Medina City Schools

Energy Savings Program

PERFORMANCE YEAR ONE
October 2009 – September 2010
YEAR END SAVINGS REPORT
March 18, 2011

Prepared by:
The Brewer-Garrett Company
6800 Eastland Road
Middleburg Heights, OH 44130

Table of Contents

Section 1: Overview

The Brewer-Garrett Company is pleased to present the results for Performance Year One of the Medina City Schools Energy Savings Program.

Medina City Schools (Medina) and The Brewer-Garrett Company have worked diligently to implement and track energy conservation measures designed to save Medina utility dollars. The total savings have exceeded the projections made during the development of the Program. For Performance Year One, we projected $315,769 in total energy savings.

The savings achieved by Medina City Schools for Performance Year One and the Interim Period (Installation) of the Energy Savings Program are $909,147.

Section 2: Savings Guarantee Summary

The Performance Guarantee and this Year End Savings Report are governed by the Energy Performance Agreement, executed by Medina City Schools and The Brewer-Garrett Company on August 31, 2007 (Contract). The Energy Performance Agreement is included in Appendix C of this report for reference.

Performance Year One began upon completion of the installation phase of the project in September 2009 and covers the 12 month time period from October 2009 through September 2010.

The Interim Period covers the time period from contract execution to construction completion, namely September 2007 through September 2009. Section 4.2 of the Contract states that all savings generated during the Interim Period will be added to the first year audit. The Interim Period savings are itemized in the Performance History shown in Section 3 of this report.

The Performance Guarantee is summarized in Table 2a, and is based on Schedule C of the Contract: Energy and Operational Savings Guarantee. The Total Guaranteed Savings over the term of this agreement (15 years) is: $4,736,535.

Summary of Performance Guarantee

Total Guaranteed Savings ($)	$4,736,535

		Guaranteed Savings ($)	
Performance Year		Total Energy/Water/Sewer/ Savings ($)	Cumulative Guaranteed Savings ($)
1	2010	$315,769	$315,769
2	2011	$315,769	$631,538
3	2012	$315,769	$947,307
4	2013	$315,769	$1,263,076
5	2014	$315,769	$1,578,845
6	2015	$315,769	$1,894,614
7	2016	$315,769	$2,210,383
8	2017	$315,769	$2,526,152
9	2018	$315,769	$2,841,921
10	2019	$315,769	$3,157,690
11	2020	$315,769	$3,473,459
12	2021	$315,769	$3,789,228
13	2022	$315,769	$4,104,997
14	2023	$315,769	$4,420,766
15	2024	$315,769	$4,736,535
Total		$4,736,535	

Table 2a

Section 3: Performance History

Table 3a

Performance History for the Medina City Schools Energy Savings Program

Performance Period	Guaranteed Savings ($)	Actual Savings ($)	Cumulative Guaranteed Savings ($)	Cumulative Actual Savings ($)
Interim Period	-----	$470,472	-----	$470,472
10/09 - 9/10	$315,769	$438,675	$315,769	$909,147
10/10 - 9/11	$315,769			
10/11 - 9/12	$315,769			
10/12 - 9/13	$315,769			
10/13 - 9/14	$315,769			
10/14 - 9/15	$315,769			
10/15 - 9/16	$315,769			
10/16 - 9/17	$315,769			
10/17 - 9/18	$315,769			
10/18 - 9/19	$315,769			
10/19 - 9/20	$315,769			
10/20 - 9/21	$315,769			
10/21 - 9/22	$315,769			
10/22 - 9/23	$315,769			
10/23 - 9/24	$315,769			
Total	$4,736,535			

Energy Audit for Medina City Schools, Year One
The undersigned agrees that The Brewer-Garrett Company delivered this audit to Medina City Schools. If no written reply is made to The Brewer-Garrett Company concerning the validity of this audit in 30 days, it will be considered accepted by Medina City Schools.

