OR PROVIDING ACCESS FOR EQUIPMENT -VALVES FOR VENTS AND DRAINS -PRESSURE GAUGES FOR CHILLED WATER LINES -RELIEF PIPING TO THE ATMOSPHERE -DISSASEMBLY/REASSEMBLY OF CHILLER IF REQUIRED FOR INSTALLATION -COORDINATION DRAWINGS OF CENTRAL PLANT -OCCUPANCY ADJUSTMENTS AFTER COMPLETION OF YORK CHILLER START-UP -PIPING AND WIRING -EVAPORATOR FLOW/DIFFERENTIAL PRESSURE SWITCH -CONDENSOR FLOW/DIFFERENTIAL PRESSURE SWITCH Cost Account Number: 2931-890-CMBB-W				
016	40555A-016	2	EACH	2 WATER-COOLED MAGNETIC CHILLERS 1000 TONS TAG # CH-1000 ITEMS INCLUDED BY SUPPLIER: - MOTOR, 460 VOLTS, 3 PHASE, 60Hz - -MOTOR ENCLOSURE: HERMETICALLY SEALED	06/28/2016	EBF1945293189	240,785	481,570.00

ch2m:

CHANGE ORDER

INTEGRATED SERVICES PROGRAM

CH2M HILL AS AGENTS FOR GENERAL ELECTRIC

C.O. ISSUE DATE: 06/29/2016

PRICES IN $

P.O. ID: EBF1945-40555A GE EVENDALE - NORTH UTILITY PLANT CENTRIFUGAL CHILLERS C.O. ID: 002

ITEM	TAG NUMBER	QUANTITY	UNIT	DESCRIPTION	SHIP DATE	CTRL. ACCOUNT	UNIT PRICE	TOTAL PRICE
				-INVERTED PERFORMANCE TECHNOLOGY -VARIABLE SPEED DRIVE , FACTORY MOUNTED AND WIRED. NEMA 1 -SINGLE COMPRESSOR -ISOLATION VALVES -EVAPORATOR: 2 PASS --HINGED MARINE WATER BOXES, RATED FOR 150 psig WATER-SIDE PRESSURE. --VICTAULIC CONNECTION --WATER BOX HINGES --FACTORY THERMAL INSULATION FOR EVAPORATOR 3/4" INCHES --FLOW SENSORS, FACTORY MOUNTED AND WIRED. -CONDENSER: 2 PASS --HINGED MARINE WATER BOXES , RATED FOR 150 psig WATER-SIDE PRESSURE --VICTAULIC CONNECTION --WATER BOX HINGES --FLOW SENSORS, FACTORY MOUNTED AND WIRED. -UNIT WARRANTY: 18 MONTH (1 YEAR) ENTIRE UNIT LABOR AND MATERIAL (FROM DATE OF SHIPMENT) AND 10 YEAR PARTS WARRANTY -CHILLER START UP (PCAT) AND 40 HR TRAINING -FACTORY CHILLER TESTING -ADDITIONAL WATERBOX GASKET VALVES -BACnet MS/TP CARD FOR TAC INTERFACE -OPTIVIEW CONTROL PANEL (GRAPHICAL INTERFACE/CONTROLLER AT UNIT) -OPTIMIZATION SOFTWARE INCLUDED				

GE Aviation - NUP Custom Centralized Chiller Plant
4/27/2018

New Chillers:				
% Load	Total Capacity:	Total kW:	kW/ton:	EWT Cond.
100	3,000	1,723	0.574	85
75	2,250	915	0.407	75
50	1,500	407	0.271	65
25	750	214	0.285	65

Existing Chillers:			
% Load	Total Capacity:	Total kW:	kW/ton:
100	4,100	2,638	0.643
75	3,076	1,740	0.566
50	1,550	726	0.469
25	775	419	0.541

Savings Summary:												
% Load	Total Capacity:		Existing kW/ton:	New kW/ton:	Savings kW/ton:		kW Savings:	Hours:	kWh Savings:			
100	3,000		0.643	0.574	0.069		206.69	1,095	226,323.40			
75	2,250		0.566	0.407	0.159		357.46	1,095	391,418.96			
50	1,500		0.469	0.271	0.197		296.24	2,190	648,771.87			
25	750		0.541	0.285	0.255		191.48	-	-		*Will turn off a chiller before running at 25%	
Total:						Total:	1,051.87	4,380	1,266,514.23			
						Cost:			$ 722,355.00			
						Energy Savings (@ 0.07/kWh):			$ 88,656.00			
						Rebate (Mercantile 50%):			$ 145,865.63			
						Simple Payback:			8.15			

New Chillers:

Chillers
Make: York Qty: 3
Model: YMC2-S3517AB5

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	1000	43	55	2135	21.9	85	95	3100	26.5	585		0.5742
75	750	43	55	2135	21.9	85	95	2325	15.1	397.5		0.512
50	500	43	55	2135	21.9	85	95	1550	6.6	260		0.505
25	250	43	55	2135	21.9	85	95	775	3	180		0.505

Existing Chillers:

BLDG 90

Chillers
Make: McQuay Qty 2
Model:

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	300	43	55	720	21.9	85	95	900	26.5	240		0.8
75	225	43	55	540	21.9	85	95	675	15.1	180		0.8
50	150	43	55	360	21.9	85	95	450	6.6	120		0.8
25	75	43	55	180	21.9	85	95	225	3	60		0.8

BLDG 100

Chillers
Make: York Qty 1
Model: YTC1D1B2-CJE

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	250	45	53	600	11.1	85	94.45	750	13.4	165		0.585
75	188	45	53	450	11.1	85	94.45	562.5	13.4	112		0.53
50	125	45	53	225	11.1	85	94.45	281.25	13.4	73		0.52
25	62	45	53	56.25	11.1	85	94.45	70.3125	13.4	50		0.72

Make: York Qty 1
Model: YTG1A1C3-CKH

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	300	44	54	720	18.4	85	94.4	900	26.5	188		0.585
75	225	44	54	540	18.4	85	94.4	675	26.5	121		0.53
50	150	44	54	270	18.4	85	94.4	337.5	26.5	79		0.52
25	75	44	54	67.5	18.4	85	94.4	84.375	26.5	55		0.72

BLDG 204

Chillers
Make: Trane
Model: TRTHO C1E1F1

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	261.9	44	55.3	600	4	85	94.8	750	9.1	168		0.641
75	196.4	44	52.5	600	4	75	82.3	750	9	112.2		0.571
50	130.9	44	49.6	600	4	65	69.8	750	9.3	64.7		0.494
25	65.5	44	46.8	600	4	65	67.6	750	9.3	48.4		0.739

