Ohio | Public Utilities Commission

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

Case No.: 13-0082-EL-EEC

Mercantile Customer: Boardman Local School District (See Attached Exhibit A)

Electric Utility: Ohio Edison Company

Program Title or Description: See Attached Exhibit A

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:Boardman Local School District

Principal address: 7410 Market Street, Youngstown, Ohio 44512

Address of facility for which this energy efficiency program applies: See Attached Exhibit A

Name and telephone number for responses to questions: George Donie (330) 726-3402

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

☐ The customer uses more than seven hundred thousand kilowatt hours per year at the above facility. (Please attach documentation.)

☒ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.)

Section 2: Application Information

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

☐ Individually, without electric utility participation.

☒ Jointly with the electric utility.

B) The electric utility is: Ohio Edison Company

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

☐ Energy savings from the customer's energy efficiency program. (Complete Sections 3, 5, 6, and 7.)

☐ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)

☒ Both the energy savings and the capacity savings from the customer's energy efficiency program. (Complete all sections of the Application.)

Section 3: Energy Efficiency Programs

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

☒ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)). **If Checked, Please see Exhibit 1 and Exhibit 2**

☐ Installation of new equipment to replace equipment that needed to be replaced The customer installed new equipment on the following date(s): _____.

☐ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s):

_____.

☒ Behavioral or operational improvement.

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

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

Annual savings: (See Attached Exhibit A) 279,564 kWh

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

Annual savings: _____ kWh

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

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

Annual savings: _____ kWh

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

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

Behavioral Savings: (See Attached Exhibit A) 183,227kWh

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?

8/31/2012 - See Attached Exhibit A

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

See Attached Exhibit A - 22 kW

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

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

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

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

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

OR

☐ Commitment payment

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

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

☒ A cash rebate of $25,692.00. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

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

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

OR

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

OR

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

Section 6: Cost Effectiveness

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

☐ Total Resource Cost (TRC) Test. The calculated TRC value is: _____(Continue to Subsection 1, then skip Subsection 2)

☒ Utility Cost Test (UCT) . The calculated UCT value is: **See Exhibit 3** (Skip to Subsection 2.)

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

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

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The incremental measure costs were _____.

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

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

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

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

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

Section 7: Additional Information

Please attach the following supporting documentation to this application:

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

Ohio | Public Utilities Commission

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

Case No.:13-0082-**EL-EEC**

State of Ohio :

George Donie , Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

   Boardman Local School District
   [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.

Director of Operations
Signature of Affiant & Title

Sworn and subscribed before me this 15th day of October, 2012 Month/Year

Joan E. Darnell
Signature of official administering oath

Joan E. Darnell
Print Name and Title

JOAN E. DARNELL, Notary Public
State of Ohio
My Commission Expires Oct. 5, 2013

My commission expires on

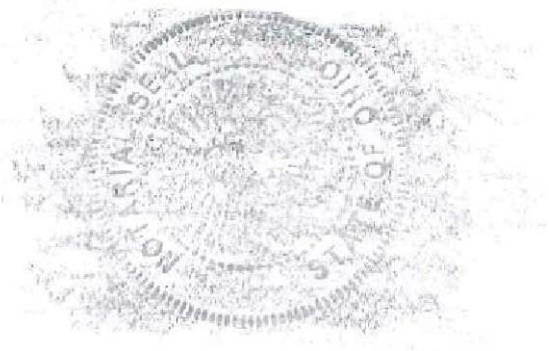

Exhibit 1

Customer Legal Entity Name: Boardman Local School District

Site Address: Boardman Center Middle School
Principal Address: 7410 Market Street

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	Gymnasium Lighting Upgrade	Replaced (22) 250 watt metal halide high-bay fixtures with GE 4 lamp T8 fluorescent fixtures with high efficiency electronic ballasts.	See attached lighting calculator: 'BLS_BCMS_P1_Lighting Calculator.xls'.	1 to 2 years. The decision was made to replace the 250 watt metal halide fixtures with fluorescent technology for the energy savings, increase in light levels, and maintenance savings.	N/A
2	HVAC Control System Upgrade	A Building Automation System (BAS) system was installed controlling Unit Ventilators (UV) and Heating Ventilators (HV). The HV and UV units, installed in classrooms, offices, and common areas operated continuously, regardless of whether the space is occupied or unoccupied. The BAS is programmed to turn off the HV and UV units during periods when the ventilated spaces are unoccupied (e.g. night time, summer break, and holidays). Occupancy sensors installed in the ventilated spaces confirm the space is unoccupied. Th energy savings was calculated by comparing the 24/7 energy usage with the new programmed control schedule.	Please see attached energy savings analysis spreadsheet 'BLS_BCMS_P2_Energy Savings Calculations.pdf'.	N/A	N/A

Docket No. 13-0082
Site: 7410 Market Street

Exhibit 2

Customer Legal Entity Name: Boardman Local School District
Site Address: Boardman Center Middle School
Principal Address: 7410 Market Street

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2010	547,147	547,147	547,147
Average	**547,147**	**547,147**	**547,147**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*
1	Gymnasium Lighting Upgrade	08/31/2012	$11,607	$5,804	12,276	12,276	4	$614	$460
2	HVAC Control System Upgrade	08/31/2012	$13,286	$6,643	102,470	102,470	-	$8,198	$6,148
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
		Total	**$24,893**		**114,746**	**114,746**	**4**	**$8,811**	**$6,609**

Docket No. 13-0082
Site: 7410 Market Street

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

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

Commitment Payment $
$0

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	12	$ 308	$ 3,784	$ 1,773	$460	$123	$ 2,356	**1.6**
2	102	$ 308	$ 31,589	$ 1,773	$6,148	$1,025	$ 8,946	**3.53**
Total	**115**	**$ 308**	**35,374**	**3,546**	**$6,609**	**$1,147**	**11,302**	**3.1**

Notes

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

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

(C) = (A) * (B)

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

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

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

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

(H) =(C) / (G)

Boardman Local School District ~ Boardman Center Middle School
Docket No. 13-0082

Site: 7410 Market Street

Lighting Inventory Form

Applicant Name: Beardman Local Schools

Facility Name: Beardman Center Middle School Gymnasium

Date: 7/6/2023

Lighting Zone (exterior only): Lighting Zone 3

Instructions: Please use one line for each fixture type in a room or area

For existing or proposed control, choose OCC for Occupancy Sensor, DAYLTG for photosensor, or NONE for none. Controls must save energy to qualify.

The total of Column S, the quantities of CFLs and exit signs in Column M, and the quantities of sensors in Column R, will be used to calculate your incentive on the NonStandard Lighting form.

	PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)						BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION										Energy Calculations									
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity drop down applicable	Units e.g. Square Feet (ft²) If multiple fixture types are used, please only enter the total area/distance/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity drop down applicable	Interior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Exterior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Change in Connected Load (kW) excluding retrofit CFL or LED Exit Signs	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Interior Demand Savings (kW) Including Retrofit CFLs or Exit Signs	Exterior Demand Savings (kW) Including Retrofit CFLs or Exit Signs	Demand Savings (kW) Retrofit CFLs or LED Exit Signs	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual Interior Fixture kWh Saved (excluding retrofit CFLs or Exit Signs)
e.g.	Retrofit	400 North Street	2	Office	Other	Interior	Office - Small		Cooled Space	3	F48EL	212	0.64	NONE																									
e.g.	New Construction	Example	1	Restaurant	Conference, Meeting or Training Room	Exterior	Retail - Small	Building facades (liner 8 lateral)	Cooled Space							400	linear ft	4.8			25	0.13	Yes																	
1	Retrofit	7410 Market Street	1	Sales Spa	Other	Interior	Other - Please estimate CF and EFLH		Uncooled space	22	MH250/1	395	8.69	NONE					22	Cut Sheet 1	155	3.49	No	NONE		4.99			35%	34%	0%	0%	0%	0%	8.99			3,000	3,000	13,016
2														NONE										NONE														
3														NONE										NONE														
4														NONE										NONE														
5														NONE										NONE														
6														NONE										NONE														
7														NONE										NONE														
8														NONE										NONE														
9														NONE										NONE														
10														NONE										NONE														
11														NONE										NONE														
12														NONE										NONE														
13														NONE										NONE														
14														NONE										NONE														
15														NONE										NONE														
16														NONE										NONE														
17														NONE										NONE														
18														NONE										NONE														
19														NONE										NONE														
20														NONE										NONE														
21														NONE										NONE														
22														NONE										NONE														
23														NONE										NONE														
24														NONE										NONE														
25														NONE										NONE														
26														NONE										NONE														
27														NONE										NONE														
28														NONE										NONE														
29														NONE										NONE														
30														NONE										NONE														
31														NONE										NONE														
32														NONE										NONE														
33														NONE										NONE														
34														NONE										NONE														
35														NONE										NONE														
36														NONE										NONE														
37														NONE										NONE														
38														NONE										NONE														
39														NONE										NONE														
40														NONE										NONE														
41														NONE										NONE														
42														NONE										NONE														
43														NONE										NONE														
44														NONE										NONE														
45														NONE										NONE														
46														NONE										NONE														
47														NONE										NONE														
48														NONE										NONE														
49														NONE										NONE														
50														NONE										NONE														
51														NONE										NONE														
52														NONE										NONE														
53														NONE										NONE														
54														NONE										NONE														
55														NONE										NONE														
56														NONE										NONE														
57														NONE										NONE														
58														NONE										NONE														
59														NONE										NONE														
60														NONE										NONE														
61														NONE										NONE														
62														NONE										NONE														
63														NONE										NONE														
64														NONE										NONE														
65														NONE										NONE														
66														NONE										NONE														
67														NONE										NONE														
68														NONE										NONE														
69														NONE										NONE														
70														NONE										NONE														
71														NONE										NONE														
72														NONE										NONE														
73														NONE										NONE														
74														NONE										NONE														
75														NONE										NONE														
76														NONE										NONE														
77														NONE										NONE														
78														NONE										NONE														
79														NONE										NONE														
80														NONE										NONE														
81														NONE										NONE														
82														NONE										NONE														
83														NONE										NONE														
84														NONE										NONE														
85														NONE										NONE														
86														NONE										NONE														
87														NONE										NONE														
88														NONE										NONE														
89														NONE										NONE														
90														NONE										NONE														
91														NONE										NONE														
92														NONE										NONE														
93														NONE										NONE														
94														NONE										NONE														
95														NONE										NONE														
96														NONE										NONE														
97														NONE										NONE														
98														NONE										NONE														
99														NONE										NONE														
100														NONE										NONE														
101														NONE										NONE														
102														NONE										NONE														
103														NONE										NONE														
104														NONE										NONE														
105														NONE										NONE														
106														NONE										NONE														
107														NONE										NONE														
108														NONE										NONE														
109														NONE										NONE														
110														NONE										NONE														
111														NONE										NONE														
112														NONE										NONE														
113														NONE										NONE														
114														NONE										NONE														
115														NONE										NONE														
116														NONE										NONE														
117														NONE										NONE														
118														NONE										NONE														
119														NONE										NONE														
120														NONE										NONE														
121														NONE										NONE														
122														NONE										NONE														
123														NONE										NONE														
124														NONE										NONE														
125														NONE										NONE														
126														NONE										NONE														
127														NONE										NONE														
128														NONE										NONE														
129														NONE										NONE														
130														NONE										NONE														
131														NONE										NONE														
132														NONE										NONE														
133														NONE										NONE														
134														NONE										NONE														
135														NONE										NONE														
136														NONE										NONE														
137														NONE										NONE														
138														NONE										NONE														
139														NONE										NONE														
140														NONE										NONE														
141														NONE										NONE														
142														NONE										NONE														
143														NONE										NONE														
144														NONE										NONE														
145														NONE										NONE														
146														NONE										NONE														
147														NONE										NONE														
148														NONE										NONE														
149														NONE										NONE														
150														NONE										NONE														
151														NONE										NONE														
152														NONE										NONE														
153														NONE										NONE														
154														NONE										NONE														
155														NONE										NONE														
156														NONE										NONE														
157														NONE										NONE														
158														NONE										NONE														
159														NONE										NONE														
160														NONE										NONE														
161														NONE										NONE														
162														NONE										NONE														
163														NONE										NONE														
164														NONE										NONE														
165														NONE										NONE														
166														NONE										NONE														
167														NONE										NONE														
168														NONE										NONE														
169														NONE										NONE														
170														NONE										NONE														
171														NONE										NONE														
172														NONE										NONE														
173														NONE										NONE														
174														NONE										NONE														
175														NONE										NONE														
176														NONE										NONE														
177														NONE										NONE														
178														NONE										NONE														
179														NONE										NONE														
180														NONE										NONE														
181														NONE										NONE														
182														NONE										NONE														
183														NONE										NONE														
184														NONE										NONE														
185														NONE										NONE														
186														NONE										NONE														
187														NONE										NONE														
188														NONE										NONE														
189														NONE										NONE														
190														NONE										NONE														

PROJECT BASIC INFORMATION											PRE-INSTALLATION (RETROFIT)					BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION							Energy Calculations												
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity where applicable	Units e.g. Square Feet (sf) If multiple fixture types are used, please only enter the total area/distance/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity where applicable	Interior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Exterior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Change in Connected Load (kW) retrofit CFL or LED Exit Signs	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Interior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Exterior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Demand Savings (kW) Retrofit CFLs or LED Exit Signs	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual Interior Fixture kWh Saved (excluding retrofit CFLs or Exit Signs)
1														NONE										NONE															
2														NONE										NONE															
3														NONE										NONE															
4														NONE										NONE															
5														NONE										NONE															
6														NONE										NONE															
7														NONE										NONE															
8														NONE										NONE															
9														NONE										NONE															
10														NONE										NONE															
11														NONE										NONE															
12														NONE										NONE															
13														NONE										NONE															
14														NONE										NONE															
15														NONE										NONE															
16														NONE										NONE															
17														NONE										NONE															
18														NONE										NONE															
19														NONE										NONE															
20														NONE										NONE															
21														NONE										NONE															
22														NONE										NONE															
23														NONE										NONE															
24														NONE										NONE															
25														NONE										NONE															
26														NONE										NONE															
27														NONE										NONE															
28														NONE										NONE															
29														NONE										NONE															
30														NONE										NONE															
31														NONE										NONE															
32														NONE										NONE															
33														NONE										NONE															
34														NONE										NONE															
35														NONE										NONE															
36														NONE										NONE															
37														NONE										NONE															
38														NONE										NONE															
39														NONE										NONE															
40														NONE										NONE															
41														NONE										NONE															
42														NONE										NONE															
43														NONE										NONE															
44														NONE										NONE															
45														NONE										NONE															
46														NONE										NONE															
47														NONE										NONE															
48														NONE										NONE															
49														NONE										NONE															
50														NONE										NONE															
Totals										22			6.40						22			2.40			6.69								1.29					12,276

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	12,276
Total Change in Connected Load	4.09

Annual Estimated Cost Savings	$1,227.60
Annual Operating Hours	3,000

Interior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$613.80
Exterior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$0.00
Total retrofit CFL Incentive @ $1/screw-in CFL lamp; $15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	$0.00
Total retrofit LED Exit Incentive @ $10/exit sign	$0.00
Total Lighting Controls Incentive @ $25/occupancy sensor and $25/daylight sensor (includes all Lighting Controls, both interior and exterior)	$0.00

Total Calculated Incentive	$613.80

Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	22
Total Lamp Quantity for retrofit Screw-In CFLs	0
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

Please briefly describe how you estimated your coincidence factor (CF) and applicant equivalent full-load hours (EFLH) for facility type "Other" indicated on the Lighting Form tab

Demand Savings (For Internal Use Only)	1.39

Center Middle School

161,340 Sq. Ft.