Accepted by: _____

Date: _____

Medina City Schools

Delivered by: _____

Date: _____

The Brewer-Garrett Company

Section 4: Summary of Savings

Medina City Schools ~ Interim Period

Summary of Savings

Electric			
KWH Used In Extended Base Year		23,487,240	KWH
Baseline for	Interim Period	23,746,844	KWH
Actual Usage for	Interim Period	22,148,830	KWH
Total KWH Saved		1,598,014	KWH
Total Dollars Saved		$355,497	

Natural Gas			
MCF Used In Extended Base Year		85,921	MCF
Baseline for	Interim Period	95,245	MCF
Actual Usage for	Interim Period	88,509	MCF
Total MCF Saved		6,736	MCF
Total Dollars Saved		$93,799	

Water and Sewer			
Water Used In Extended Base Year		3,239	CCF
Water Baseline for	Interim Period	3,239	CCF
Water Actual Usage for	Interim Period	1,966	CCF
Total Water CCF Saved		1,273	CCF
Total Water Dollars Saved		$2,365	
Total Sewer Dollars Saved		$18,811	

Total Savings	**Interim Period**	**$470,472**

Table 4a

Medina City Schools ~ Performance Year 1

Summary of Savings

Electric			
KWH Used In Base Year		11,180,440	KWH
Baseline for	Performance Year 1	11,614,637	KWH
Actual Usage for	Performance Year 1	9,558,731	KWH
Total KWH Saved		2,055,906	KWH
Total Dollars Saved		$286,127	

Natural Gas			
MCF Used In Base Year		42,373	MCF
Baseline for	Performance Year 1	43,288	MCF
Actual Usage for	Performance Year 1	32,782	MCF
Total MCF Saved		10,506	MCF
Total Dollars Saved		$128,324	

Water and Sewer			
Water Used In Base Year		3,676	CCF
Water Baseline for	Performance Year 1	3,676	CCF
Water Actual Usage for	Performance Year 1	2,064	CCF
Total Water CCF Saved		1,612	CCF
Total Water Dollars Saved		$3,539	
Total Sewer Dollars Saved		$19,315	

Lighting M&V Savings at Bus Garage	Performance Year 1	$1,370	

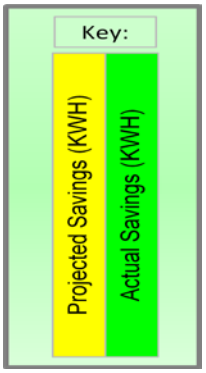
Total Savings	**Performance Year 1**	**$438,675**	

Table 4b

Section 5: Electric Savings

Several projects implemented as part of the Medina City Schools Energy Savings Program were projected to achieve electric savings. These projects include a) district wide lighting retrofits and occupancy sensor installations, b) lighting controls at the High School, c) district wide vending machine control, d) variable frequency drives at Ella Canavan, Root and the High School, e) demand ventilation at Blake, Heritage, High School and Root, f) building automation system upgrades at the High School, and g) electric fan coil unit replacement with a natural gas unit at Heritage.

The annual projected and actual electric savings for each school are charted side by side in Figure 5a. We are very pleased to report that the actual electric savings have exceeded the projected savings at nearly all schools. In fact, for Performance Year One, the total actual savings for all affected schools are 35% higher than were projected as part of the Energy Savings Program.