Make: Carrier Qty 2
Model: 19XR-3232385CQ564

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	500	44	54	1190	32.2	85	95	1411	31.8	323		0.652
	375									221		0.632

BLDG 300

Chiller BLDG 300
Make: CARRIER
Model: 30HX161

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	156.6	44	55.3	600	4	85	94.8	750	9.1	112.2		0.717
75	117.4	44	52.5	600	4	75	82.3	750	9	75.43		0.6425
50	78.28	44	49.6	600	4	65	69.8	750	9.3	35.71		0.4562
25	39.14	44	46.8	600	4	65	67.6	750	9.3	17.79		0.4547

CHILLER BLDG 301
Make: Carrier
Model: 30HK-050

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	50	44	54	1190	32.2	85	95	1411	31.8	40		0.8
75	37.5									30		0.8
50	25									20		0.8
25	12.5									10		0.8

BLDG 500

Chillers
Make: McQuay Qty 2
Model: WME0700S

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	700	44	55	1680	19.4	85	99.04	1400.57	4.9	410.6		0.587
75	525	44	51.5	1680	19.5	75	85.085	1400.57	5.05	219.45		0.418
50	350	44	48	1680	19.6	65	71.49	1400.57	5.3	101.15		0.289
25	175	44	46.5	1680	19.6	65	68.31	1400.57	5.3	56.7		0.324

Make: multistack qty 2
Model: ms015xc5h2w2aac-410a

% Load	Capacity	LWT Evap	EWT Evap	Flow Evap	WPD Evap	EWT Cond	LWT Cond	Flow Cond	WPD Cond	kW	Efficiency (kW/ton)	
100	40.5	44	59.2	70	5.06	60	70	111.2	6.62	20.3		0.502
75	30.8	44		70	5.06	60	70	111.2	6.62	15.2		0.494
50	20.3	44		70	5.06	60	70	111.2	6.62	10.2		0.506
25	10.4	44		70	5.06	60	70	111.2	6.62	5.4		0.518

YORK

Project:
Unit Tag:
Engineer:
Customer:

Rating Program: XEngine 1.0.6675
Software Version: YW 18.02
Date: 04/30/2018 15:26:29

SALES REPORT

Unit Specifications			
Model	YMC2-S3517AB	**Refrigerant**	R134a
Specified Net Capacity (Tons)	1000	**Refrigerant Charge (lb)**	2162
Rated Net Capacity (Tons)	1000	**Variable Orifice**	V3
Full Load (kW/Ton.R)	0.5742	**Isolation Valve**	Y
NPLV.IP (kW/Ton.R)	0.3189	**OptiSound Control**	Y
Input Power (kW)	574.2	**Voltage / Hz**	460 / 60.0
Starter Type	HYP1278XHC***-46A	**FLA (Amps)**	754
Compressor	M6C-331FAC	**A-Weighted SPL (dBA)**	82
Evaporator	EC3914-371-CS*-2***	**Min Circuit Ampacity**	943
Condenser	CB3914-260-BS*-2***	**Max Circuit Breaker Amps**	1600

	Evaporator	Condenser
Fluid	Water*	Water*
Tube MTI No.	371	260 / 260
Passes	2*	2*
Fouling Factor (hr-ft²-°F/Btu)	0.000100*	0.000250*
Entering Fluid Temp (°F)	54.20	85.00*
Leaving Fluid Temp (°F)	43.00*	94.09
Fluid Flow (gpm)	2135*	3100*
Fluid Pressure Drop (ft H2O)	22.3	26.5

(*) Designates User Specified Input

Certified in accordance with the AHRI Water-Cooled Water Chilling and Heat Pump Water-Heating Packages Using Vapor Compressor Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org. Auxiliary components included in total kW: Chiller Controls.
Compliant with ASHRAE 90.1-2004.
Compliant with ASHRAE 90.1-2007.
Compliant with ASHRAE 90.1-2010.
Compliant with ASHRAE 90.1-2013.
Compliant with ASHRAE 90.1-2016.
Compliant with the requirements of the LEED Energy and Atmosphere Enhanced Refrigerant Management Credit (EAc4).
Materials and construction per mechanical specifications - Form 160.84-EG1.
Auxiliary components included in total kW - Chiller controls.

YORK

Project:
Unit Tag:
Engineer:
Customer:

Rating Program: XEngine 1.0.6675
Software Version: YW 18.02
Date: 04/30/2018 15:26:29

Partload Data (Minimum Condenser Water Temperature)										
CEFT (°F)	% LOAD									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
85.00°	0.5742	0.5440	0.5216	0.5039	0.5009	0.5051	0.5202	0.5531	0.6623	-
80.00°	0.5206	0.4903	0.4671	0.4495	0.4405	0.4366	0.4435	0.4691	0.5541	0.9565
75.00°	0.4711	0.4434	0.4166	0.3969	0.3838	0.3784	0.3828	0.4023	0.4615	0.7893
70.00°	0.4270	0.3966	0.3694	0.3488	0.3325	0.3224	0.3230	0.3360	0.3780	0.6239
65.00°	0.3840	0.3532	0.3265	0.3048	0.2853	0.2711	0.2676	0.2737	0.2971	0.4771
60.00°	0.3475	0.3141	0.2868	0.2632	0.2414	0.2244	0.2182	0.2197	0.2368	0.3105
55.00°	0.3145	0.2775	0.2494	0.2251	0.1996	0.1815	0.1710	0.1690	0.1778	0.2260
50.00°	0.2786	0.2447	0.2162	0.1868	0.1628	0.1418	0.1269	0.1354	0.1505	0.1773
45.00°	0.2577	0.2244	0.1974	0.1675	0.1336	0.1040	0.1113	0.1240	0.1502	0.2216
40.00°	0.2544	0.2242	0.1993	0.1691	0.1373	0.1082	0.1139	0.1268	0.1975	0.3206
39.00°	0.2510	0.2213	0.1966	0.1684	0.1377	0.1075	0.1130	0.1255	0.1955	0.3198
38.00°	0.2475	0.2181	0.1955	0.1684	0.1383	0.1068	0.1120	0.1236	0.1934	0.3189
37.00°	0.2438	0.2170	0.1950	0.1684	0.1389	0.1060	0.1112	0.1217	0.1913	0.3180
36.00°	0.2430	0.2167	0.1947	0.1687	0.1393	0.1051	0.1109	0.1208	0.1891	0.3171
*Values are in kW/Ton.R										

Certified in accordance with the AHRI Water-Cooled Water Chilling and Heat Pump Water-Heating Packages Using Vapor Compressor Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org. Auxiliary components included in total kW: Chiller Controls.
Compliant with ASHRAE 90.1-2004.
Compliant with ASHRAE 90.1-2007.
Compliant with ASHRAE 90.1-2010.
Compliant with ASHRAE 90.1-2013.
Compliant with ASHRAE 90.1-2016.
Compliant with the requirements of the LEED Energy and Atmosphere Enhanced Refrigerant Management Credit (EAc4).
Materials and construction per mechanical specifications - Form 160.84-EG1.
Auxiliary components included in total kW - Chiller controls.