Savings

Gas $	Mcf		Elec $	kWh	kW
$24,111	**1,737.1**		**$3,297**	**102,470**	
20%	20%		5%	15%	

2005 Base Usage

Dominion			Ohio Edison Rate 21			
Gas $	**Mcf**	**$/Mcf**	**Elec $**	**kWh**	**kW**	**$/kWh**
$120,796	**8,628.3**	**$13.88**	**$63,313**	**681,688**	**2,261.7**	**$ 0.09**

Ohio Edison Rate 21		
First kWh		$0.1966
Next kWh		$0.2151
Next kWh		$0.0530
Over kWh		$0.0322

Denotes tier cost used

Gas Usage Analysis

Mcf Usage

Month	Mcf	$			Max	Min	Average	HDD
1	1,541	$21,570			33.5	18.0	25.7	1,214
2	1,846	$25,844			36.5	21.2	28.9	1,009
3	1,360	$19,046			40.7	23.8	32.3	1,009
4	653	$9,143			60.6	37.7	49.2	467
5	515	$7,216			65.2	42.1	53.6	352
6	51	$715			81.9	59.0	70.5	27
7	30	$424	Non heating		84.0	61.3	72.6	
8	15	$204	Period		82.5	60.7	71.6	8
9	30	$413			77.0	53.3	65.2	42
10	292	$4,082			61.0	44.4	52.7	386
11	569	$7,963			52.6	34.8	43.7	631
12	1,727	$24,175			32.4	21.2	26.8	1,178
					Average heating period O		**39.1**	

Gas usage analysis

8,628.3	Total Mcf used
125.5	Non heating period Mcf
384.0	8 months cooking and domestic hot water usage
8,118.8	Base heating usage (steam boiler)

Electric Usage Analysis

Month	kWd	kWh	$		Max	Min	Average	CDD
1	184.2	62,720	$5,630		33.5	18.0	25.7	
2	203.8	59,976	$5,541		36.5	21.2	28.9	
3	192.1	58,016	$5,302		40.7	23.8	32.3	
4	180.3	59,192	$5,228		60.6	37.7	49.2	
5	184.2	58,800	$5,252	Shoulder	65.2	42.1	53.6	2
6	192.1	61,152	$5,468		81.9	59.0	70.5	195
7	219.5	33,320	$4,002	Cooling	84.0	61.3	72.6	244
8	117.6	37,632	$3,365	Period	82.5	60.7	71.6	220
9	188.2	58,016	$6,000	Shoulder	77.0	53.3	65.2	51
10	192.1	58,408	$5,323		61.0	44.4	52.7	11
11	203.8	60,760	$5,756		52.6	34.8	43.7	
12	203.8	73,696	$6,445		32.4	21.2	26.8	

kWh usage analysis

681,688 Total kWh used

kWh	% used		kWh	% Used	
610,736		**School period usage**	**70,952**		**Vacation period usage**
134,362	22%	AHU/Unit vents	12,062	17%	AHU/Unit vents
18,322	3%	Boiler system			Boiler system
		Chiller Systems			Chiller Systems
427,515	70%	Lighting	56,762	80%	Lighting
30,537	5%	Misc	2,129	3%	Misc
610,736	100%		70,952	100%	

kW usage analysis

2,262 Total kW used

kW	% used		kW	% used	
1,924.6		**School period usage**	**337.1**		**Vacation period usage**
423.4	22%	AHU/Unit vents	84.3	25%	AHU/Unit vents
19.2	1%	Boiler system			Boiler system
		Chiller System			Chiller System
1,385.7	72%	Lighting	246.1	73%	Lighting
96.2	5%	Misc	6.7	2%	Misc
	100%			100%	

Base Occupancy Schedule

	Wk	Day	Daily Hours	Total Hours
Occ. Heating	28.0	7.0	14.0	2,744
Unocc. Heating	28.0	7.0	10.0	1,960
Unocc. Heating				
Occ. Ventilation	15.0	7.0	24.0	2,520
UnOcc Ventilation				
UnOcc Ventilation				
Occ. No-Condition	9.1	7.0	24.0	1,529
UnOcc No-Condition				
UnOcc No-Condition				
Occ. Cooling				
Unocc. Cooling				
Unocc. Cooling				
Sum .Occ. Cooling				
Sum .Unocc. Cooling				
Sum .Unocc. Cooling				
				8753

The boiler system has a simple time clock/thermostat setback system. The HV and UV units fans operate 24/7. Therefore, coils are only hot when boilers operate. The Unoccupied hours have been reduced to allow for the boiler on/off periods.

New Occupancy Schedule

	Wk	Day	Daily Hours	Total Hours
Occ. Heating	28.0	5.0	10.0	1,400
Unocc. Heating	28.0	5.0	14.0	1,960
Unocc. Heating	28.0	2.0	24.0	1,344
Occ. Ventilation	15.0	5.0	10.0	750
UnOcc Ventilation	15.0	5.0	14.0	1,050
UnOcc Ventilation	15.0	2.0	24.0	720
Occ. No-Condition	9.1	5.0	10.0	455
UnOcc No-Condition	9.1	5.0	14.0	637
UnOcc No-Condition	9.1	2.0	24.0	437
Occ. Cooling				
Unocc. Cooling				
Unocc. Cooling				
Sum .Occ. Cooling				
Sum .Unocc. Cooling				
Sum .Unocc. Cooling				
				8,753

Center Middle School

Unit Ventilators and HV units

ECM Savings Totals			
	Kwh Saved	102,470	
ECM Description	$ Saved	$3,297	
Occupied/Unoccupied scheduling electric savings	Mcf Saved	637	
Eliminate excessive occupied period ventilation	$ Saved	$8,843	
Eliminate unoccupied period ventilation			

		Auditorium HV Units	Library HV Units	Auxillary Gym HV Unit	Unit Ventilators
Base information					
Main Units					
	Number of units	2	2	1	66
	Unit CFM	8,750	2,500	4,000	1,200
	Total CFM	17,500	5,000	4,000	79,200
	Motor Horsepower	5	0.75	1.5	0.3
	Total Horsepower	10	1.5	1.5	19.8
Exhaust Fans					
	Number of units	0	0	0	0
	Unit CFM	0	0	0	0
	Total CFM	0	0	0	0
	Motor Horsepower	0.5	0.5	0.5	0
	Total Horsepower	0	0	0	0
Base Operating Hours					
Non-conditioning period					
	Occupied non-cond. hours	1,529	1,529	1,529	1,529
	Unoccupied non-cond. hours	0	0	0	0
Heating period					
	Occupied heating hours	2,744	2,744	2,744	2,744
	Unoccupied heating hours	1,960	1,960	1,960	1,960
Ventilation period					
	Occ. Ventilation	2,520	2,520	2,520	2,520
	UnOcc Ventilation	0	0	0	0
New Operating Hours					
Non-conditioning period					
	Occupied non-cond. hours	455	455	455	455
	Unoccupied non-cond. hours	1,074	1,074	1,074	1,074
Heating period					
	Occupied heating hours	1,400	1,400	1,400	1,400
	Unoccupied heating hours	3,304	3,304	3,304	3,304
Ventilation period					
	Occ. Ventilation	750	750	750	750
	UnOcc Ventilation	1,770	1,770	1,770	1,770

Center Middle School						
Unit Ventilators and HV units		**ECM Savings Totals**				
		Kwh Saved	102,470			
ECM Description		$ Saved	$3,297			
Occupied/Unoccupied scheduling electric savings		Mcf Saved	637			
Eliminate excessive occupied period ventilation		$ Saved	$8,843			
Eliminate unoccupied period ventilation						
			Auditorium HV Units	**Library HV Units**	**Auxillary Gym HV Unit**	**Unit Ventilators**
Occupied/Unoccupied scheduling electric savings						
	Est. supply fan motor kW		7.46	1.12	1.12	14.77
	Est. exhaust fan motor kW		0.00	0.00	0.00	0.00
Hours						
	Base non conditioning period runtime		1,529	1,529	1,529	1,529
	Base heating period runtime		2,744	2,744	2,744	2,744
	Base ventilation period runtime		2,520	2,520	2,520	2,520
	New non conditioning period runtime		455	455	455	455
	New heating period runtime		1,400	1,400	1,400	1,400
	New ventilation period runtime		750	750	750	750
kWh savings						
	Base non conditioning period kWh		11,405	1,711	1,711	22,582
	Base heating period kWh		20,470	3,071	3,071	40,531
	Base ventilation period kWh		18,799	2,820	2,820	37,222
	New non conditioning period kWh		3,394	509	509	6,721
	New heating period kWh		10,444	1,567	1,567	20,679
	New ventilation period kWh		5,595	839	839	11,078
	Non conditioning period kWh saved		8,011	1,202	1,202	15,861
	Heating period kWh saved		10,026	1,504	1,504	19,852
	Ventilation period kWh saved		13,204	1,981	1,981	26,144
	4th tier kWh rate		$0.0322	$0.0322	$0.0322	$0.0322
	$/kWh * kwh saved = $ saved	$3,297	$1,005	$151	$151	$1,990
Eliminate excess occupied period ventilation						
Heating						
	Average outdoor temperature (F)		39.1	39.1	39.1	39.1
	Average indoor temperature (F)		72.0	72.0	72.0	72.0
	Estimated base ventilation rate		25%	25%	25%	0%
	(New) Minimum ventilation rate		15%	15%	20%	0%
	Ventilation rate difference		10%	10%	5%	0%
	CFM reduction		1,750	500	200	0
	Occupied hours		1,400	1,400	1,400	1,400
	Btu/hr = CFM * delta T * 1.08		62,157	17,759	7,104	0
	MCF saved = ((Btu/Hr * hours)/boiler eff. (80%))/1,000,000		109	31	12	0
	$/Mcf		$13.88	$13.88	$13.88	$13.88
	$ Saved	$2,114	$1,509.80	$431.37	$172.55	$0.00

Center Middle School							
Unit Ventilators and HV units		**ECM Savings Totals**					
		Kwh Saved	102,470				
ECM Description		$ Saved	$3,297				
Occupied/Unoccupied scheduling electric savings		Mcf Saved	637				
Eliminate excessive occupied period ventilation		$ Saved	$8,843				
Eliminate unoccupied period ventilation							
			Auditorium HV Units	**Library HV Units**	**Auxillary Gym HV Unit**		**Unit Ventilators**
Eliminate excess unoccupied period ventilation							
Heating							
	Average outdoor temperature (F)		39.1	39.1	39.1		39.1
	Average indoor temperature (F)		72.0	72.0	72.0		72.0
	Estimated base ventilation rate		25%	25%	25%		15%
	(New) Minimum ventilation rate		5%	5%	5%		5%
	Ventilation rate difference		20%	20%	20%		10%
	CFM reduction		3,500	1,000	800		7,920
	Boiler night setback derating		25%	25%	25%		25%
	Unoccupied hours		826	826	826		826
	The boiler system has a simple time clock/thermostat setback system. The HV and UV units fans operate 24/7. Therefore, coils are only hot when boilers operate. The Unoccupied hours have been reduced to allow for the boiler on/off periods.						
	Btu/hr = CFM * delta T * 1.08		124,315	35,519	28,415		281,307
	MCF saved = ((Btu/Hr * hours)/boiler eff. (80%))/1,000,000		128	37	29		290
	$/Mcf		$13.88	$13.88	$13.88		$13.88
	$ Saved	$6,729	$1,781.57	$509.02	$407.22		$4,031.43

Exhibit 1

Customer Legal Entity Name: Boardman Local School District

Site Address: Boardman High School & Performing Arts Ctr.
Principal Address: 7635 Glenwood Ave.