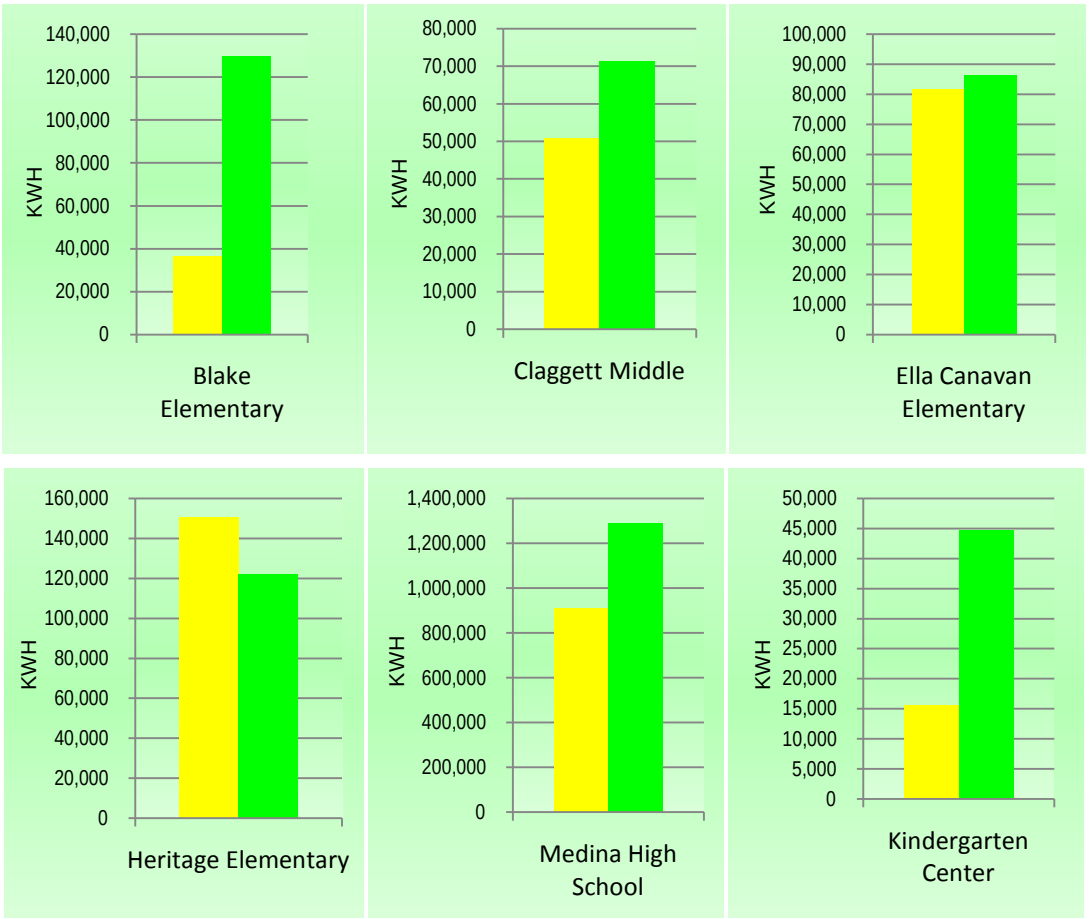


Figure 5a

Heating/ventilating units at Fenn and Garfield were replaced and air conditioning was added as part of the Energy Savings Program. The energy use associated with the air conditioning equipment is an adjustment to the baseline as addressed in Schedule F of the Contract: Savings Calculation Formulae: Methodology to Adjust Baseline. The annual projected vs actual electric savings for these buildings are shown in Figure 5b.

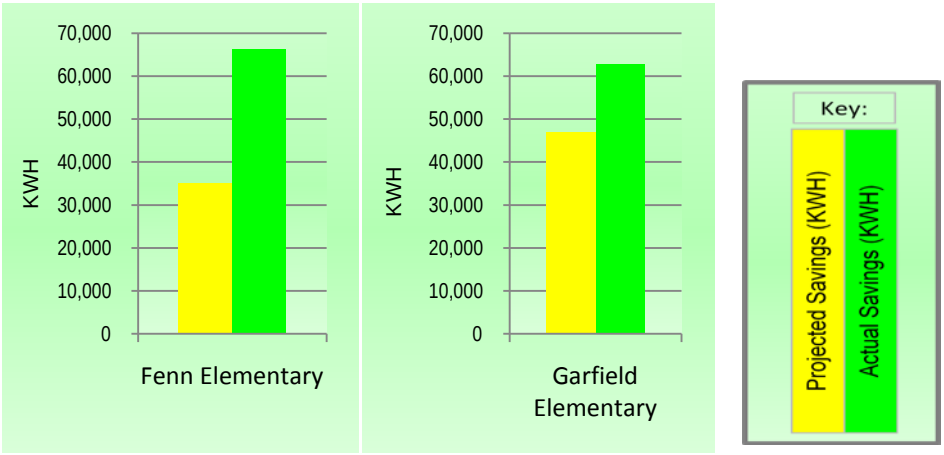


Figure 5b

The installation of a dedicated chiller system at Root to serve the office area was also included in the Energy Savings Program. Demand and energy savings were projected based on the operation of this new unit for office area cooling, in place of the main building chiller. However, the switch from main chiller to office area chiller must be done manually. An analysis of the building's electric utility bills indicates that this system may not be operating as designed. Figure 5c clearly shows that the annual projected electric energy savings at Root have not been met.