Equipment Submittal
For Approval

Project:

GE AVIATION – EVENDALE
BUILDING 451
NORTH UTILITY PLANT

YORK YMC² MAGNETIC CENTRIFUGAL CHILLER (TAG: CH-3, 4, & 5))

SUBMITTED TO:

Brian Beckman
1 Neumann Way
Mail Drop D59
Cincinnati, Ohio 45215

DATE:
June 25 2016

SUBMITTED BY:

SCOTT MARGESON
SYSTEMS APPLICATION ENGINEER
JOHNSON CONTROLS
7863 PALACE DRIVE
CINCINNATI, OHIO 45249
(513) 630-7853

Submittal Summary

YORK YMC² MAGNETIC CENTRIFUGAL CHILLER

Items Included by Johnson Controls

- Motor, 460 volts, 3 phase, 60 Hz
  - Motor Enclosure: Hermetically Sealed
- **Inverted Performance Technology**
- Variable Speed Drive, factory mounted and wired. NEMA 1
- Single Compressor
- Isolation Valves
- Evaporator: 2- Pass
  - Hinged Marine Water Boxes, rated for 150 psig water-side pressure.
  - Victaulic Connection.
  - Water Box Hinges
  - Factory Thermal Insulation for Evaporator 3/4" inches. Insulation finish to match chiller finish.
  - Flow Sensors, factory mounted and wired.
- Condenser: 2 - Pass
  - Hinged Marine Water Boxes, rated for 150 psig water-side pressure.
  - Victaulic Connection.
  - Water Box Hinges
  - Flow Sensors, factory mounted and wired.
- Unit Warranty: 10 Year Parts Warranty including Refrigerant
- Chiller Start up (PCAT) and 40hr Training
- Factory Chiller Testing
- Additional Waterbox Gasket Seals for both Evaporator and Condenser water boxes per chiller.
- Service Isolation Valves
- BACnet MS/TP Card for TAC Interface
- Optiview control panel (graphical interface/controller at unit)
- Optimization software included
- Assistance in Duke Rebate application process

Items Included but INSTALLED BY OTHERS

- 1" Thick Neoprene Pad

Items NOT Included

- Refrigerant monitor or SCBA
- Rigging, hauling, or providing access for equipment.
- Valves for vents and drains
- Pressure gauges for chilled water lines
- Relief piping to the atmosphere.
- Disassembly / Reassembly of chiller if required for installation.
- Coordination drawings of central plant.
- Occupancy adjustments after completion of York chiller start-up
- Piping and Wiring
- Evaporator Flow/Differential Pressure Switch
- Condenser Flow/Differential Pressure Switch

Submittal Notes

- Evaporator and Condenser Nozzles for CH-451-3, 4 & 5 are currently selected as Right Hand Connection (See Unit Drawing). Please confirm handing connections as right hand or left hand.
- Pressure relief valves included.
- One quart of paint to match chiller included.
- Warranty and training included per plans and specs.

PERFORMANCE SPECIFICATION

YMC² CHILLER PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model No.		Net Capacity (tons)	Power	Refrigerant
CH-451-3-4-5	3	YMC2-S3517A BS		1000	460/3/60.0	R-134A

Unit Data	Evaporator	Condenser
Compressor Model: M6C-331FAC	Model: EC3914-371-CS1-2GMR	Model: CB3914-260-BS1-2GMR
EWT (°F):	54.20	85.00
LWT (°F):	43.00	94.09
Flow Rate (gpm):	2135	3100
Pressure Drop (ft):	21.9	26.5
Fluid Type (%):	WATER	WATER
Circuit No. of Passes:	2	2
Fouling Factor (ft² °F hr / Btu):	0.000100	0.000250
Tube No. / Description:	371 - 0.025" Turbo-ESP Copper (3/4")	260 - 0.025" CSL Enhanced Copper
Design Working Pressure (psig):	150	150
Entering Water Nozzle @ Location:	R	R
Leaving Water Nozzle @ Location:	R	R
Water Box Weight, ea (lb)(1):	651	651
Cover Plate Weight , ea (lb):	481	481
Return Head Weight (lb):	215	271
Water Weight (lb):	2745	2734
Water Volume(gal):	330	328

Performance Data		Electrical Data		Other	
Job KW:	574.0	Job FLA:	753	Operating Wt. (lb):	35398
KW/Ton.R:	0.5740	Min Circuit Ampacity (Amps):	942	Per Isolator (lb):	8850
NPLV.IP:	0.3190	Max Fuse/Breaker:	1600	Refrigerant Wt. (lb):	1710
				Compressor Wt. (lb):	4400
Isolation Valves:	YES			Ship Wt (lb):	29953
		Type Starter: VSD w/ filter			
		VSD Model: HYP1278XHC30B-46A			

Notes:

(1) Not including cover plate on marine water boxes.

AHRI Message:
Certified in accordance with the AHRI Water-Cooled Water Chilling and Heat Pump Water-Heating Packages Using Vapor Compressor Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Special Quote Notes:

PRODUCT DRAWING

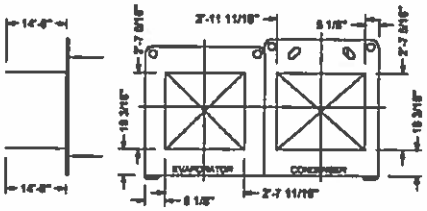
NOZZLE LEGEND

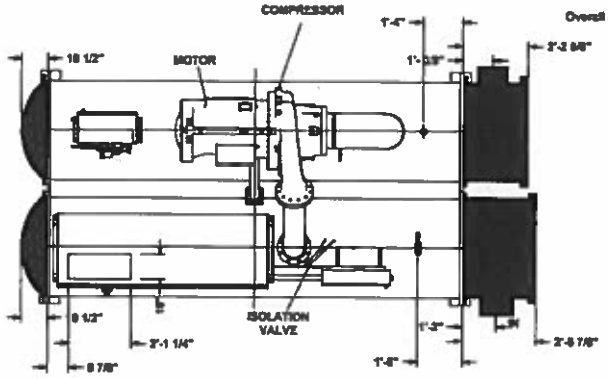
EVAPORATOR INLET Right End 2 PASS 12 DIA. (150 Psig DWP)
EVAPORATOR OUTLET Right End 2 PASS 12 DIA. (150 Psig DWP)
CONDENSER INLET Right End 2 PASS 14 DIA. (150 Psig DWP)
CONDENSER OUTLET Right End 2 PASS 14 DIA. (150 Psig DWP)