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	Exhaust Damper Upgrades	The existing barometric and motorized exhaust dampers were replaced with new to reduce outside air infiltration. Savings in electrical use, as a result of upgrading the dampers, is produced by reducing the cooling load on the chiller system. The new dampers have low leakage seals with motarized damper actuators. The dampers are now controlled by the building automation system. This was a House Bill 264 project.	Please see attached calculations: 'BLS_BHS & PAC_P1_Energy Calculations.pdf'.	3 to 4 years. The decision to replace the exhaust dampers with new was made to reduce energy use during the cooling and heating seasons.	N/A
2	Unit Ventilator Upgrades	The unit ventilators in the high school and performing arts building were upgraded with new high-efficiency units. All of the existing UV controls were upgraded with EC motors and DDC controls for use with the building automation system. Energy is saved by reducing the run times of the unit ventilators when the spaces are not occupied or when the CO2 concentrations in the rooms are at acceptable levels. Unit ventilator run times are further reduced by lowering and raising heating and cooling setpoints during the times when the building is not occupied.	Please see attached calculations 'BLS_BHS & PAC_P2_Energy Calculations.pdf'.	3 to 4 years. The decision to upgrade the unit ventilators was made to reduce energy use and increase the comfort levels of the occupants.	N/A
3	Boiler & Chilled Water Upgrades	Modifications were made to the hot and chilled water pump system in order to reduce energy use. Two 20 hp pumps are used to deliver heated or chilled water to the unit ventilators throughout the building. VFDs placed on the 2 pump motors allow the building automation system (BAS) to control the entire heating and cooling system more efficiency than before. By integrating the VFDs into the BAS, the pumps will now only deliver the required amount of water needed to satisfy the demand of the unit ventilators. The pumps can now be shut down after hours according to a pre-programmed schedule or during times when the building is not occupied. Prior to having the controls in place, the maintenance staff had to manually switch the pumps on and off based on the activities scheduled throughout the day.	Please see the attached calculations 'BLS_BHS & PAC_P3_Energy Calculations.pdf'.	N/A	N/A
4	High Efficiency Window Upgrades	The windows in the high school and performing arts building were upgraded to reduce air infiltration and to conserve energy. The new windows feature lower U-values and higher R-values which reduce the heating and cooling load on the building. Electrical energy is saved as the chiller, fan motors, and pump motors will not run as long to keep the space confortable for the occupants.	See the attached calculations 'BLS_BHS & PAC_P4_Energy Calculations.pdf'.	3 to 4 years. The decision to replace the windows was made to conserve energy and improve the comfort levels within the building.	N/A

Exhibit 2

Customer Legal Entity Name: Boardman Local School District
Site Address: Boardman High School & Performing Arts Ctr.
Principal Address: 7635 Glenwood Ave.

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2010	1,777,908	1,777,908	1,777,908
Average	**1,777,908**	**1,777,908**	**1,777,908**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Exhaust Damper Upgrades	08/31/2012	$61,951	$30,976	45,274	45,274	-	$3,622	$2,717	
2	Unit Ventilator Upgrades	08/31/2012	$813,881	$406,941	139,080	139,080	-	$11,126	$8,345	
3	Boiler & Chilled Water Upgrades	08/31/2012	$874,318	$437,159	67,664	67,664	-	$5,413	$4,060	
4	High Efficiency Window Upgrades	08/31/2012	$785,096	$392,548	31,682	31,682	-	$2,534	$1,901	
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$2,535,246**		**283,700**	**283,700**	**0**	**$22,695**	**$17,021**	**$0**

Docket No. 13-0082
Site: 7635 Glenwood Ave.

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

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

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	45	$ 308	$ 13,957	$ 887	$2,717	$453	$ 4,056	**3.4**
2	139	$ 308	$ 42,876	$ 887	$8,345	$1,391	$ 10,622	**4.04**
3	68	$ 308	$ 20,859	$ 887	$4,060	$677	$ 5,623	**3.71**
4	32	$ 308	$ 9,767	$ 887	$1,901	$317	$ 3,104	**3.15**
Total	**284**	**$ 308**	**87,459**	**3,546**	**$17,021**	**$2,837**	**23,404**	**3.7**

Notes

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

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

(C) = (A) * (B)

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

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

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

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

(H) =(C) / (G)

Boardman Local School District ~ Boardman High School & Performing Arts Ctr.
Docket No. 13-0082

Site: 7635 Glenwood Ave.

Ohio Edison • The Illuminating Company • Toledo Edison

Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	Proj 1 - Exhaust Damper Upgrades
Site Name:	**Boardman H.S. & Perf. Arts Center**
Completed by (Name):	**Roth Bros., Inc.**
Date completed:	

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
Exhaust Damper Upgrades	**45,274**	**3621.92**
Total Project Energy Savings kWh	**45,274**	
Total Custom Prescriptive Rebate Amount $		**$ 3,621.92**

Notes about this rebate calculation:
The existing barometric exhaust dampers were replaced with new motorized, low-leakage dampers. The energy savings is based on the reduced heating and cooling load placed on the HVAC system, as less air is enteringor leaving the building. See the attached calculations 'P1_Boardman High School_ Exhaust Damper Calculations.pdf' for the estimated energy savings of replacing the leaky dampers.

Boardman High School

Exhaust Damper Replacement

Phase 2 ECM Description

Replace defective barometric exhaust dampers

Replace defective motorized exhaust dampers

ECM Savings Totals	
Kwh Saved	45,274
$ Saved	$2,264
Mcf Saved	586
$ Saved	$8,132

Base Information

	Gravity Exhaust Damper Replacement (single story)	Motorized Exhaust Damper Replacement (Gymnasium)
Number of units	47	25
Area Sq.In.	7,428	43,012
Average area Sq. In.	158	1,720
Base Existing Occ. Heating Hours	2,160	
Adj. Heating Hours with outdoor air temperature below indoor air temperature.	1,512	
Indoor Temp. (set point plus 4 degrees)	74	
Mean heating period outdoor air temperature	39	
Heating		
Occupied heating		
Average outdoor temperature (F)	39.1	39.1
Average indoor temperature (F)	72.0	72.0
Occupied heating hours	1,512	1,512
V = 8.02√h(Ti-To)/460+To		
Acceleration of gravity constant	8.02	8.02
Weight of air constant	460	460
Building Height (Ft) h (average)	7	14
Indoor temp (F) Ti	74.0	74.0
Average outdoor temp (F) To	39.1	39.1
Velocity V	5.61	7.93
Dampers with .25" cracks		
Damper length (inches)	12.6	41.5
Damper width (inches)	12.6	41.5
Blade Width	4.0	6.0
No of blades	3.0	7.0
Width of crack Inches	0.25	0.25
Crack area (Sq.Ft.)	0.087	0.576
Q = (A x V x K)60		
Coefficient of V (.3 to .5)	0.3	0.3
Crack Area (Sq. Ft.) A	0.087	0.576
Volume Q	8.8	82.3
No. of units	27	27
CFM	238	2221
CFM x Hours	395,880.7	3,694,427.5
Btu/hr = CFM * delta T * 1.08	13,205,987	123,240,560
Mcf Saved = (Btu/Hr/boiler eff. (80%)/1,000,000	17	154
$/Mcf	$13.88	$13.88
$2,367.35 $ Saved	$229.12	$2,138.22

Base Information

	Dampers with .75" Opening		
	Damper length (inches)	12.6	41.5
	Damper width (inches)	12.6	41.5
	Blade Width	4.0	4.0
	No of 4" blades / No. of 6" blades	3.1	10.4
	Width of crack Inches	0.75	0.75
	Crack area (Sq.Ft.)	0.271	2.456
	Q = (A x V x K)60		
	Coefficient of V (.3 to .5)	0.3	0.3
	Area (Sq. Ft.) A	0.271	2.456
	Volume Q	27.4	350.8
	No. of units	17	5
	CFM	466	1754
	CFM x Hours	774,484.2	2,916,973.0
	Btu/hr = CFM * delta T * 1.08	25,835,630	97,305,845
	Mcf Saved = (Btu/Hr/boiler eff. (86%)/1,000,000	30	113
	$/Mcf	$13.88	$13.88
$1,987.45	$ Saved	$416.98	$1,570.47

Openings with wide open damper or no dampers		
Damper length (inches)	12.6	
Damper width (inches)	12.6	
Blade Width	4.0	
No of 4" blades / No. of 6" blades	3.1	
Width of crack Inches	0.5	
Crack area (Sq.Ft.)	0.181	
Q = (A x V x K)60		
Coefficient of V (.3 to .5)	0.3	
Area (Sq. Ft.) A	0.181	
Volume Q	18.3	
No. of units	3	
CFM	55	
CFM x Hours	91,115.8	
Btu/hr = CFM * delta T * 1.08	3,039,486	
Mcf Saved = (Btu/Hr/boiler eff. (86%)/1,000,000	4	
$/Mcf	$13.88	
$49.06 $ Saved	$49.06	

Base Existing Unocc. Heating Hours	2,376
Adj. Heating Hours Hours with outdoor air temperature below indoor air temperature.	1,663
Set point (plus 2 degrees)	70
Mean heating period outdoor air temperature	39

Heating

Unoccupied heating

Average outdoor temperature (F)	39.1	39.1
Average indoor temperature (F)	70.0	70.0
Unoccupied heating hours	1,663	1,663
V = 8.02√h(Ti-To)/460+To		
Acceleration of gravity constant	8.02	8.02
Weight of air constant	460	460
Building Height (Ft) h (average)	10	15
Indoor temp (F) Ti	70.0	70.0
Average outdoor temp (F) To	39.1	39.1
Velocity V	6.31	7.73

Base Information

	Dampers with .25" cracks		
	Damper length (inches)	12.6	41.5
	Damper width (inches)	12.6	41.5
	Blade Width	4.0	6.0
	No of blades	3.0	7.0
	Width of crack Inches	0.25	0.25
	Crack area (Sq.Ft.)	0.087	0.576
	Q = (A x V x K)60		
	Coefficient of V (.3 to .5)	0.3	0.3
	Crack Area (Sq. Ft.) A	0.087	0.576
	Volume Q	9.9	80.1
	No. of units	27	20
	CFM	268	1603
	CFM x Hours	445,217.1	2,665,332.8
	Btu/hr = CFM * delta T * 1.08	14,851,773	88,911,505
	Mcf Saved = (Btu/Hr/boiler eff. (86%)/1,000,000	17	103
	$/Mcf	$13.88	$13.88
$1,674.69	$ Saved	$239.70	$1,434.99
	Dampers with .75" Opening		
	Damper length (inches)	12.6	41.5
	Damper width (inches)	12.6	41.5
	Blade Width	4.0	4.0
	No of 4" blades / No. of 6" blades	3.1	10.4
	Width of crack Inches	0.75	0.75
	Crack area (Sq.Ft.)	0.271	2.456
	Q = (A x V x K)60		
	Coefficient of V (.3 to .5)	0.3	0.3
	Area (Sq. Ft.) A	0.271	2.456
	Volume Q	30.8	341.6
	No. of units	17	5
	CFM	524	1708
	CFM x Hours	871,003.7	2,840,995.1
	Btu/hr = CFM * delta T * 1.08	29,055,376	94,771,334
	Mcf Saved = (Btu/Hr/boiler eff. (86%)/1,000,000	34	110
	$/Mcf	$13.88	$13.88
$1,998.51	$ Saved	$468.94	$1,529.57
	Openings with wide open damper or no dampers		
	Damper length (inches)	12.6	
	Damper width (inches)	12.6	
	Blade Width	4.0	
	No of 4" blades / No. of 6" blades	3.1	
	Width of crack Inches	0.5	
	Crack area (Sq.Ft.)	0.181	
	Q = (A x V x K)60		
	Coefficient of V (.3 to .5)	0.3	
	Area (Sq. Ft.) A	0.181	
	Volume Q	20.5	
	No. of units	3	
	CFM	62	
	CFM x Hours	102,471.0	
	Btu/hr = CFM * delta T * 1.08	3,418,280	
	Mcf Saved = (Btu/Hr/boiler eff. (86%)/1,000,000	4	
	$/Mcf	$13.88	
$55.17	$ Saved	$55.17	

Base Information

Table I: Recommended Design Outside Moisture Level

Design Outside Wet Bulb	Design Specific Humidity	Design Outside Wet Bulb	Design Specific Humidity
°F	gr/lb	°F	gr/lb
81	149	75	121
80	143	74	117
79	139	73	113
78	134	72	109
77	130	71	106
76	125	70	102

Table II: F_1 Factor for Grain Difference

gr/lb Difference	F_1 Factor
35	1.0
40	1.12
50	1.35
60	1.59
70	1.82
80	2.06
90	2.29
100	2.53
110	2.76
120	3.00

Cooling

Unoccupied cooling

Base Existing Unocc. Cooling Hours		2,209
Adj. Heating Hours	Hours with outdoor air temperature below indoor air temperature.	1,546
Set point		72
Mean cooling period outdoor air temperature		81
Mean cooling period outdoor air enthalpy		33

Grains per hour = (A x 300/C x D) x Δ G X F_1	
A = Area of fixed opening in square feet	52
300 = Experimental constant – velocity of vapor, ft/hr at 35 gr difference	300
C = 14 = constant factor to translate ft.3 to pounds	14
D = feet = depth of opening	1
G_O = outdoor air grains of moisture	110
G_I = indoor air grains of moisture	66
ΔG = Grains of moisture delta	44
F_1 = Moisture Difference Factor from Table II.	1.235
Grains per hour	60065
Btu = 4.5 x Total Grains x hours	417,916,197
Tons = Btu/12000	34,826
kWh = tons x 1.3 kW/ton	45,274
$/kwh =	0.05
$saved	$2,264

Ohio Edison • The Illuminating Company • Toledo Edison

Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	Project 2 - Unit Ventilator Upgrades
Site Name:	**Boardman H.S. & Perf. Arts Center**
Completed by (Name):	**Roth Bros., Inc.**
Date completed:	

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
Unit ventilator upgrades	**139,080**	**11126.40**
Total Project Energy Savings kWh	**139,080**	
Total Custom Prescriptive Rebate Amount $		**$ 11,126.40**

Notes about this rebate calculation:
Unit ventilators were upgraded to new units with digital controls. Each of the unit ventilators are controlled by the building automation system to eliminate excess ventilation and run-times when ares are not occupied. See the attached calculations 'P2_Boardman High School_UV Unit Replacement Calculations.pdf' for the estimated annual energy savings.