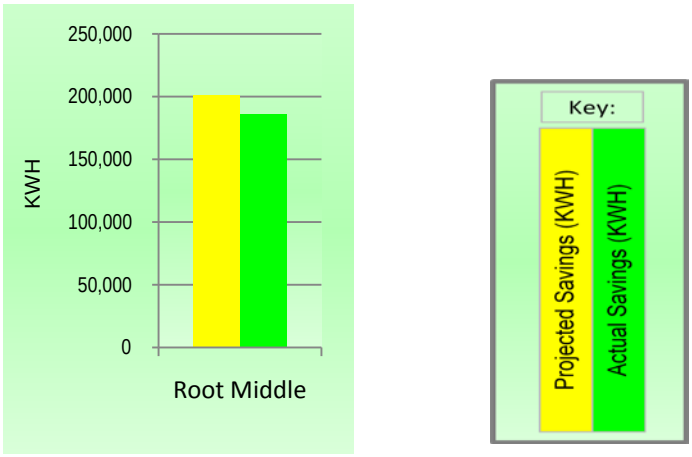


Figure 5c

In addition, there has been virtually no demand reduction at Root as evidenced by Figure 5d. There should be an obvious reduction in monthly demand when cooling for the office area is provided by the newer, smaller chiller, and the main chiller is not required to operate. Further investigation is required to determine whether the new Root chiller is operating as designed.

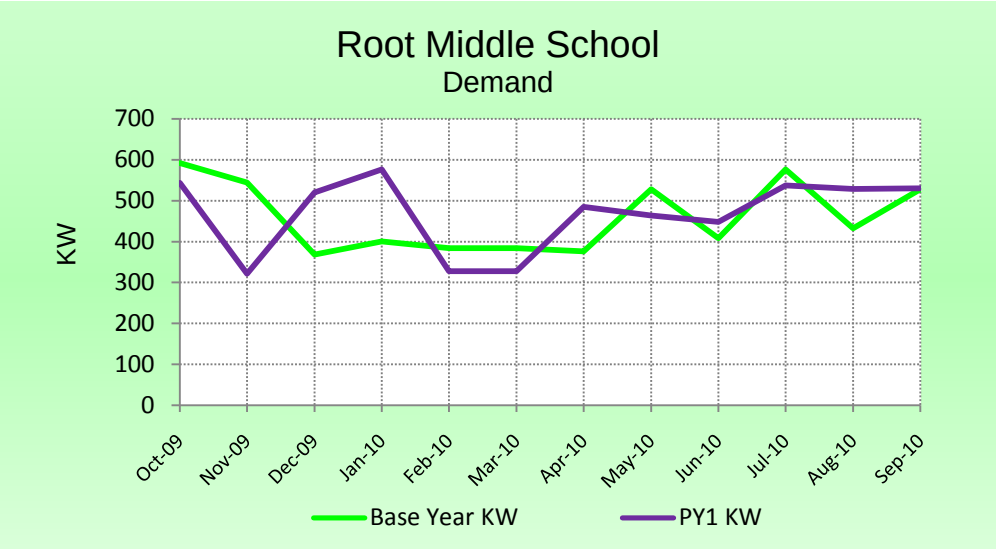


Figure 5d

Through verification of metering and service voltages, Brewer-Garrett anticipated a billing rate change for Blake Elementary in the amount of $15,000. Based on our investigation with First Energy/Ohio Edison, we are pleased to report that the installation of a new meter at Blake resulted in significant savings to Medina. Specifically, the actual annual dollar savings at Blake during Performance Year One are 242% of the projected savings.

Electric savings are determined by inserting the energy and demand savings into the actual utility rate to convert units saved to dollars saved. Units of electricity saved are equal to the Baseline KWH – Actual KWH, where the Baseline is the Base Year adjusted for time, weather and events. The electric savings are calculated monthly and then summed to yield an annual amount.

The energy savings are calculated based on the larger of the electric rate paid during the Performance Year or the Base Year as specified in Section 8.1 of the Contract.

During Performance Year One (Oct2009 – Sep2010), the electric usage in the schools affected by the Energy Savings Program has been reduced by approximately 2.0 million KWH, or 18% from the

Baseline. This is a savings of over $286,000 to Medina, and a reduction of 1,421 metric tons of CO_2 emissions.