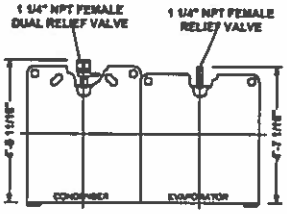
Victaulic Grooved Nozzles (per ANSI / AWWA C-606)

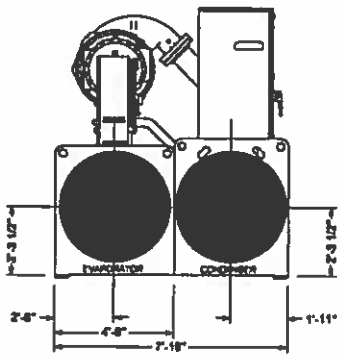
Optional water box flanges not shown.
Overall unit width and inlet nozzle length may increase up to 8".

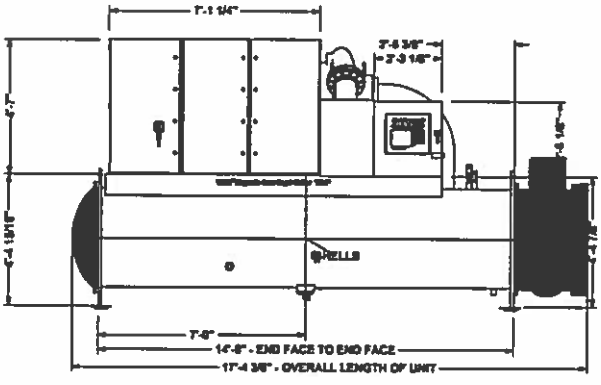
TUBE PULL AREA
ADD 2'-2 5/8" FOR EVAPORATOR MARINE WATER BOX
ADD 2'-8 7/8" FOR CONDENSER MARINE WATER BOX

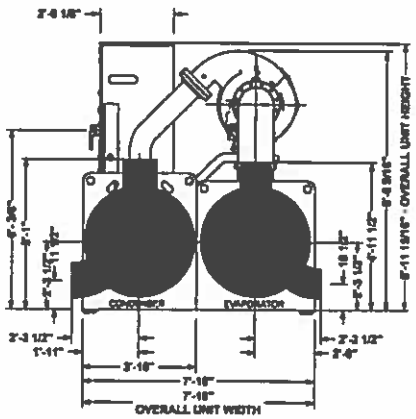












SHIPPING WT. OF HEAVIEST COMPONENT: 29953 LBS, OPERATING WT. 35366 LBS, LOAD PER ISOLATOR 8848 LBS
(SEE PERFORMANCE PAGE FOR ADDITIONAL SHIPPING WEIGHTS)

PRODUCT DRAWING

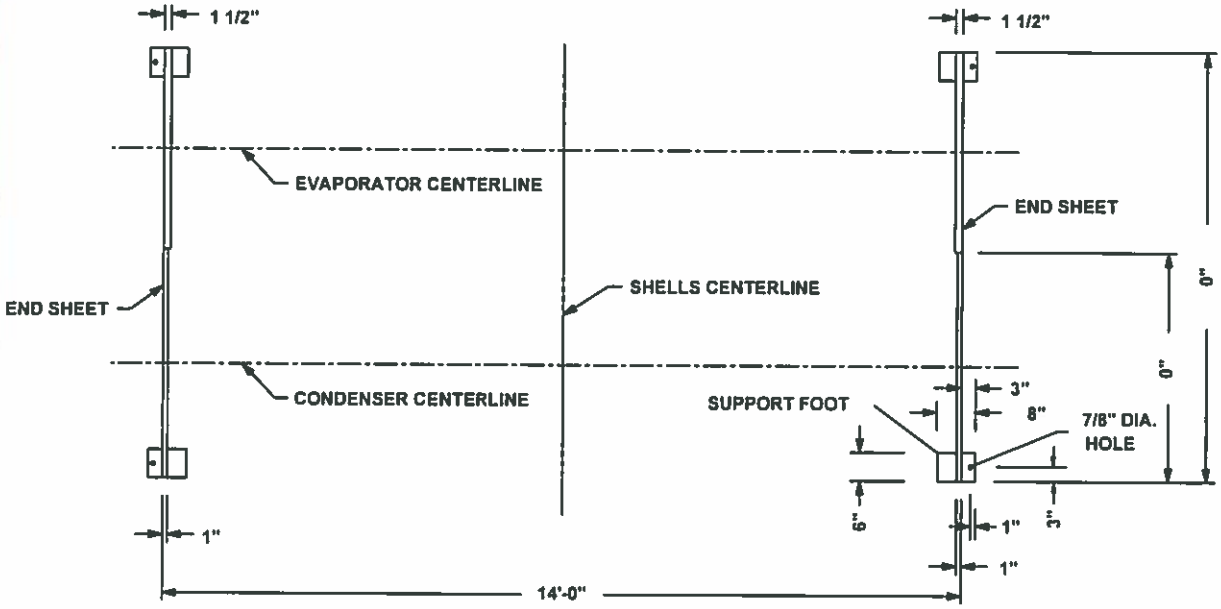
YORK Magnetic Centrifugal Chiller
MODEL YMC2-83517ABS
NOT FOR CONSTRUCTION

COMPRESSOR:	M8C-331FAC
EVAPORATOR:	EC3914-371-CS1-2GMR
CONDENSER:	CS3914-369-SS1-2GMR
VSD:	HYP127BXHC39B-48A

Project Name : GE - North Central Plant Chiller
For :
UNIT TAG: CH-451-1-2

Date : 3/4/2016 10:44:33
Rev. Date : 9:00 AM
Form: 160.78-EG1
Dwg. Lev. : 9410
Dwg. Scale : NTS

YORK
A JOHNSON CONTROLS COMPANY



DIMENSIONS ARE TYPICAL ALL FOUR CORNERS

FLOOR LAYOUT (NOT TO SCALE)

PRODUCT DRAWING FLOOR LAYOUT W/NEOPRENE ISOLATORS MODEL YMC2-83517ABS NOT FOR CONSTRUCTION	COMPRESSOR: M6C-331FAC EVAPORATOR: EC3914-371-CS1-2GMR CONDENSER: CB3914-260-BS1-2GMR VSD: HYP1278XHC30B-46A	Project Name : GE - North Central Plant Chiller For : UNIT TAG: CH-451-1-2	Date : 3/25/2016 9:59:56 Rev. Date : 3:37 PM Form: Dwg. Lev. : Dwg. Scale : NTS	YORK A JOHNSON CONTROLS COMPANY	

YMC² CHILLER
GE - North Central Plt Chiller

GENERAL
Furnish YORK YMC² Centrifugal Liquid Chilling-Unit(s) as indicated on the drawings.