Boardman High School

Unit Ventilators Replacement

Phase 2 ECM Description		**ECM Savings T**
Eliminate excessive occupied period ventilation	Kwh Saved	139,080
Pneumatic to DDC conversion	$ Saved	$5,490
BAS Demand Ventilation Control	Mcf Saved	716
	$ Saved	$9,932

	Academic Wing Pipe	**2**
Base information		
Main Units		
Number of units	64	
Average Unit CFM	1,085	
Total CFM	69,440	
Motor Horsepower	0.75	
Total Horsepower	48	
Base Operating Hours		
Non-conditioning period		
Occupied non-cond. hours	0	
Unoccupied non-cond. hours	0	
Heating period		
Occupied heating hours	2,160	
Unoccupied heating hours	2,376	
Ventilation period		
Occ. Ventilation	0	
UnOcc Ventilation	0	
Cooling Period		
Occupied cooling hours	1,128	
Unoccupied cooling hours	1,241	
Summer Cooling		
Occupied summer cooling hours	880	
Unoccupied summer cooling hours	968	
New Operating Hours		
Non-conditioning period		
Occupied non-cond. hours	0	
Unoccupied non-cond. hours	0	
Heating period		
Occupied heating hours	2,160	
Unoccupied heating hours	2,376	
Ventilation period		
Occ. Ventilation	0	
UnOcc Ventilation	0	
Cooling Period		
Occupied cooling hours	1,128	
Unoccupied cooling hours	1,241	
Summer Cooling		
Occupied summer cooling hours	880	
Unoccupied summer cooling hours	968	

		Academic Wing Pipe 2
Eliminate excess occupied period ventilation		
Heating		
Average outdoor temperature (F)		39.1
Average indoor temperature (F)		72.0
Estimated base ventilation rate		20%
(New) Minimum ventilation rate		15%
Ventilation rate difference		5%
CFM reduction		3,472
Engineering Factor		25%
Adjusted CFM		2,604
Occupied hours		2,160
Btu/hr = CFM * delta T * 1.08		92,490
MCF saved = ((Btu/Hr * hours)/boiler eff. (86%))/1,000,000		232
$/Mcf		$13.88
$ Saved	$3,224	$3,224.34
Cooling		
Occupied cooling period		
Average outdoor enthalpy (Ht) Btu/Lb		32.5
Average Indoor enthalpy (Ht) Btu/Lb 72F @ 50%		25.5
Estimated base ventilation rate		20%
(New) Minimum ventilation rate		15%
Ventilation rate difference		5%
CFM reduction		3,472
Occupied hours		2,160
Btu/hr = CFM * 4.5 * (Ht outdoor - Ht indoor)		109,889
Btus Saved = Btu/Hrs * Hours		237,359,808
kWh saved = (Btu saved/(12,000 Btu/Ton))* .7 kW/Ton		13,846
3rd Tier rate (used to capture demand savings)		$0.05
$ Saved	$734	$734.01
Summer cooling period		
Average outdoor enthalpy (Ht) Btu/Lb		32.5
Average Indoor enthalpy (Ht) Btu/Lb 72F @ 50%		25.5
Estimated base ventilation rate		20%
(New) Minimum ventilation rate		15%
Ventilation rate difference		5%
CFM reduction		3,472
Occupied hours		880
Btu/hr = CFM * 4.5 * (Ht outdoor - Ht indoor)		109,889
Btus Saved = Btu/Hrs * Hours		96,702,144
kWh saved = (Btu saved/(12,000 Btu/Ton))* .7 kW/Ton		5,641
3rd Tier rate (used to capture demand savings)		$0.05
$ Saved	$299	$299.04

		Academic Wing 2 Pipe
BAS occupancy controlled ventilation (0% outdoor air when room is unoccupied)		
Heating		
Unit CFM		69,440
Average outdoor temperature (F)		39.1
Average indoor temperature (F)		72.0
New occupied heating hours (informational)		1,080
No. of rooms unoccupied during normal school hours		3
No. of times per week		3
Weeks in heating period		27
Est. cfm supplied to rooms (1000 cfm each)		3,000
Total avoided CFM		243,000
Ventilation rate		15%
Occupiedl avoided CFM x Ventilation rate		36,450
Unoccupied hours (maintainance and cleaning)		850
Ventilation rate		15%
Avoided CFM = Total unit CFM x Ventilation rate x Hours		8,853,600
Engineering Factor		25%
Adjusted CFM		6,640,200
Total Occupied and Unoccupied avoided CFM		6,676,650
Btu/hr avoided = CFM X Delta T * 1.08		237,144,593
MCF saved = ((Btu/Hr * hours)/boiler eff. (86%))/1,000,000		276
$/Mcf		$13.88
$ Saved	$3,827	$3,827.40
Cooling		
Unit CFM		69,440
Average outdoor enthalpy (Ht) Btu/Lb		32.5
Average Indoor enthalpy (Ht) Btu/Lb 72F @ 50%		25.5
New occupied cooling hours (informational)		1,128
No. of rooms unoccupied during normal school hours		8
No. of times per week		5
Weeks in cooling period		14
Est. cfm supplied to rooms (1000 cfm each)		8,000
Total avoided CFM		564,000
Ventilation rate		15%
Occupiedl avoided CFM = Avoided CFm x Ventilation rate		84,600
Unoccupied hours (maintainance and cleaning)		564
Summer unoccupied hours (maintenance and cleaning)		440
Total avoided hours		1004
Ventilation rate		15%
Avoided CFM = Total unit CFM x Ventilation rate x Hours		10,457,664
Total Occupied and Unoccupied avoided CFM		10,542,264
kWh saved		
Btu/hr = CFM * 4.5 * (Ht outdoor - Ht indoor)		333,662,656
kWh saved = (Btu saved/(12,000 Btu/Ton))* 1.3 kW/Ton		36,147
3rd Tier rate (used to capture demand savings)		$0.05
$ Saved	$1,916	$1,916.23

		Academic Wing 2 Pipe
Pneumatic to DDC conversion		
Heating Period		
MCF - Non heating usage		1,600
MCF - Summer and shoulder month		527
MCF - Performing arts usage		4,510
Mcf - by other ECMs		4,877
Total Mcf used for heating		11,514
% used by HV units		35%
MCf used by HV units		4,030
MCF used by Unit Ventl		7,484
Mcf usage by area		4,030
Estimated savings from DDC implementation		5%
Mcf Saved		208
$/Mcf		$13.88
$ Saved	$2,881	$2,880.65
Cooling Period		
School period HV and Unit Vent. kWh usage		322,995
Period period HV and Unit Vent. kWh usage		119,178
Total kWh		442,173
HV unit total CFM		86,500
Unit Ventilator total CFM		69,440
Total CFM		155,940
HV Unit % of total CFM		55%
Unit Ventilator % of total CFM		45%
HV unit kWh		86,500
Unit Vent. kWh		69,440
kWh per Unit vent = Unit vent kWh/ no. of units		1,085
Area usage = Per unit kWh x No. of units		69,440
Estimated savings from DDC implementation		8%
kWh Saved		5,555
4th tier kWh rate		$0.03
$ Saved	$178	$177.77
Unoccupied scheduling electric savings		
Est. total supply fan motor kW		35.8
Base Occ. heating period hours		2,160
Class hours runtime		1,080
Cleaning and maintenance runtime		1,080
Base Occ. cooling period hours		1,128
Class hours runtime		564
Cleaning and maintenance runtime		564
Summer Occ. Cooling period hours		880
Class hours runtime		440
Cleaning and maintenance runtime		440
Total cleaning period hours		2,084
Est. % cleaning period fan operation (to maintain set point)		13%
Total avoided cleaning period hours		1,813
kWh saved = Supply fan kw x avoided hours		64,923
4th tier kWh rate		$0.03
$ Saved	$1,948	$1,948

		Academic Wing Pipe 2
Economizer Savings		
Total cooling Btus/hr		1,789,900
% of cacpacity replaced during econ. Period		30%
Total replaced capacity Btus/hr		536,970
Repaced capcity/12000 Btu/hr = Tons		45
1.3 kW/Ton = kW		81
Occ. Hours outdoor enthalpy less than indoor enthalpy		161
Hours x kW = kwh saved		12,968
4th tier kWh rate		$0.03
$ Saved	$415	$415

Ohio Edison • The Illuminating Company • Toledo Edison

Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	Proj 3 - Boiler & Chilled Water Upgrades
Site Name:	**Boardman H.S. & Perf. Arts Center**
Completed by (Name):	**Roth Bros., Inc.**
Date completed:	

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
Boiler & Chilled Water Upgrades	**67,664**	**5413.12**
Total Project Energy Savings kWh	**67,664**	
Total Custom Prescriptive Rebate Amount $		**$ 5,413.12**

Notes about this rebate calculation:
New building automation system controls were added to the boiler and chiller water circulation pumps, in order to conserve energy during off-peak and unoccupied times. Variable speed drives were used to vary the speed of the pump motors based on the demand for heating and cooling water from the unit ventilators. See the attached calculations 'P3_Boardman High School_HW Boiler and Chilled Water Calculations.pdf' for the annual estimated energy savings.

Boardman High School

Hot Water Boiler and Chilled Water System

Phase 2 ECM Description
High Efficiency Boiler Installation
Hot water and Chilled Water Pumping Modifications

Total estimated energy savings: 67,664kWh

High Efficiency Boiler Installation

73%	Existing boiler efficiency (by test)
86%	New boiler efficiency
15%	Reduction = (new eff - old eff)/ new eff
9,698.1	Base year usage
27%	Engineering Factor
7,079.6	Modified Base Year
1,038.1	Mcf reduction = Red. X Base year usage
$13.88	$/Mcf
$14,408.36	$ Saved

Hot water and Chilled Water Pumping Modifications
Hot water primary-secondary pump VFD

20	Pump HP
650	Pump gpm
4,536	Est. pump operating hours
15%	% hours above 65 F
3,856	Pump operating hours
13.43	Est. motor kW = kWold
55%	Est. average % Gpm reduction
1.22	kWnew = kWold * (GPMnew / GPMold)3
85%	Est. % of hours at red. CFM
3,277	Hours at red. GPM
44,007	kWold * Hours = Existing kwh usage
4,010	kWnew * Hours = New kwh usage
39,997	kWh saved
$0.05	3rd Tier rate (used to capture demand savings)
$2,120	$/kWh * kwh saved = $ saved

Chilled water pump VFD (Occupied period)

20	Pump HP
650	Pump gpm
2,256	Est. pump operating hours
15%	% hours below 65 F
1,918	Pump operating hours
13.43	Est. motor kW = kWold
45%	Est. average % Gpm reduction
2.23	kWnew = kWold * (GPMnew / GPMold)3
85%	Est. % of hours at red. GPM
1,630	Hours at red. GPM
21,887	kWold * Hours = Existing kwh usage
3,641	kWnew * Hours = New kwh usage
18,246	kWh saved
$0.05	3rd Tier rate (used to capture demand savings)
$967	$/kWh * kwh saved = $ saved

Chilled water pump VFD (Summer Occupied period)

20	Pump HP
650	Pump gpm
880	Est. pump operating hours
2%	% hours below 65 F
862	Pump operating hours
13.43	Est. motor kW = kWold
65%	Est. average % Gpm reduction
0.58	kWnew = kWold * (GPMnew / GPMold)3
85%	Est. % of hours at red. GPM
733	Hours at red. GPM
9,843	kWold * Hours = Existing kwh usage
422	kWnew * Hours = New kwh usage
9,421	kWh saved
$0.05	3rd Tier rate (used to capture demand savings)
$499	$/kWh * kwh saved = $ saved

Ohio Edison • The Illuminating Company • Toledo Edison

Mercantile Customer Program - Custom Project Rebate Calculator

Project Name and Number:	Project 4 - Window Upgrades
Site Name:	**Boardman H.S. & Perf. Arts Center**
Completed by (Name):	**Roth Bros., Inc.**
Date completed:	

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * $0.08
Window Upgrades	**31,682**	**2534.56**
Total Project Energy Savings kWh	**31,682**	
Total Custom Prescriptive Rebate Amount $		**$ 2,534.56**

Notes about this rebate calculation:
All windows in the high school and performing arts building were replaced with new high-efficiency windows. See the attached calculations 'P4_Boardman High School_Window Replacement Calculations.pdf' for the annual estimated energy savings. Pages 1 and 2 calculate the energy savings resulting from the increase in thermal efficiency. Pages 3 - 5 calculate the energy saved by the reduction of air air infiltration through the window frames.