The electricity savings at the Bus Garage as a result of the lighting retrofit are calculated based on the Measurement and Verification (M&V) methodology explained in Schedule F of the Contract. This methodology is used because the lighting retrofit is the only Energy Conservation Measure implemented at the Bus Garage; therefore electric savings due to lighting can be isolated. Voltage and amperage readings were taken in several locations throughout the Bus Garage and the other Medina schools, before and after the lighting retrofits took place. The before and after readings were taken with the same meters, in the same locations, and were used to calculate an average of watts of energy used by each lamp technology. The average readings for both the before and after measurements were inserted into the lighting spreadsheet to generate units saved. These units saved were multiplied by the utility rate to convert units saved to dollars saved. The electric savings at the Bus Garage resulting from the lighting retrofit are $1,370 for Performance Year One.

Combined electric use in all of the Medina City Schools that were affected by Brewer-Garrett is summarized in Figure 5e. The Base Year, Baseline and Actual total usage during the *combined Performance Year One and Interim Period* are shown side-by-side for comparison. The overall electric usage in these schools has been reduced by approximately 10% from the Baseline; or 3.6 million KWH. This is equivalent to 2,525 metric tons of CO_2 emissions, or the annual greenhouse gas emissions of nearly 500 passenger vehicles.

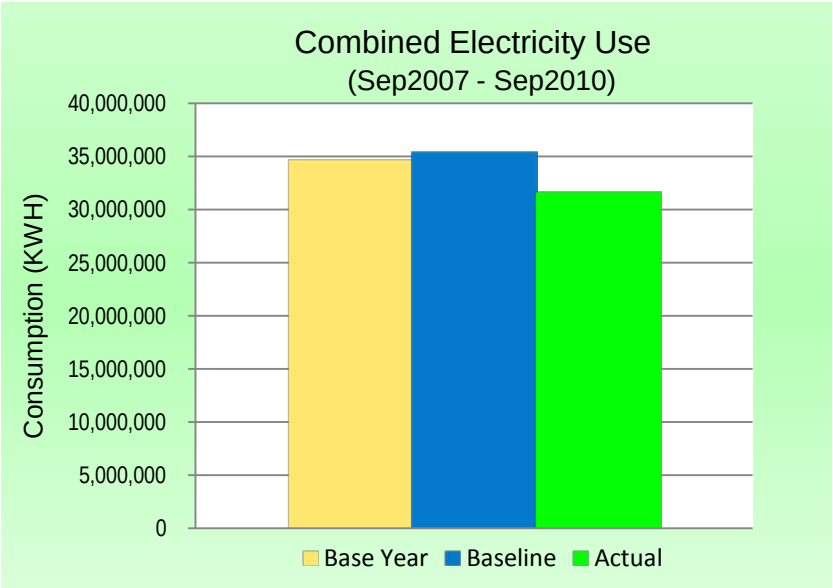
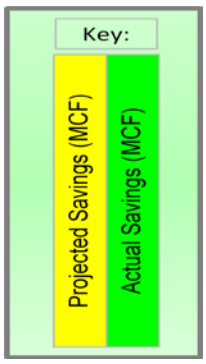


Figure 5e

Section 6: Natural Gas Savings

Several projects implemented as part of the Medina City Schools Energy Savings Program were projected to result in natural gas savings. These projects include a) demand ventilation at Blake, Heritage, High School and Root, b) building automation system upgrades at the High School, c) heat recovery and pool system modifications at the High School, and d) replacement of heating/ventilating units at Fenn and Garfield. The replacement of an electric fan coil unit with a gas-fired unit at Heritage was expected to save electricity, but use more natural gas.



The annual projected and actual natural gas savings for each school are charted side by side in Figure 6a. While actual savings at Garfield and Root exceeded projections, savings at Blake, Fenn, and the High School fell slightly short. As expected, natural gas use at Heritage increased due to the installation of the gas-fired unit. Overall, for Performance Year One, the actual savings are within 92% of the savings projected as part of the Energy Savings Program.