Each unit shall produce a capacity of *** UNASSIGNED *** tons, cooling 2135 gpm of WATER from 54.20 to 43.00 °F when supplied with 3100 gpm of condenser water at 85.00°F. Power input shall not exceed 574 KW with an NPLV of 0.319. The cooler shall be selected for 0.00010 fouling factor and a maximum liquid pressure drop of 21.9 ft. Water side shall be designed for 150 psig working pressure. The condenser shall be selected for 0.00025 fouling factor and maximum liquid pressure drop of 26.5 ft. Water side shall be designed for 150 psig working pressure. Power shall be supplied to the unit at 460 volts - 3 phase - 60 Hertz. The chiller shall use HFC R-134A.

Each unit shall be completely factory-packaged including evaporator, unit mounted Optispeed variable speed drive, condenser, sub-cooler, compressor, hermetic motor, Optiview control center. and all interconnecting unit piping and wiring. The chiller shall be painted prior to shipment.

Performance shall be certified in accordance with ARI Standard 550/590. Only chillers that are listed in the ARI Certification Program for Centrifugal and Rotary Screw Water Chillers are acceptable.

The initial charge of refrigerant shall be supplied, shipped in containers and cylinders for field installation or factory charged in the chiller.

COMPRESSOR
The compressor shall be a single-stage centrifugal type powered by a high speed electric motor. A cast aluminum, fully shrouded impeller shall be mounted directly to the motor shaft. The impeller shall be designed for balanced thrust, dynamically balanced and overspeed tested for smooth, vibration-free operation. Compressor castings shall be designed for 235 psig working pressure and hydrostatically pressure tested at 355 psig for HFC R-134A units.

Capacity control shall be achieved by the combined use of variable speed and variable diffuser geometry to provide fully modulating control from maximum to minimum load while maintaining constant chiller leaving water temperature.

MOTOR
The compressor motor shall be a hermetic, oil free, permanent magnet type directly coupled to the compressor. The motor will be bolted to a cast iron adapter plate mounted on the compressor to provide factory alignment of the shaft. The motor shaft shall be supported on active magnetic radial and thrust bearings. Magnetic bearing control shall be equipped with auto vibration reduction and balancing systems. During a power failure event, the magnetic bearings shall remain active throughout the compressor coast down. Rolling element bearings shall be provided as a backup to the magnetic bearings designed for emergency touch down situations. Motor stator and rotor shall be equipped with a pressure driven refrigerant cooling loop to maintain acceptable operating temperatures.

VARIABLE SPEED DRIVE
A variable speed drive shall be factory installed on the chiller. It will vary the compressor motor speed by controlling the frequency and voltage of the electrical power to the motor. The capacity control logic shall automatically adjust motor speed and compressor diffuser geometry for maximum part-load efficiency by analyzing information fed to it by sensors located throughout the chiller.

Drive shall be PWM type utilizing IGBT's with a power factor of 0.97 or better at all loads and speeds.

The variable speed drive shall be unit mounted in a NEMA 1 enclosure with all power and control wiring between the drive and chiller factory installed. Field power wiring shall be a single point connection and electrical lugs for incoming power wiring will be provided. The entire chiller package shall be UL listed.

The following features will be provided:

a. Door interlocked circuit breaker capable of being padlocked.
b. Ground fault protection.

c. Over voltage and under voltage protection.
d. 3-phase sensing motor over current protection.
e. 3-phase sensing input over current protection.
f. Single phase protection.
g. Insensitive to phase rotation.
h. Over temperature protection.
i. IEEE Std. 519-1992 compliance
j. Digital readout at the chiller unit control panel of output frequency, output voltage, 3-phase output current, input Kilowatts and Kilowatt-hours, self-diagnostic service parameters. Separate meters for this information will not be acceptable.
k. KW Meter - The unit's input power consumption will be measured and displayed digitally via the unit's control panel. The KW meter accuracy is typically +/- 3% of reading. KW meter scale is 0 - 788 KW
l. KWh Meter – The unit's cumulative input power consumption is measured and displayed digitally via the unit's control panel. The KWh meter is resetable and it's accuracy is typically +/- 3% of reading. KWh meter scale is 0 – 999,999 kWh.
m. Ammeter – Simultaneous three-phase true RMS digital readout via the unit control panel. Three current transformers provide isolated sensing. The ammeter accuracy is typically +/- 3% of readming. Ammeter scale is 0 - 545 A RMS .
n. Voltmeter – Simultaneous three-phase true RMS digital readout via the unit control panel. The voltmeter accuracy is typically +/- 3% of reading. Voltmeter scale is 0 – 670 VAC.
o. Elapsed Time Meter – Digital readout of the unit's elapsed running time (0 – 876,600 hours, resetable) is displayed via the unit control panel.

EVAPORATOR

Evaporator shall be a shell-and-tube, hybrid falling film type designed for 235 psig working pressure on the refrigerant side. Shell shall be fabricated from rolled carbon steel plate with fusion welded seams; have carbon steel tube sheets, drilled and reamed to accommodate the tubes; and intermediate tube supports spaced no more than four feet apart. The refrigerant side shall be designed, tested and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section VIII- Division 1. Tubes shall be high-efficiency, internally and externally enhanced type having plain copper lands at all intermediate tube supports to provide maximum tube wall thickness at the support area. Each tube shall be roller expanded into the tube sheets providing a leak-proof seal, and be individually replaceable. Water velocity through the tubes shall not exceed 12 fps. A liquid level sight glass will be located on the side of the shell to aid in determining proper refrigerant charge. A suction baffle eliminator will be located above the tube bundle to prevent liquid refrigerant carryover to the compressor. The evaporator shall have a refrigerant relief device sized to meet the requirements of ASHRAE 15 Safety Code for Mechanical Refrigeration.