High School

Windows

	Mcf saved	$ Saved	kWh Saved	$ Saved
Academic Wing	488	$6,778.56	8269	$438.38
Single Story Classrooms	169	$2,340.50	2889	$153.17
Curtain Wall Entrances	111	$1,546.20	1727	$91.53
Main Entrance	19	$268.13	0	0
Total	788	$10,933.40	12,885	$683.07

ECM Description
Window Replacement Thermal Savings

Base Existing Occ. Heating Hours	2,160
Adj. Heating Hours with outdoor air temperature below indoor air temperature.	1,512
Set point	72
Mean heating period outdoor air temperature	39

Area	Structure	Type	Area (ft²)	R-Value (ft²°F/Btuh) Base	R-Value (ft²°F/Btuh) New	U-Factor Base	U-Factor New	U-Factor Diff	U*A*(Set point-Mean)*Hrs.	MCF/.86 eff
1st Floor	Single Story Classrooms									
School	Windows	Window	929	1.00	2.85	1.000	0.351	0.649	29,986,462	34.9
School	Windows	Panel	679	1.25	14.32	0.800	0.070	0.730	24,653,296	28.7
School	Windows	Frames	476	1.00	1.96	1.000	0.510	0.490	11,593,238	13.5
									Mcf Saved	77.0
									$/Mcf	$13.88
									Saved	$1,068.97
Curtain Wall Entrances										
School	Entrance S1	Window	89	1.00	2.85	1.000	0.351	0.649	2,862,002	3.3
School	Entrance S2	Window	987	1.00	2.85	1.000	0.351	0.649	31,868,282	37.1
School	Entrance N2	Window	160	1.00	2.85	1.000	0.351	0.649	5,170,002	6.0
School	Entrance S1	Frame	89	1.00	1.96	1.000	0.510	0.490	2,159,525	2.5
School	Entrance S2	Frame	232	1.00	1.96	1.000	0.510	0.490	5,647,320	6.6
School	Entrance N2	Frame	42	1.00	1.96	1.000	0.510	0.490	1,017,087	1.2
									Mcf Saved	56.7
									$/Mcf	$13.88
									Saved	$786.39
Academic Wing Curtain Wall Windows										
School	Curtain Wall 3 story	Window	2,819	1.00	2.85	1.000	0.351	0.649	90,992,290	105.8
School	Curtain Wall 3 story	Panel	2,399	1.25	14.00	0.800	0.071	0.729	86,913,059	101.1
School	Curtain Wall 3 story	Frame	682	1.00	1.96	1.000	0.510	0.490	16,610,480	19.3
									Mcf Saved	226.2
									$/Mcf	$13.88
									Saved	$3,139.40
Main Entrance										
School	Entrance 1	Window	538	1.50	2.85	0.667	0.351	0.316	8,449,477	9.8
									Mcf Saved	9.8
									$/Mcf	$13.88
									Saved	$136.37

Base Existing Unocc. Heating Hours	2,376
Adj. Heating Hours	1,663
Set point	68
Mean heating period outdoor air temperature	39

Area	Structure	Type	Area (ft²)	R-Value (ft²°F/Btuh) Base	R-Value (ft²°F/Btuh) New	U-Factor* Base	U-Factor* New	U-Factor* Diff	U*A*(Set point-Mean)*Hrs.	MCF/.86 eff
1st Floor										
School	Windows	Window	1,021	1.00	2.85	1.000	0.351	0.649	31,842,492	37.0
School	Windows	Panel	1,021	1.25	14.00	0.800	0.071	0.729	35,739,816	41.6
School	Windows	Frames	476	1.00	1.96	1.000	0.510	0.490	11,201,509	13.0
									Mcf Saved	91.6
									$/Mcf	$13.88
									Saved	$1,271.53

Curtain Wall Entrances											
School	Entrance S1	Window	89	1.00	2.85	1.000	0.351	0.649	2,765,296	3.2
School	Entrance S2	Window	987	1.00	2.85	1.000	0.351	0.649	30,791,471	35.8
School	Entrance N2	Window	160	1.00	2.85	1.000	0.351	0.649	4,995,310	5.8
School	Entrance S1	Frame	89	1.00	1.96	1.000	0.510	0.490	2,086,556	2.4
School	Entrance S2	Frame	232	1.00	1.96	1.000	0.510	0.490	5,456,500	6.3
School	Entrance N2	Frame	42	1.00	1.96	1.000	0.510	0.490	982,721	1.1
									Mcf Saved	54.7
									$/Mcf	$13.88
									Saved	$759.81
Academic Wing Curtain Wall Windows										
School	Curtain Wall 3 story	Window	3,164	1.00	2.85	1.000	0.351	0.649	98,677,418	114.7
School	Curtain Wall 3 story	Panel	3,164	1.25	14.00	0.800	0.071	0.729	110,754,925	128.8
School	Curtain Wall 3 story	Frame	682	1.00	1.96	1.000	0.510	0.490	16,049,222	18.7
									Mcf Saved	262.2
									$/Mcf	$13.88
									Saved	$3,639.17
Main Entrance										
School	Entrance 1	Window	538	1.50	2.85	0.667	0.351	0.316	8,163,974	9.5
									Mcf Saved	9.5
									$/Mcf	$13.88
									Saved	$131.76

Base Existing Occ. cooling Hours	2,008
Adj. Heating Hours Hours with outdoor air temperature below indoor air temperature.	1,807
Set point	72
Mean heating period outdoor air temperature	81

				R-Value (ft²°F/Btuh)		U-Factor			U*A*(Set point-Mean)*Hrs.	
Area	**Structure**	**Type**	**Area (ft²)**	**Base**	**New**	**Base**	**New**	**Diff**		**Tons *1.3 kW**
1st Floor										
School	Windows	Window	1,021	1.00	2.85	1.000	0.351	0.649	10,779,568	1,167.8
School	Windows	Panel	1,021	1.25	14.00	0.800	0.071	0.729	12,098,920	1,310.7
School	Windows	Frames	476	1.00	1.96	1.000	0.510	0.490	3,792,022	410.8
									kWh Saved	2,889.3
									$/kWh	$0.05
									Saved	$153.17
Curtain Wall Entrances										
School	Entrance S1	Window	89	1.00	2.85	1.000	0.351	0.649	936,130	101.4
School	Entrance S2	Window	987	1.00	2.85	1.000	0.351	0.649	10,423,768	1,129.2
School	Entrance N2	Window	160	1.00	2.85	1.000	0.351	0.649	1,691,051	183.2
School	Entrance S1	Frame	89	1.00	1.96	1.000	0.510	0.490	706,357	76.5
School	Entrance S2	Frame	232	1.00	1.96	1.000	0.510	0.490	1,847,177	200.1
School	Entrance N2	Frame	42	1.00	1.96	1.000	0.510	0.490	332,678	36.0
									kWh Saved	1,726.5
									$/kWh	$0.05
									Saved	$91.53
Academic Wing Curtain Wall Windows										
School	Curtain Wall 3 story	Window	3,164	1.00	2.85	1.000	0.351	0.649	33,405,046	3,618.9
School	Curtain Wall 3 story	Panel	3,164	1.25	14.00	0.800	0.071	0.729	37,493,617	4,061.8
School	Curtain Wall 3 story	Frame	682	1.00	1.96	1.000	0.510	0.490	5,433,107	588.6
									kWh Saved	8,269.3
									$/kWh	$0.05
									Saved	$438.38

High School

Windows

	Mcf saved	$ Saved	Kwh saved	$ Saved
Academic Wing	393.0	$5,455	14,196	$752.57
Single Story Classrooms	94.6	$1,313	3,938	$208.77
Curtain Wall Entrances	10.6	$148	473	$25.09
Main Entrance	4.3	$59	189.3	$10.04
Totals	502.5	$6,975	18,797.0	$996.48

ECM Description

Window Replacement Infiltration Savings

Average outdoor temperature	39
Average indoor temperature	70

Table 5.8

	Wind Coefficient		
	Stories		
	1	2	3
No obstruction	0.0119	0.0157	0.0184
Few obstruction	0.0092	0.0121	0.0143
Moderate shielding	0.0065	0.0086	0.0101
Heavy sheilding	0.0039	0.0051	0.006
Very heavy sheilding	0.0012	0.0016	0.0018

(1993 ASHRAE Handbook of Fundamentals)

Table 5.9

Stack Coefficient $CFM^2 \times Mph^2$		
Stories		
1	2	3
0.0156	0.0313	0.0471

(1993 ASHRAE Handbook of Fundamentals)

	Academic Wing				Single Story Classrooms				Curtain Wall Entrances				Main Entrance
	North	East	South	West	North	East	South	West	North	East	South	West	West
Window Height	24	24	24	24	24	24	24	24	96	96	96	96	96
Window Width	35	35	35	35	42	42	42	42	72	72	72	72	72
Perimeter Inches	118	118	118	118	132	132	132	132	336	336	336	336	336
Area at .25" crack	29.5	29.5	29.5	29.5	33	33	33	33	84	84	84	84	84
Area at .125"	14.75	14.75	14.75	14.75	16.5	16.5	16.5	16.5	42	42	42	42	42
Area at .0625"	7.375	7.375	7.375	7.375	8.25	8.25	8.25	8.25	21	21	21	21	21
Area at .032"	3.54	3.54	3.54	3.54	3.96	3.96	3.96	3.96	10.08	10.08	10.08	10.08	10.08
Windows	North	East	South	West	North	East	South	West	North	East	South	West	West
No. of windows	28	48	48	48	20	20	10	6	0	0	2	1	1
% at .25" crack	16%	10%	11%	18%	22%	16%	16%	25%	0%	0%	100%	0%	100%
% at .125"	18%	25%	25%	30%	14%	13%	18%	15%	0%	0%	0%	100%	0%
% at .0625	45%	35%	30%	43%	35%	38%	21%	33%	0%	0%	0%	0%	0%
% no leakage	21%	30%	34%	9%	29%	33%	45%	27%	0%	0%	0%	0%	0%
Sq. in. at .25" crack	132.2	141.6	155.8	254.9	145.2	105.6	52.8	49.5	0.0	0.0	59.0	0.0	29.5
Sq. in. at .125"	74.3	177.0	177.0	212.4	46.2	42.9	29.7	14.9	0.0	0.0	0.0	14.8	0.0
Sq. in. at .0625	92.9	123.9	106.2	152.2	57.8	62.7	17.3	16.3	0.0	0.0	0.0	0.0	0.0
Sq. in. no leakage	20.8	51.0	57.8	15.3	23.0	26.1	17.8	6.4	0.0	0.0	0.0	0.0	0.0
Panels (upper edge, width only)	35.0	35.0	35.0	35.0	42.0	42.0	42.0	42.0					
Area at .25" crack	8.75	8.75	8.75	8.75	10.5	10.5	10.5	10.5					
Area at .125"	4.375	4.375	4.375	4.375	5.25	5.25	5.25	5.25					
Area at .0625"	2.1875	2.1875	2.1875	2.1875	2.625	2.625	2.625	2.625					
Area at .032"	1.05	1.05	1.05	1.05	1.26	1.26	1.26	1.26					
Combined window and panel edge leakage area	320.2	493.5	496.7	634.8	272.1	237.3	117.6	87.1	0.0	0.0	59.0	14.8	29.5

Occupied Heating

Base Existing Occ. Heating Hours	2,160
Adj. Heating Hours with outdoor air temperature below indoor air temperature.	1,512
Set point	72
Mean heating period outdoor air temperature	39

$I_{CFM} = L[(A \times TD) + (B \times V^2)\}^{1/2}$

L = Leakage area sq. in.	320.2	493.5	496.7	634.8	272.1	237.3	117.6	87.1	0.0	0.0	59.0	14.8	29.5
A = Stack coefficient	0.0471	0.0471	0.0471	0.0471	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156
T_o = Mean outdoor temp.	39	39	39	39	39	39	39	39	39	39	39	39	39
Ti = Indoor temp.	72	72	72	72	72	72	72	72	72	72	72	72	72
B = Wind Coefficient	0.006	0.0101	0.0143	0.0143	0.006	0.0101	0.0143	0.0143	0.006	0.0101	0.0143	0.0143	0.0143
V = Average wind velocity Mph	6	6	6	6	6	6	6	6	6	6	6	6	6
I = CFM	425.4	682.5	713.6	911.9	232.3	222.2	119.3	88.3	0.0	0.0	59.8	15.0	29.9
Total infiltration CFM	2,733.5				662.1				74.8				29.9
Btu = Cfm * hours*Delta T* 1.08	146,797,334				35,559,434				4,015,432				1,606,173
Mcf = Btu/ Boiler Eff.(86%)/1000000	170.7				41.3				4.7				1.9

Unoccupied Heating

Base Existing Unocc. Heating Hours	2,376
Adj. Heating Hours Hours with outdoor air temperature below indoor air temperature.	1,663
Set point	68
Mean heating period outdoor air temperature	39

$I_{CFM} = L[(A \times TD) + (B \times V^2)\}^{1/2}$

L = Leakage area sq. in.	320.2402	493.476	496.7328	634.7928	272.118	237.336	117.645	87.1002	0	0	59	14.75	29.5
A = Stack coefficient	0.0471	0.0471	0.0471	0.0471	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156
T_o = Mean outdoor temp.	31	31	31	31	31	31	31	31	31	31	31	31	31
Ti = Indoor temp.	68	68	68	68	68	68	68	68	68	68	68	68	68
B = Wind Coefficient	0.006	0.0101	0.0143	0.0143	0.006	0.0101	0.0143	0.0143	0.006	0.0101	0.0143	0.0143	0.0143
V = Average wind velocity Mph	6	6	6	6	6	6	6	6	6	6	6	6	6
I = CFM	448.8	717.1	747.2	954.9	242.6	230.4	123.0	91.1	0.0	0.0	61.7	15.4	30.9
Total infiltration CFM	2,868.0				687.2				77.1				30.9
Btu = Cfm * hours*Delta T* 1.08	191,190,339				45,809,028				5,141,745				2,056,698
Mcf = Btu/ Boiler Eff.(86%)/1000000	222.3				53.3				6.0				2.4
Total Mcf Saved	393.0				94.6				10.6				4.3
$/Mcf	13.88				13.88				13.88				13.88
$ Saved	$5,455				$1,313				$148				$59

Occupied Cooling

Base Existing Occ. cooling Hours	2,008
Adj. Heating Hours Hours with outdoor air temperature below indoor air temperature.	1,807
Set point	72
Mean heating period outdoor air temperature	81

$I_{CFM} = L[(A \times TD) + (B \times V^2)}^{1/2}$

L = Leakage area sq. in.	320.2402	493.476	496.7328	634.7928	272.118	237.336	117.645	87.1002	0	0	59	14.75	29.5
A = Stack coefficient	0.0471	0.0471	0.0471	0.0471	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156	0.0156
T_o = Mean outdoor temp.	81	81	81	81	81	81	81	81	81	81	81	81	81
Ti = Indoor temp.	72	72	72	72	72	72	72	72	72	72	72	72	72
B = Wind Coefficient	0.006	0.0101	0.0143	0.0143	0.006	0.0101	0.0143	0.0143	0.006	0.0101	0.0143	0.0143	0.0143
V = Average wind velocity Mph	6	6	6	6	6	6	6	6	6	6	6	6	6
I = CFM	256.2	437.9	481.3	615.0	162.5	168.5	95.2	70.5	0.0	0.0	47.8	11.9	23.9
Total infiltration CFM	1,790.4				496.7				59.7				23.9
Average outdoor enthalpy (Ht) Btu/Lb	32.5				32.5				32.5				32.5
Average Indoor enthalpy (Ht) Btu/Lb 72F @ 50%	25.5				25.5				25.5				25.5
Btu/hr = CFM * 4.5 * (Ht outdoor - Ht indoor)	72,511				20,115				2,418				967
Btus Saved = Btu/Hrs * Hours	###########				36,352,370				4,369,283				1,747,713
kWh saved = (Btu saved/(12,000 Btu/Ton)) x 1.3 kW/Ton	14,196				3,938				473				189
3rd Tier rate (used to capture demand savings)	$0.05				$0.05				$0.05				$0.05
$ Saved	$752.57				$208.77				$25.09				$10.04