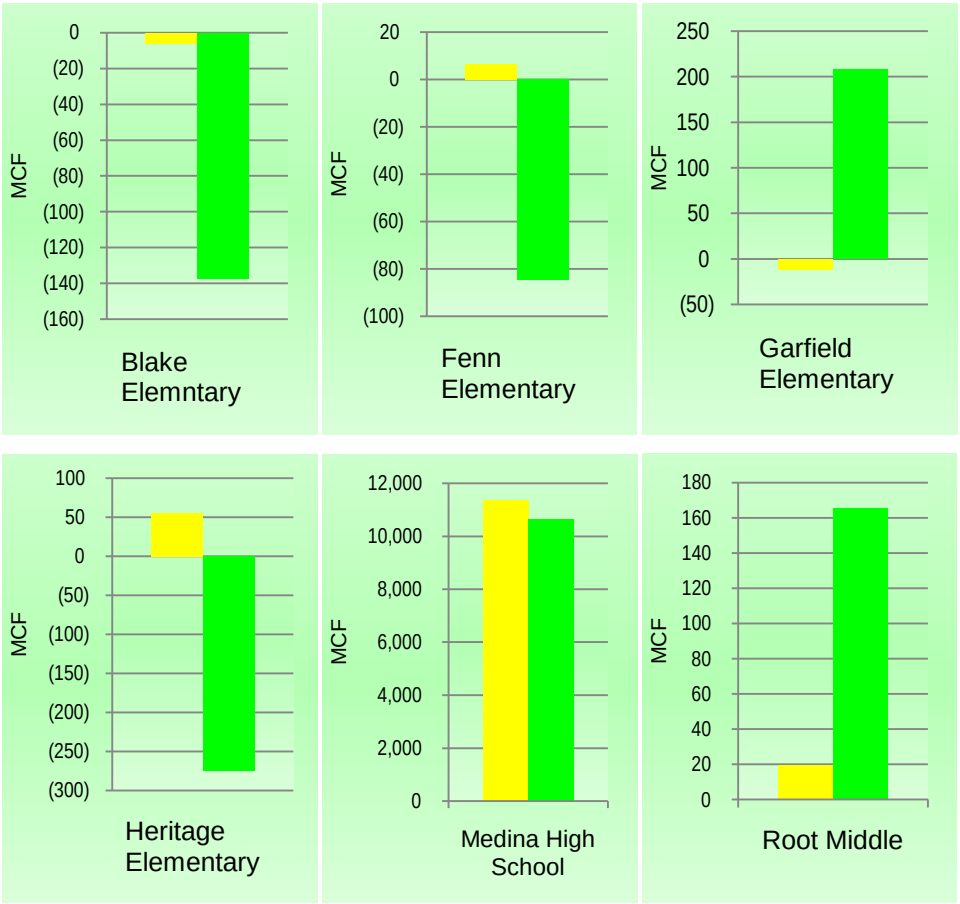


Figure 6a

Natural gas dollar savings are calculated each month by multiplying the monthly natural gas rate in $/MCF by the units of natural gas saved. The monthly natural gas rate in $/MCF is calculated based on: Total Natural Gas $ / Total Natural Gas MCF, and is calculated separately for each building. The units of natural gas saved are equal to the Baseline MCF – Actual MCF, where Baseline is the Base Year adjusted for time, weather and events. The natural gas savings are calculated each month, and then summed to yield an annual savings.

The energy savings are calculated based on the larger of the natural gas rate paid during the Performance Year or the Base Year as specified in Section 8.1 of the Contract.

During Performance Year One (Oct2009 – Sep2010), the natural gas usage in the schools affected by the Energy Savings Program has been reduced by approximately 10,500 MCF, or 24% from the Baseline. This is a savings of over $128,000 to Medina, and a reduction of 525 metric tons of CO_2 emissions.

Combined natural gas use in all of the Medina City Schools that were affected by Brewer-Garrett is summarized in Figure 6b. The Base Year, Baseline and Actual total usage during the *combined Performance Year One and Interim Period* are shown side-by-side for comparison. The overall natural gas usage in these schools has been reduced by approximately 12% from the Baseline, or 17,242 MCF. This is equivalent to 862 metric tons of CO_2 emissions, or the annual greenhouse gas emissions of over 150 passenger vehicles.