Water boxes shall be removable to permit tube cleaning and replacement. Stubout water connections having victaulic grooves will be provided. Waterboxes shall be designed for 150psi (10.3 bar) design working pressure and tested at 225 psig (15.5 bar). Vent and drain connections with plugs will be provided on each water box. Low flow protection shall be provided by a thermal-type flow sensor, factory mounted in the water nozzle connection and wired to the chiller control center.

CONDENSER

Condenser shall be of the shell-and-tube type, designed for 235 psig working pressure on the refrigerant side. Shell shall be fabricated from rolled carbon steel plate with fusion welded seams; have carbon steel tube sheets, drilled and reamed to accommodate the tubes; and intermediate tube supports spaced no more than four feet apart. The refrigerant side shall be designed, tested and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section VIII- Division 1. Tubes shall be high-efficiency, internally and externally enhanced type having plain copper lands at all intermediate tube supports to provide maximum tube wall thickness at the support area. Each tube shall be roller expanded into the tube sheets providing a leak-proof seal, and be individually replaceable. Water velocity through the tubes shall not exceed 12 fps.

Water boxes shall be removable to permit tube cleaning and replacement. Stubout water connections having ANSI/AWWA C-606 grooves will be provided. Waterboxes shall be designed for 150 psi (10.3 bar) design working pressure and tested at 225 psig (15.5 bar). Vent and drain connections with plugs will be provided on each water box.

Refrigerant Flow Control

Refrigerant flow to the evaporator shall be controlled by a variable orifice for improving unloading capabilities. The variable orifice control shall automatically adjust to maintain proper refrigerant level in the condenser and evaporator. This shall be controlled by monitoring refrigerant liquid level in the condenser, assuring optimal subcooler performance.

Graphic Control Center

General: The chiller shall be controlled by a stand-alone microprocessor based control center. The chiller control center shall provide control of chiller operation and monitoring of chiller sensors, actuators, relays and switches.

Control panel: The control panel shall include a 10.4 in. diagonal color liquid crystal display (LCD) surrounded by "soft" keys which are redefined based on the screen displayed at that time. This shall be mounted in the middle of a keypad interface and installed in a locked enclosure. The screen shall detail all operations and parameters, using a graphical representation of the chiller and its major components. Panel verbiage shall be available in English as standard and in other languages as an option with English always available. Data shall be displayed in either English or Metric units. Smart Freeze Point Protection shall run the chiller at 36.00°F leaving chilled water temperature, and not have nuisance trips on low water temperature. The sophisticated program and sensor shall monitor the chiller water temperature to prevent freeze up. When needed Hot Gas Bypass is available as an option. The panel shall display countdown timer messages so the operator knows when functions are starting and stopping. Every programmable point shall have a pop-up screen with the allowable ranges, so that the chiller can not be programmed to operate outside of its design limits.

The chiller control panel shall also provide:

1. System operating information including:
   a. return and leaving chilled liquid temperature
   b. return and leaving condenser liquid temperature
   c. evaporator and condenser saturation temperature
   d. evaporator and condenser pressure
   e. compressor discharge temperature
   f. percent full load motor current
   g. motor frequency
   h. magnetic bearing levitation status
   i. magnetic bearing temperatures
   j. operating hours
   k. number of compressor starts

2. Digital programming of setpoints through the universal keypad including:
   a. leaving chilled liquid temperature
   b. percent current limit
   c. pull-down demand limiting
   d. six-week schedule for starting and stopping the chiller, pumps and tower
   e. remote reset temperature range

3. Status messages indicating:
   a. system ready to start
   b. system running
   c. system coastdown
   d. system safety shutdown-manual restart
   e. system cycling shutdown-auto restart
   f. MBC startup
   g. start inhibit

4.The text displayed within the system status and system details field shall be displayed as a color coded message to indicate severity: red for safety fault, orange for cycling faults, yellow for warnings, and green for normal messages.

5.Safety shutdowns enunciated through the display and the status bar, and consist of system status, system details, day, time, cause of shutdown, and type of restart required. Safety shutdowns shall include:

a.evaporator – low pressure
b. evaporator – transducer or leaving liquid probe
c. evaporator – transducer or temperature sensor
d. condenser – high pressure contacts open
e. condenser – high pressure
f. condenser – pressure transducer out of range
g. auxiliary safety – contacts closed
h. discharge – high temperature
i. discharge – low temperature
j. control panel – power failure
k. watchdog – software reboot
l. MBC – Internal Fault
m. MBC – High Bearing Temperature
n. MBC – Cable Fault
o. MBC – Speed Signal Fault
p. MBC – Overspeed Fault
q. MBC – Communication
r. MBC – High Bearing Current
s. MBC – Rotor Elongation
t. MBC – Oscillator Fault
u. MBC – Power Supply Fault
v. MBC – Unauthorized Rotation
w. MBC – No Rotation
x. VSD Shutdown – Requesting Fault Data
y. VSD – Stop contacts Open
z. VSD – DC Bus Preregulation Lockout
aa. VSD – Logic Board Plug
bb. VSD – Ground Fault
cc. VSD – Phase __ Input DCCT (A,B,C)
dd. VSD – Phase __ Motor DCCT (A,B,C)
ee. VSD – Input Current Overload
ff. VSD – 105% Motor Current Overload
gg. VSD – High Phase __ Input Baseplate Temperature (A,B,C)
hh. VSD – High Phase __ Motor Baseplate Temperature (A,B,C)
ii. VSD – Motor or Stator Current Imbalance
jj. VSD – Motor Current THD Fault
kk. VSD – Motor Synchronization Fault
ll. VSD – Rectifier Program Fault
mm. VSD – Inverter Program Fault

6.Cycling shutdowns enunciated through the display and the status bar, and consists of system status, system details, day, time, cause of shutdown, and type of restart required. Cycling shutdowns shall include:

a. multiunit cycling – contacts open
b. system cycling - contacts open
c. control panel - power failure
d. leaving chilled liquid - low temperature
e. leaving chilled liquid - flow switch open
f. condenser – flow switch open
g. motor controller – contacts open

h. motor controller – loss of current
i. MBC – Position
j. MBC – Low Frequency Displacement
k. MBC – Vibration
l. MBC – High Amplifier Temperature
m. MBC – High DC/DC Temperature
n. MBC – No Levitation
o. MBC – Serial Communications Fault
p. Power Fault
q. Control Panel – Schedule
r. VSD Precharge – Low DC Bus Voltage
s. VSD – DC Bus Preregulation
t. VSD – Logic Board Power Supply
u. VSD – High DC Bus Voltage
v. VSD – High Phase __ Input Current (A,B,C)
w. VSD – High Phase __ Motor Current (A,B,C)
x. VSD – Phase __ Input Gate Driver (A,B,C)
y. VSD – Phase __ Motor Gate Driver (A,B,C
z. VSD – Single Phase Input Power
aa. VSD – DC Bus Under Voltage
bb. VSD – Low Phase __ Input Baseplate Temperature (A,B,C)
cc. VSD – Low Phase __ Motor Baseplate Temperature (A,B,C)
dd. VSD – High Internal Ambient Temperature
ee. VSD – Serial Communications
ff. VSD – Logic Board Processor
gg. VSD – Run Signal
hh. VSD Shutdown – Requesting Fault Data
ii. VSD – Stop Contacts Open
jj. VSD – Initialization Failed

7.Security access to prevent unauthorized change of setpoints, to allow local or remote control of the chiller, and to allow manual operation of the prerotation vanes. Access shall be through ID and password recognition, which is defined by three different levels of user competence: view, operator, and service.