Exhibit 1

Customer Legal Entity Name: Boardman Local School District

Site Address: Boardman Market Street Elementary School
Principal Address: 5555 Market Street

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	Basement Lighting Upgrade	Replaced existing 150 watt incandescent lamps with T8 fluorescent fixtures and compact fluorescent lamps.	Please see attached lighting calculator 'BLS_BMSE_P1_Lighting Calculator.xls'.	Approximately 1 to 2 years. The decision was made to do a lighting upgrade and replace the 150 watt incandescent lamps with T8 and compact fluorescent technology for the energy savings, increase in light levels, and maintenance savings.	N/A
2	HV Unit Fan VFDs	Installed variable frequency drives on the heating ventilator fan units in the Primary Wing, Intermediate Wing, Auditorium/Cafeteria, and Gym. Each VFD is controlled separately by the building automation system.	See the attached calcuations 'BLS_BMSE_P2_Energy Calculations.pdf'.	N/A	N/A

Docket No. 13-0082
Site: 5555 Market Street

Exhibit 2

Customer Legal Entity Name: Boardman Local School District
Site Address: Boardman Market Street Elementary School
Principal Address: 5555 Market Street

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2010	291,560	291,560	291,560
Average	**291,560**	**291,560**	**291,560**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*
1	Basement Lighting Upgrade	08/31/2012	$61,951	$30,976	12,566	12,566	4	$430	$323
2	HV Unit Fan VFDs	08/31/2012	$61,951	$30,976	13,093	13,093	-	$385	$289
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
		Total	**$123,902**		**25,659**	**25,659**	**4**	**$815**	**$611**

Docket No. 13-0082
Site: 5555 Market Street

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

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

Commitment Payment $
$0

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	13	$ 308	$ 3,874	$ 1,773	$323	$126	$ 2,221	**1.7**
2	13	$ 308	$ 4,036	$ 1,773	$289	$131	$ 2,193	**1.84**
Total	**26**	**$ 308**	**7,910**	**3,546**	**$611**	**$257**	**4,414**	**1.8**

Notes

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

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

(C) = (A) * (B)

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

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

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

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

(H) =(C) / (G)

Boardman Local School District ~ Boardman Market Street Elementary Schoo
Docket No. 13-0082

Site: 5555 Market Street

Lighting Inventory Form

Applicant Name: Boardman Local Schools

Facility Name: Market Street Elementary

Date: 7/6/2023

Lighting Zone (exterior only): Lighting Zone 3

Instructions: Please use one line for each fixture type in a room or area

For existing or proposed control, choose OCC for Occupancy Sensor, DAYLTG for photosensor, or NONE for none. Controls must save energy to qualify.

Lighting Form

The total of Column S, the quantities of CFLs and exit signs in Column M, and the quantities of sensors in Column R, will be used to calculate your incentive on the NonStandard Lighting form.

PROJECT BASIC INFORMATION										PRE-INSTALLATION (OR TROFFER)					BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION						Energy Calculations												
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control (drop down)	Existing Sensor Quantity (Blank when applicable)	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts / Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control (drop down)	Proposed Sensor Quantity (Blank when applicable)	Interior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Exterior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Change in Connected Load (kW) retrofit CFL or LED Exit Signs	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Interior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Exterior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Demand Savings (kW) Retrofit CFLs or LED Exit Signs	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual Interior Fixture kWh Saved (excluding retrofit CFLs or Exit Signs)
# or Example	Retrofit or New Construction	400 North Street Example	2 1	Office Restaurant	Other Conference, Meeting or Training Room	Interior Exterior	Office - Small Retail - Small	Building facade (line # based)	Cooled Space Cooled Space	3	FA4AU	112	0.34	NONE		510	linear ft	3.4	3	CFT56/1-BX	56	0.17	Nov	OCC	3			0.17		84%	34%	12%	0%	30%			0.19	2,800	3,435
																			0	Example Cut Sheet 2	20	0.13	Yes	DAY	0		1.75			88%	34%	12%	0%	0%			0.09		2,760	3,069
1	Retrofit	5555 Market Street	1	Basement	Other	Interior	Other - Please estimate CF and EFLH		Cooled Space	20	I55/2/1	100	2.00	NONE					20	Cut Sheet 1	25	0.50	No	NONE		2.50				36%	36%	34%	10%	0%	0%	1.14			3,000	3,000	8,000
2	Retrofit	5555 Market Street	1	Basement	Other	Interior	Other - Please estimate CF and EFLH		Cooled Space	10	I55/2/1	100	1.50	NONE					10	Cut Sheet 2	26	0.26	No	NONE				1.24	34%	34%	34%	10%	0%	0%			0.56	3,000	3,000	
3														NONE										NONE												
4														NONE										NONE												
5														NONE										NONE												
6														NONE										NONE												
7														NONE										NONE												
8														NONE										NONE												
9														NONE										NONE												
10														NONE										NONE												
11														NONE										NONE												
12														NONE										NONE												
13														NONE										NONE												
14														NONE										NONE												
15														NONE										NONE												
16														NONE										NONE												
17														NONE										NONE												
18														NONE										NONE												
19														NONE										NONE												
20														NONE										NONE												
21														NONE										NONE												
22														NONE										NONE												
23														NONE										NONE												
24														NONE										NONE												
25														NONE										NONE												
26														NONE										NONE												
27														NONE										NONE												
28														NONE										NONE												
29														NONE										NONE												
30														NONE										NONE												
31														NONE										NONE												
32														NONE										NONE												
33														NONE										NONE												
34														NONE										NONE												
35														NONE										NONE												
36														NONE										NONE												
37														NONE										NONE												
38														NONE										NONE												
39														NONE										NONE												
40														NONE										NONE												
41														NONE										NONE												
42														NONE										NONE												
43														NONE										NONE												
44														NONE										NONE												
45														NONE										NONE												
46														NONE										NONE												
47														NONE										NONE												
48														NONE										NONE												
49														NONE										NONE												
50														NONE										NONE												
51														NONE										NONE												
52														NONE										NONE												
53														NONE										NONE												
54														NONE										NONE												
55														NONE										NONE												
56														NONE										NONE												
57														NONE										NONE												
58														NONE										NONE												
59														NONE										NONE												
60														NONE										NONE												
61														NONE										NONE												
62														NONE										NONE												
63														NONE										NONE												
64														NONE										NONE												
65														NONE										NONE												
66														NONE										NONE												
67														NONE										NONE												
68														NONE										NONE												
69														NONE										NONE												
70														NONE										NONE												
71														NONE										NONE												
72														NONE										NONE												
73														NONE										NONE												
74														NONE										NONE												
75														NONE										NONE												
76														NONE										NONE												
77														NONE										NONE												
78														NONE										NONE												
79														NONE										NONE												
80														NONE										NONE												
81														NONE										NONE												
82														NONE										NONE												
83														NONE										NONE												
84														NONE										NONE												
85														NONE										NONE												
86														NONE										NONE												
87														NONE										NONE												
88														NONE										NONE												
89														NONE										NONE												
90														NONE										NONE												
91														NONE										NONE												
92														NONE										NONE												
93														NONE										NONE												
94														NONE										NONE												
95														NONE										NONE												
96														NONE										NONE												
97														NONE										NONE												
98														NONE										NONE												
99														NONE										NONE												
100														NONE										NONE												
101														NONE										NONE												
102														NONE										NONE												
103														NONE										NONE												
104														NONE										NONE												
105														NONE										NONE												
106														NONE										NONE												
107														NONE										NONE												
108														NONE										NONE												
109														NONE										NONE												
110														NONE										NONE												
111														NONE										NONE												
112														NONE										NONE												
113														NONE										NONE												
114														NONE										NONE												
115														NONE										NONE												
116														NONE										NONE												
117														NONE										NONE												
118														NONE										NONE												
119														NONE										NONE												
120														NONE										NONE												
121														NONE										NONE												
122														NONE										NONE												
123														NONE										NONE												
124														NONE										NONE												
125														NONE										NONE												
126														NONE										NONE												
127														NONE										NONE												
128														NONE										NONE												
129														NONE										NONE												
130														NONE										NONE												
131														NONE										NONE												
132														NONE										NONE												
133														NONE										NONE												
134														NONE										NONE												
135														NONE										NONE												
136														NONE										NONE												
137														NONE										NONE												
138														NONE										NONE												
139														NONE										NONE												
140														NONE										NONE												
141														NONE										NONE												
142														NONE										NONE												
143														NONE										NONE												
144														NONE										NONE												
145														NONE										NONE												
146														NONE										NONE												
147														NONE										NONE												
148														NONE										NONE												
149														NONE										NONE												
150														NONE										NONE												
151														NONE										NONE												
152														NONE										NONE												
153														NONE										NONE												
154														NONE										NONE												
155														NONE										NONE												
156														NONE										NONE												
157														NONE										NONE												
158														NONE										NONE												
159														NONE										NONE												
160														NONE										NONE												
161														NONE										NONE												
162														NONE										NONE												
163														NONE										NONE												
164														NONE										NONE												
165														NONE										NONE												
166														NONE										NONE												
167														NONE										NONE												
168														NONE										NONE												
169														NONE										NONE												
170														NONE										NONE												
171														NONE										NONE												
172														NONE										NONE												
173														NONE										NONE												
174														NONE										NONE												
175														NONE										NONE												
176														NONE										NONE												
177														NONE										NONE												
178														NONE										NONE												
179														NONE										NONE												
180														NONE										NONE												
181														NONE										NONE												
182														NONE										NONE												
183														NONE										NONE												
184														NONE										NONE												
185														NONE										NONE												
186														NONE										NONE												
187														NONE										NONE												
188														NONE										NONE												
189														NONE										NONE												
190														NONE										NONE												
191														NONE										NONE												
192														NONE										NONE												
193														NONE										NONE												
194														NONE										NONE												
195														NONE										NONE												
196														NONE										NONE												
197														NONE										NONE												
198														NONE										NONE												
199														NONE										NONE												
200														NONE										NONE												
201														NONE										NONE												
202														NONE										NONE												
203														NONE										NONE												
204														NONE										NONE												
205														NONE										NONE												
206														NONE										NONE												
207														NONE										NONE												
208														NONE										NONE												
209														NONE										NONE												
210														NONE										NONE												
211														NONE										NONE												
212														NONE										NONE												
213														NONE										NONE												
214														NONE										NONE												
215														NONE										NONE												
216														NONE										NONE												
217														NONE										NONE												
218														NONE										NONE												
219														NONE										NONE												
220														NONE										NONE												
221														NONE										NONE												
222														NONE										NONE												
223														NONE										NONE												
224														NONE										NONE												
225														NONE										NONE												
226														NONE										NONE												
227														NONE										NONE												
228														NONE										NONE												
229														NONE										NONE												
230														NONE										NONE												
231														NONE										NONE												
232														NONE										NONE												
233														NONE										NONE												
234														NONE										NONE												
235														NONE										NONE												
236														NONE										NONE												

	PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)						BASELINE (NEW CONSTRUCTION)					POST-INSTALLATION											Energy Calculations											
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control Drop-downs	Existing Sensor Quantity When Applicable	Units e.g. Square Feet (sf) If multiple fixture types are used, please only enter the total area/fixture/qty once per space.		Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts / Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control Drop-downs	Proposed Sensor Quantity When Applicable	Interior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Exterior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Change in Connected Load (kW) retrofit CFL or LED Exit Signs	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Interior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Exterior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Demand Savings (kW) Retrofit CFLs or LED Exit Signs	Applied Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual Interior Fixture kWh Saved (excluding retrofit CFLs or Exit Signs)
101														NONE											NONE																
102														NONE											NONE																
103														NONE											NONE																
104														NONE											NONE																
105														NONE											NONE																
106														NONE											NONE																
107														NONE											NONE																
108														NONE											NONE																
109														NONE											NONE																
110														NONE											NONE																
111														NONE											NONE																
112														NONE											NONE																
113														NONE											NONE																
114														NONE											NONE																
115														NONE											NONE																
116														NONE											NONE																
117														NONE											NONE																
118														NONE											NONE																
119														NONE											NONE																
120														NONE											NONE																
121														NONE											NONE																
122														NONE											NONE																
123														NONE											NONE																
124														NONE											NONE																
125														NONE											NONE																
126														NONE											NONE																
127														NONE											NONE																
128														NONE											NONE																
129														NONE											NONE																
130														NONE											NONE																
131														NONE											NONE																
132														NONE											NONE																
133														NONE											NONE																
134														NONE											NONE																
135														NONE											NONE																
136														NONE											NONE																
137														NONE											NONE																
138														NONE											NONE																
139														NONE											NONE																
140														NONE											NONE																
Totals										30			4.50							30			0.76			2.50		1.26							1.14		0.56				0.400

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	12,566
Total Change in Connected Load	3.74

Annual Estimated Cost Savings	$1,256.60
Annual Operating Hours	3,000

Interior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$420.00
Exterior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$0.00
Total retrofit CFL Incentive @ $1/screw-in CFL lamp; $15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	$10.00
Total retrofit LED Exit Incentive @ $10/exit sign	$0.00
Total Lighting Controls Incentive @ $25/occupancy sensor and $25/daylight sensor (includes all Lighting Controls, both interior and exterior)	$0.00

Total Calculated Incentive	$430.00

Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	20
Total Lamp Quantity for retrofit Screw-In CFLs	10
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

Please briefly describe how you estimated your coincidence factor (CF) and applicant equivalent full-load hours (EFLH) for facility type “Other” indicated on the Lighting Form tab

Demand Savings (For Internal Use Only)	1.70

FirstEnergy®

Ohio Edison • The Illuminating Company • Toledo Edison

Project Name:	
Site Name:	
Completed by (Name):	
Date completed:	