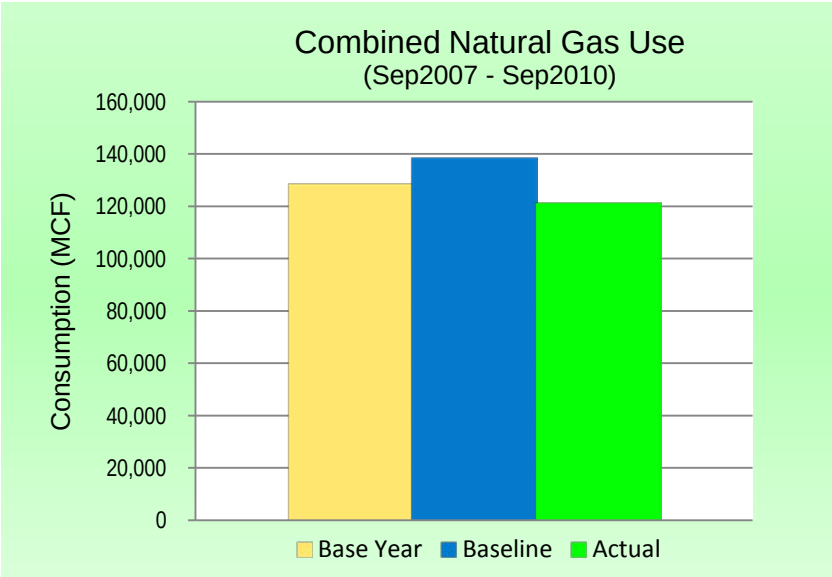
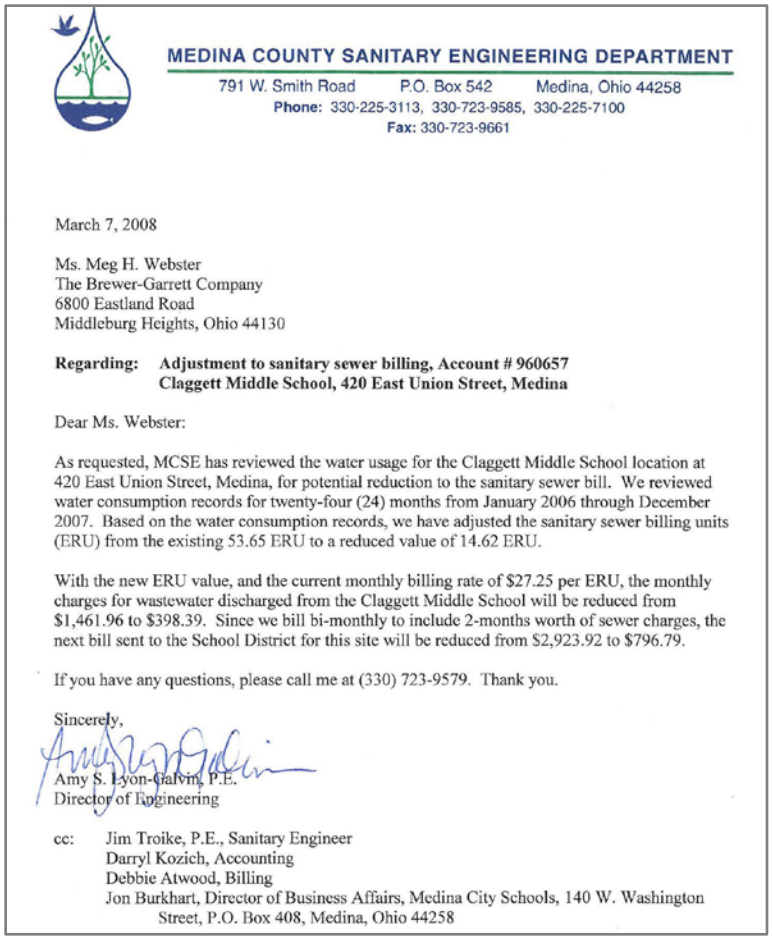


Figure 6b

Section 7: Water and Sewer Savings

Water conservation projects were implemented at Claggett and Garfield as part of the Medina City Schools Energy Savings Program. In addition, Brewer-Garrett was instrumental in effecting a sewer rate change for Claggett which has saved Medina approximately $12,000 annually. The letter addressing this rate change is shown in Figure7a.