8.Trending data with the ability to customize points of once every second to once every hour. The panel shall trend up to 6 different parameters from a list of over 140, without the need of an external monitoring system.

9.The operating program stored in non-volatile memory (EPROM) to eliminate reprogramming the chiller due to AC power failure or battery discharge. Programmed setpoints shall be retained in lithium battery-backed RTC memory for a minimum of 11 years with power removed from the system.

10.A fused connection through a transformer in the compressor motor starter to provide individual over-current protected power for all controls.

11. A numbered terminal strip for all required field interlock wiring.

12.An RS-232 port to output all system operating data, shutdown / cycling message, and a record of the last 10 cycling or safety shutdowns to a field-supplied printer. Data logs to a printer at a set programmable interval. This data can be preprogrammed to print from 1minute to 1day.

13.The capability to interface with a building automation system to provide:
a. remote chiller start and stop
b. remote leaving chiller liquid temperature adjust
c. remote current limit setpoint adjust
d. remote ready to start contacts

e. safety shutdown contacts
f. cycling shutdown contacts
g. run contacts

STARTUP AND OPERATOR TRAINING
The services of a factory trained, field service representative will be provided to supervise the final leak testing, charging and the initial startup and conduct concurrent operator instruction.

FACTORY INSULATION
Factory-applied, anti-sweat insulation shall be attached to the cooler shell, flow chamber, tube sheets, suction connection, and (as necessary) to the auxiliary tubing. The insulation shall be a flexible, closed-cell plastic type, 3/4 thick, applied with vapor-proof cement. The insulation will normally prevent sweating in environments with relative humidity up to 75% and dry bult temperatures ranging from 50 to 90 °F.

ISOLATION MOUNTING
Included with the unit are four vibration isolation mounts, consisting of 1" thick neoprene isolation pads, for field mounting. The pads are to be mounted under the steel mounting pads on the tube sheets. Suitable for ground floor installation.

SHIPMENT Form 1
The chiller is shipped complete with miscellaneous loose items shipped together. Refrigerant charges are included.

The unit is completely assembled at the factory.
- The driveline (compressor/motor assembly) is mounted and all the necessary interconnecting piping is assembled.
- The complete unit is factory leak-tested, evacuated, and shipped charged with R-134A refrigerant.
- The OptiView™ Control Center is mounted on the unit.
- The Variable Speed Drive (VSD) is mounted, wired, and shipped with glycol.

The following items are shipped together:
- Four (4) vibration isolation pads (or optional spring isolators and brackets).
- VSD Inhibitor
- Other shipped loose items, including piping, water temperature controls, wiring, etc.

Mercantile Self Direct
Nonresidential Custom Rebate Application
PART 1

Ohio Mercantile Self Direct Program

Application Guide and Cover Sheet

Questions? Call 866.380.9580 or visit 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. You may also fax to 513.629.5572.

Mercantile customers, defined as using at least 700,000 kilowatt-hours (kWh) annually or having an account in multiple locations are eligible for the Mercantile Self Direct program. Indicate which applies:

- ☒ a single Duke Energy Ohio account with 700,000 kWh annual usage
- ☐ an account with multiple locations

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

Account Number	Annual Usage	Account Number	Annual Usage
84500860013	148,246,985		

Self Direct rebates are available for completed Custom projects that have not previously received a Duke Energy Smart $aver® Custom Incentive. Self Direct rebates 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 rules allow for, though do not require, certain projects that are Prescriptive in nature under the Smart $aver program to be evaluated using the Custom process in the Self Direct program. Use the list on page two as a guide to determine which Self Direct program best fits your project(s). Apply for Self Direct projects using the appropriate application forms in conjunction with this cover sheet.

Self Direct program rules also allow for behaviorally based and/or no cost and low cost projects to receive rebates.

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

☒ All sections of appropriate application(s) are completed	☒ Proof of payment.*	☒ Manufacturer's Spec sheets	☒ Energy model/calculations and detailed inputs for Custom applications

*If a single payment record is intended to demonstrate the costs of both Prescriptive and Custom projects, please include an additional document with an estimated breakout of costs for each Prescriptive and Custom energy conservation measure.

Mercantile Self Direct
Nonresidential Custom Rebate Application
PART 1

DUKE ENERGY.

**Behavioral energy efficiency and demand reduction projects must be both measurable and verifiable. Provide justification with your application. Rebates for such projects may be small in magnitude.

Application Type	Prescriptive Measures with Optional Custom Processing	
Heating and Cooling and Window Films, Programmable Thermostats, and Guest Room Energy Management Systems	☐ ENERGY STAR® Window/Sleeve/Room AC ☐ Central Air Unit	☐ Air Source Heat Pump Water Heater
	☐ Setback/Programmable Thermostat ☐ Guestroom Energy Management Control	☐ Window Film
Chillers	☐ Air Cooled Chiller	☐ Water Cooled Chiller
Motors, Pumps and Variable Frequency Drives (VFDs)	☐ VFD – applied to Process Pump ☐ VFD – applied to HVAC Pump	☐ VFD – applied to HVAC Fan
Food Service	☐ ENERGY STAR Hot Food Holding Cabinet ☐ Night Covers for Display ☐ ECM Cooler, Freezer, and Display Case Motors ☐ ENERGY STAR Solid or Glass Door Reach-in Freezer or Refrigerator	☐ Anti-Sweat Heater Control ☐ Cooking Equipment ☐ ENERGY STAR Ice Machine
Process Equipment	☐ Engineered Nozzle – Compressed Air ☐ Air Compressor Equipped with VFD	☐ Pellet Dryer Duct Insulation
Chiller Tune-ups	☐ Air Cooled Chiller tune-up	☐ Water Cooled Chiller tune-up

Please indicate above any Prescriptive energy conservation measures to be evaluated through the Custom process. Only Prescriptive measures listed above are eligible for this option. To receive a Self Direct Custom rebate, a detailed analysis of pre-project and post-project energy usage and project costs must be included in the application.