Motor Rebate Calculation Form

Motor ID, Location, and Operation Data				Old Motor Nameplate Data								New Motor Nameplate Data								
Unique Motor ID(s)	Number of Identical Units	Motor Location	Annual Hours of Op[2]	Loading (Constant, or if variable, indicate control type)	Load Factor (LF)[3]	Enclosure type: TEFC or ODP	Mfr.	Model Number	Motor HP	Nominal Efficiency	Speed (RPM)	Loading (Constant, or if variable, indicate control type)	Load Factor (LF)[3]	Enclosure type: TEFC or ODP	Mfr.	Model Number	Motor HP	Nominal Efficiency	Speed (RPM)	Total Motor Incentive[1] $
																			Incentive (through 10/11/2011)	**$0**

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

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

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

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

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

FirstEnergy

Ohio Edison • The Illuminating Company • Toledo Edison

Table 1 - Minimum Motor Efficiency Requirements (NEMA Premium® Efficiencies)

Open Drip Proof (ODP)				Totally Enclosed Fan-Cooled (TEFC)			
Size HP	# of Poles			Size HP	# of Poles		
	6	4	2		6	4	2
	Speed (RPM)				Speed (RPM)		
	1200	1800	3600		1200	1800	3600
1	82.50%	85.50%	77.00%	1	82.50%	85.50%	77.00%
1.5	96.50%	86.50%	84.00%	1.5	87.50%	86.50%	84.00%
2	87.50%	86.50%	85.50%	2	88.50%	86.50%	85.50%
3	88.50%	89.50%	85.50%	3	89.50%	89.50%	86.50%
5	89.50%	89.50%	86.50%	5	89.50%	89.50%	88.50%
7.5	90.20%	91.00%	88.50%	7.5	91.00%	91.70%	89.50%
10	91.70%	91.70%	89.50%	10	91.00%	91.70%	90.20%
15	91.70%	93.00%	90.20%	15	91.70%	92.40%	91.00%
20	92.40%	93.00%	91.00%	20	91.70%	93.00%	91.00%
25	93.00%	93.60%	91.70%	25	93.00%	93.60%	91.70%
30	93.60%	94.10%	91.70%	30	93.00%	93.60%	91.70%
40	94.10%	94.10%	92.40%	40	94.10%	94.10%	92.40%
50	94.10%	94.50%	93.00%	50	94.10%	94.50%	93.00%
60	94.50%	95.00%	93.60%	60	94.50%	95.00%	93.60%
75	94.50%	95.00%	93.60%	75	94.50%	95.40%	93.60%
100	95.00%	95.40%	93.60%	100	95.00%	95.40%	94.10%
125	95.00%	95.40%	94.10%	125	95.00%	95.40%	95.00%
150	95.40%	95.80%	94.10%	150	95.80%	95.80%	95.00%
200	95.40%	95.80%	95.00%	200	95.80%	96.20%	95.40%

Table 2 - Incentive Levels Per Motor through 10/11/2011

Open Drip Proof (ODP)				Totally Enclosed Fan-Cooled (TEFC)			
Size HP	# of Poles			Size HP	# of Poles		
	6	4	2		6	4	2
	Speed (RPM)				Speed (RPM)		
	1200	1800	3600		1200	1800	3600
1	$25	$25	$25	1	$25	$25	$25
1.5	$30	$30	$30	1.5	$30	$30	$30
2	$60	$60	$60	2	$60	$60	$60
3	$60	$60	$60	3	$60	$60	$60
5	$60	$60	$60	5	$60	$60	$60
7.5	$80	$80	$80	7.5	$80	$80	$80
10	$80	$80	$80	10	$80	$80	$80
15	$125	$125	$125	15	$125	$125	$125
20	$125	$125	$125	20	$125	$125	$125
25	$164	$164	$164	25	$164	$164	$164
30	$199	$199	$199	30	$199	$199	$199
40	$234	$234	$234	40	$234	$234	$234
50	$269	$269	$269	50	$269	$269	$269
60	$304	$304	$304	60	$304	$304	$304
75	$339	$339	$339	75	$339	$339	$339
100	$374	$374	$374	100	$374	$374	$374
125	$410	$410	$410	125	$410	$410	$410
150	$445	$445	$445	150	$445	$445	$445
200	$468	$468	$468	200	$468	$468	$468

Ohio Edison • The Illuminating Company • Toledo Edison

Project Name:	HV Unit VFD Installation
Site Name:	Market Street Elementary School
Completed by (Name):	Roth Bros., Inc.
Date completed:	

Variable Frequency Drive Rebate Form

VFD and Controlled Motor Nameplate DATA											
Motor Application	**VFD Manufacturer**	**VFD Model Number**	**Unique Motor ID(s)**	**Motor Location**	**Enclosure type: TEFC or ODP**	**Annual Hours of Operation[2]**	**Load Factor (LF)[3]**	**Motor Model Number**	**Motor HP**	**Motor Nominal Efficiency**	**Total Motor Incentive [1] $**
VAV	Square D		AH-1	Primary Wing	ODP	2790	0.8	Unknown	1	93	**35**
VAV	Square D		AH-2	Intermediate Wing	ODP	2790	0.8	Unknown	2	93	**70**
VAV	Square D		AH-3	Auditorium/ Cafeteria	ODP	2790	0.8	Unknown	3	93	**105**
VAV	Square D		AH-4	GYM	ODP	2790	0.8	Unknown	5	93	**175**
										Incentive through 10/11/2011 @ $35/hp	**385**

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

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

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

Exhibit 1

Customer Legal Entity Name: Boardman Local School District

Site Address: Boardman Glenwood Middle School
Principal Address: 7635 Glenwood Ave

Project No.	Project Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying project results	What date would you have replaced your equipment if you had not replaced it early? Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you rejected in favor of the more efficient new equipment.
1	Gym Lighting Upgrades	400 watt metal halide and 300 watt incandescent high bay fixtures were upgraded to T8 fluorescent technology. The 400 watt HID fixtures were upgraded to 6 lamp T8 fixtures with high power ballast. The 300 watt incandescent fixtures were upgraded to 2 lamp T8 fluorescent with low power ballasts and 32 watt lamps.	See the attached lighting calculator 'BLS_GMS_P1_Lighting Calculator.xls'.	Approximately 1 to 2 years. The decision was made to upgrade the gym lighting in order to increase energy savings, increase lighting levels, and to reduce maintenance costs.	N/A

Exhibit 2

Customer Legal Entity Name: Boardman Local School District
Site Address: Boardman Glenwood Middle School
Principal Address: 7635 Glenwood Ave

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	696,129	696,129	696,129
Average	**696,129**	**696,129**	**696,129**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*
1	Gym Lighting Upgrades	08/31/2012	$31,797	$15,899	38,686	38,686	14	$1,934	$1,451
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		
		Total	**$31,797**		**38,686**	**38,686**	**14**	**$1,934**	**$1,451**

Docket No. 13-0082
Site: 7635 Glenwood Ave

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

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

Commitment Payment $
$0

Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	39	$ 308	$ 11,926	$ 4,050	$1,451	$387	$ 5,887	**2.0**
Total	**39**	**$ 308**	**11,926**	**4,050**	**$1,451**	**$387**	**5,887**	**2.0**

Notes

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

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

(C) = (A) * (B)

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

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

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

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

(H) =(C) / (G)

Boardman Local School District ~ Boardman Glenwood Middle School
Docket No. 13-0082

Site: 7635 Glenwood Ave

Lighting Inventory Form

Applicant Name: Boardman Local Schools

Facility Name: Glenwood Gym

Date: 7/6/2012

Lighting Zone (exterior only): Lighting Zone 3

Instructions: Please use one line for each fixture type in a room or area

For existing or proposed control, choose OCC for Occupany Sensor, DAYLTG for photosensor, or NONE for none. Controls must save energy to qualify.

The total of Column S, the quantities of CFLs and exit signs in Column M, and the quantities of sensors in Column R, will be used to calculate your incentive on the NonStandard Lighting form.

PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)						BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION							Energy Calculations														
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity When applicable	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.		Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity When applicable	Interior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Exterior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Change in Connected Load (kW) retrofit CFL or LED Exit Signs	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Interior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Exterior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Demand Savings (kW) Retrofit CFLs or LED Exit Signs	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual Interior Fixture kWh Saved (excluding retrofit CFLs or Exit Signs)
e.g.	Retrofit	400 North Street	2	Office	Other	Interior	Office - Small		Cooled Space	3	F44ILL	112	0.34	NONE						3	CFT55/1-BX	56	0.17	No	OCC	3			0.17	84%	84%	34%	12%	0%	30%			0.19	2,808	3,435	
e.g.	New Construction	Example	1	Restaurant	Conference, Meeting or Training Room	Exterior	Retail - Small	Builing facades (liner ft based)	Cooled Space							500	linear ft	3.8	1.88	5	Example Cut Sheet 2	25	0.13	Yes	DAY	5		1.75		88%	89%	34%	12%	0%	0%		2.09		8,760	3,068	
1	Retrofit	7635 Glenwood Ave.	1	Gym	Other	Interior	Other - Please estimate CF and EFLH		Uncooled space	40	MH400/1	458	18.32	NONE						38	Cut Sheet 1	238	9.04	No	NONE		9.28			41%	41%	0%	0%	0%	0%	3.80			3,600	3,600	33,394
2	Retrofit	7635 Glenwood Ave.	1	Gym Bleachers	Other	Interior	Other - Please estimate CF and EFLH		Uncooled space	21	I300/1	300	6.30	NONE						21	Cut Sheet 2	48	1.01	No	NONE		5.29			11%	11%	0%	0%	0%	0%	0.58			1,000	1,000	5,292
3														NONE											NONE																
4														NONE											NONE																
5														NONE											NONE																
6														NONE											NONE																
7														NONE											NONE																
8														NONE											NONE																
9														NONE											NONE																
10														NONE											NONE																
11														NONE											NONE																
12														NONE											NONE																
13														NONE											NONE																
14														NONE											NONE																
15														NONE											NONE																
16														NONE											NONE																
17														NONE											NONE																
18														NONE											NONE																
19														NONE											NONE																
20														NONE											NONE																
21														NONE											NONE																
22														NONE											NONE																
23														NONE											NONE																
24														NONE											NONE																
25														NONE											NONE																
26														NONE											NONE																
27														NONE											NONE																
28														NONE											NONE																
29														NONE											NONE																
30														NONE											NONE																
31														NONE											NONE																
32														NONE											NONE																
33														NONE											NONE																
34														NONE											NONE																
35														NONE											NONE																
36														NONE											NONE																
37														NONE											NONE																
38														NONE											NONE																
39														NONE											NONE																
40														NONE											NONE																
41														NONE											NONE																
42														NONE											NONE																
43														NONE											NONE																
44														NONE											NONE																
45														NONE											NONE																
46														NONE											NONE																
47														NONE											NONE																
48														NONE											NONE																
49														NONE											NONE																
50														NONE											NONE																
51														NONE											NONE																
52														NONE											NONE																
53														NONE											NONE																
54														NONE											NONE																
55														NONE											NONE																
56														NONE											NONE																
57														NONE											NONE																
58														NONE											NONE																
59														NONE											NONE																
60														NONE											NONE																
61														NONE											NONE																
62														NONE											NONE																
63														NONE											NONE																
64														NONE											NONE																
65														NONE											NONE																
66														NONE											NONE																
67														NONE											NONE																
68														NONE											NONE																
69														NONE											NONE																
70														NONE											NONE																
71														NONE											NONE																
72														NONE											NONE																
73														NONE											NONE																
74														NONE											NONE																
75														NONE											NONE																
76														NONE											NONE																
77														NONE											NONE																
78														NONE											NONE																
79														NONE											NONE																
80														NONE											NONE																
81														NONE											NONE																
82														NONE											NONE																
83														NONE											NONE																
84														NONE											NONE																
85														NONE											NONE																
86														NONE											NONE																
87														NONE											NONE																
88														NONE											NONE																
89														NONE											NONE																
90														NONE											NONE																
91														NONE											NONE																
92														NONE											NONE																
93														NONE											NONE																
94														NONE											NONE																
95														NONE											NONE																
96														NONE											NONE																
97														NONE											NONE																
98														NONE											NONE																
99														NONE											NONE																
100														NONE											NONE																
101														NONE											NONE																
102														NONE											NONE																
103														NONE											NONE																
104														NONE											NONE																
105														NONE											NONE																
106														NONE											NONE																
107														NONE											NONE																
108														NONE											NONE																
109														NONE											NONE																
110														NONE											NONE																
111														NONE											NONE																
112														NONE											NONE																
113														NONE											NONE																
114														NONE											NONE																
115														NONE											NONE																
116														NONE											NONE																
117														NONE											NONE																
118														NONE											NONE																
119														NONE											NONE																
120														NONE											NONE																
121														NONE											NONE																
122														NONE											NONE																
123														NONE											NONE																
124														NONE											NONE																
125														NONE											NONE																
126														NONE											NONE																
127														NONE											NONE																
128														NONE											NONE																
129														NONE											NONE																
130														NONE											NONE																
131														NONE											NONE																
132														NONE											NONE																
133														NONE											NONE																
134														NONE											NONE																
135														NONE											NONE																
136														NONE											NONE																
137														NONE											NONE																
138														NONE											NONE																
139														NONE											NONE																
140														NONE											NONE																
141														NONE											NONE																
142														NONE											NONE																
143														NONE											NONE																
144														NONE											NONE																
145														NONE											NONE																
146														NONE											NONE																
147														NONE											NONE																
148														NONE											NONE																
149														NONE											NONE																
150														NONE											NONE																
151														NONE											NONE																
152														NONE											NONE																
153														NONE											NONE																
154														NONE											NONE																
155														NONE											NONE																
156														NONE											NONE																
157														NONE											NONE																
158														NONE											NONE																
159														NONE											NONE																
160														NONE											NONE																
161														NONE											NONE																
162														NONE											NONE																
163														NONE											NONE																
164														NONE											NONE																
165														NONE											NONE																
166														NONE											NONE																
167														NONE											NONE																
168														NONE											NONE																
169														NONE											NONE																
170														NONE											NONE																
171														NONE											NONE																
172														NONE											NONE																
173														NONE											NONE																
174														NONE											NONE																
175														NONE											NONE																
176														NONE											NONE																
177														NONE											NONE																
178														NONE											NONE																
179														NONE											NONE																
180														NONE											NONE																
181														NONE											NONE																
182														NONE											NONE																
183														NONE											NONE																
184														NONE											NONE																
185														NONE											NONE																
186														NONE											NONE																
187														NONE											NONE																
188														NONE											NONE																
189														NONE											NONE																
190														NONE											NONE																

	PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)					BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION							Energy Calculations										
Table Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop-down	Existing Sensor Quantity (When applicable)	Units e.g. Square Feet (sf) If multiple fixture types are used, please only enter the total area/distance/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop-down	Proposed Sensor Quantity (When applicable)	Interior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Exterior Change in Connected Load (kW) excluding retrofit CFLs or Exit Signs	Change in Connected Load (kW) retrofit CFL or LED Exit Signs	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Interior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Exterior Demand Savings (kW) excluding Retrofit CFLs or Exit Signs	Demand Savings (kW) Retrofit CFLs or LED Exit Signs	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual Interior Fixture kWh Saved (excluding retrofit CFLs or Exit Signs)
181														NONE										NONE													
182														NONE										NONE													
183														NONE										NONE													
184														NONE										NONE													
185														NONE										NONE													
186														NONE										NONE													
187														NONE										NONE													
188														NONE										NONE													
189														NONE										NONE													
190														NONE										NONE													
191														NONE										NONE													
192														NONE										NONE													
193														NONE										NONE													
194														NONE										NONE													
195														NONE										NONE													
196														NONE										NONE													
197														NONE										NONE													
198														NONE										NONE													
199														NONE										NONE													
200														NONE										NONE													
201														NONE										NONE													
202														NONE										NONE													
203														NONE										NONE													
204														NONE										NONE													
205														NONE										NONE													
206														NONE										NONE													
207														NONE										NONE													
208														NONE										NONE													
209														NONE										NONE													
210														NONE										NONE													
211														NONE										NONE													
212														NONE										NONE													
213														NONE										NONE													
214														NONE										NONE													
215														NONE										NONE													
216														NONE										NONE													
217														NONE										NONE													
218														NONE										NONE													
219														NONE										NONE													
220														NONE										NONE													
221														NONE										NONE													
222														NONE										NONE													
223														NONE										NONE													
224														NONE										NONE													
225														NONE										NONE													
226														NONE										NONE													
227														NONE										NONE													
228														NONE										NONE													
229														NONE										NONE													
230														NONE										NONE													
231														NONE										NONE													
232														NONE										NONE													
233														NONE										NONE													
234														NONE										NONE													
235														NONE										NONE													
236														NONE										NONE													
237														NONE										NONE													
238														NONE										NONE													
239														NONE										NONE													
240														NONE										NONE													
241														NONE										NONE													
242														NONE										NONE													
243														NONE										NONE													
244														NONE										NONE													
245														NONE										NONE													
246														NONE										NONE													
247														NONE										NONE													
248														NONE										NONE													
249														NONE										NONE													
250														NONE										NONE													
Totals										61			24.62						59			18.05			14.57								4.39				35.686

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	38,686
Total Change in Connected Load	14.57

Annual Estimated Cost Savings	$3,868.60
Annual Operating Hours	2,300

Interior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$1,934.30
Exterior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$0.00
Total retrofit CFL Incentive @ $1/screw-in CFL lamp; $15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	$0.00
Total retrofit LED Exit Incentive @ $10/exit sign	$0.00
Total Lighting Controls Incentive @ $25/occupancy sensor and $25/daylight sensor (includes all Lighting Controls, both interior and exterior)	$0.00

Total Calculated Incentive	$1,934.30

Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	59
Total Lamp Quantity for retrofit Screw-In CFLs	0
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

Please briefly describe how you estimated your coincidence factor (CF) and applicant equivalent full-load hours (EFLH) for facility type "Other" indicated on the Lighting Form tab

Demand Savings (For Internal Use Only)	4.39

Form **W-9**
(Rev. October 2007)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)
Boardman Local School District

Business name, if different from above

Check appropriate box: ☐ Individual/Sole proprietor ☐ Corporation ☐ Partnership
☐ Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶ _____
☑ Other (see instructions) ▶ **Govt Entity**

☐ Exempt payee

Address (number, street, and apt. or suite no.)
7410 Market Street

Requester's name and address (optional)

City, state, and ZIP code
Boardman, OH 44512

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
: :

or

Employer identification number
34 : 6000286

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (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, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here | **Signature of U.S. person** ▶ [signature] | **Date** ▶ Sept. 27, 2011

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

Mercantile Customer Project Commitment Agreement
Cash Rebate Option

THIS MERCANTILE CUSTOMER PROJECT COMMITMENT AGREEMENT ("Agreement") is made and entered into by and between Ohio Edison Company , its successors and assigns (hereinafter called the "Company") and Boardman Local School District, Taxpayer ID No. 34-6000286 its permitted successors and assigns (hereinafter called the "Customer") (collectively the "Parties" or individually the "Party") and is effective on the date last executed by the Parties as indicated below.

WITNESSETH

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

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

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

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

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

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

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

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

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

1. **Customer Energy Projects.** Customer hereby commits to the Company and Company accepts for integration into the Company Plan the Customer Energy Project(s) set forth on attached Exhibit 1. Said commitment shall be for the life of the Customer Energy Project(s). Company will incorporate said project(s) into the Company Plan to the extent that such projects qualify. In so committing, and as evidenced by the affidavit attached hereto as Exhibit A, Customer acknowledges that the information provided to the Company about the Customer Energy Project(s) is true and accurate to the best of its knowledge.

a. By committing the Customer Energy Project(s) to the Company, Customer acknowledges and agrees that the Company shall control the use of the kWh and/or kW reductions resulting from said projects for purposes of complying with the Statute. By committing the Customer Energy Project(s), Customer further acknowledges and agrees that the Company shall take ownership of the energy efficiency capacity rights associated with said Project(s) and shall, at its sole discretion, aggregate said capacity into the PJM market through an auction. Any proceeds from any such bids accepted by PJM will be used to offset the costs charged to the Customer and other of the Company's customers for compliance with state mandated energy efficiency and/or peak demand requirements

b. The Company acknowledges that some of Customer's Energy Projects contemplated in this paragraph may have been performed under certain other federal and/or state programs in which certain parameters are required to be maintained in order to retain preferential financing or other government benefits (individually and collectively, as appropriate, "Benefits"). In the event that the use of any such project by the Company in any way affects such Benefits, and upon written request from the Customer, Company will release said Customer's Energy Project(s) to the extent necessary for Customer to meet the prerequisites for such Benefits. Customer acknowledges that such release (i) may affect Customer's cash rebate discussed in Article 3 below; and (ii) will not affect any of Customer's other requirements or obligations.

c. Any future Customer Energy Project(s) committed by Customer shall be subject to a separate application and, upon approval by the Commission, said projects shall become part of this Agreement.

d. Customer will provide Company or Company's agent(s) with reasonable assistance in the preparation of the Commission's standard joint application for approval of this Agreement ("Joint Application") that will be filed with the Commission, with such Joint Application being consistent with then current Commission requirements.

e. Upon written request and reasonable advance notice, Customer will grant employees or authorized agents of either the Company or the Commission reasonable, pre-arranged access to the Customer Energy Project(s) for purposes of measuring and verifying energy savings and/or peak demand reductions resulting from the Customer Energy Project(s). It is expressly agreed that consultants of either the Company or the Commission are their respective authorized agents.

2. **Joint Application to the Commission.** The Parties will submit the Joint Application using the Commission's standard "Application to Commit Energy Efficiency/Peak Demand Reduction Programs" ("Joint Application") in which they will seek the Commission's approval of (i) this Agreement: (ii) the commitment of the Customer Energy Project(s) for inclusion in the Company Plan; and (iii) the Customer's Cash Rebate.

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

i. A narrative description of the Customer Energy Project(s), including but not limited to, make, model and year of any installed and/or replaced equipment;
ii. A copy of this Agreement; and
iii. A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results.

3. **Customer Cash Rebate.** Upon Commission approval of the Joint Application, Customer shall provide Company with a W-9 tax form, which shall at a minimum include Customer's tax identification number. Within the greater of 90 days of the Commission's approval of the Joint Application or the completion of the Customer Energy Project, the Company will issue to the Customer the Cash Rebate in the amount set forth in the Commission's Finding and Order approving the Joint Application.

    a. Customer acknowledges: i) that the Company will cap the Cash Rebate at the lesser of 50% of Customer Energy Project(s) costs or $250,000; ii) the maximum rebate that the Customer may receive per year is $500,000 per Taxpayer Identification Number per utility service territory; and iii) if the Customer Energy Project qualifies for a rebate program approved by the Commission and offered by the Company, Customer may still elect to file such project under the Company's mercantile customer self direct program, however the Cash Rebate that will be paid shall be discounted by 25%; and

    b. Customer acknowledges that breaches of this Agreement, include, but are not limited to:

        i. Customer's failure to comply with the terms and conditions set forth in the Agreement, or its equivalent, within a reasonable period of time after receipt of written notice of such non-compliance;

        ii. Customer knowingly falsifying any documents provided to the Company or the Commission in connection with this Agreement or the Joint Application.

    c. In the event of a breach of this Agreement by the Customer, Customer agrees and acknowledges that it will repay to the Company, within 90 days of receipt of written notice of said breach, the full amount of the Cash Rebate paid under this Agreement. This remedy is in addition to any and all other remedies available to the Company by law or equity.

4. **Termination of Agreement.** This Agreement shall automatically terminate:

    a. If the Commission fails to approve the Joint Agreement;

    b. Upon order of the Commission; or

    c. At the end of the life of the last Customer Energy Project subject to this Agreement.

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

5. **Confidentiality.** Each Party shall hold in confidence and not release or disclose to any person any document or information furnished by the other Party in connection with this Agreement that is designated as confidential and proprietary ("Confidential Information"), unless: (i) compelled to disclose such document or information by judicial, regulatory or administrative process or other provisions of law; (ii) such document or information is generally available to the public; or (iii) such document or information was available to the receiving Party on a non-confidential basis at the time of disclosure.

    a. Notwithstanding the above, a Party may disclose to its employees, directors, attorneys, consultants and agents all documents and information furnished by the other Party in connection with this Agreement, provided that such employees, directors, attorneys,

consultants and agents have been advised of the confidential nature of this information and through such disclosure are deemed to be bound by the terms set forth herein.

b. A Party receiving such Confidential Information shall protect it with the same standard of care as its own confidential or proprietary information.

c. A Party receiving notice or otherwise concluding that Confidential Information furnished by the other Party in connection with this Agreement is being sought under any provision of law, to the extent it is permitted to do so under any applicable law, shall endeavor to: (i) promptly notify the other Party; and (ii) use reasonable efforts in cooperation with the other Party to seek confidential treatment of such Confidential Information, including without limitation, the filing of such information under a valid protective order.

d. By executing this Agreement, Customer hereby acknowledges and agrees that Company may disclose to the Commission or its Staff any and all Customer information, including Confidential Information, related to a Customer Energy Project, provided that Company uses reasonable efforts to seek confidential treatment of the same.

6. **Taxes.** Customer shall be responsible for all tax consequences (if any) arising from the payment of the Cash Rebate.

7. **Notices.** Unless otherwise stated herein, all notices, demands or requests required or permitted under this Agreement must be in writing and must be delivered or sent by overnight express mail, courier service, electronic mail or facsimile transmission addressed as follows:

If to the Company:

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

If to the Customer:

Boardman Local School District
7410 Market Street
Boardman, OH 44512
Attn:George Donie
Telephone:330-726-3402
Fax:
Email:

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

8. **Authority to Act.** The Parties represent and warrant that they are represented by counsel in connection with this Agreement, have been fully advised in connection with the execution thereof, have taken all legal and corporate steps necessary to enter into this Agreement, and that the undersigned has the authority to enter into this Agreement, to bind the Parties to all provisions herein and to take the actions required to be performed in fulfillment of the undertakings contained herein.

9. **Non-Waiver.** The delay or failure of either party to assert or enforce in any instance strict performance of any of the terms of this Agreement or to exercise any rights hereunder conferred, shall not be construed as a waiver or relinquishment to any extent of its rights to assert or rely upon such terms or rights at any later time or on any future occasion.

10. **Entire Agreement.** This Agreement, along with related exhibits, and the Company's Rider DSE, or its equivalent, as amended from time to time by the Commission, contains the Parties' entire understanding with respect to the matters addressed herein and there are no verbal or collateral representations, undertakings, or agreements not expressly set forth herein. No change in, addition to, or waiver of the terms of this Agreement shall be binding upon any of the Parties unless the same is set forth in writing and signed by an authorized representative of each of the Parties. In the event of any conflict between Rider DSE or its equivalent and this document, the latter shall prevail.

11. **Assignment.** Customer may not assign any of its rights or obligations under this Agreement without obtaining the prior written consent of the Company, which consent will not be unreasonably withheld. No assignment of this Agreement will relieve the assigning Party of any of its obligations under this Agreement until such obligations have been assumed by the assignee and all necessary consents have been obtained.

12. **Severability.** If any portion of this Agreement is held invalid, the Parties agree that such invalidity shall not affect the validity of the remaining portions of this Agreement, and the Parties further agree to substitute for the invalid portion a valid provision that most closely approximates the economic effect and intent of the invalid provision.

13. **Governing Law.** This Agreement shall be governed by the laws and regulations of the State of Ohio, without regard to its conflict of law provisions.

14. **Execution and Counterparts.** This Agreement may be executed in multiple counterparts, which taken together shall constitute an original without the necessity of all parties signing the same page or the same documents, and may be executed by signatures to electronically or telephonically transmitted counterparts in lieu of original printed or photocopied documents. Signatures transmitted by facsimile shall be considered original signatures.

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

Ohio Edison Company
(Company)

By: _____

Title: **V.P. Of Energy Efficiency**

Date: 10-26-12

Boardman Local School District
(Customer)

By: _____

Title: Director of Operations

Date: 10-15-12

Summary: Application electronically filed by Ms. Lindsey E Sacher on behalf of Ohio Edison Company and Boardman Local School District