Although some Self Direct Prescriptive measures are eligible for evaluation through Custom processes, such an approach may not be most effective for certain measures.

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 Self Direct team at 866.380.9580.

Every application must include calculations of the baseline electrical usage and the electrical usage of the proposed high-efficiency equipment/system. These calculations are performed and submitted by the Duke Energy Ohio customer, or your designated equipment vendor / engineer. Application Part 2 worksheets and page 6 of this application contain additional guidance on acceptable calculations. *Complex or unique projects may require the use, at the applicant's expense, of modeling software.* Please contact the Duke Energy Self Direct team with questions about these requirements.

If you do not receive an acknowledgement email within 1 day of submitting an application via online, email, or fax, please call 866.380.9580. The acknowledgement email will provide 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 form and excel worksheets.

Email: Complete, sign, scan and send this application form and attachments to:
SelfDirect@duke-energy.com (note attachment size limit is applicable)

Fax: 513.629.5572

Mercantile Self Direct
Nonresidential Custom Rebate Application
PART 1

DUKE ENERGY.

1. Contact Information (Required)

Duke Energy Customer Contact Information[1]						
Company Name (as it appears on your bill)	GE Aircraft Engines					
Address	1 Neumann Way					
City	Cincinnati	State	OH	ZIP Code	45215	
Project Contact	Chris Kearns					
Office Phone	5132228843	Mobile Phone				
Email Address	chris.kearns@ge.com					

Equipment Vendor / Contractor / Architect / Engineer Contact Information						
Company Name	Energy Management Solutions Inc					
Address	684 Excelsior Blvd					
City	Excelsior	State	MN	ZIP Code	55331	
Project Contact	Kelly Rogers					
Office Phone	9527677450	Mobile Phone				
Email Address	krogers@emsenergy.com					

Who is the primary point of contact for technical questions?[2]	Kelly Rogers

Payment Information					
If an incentive is awarded, who should receive payment?[3] ☒ Customer ☐ Vendor* (customer or customer's agent[4] must sign below) *If the payee is the vendor, they must issue a credit in the amount of the incentive to the customer on the invoice and include it with the payment request.					
Tax ID Number for Payee (provide W-9)	140689340				
Mailing Address for Payee (if different from above)					
Street	1 Neumann Way				
City	Cincinnati	State	OH	ZIP Code	45215

[1] Provided customer information should match the Duke Energy customer of record and W-9 form provided with this application. If the customer entity is a business affiliate of the Duke Energy customer of record, documentation must be provided that demonstrates the business affiliation.

[2] Note that if the vendor is the primary point of contact, the customer will still be copied on all application correspondence. If the customer does not wish to be copied, the customer must provide a signed letter of authorization on customer letterhead indicating an entity is acting as an agent for the customer. Duke Energy does not act as an agent.

[3] If payment is to be made to an entity other than the Duke Energy account holder or the vendor, a payment waiver is required and will be provided for customer signature.

[4] If an outside agent is acting on behalf of the Duke Energy customer of record, a letter of authorization on customer letterhead and signed by an authorized employee of the customer must be provided.

2. Project Information (Required)

A. Please indicate project type:
☒ New construction
☐ Expansion at an existing facility (existing Duke Energy account number)
☐ Replacing equipment due to equipment failure
☐ Replacing equipment that is estimated to have remaining useful life of two years or less
☐ Replacing equipment that is estimated to have remaining useful life of more than two years
☐ Behavioral, operational and/or procedural programs/projects

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

C. When did you start and complete implementation?
Start date 3/2016 (mm/yyyy) End date 10/2017 (mm/yyyy)

D. Are you also applying for Self Direct Prescriptive rebates and, if so, which one(s)[5]?

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. List all assumptions about the baseline and proposed equipment energy use and operation schedule, or attach a document listing that information. Attach specification sheets for all proposed new equipment.

G. Attach a supplier or contractor invoice(s) and/or other equivalent information documenting the Implementation Cost for each project listed in your application.
Does the Implementation Cost include any internal labor[6]? No

[5] If your project involves some equipment that is eligible for prescriptive rebates and some equipment that is likely eligible for custom rebates, 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.
[6] Internal labor costs cannot be counted in the Incremental Project Cost for purposes of analysis.

If yes, please specify which costs are internal labor.

3. Attestation, Terms and Conditions, and Signature (Required)

Attestation

By signing below, I agree to the following:

I, **(INSERT NAME)** Chris Kearns, do hereby consent to Duke Energy Ohio, Inc. 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 have read and agree to the below Terms and Conditions of the Duke Energy Ohio's Mercantile Self Direct Program.

I certify that I meet the eligibility requirements of the Duke Energy Ohio's Mercantile Self Direct Program, as applicable, and that all information provided within my application is correct to the best of my knowledge.

I certify that the taxpayer identification number provided in my application 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).

Instructions/Terms/Conditions

Note: Please keep for your records

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 (PUCO). *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 PUCO. *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 Rebate Amount.

8. Customers are encouraged to retain copies of all forms, invoices and supporting documentation for their records.

9. Approved rebates are valid for six 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.

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 rebates. 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 rebates;
    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.*

CUSTOMER SIGNATURE REQUIRED

By signing below, I certify that I have read and agree to the above Mercantile Self Direct Attestation and Terms and Conditions.

Customer Signature			
Print Name	Chris Kearns	Date	4/23/2018

TRADE ALLY SIGNATURE (REQUIRED ONLY IF TRADE ALLY IS PAYEE)

By signing below, I certify that I have read and agree to the above Mercantile Self Direct Attestation and Terms and Conditions.

Trade Ally Signature			
Print Name		Date	

CUSTOMER – AUTHORIZATION TO DESIGNATE TRADE ALLY AS PAYEE

If an incentive is awarded and the customer would like to authorize payment to the trade ally, the customer must sign below to allow release of their incentive to the trade ally.

Required: Final invoice from trade ally to customer must show the incentive credited to the customer. If the itemized invoice does not reflect a deduction of the incentive amount, the payee will be changed to the customer.

Customer Signature			
Print Name		Date	

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

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Case No(s). 18-1808-EL-EEC

Summary: Application Application to Commit Energy
Efficiency/Peak Demand
Reduction Programs
(Mercantile Customers Only)- PART 1 electronically filed by Carys Cochern on behalf of Duke Energy