MEDINA COUNTY SANITARY ENGINEERING DEPARTMENT
791 W. Smith Road P.O. Box 542 Medina, Ohio 44258
Phone: 330-225-3113, 330-723-9585, 330-225-7100
Fax: 330-723-9661

March 7, 2008

Ms. Meg H. Webster
The Brewer-Garrett Company
6800 Eastland Road
Middleburg Heights, Ohio 44130

Regarding: Adjustment to sanitary sewer billing, Account # 960657
Claggett Middle School, 420 East Union Street, Medina

Dear Ms. Webster:

As requested, MCSE has reviewed the water usage for the Claggett Middle School location at 420 East Union Street, Medina, for potential reduction to the sanitary sewer bill. We reviewed water consumption records for twenty-four (24) months from January 2006 through December 2007. Based on the water consumption records, we have adjusted the sanitary sewer billing units (ERU) from the existing 53.65 ERU to a reduced value of 14.62 ERU.

With the new ERU value, and the current monthly billing rate of $27.25 per ERU, the monthly charges for wastewater discharged from the Claggett Middle School will be reduced from $1,461.96 to $398.39. Since we bill bi-monthly to include 2-months worth of sewer charges, the next bill sent to the School District for this site will be reduced from $2,923.92 to $796.79.

If you have any questions, please call me at (330) 723-9579. Thank you.

Sincerely,

Amy S. Lyon-Galvin, P.E.
Director of Engineering

cc: Jim Troike, P.E., Sanitary Engineer
Darryl Kozich, Accounting
Debbie Atwood, Billing
Jon Burkhart, Director of Business Affairs, Medina City Schools, 140 W. Washington Street, P.O. Box 408, Medina, Ohio 44258

Figure 7a

An additional sewer rate change for Claggett and Garfield as a result of the decrease in water use will be pursued by Brewer-Garrett on Medina's behalf. We have already contacted the Medina County Sanitary Engineering Department, and will keep Medina abreast of the situation. These sewer savings are not reflected in this Performance Report; they should occur during Performance Year Two.

Sewer savings were expected at the High School, where a sub-meter was installed for the cooling tower. This sub-meter enables the measurement of water evaporation to the atmosphere during the cooling process. Brewer-Garrett will pursue a sewer rate change for the High School, which should also occur during Performance Year Two.

Water dollar savings are calculated each month by multiplying the monthly water rate in $/CCF by the units of water saved. The monthly water rate in $/CCF is calculated based on: Total Water $ / Total Water CCF, and is calculated separately for each building. The units of water saved are equal to the Baseline CCF – Actual CCF, where Baseline is the Base Year use with no adjustments. The water savings are calculated each month, and then summed to yield an annual savings.

Sewer dollar savings are calculated bi-monthly, to correspond with actual sewer bills. Sewer savings in this performance report deal with Claggett Middle School only and are the result of the reduction in sewer "units" as identified in the letter in Figure 7a. The sewer savings in terms of "units" are multiplied by the sewer rate in $/"unit" on a bi-monthly basis, and then summed to yield an annual savings.

The water and sewer savings are calculated based on the larger of the water and sewer rates paid during the Performance Year or the Base Year as specified in Section 8.1 of the Contract.

The combined water use for Claggett and Garfield is summarized in Figure 7b. The Base Year, Baseline and Actual total usage during the *combined Performance Year One and Interim Period* are shown side-by-side for comparison. The overall water usage in these schools has been reduced by approximately 42% from the Baseline. The amount of water saved by Medina, as a result of the water conservation projects, is sufficient to fill more than three Olympic sized swimming pools.

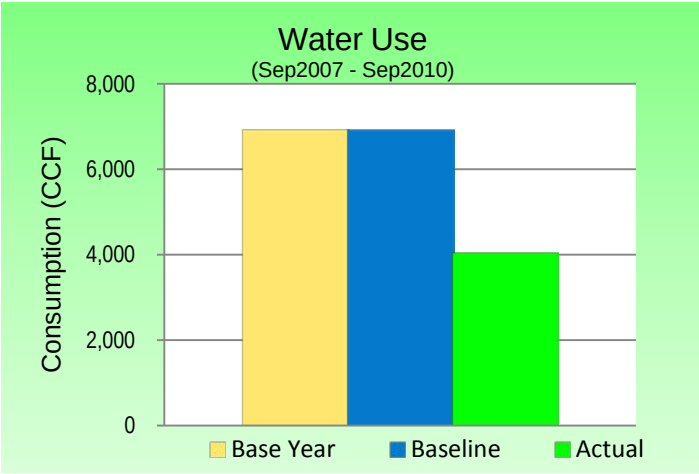


Figure 7b

Section 8: Operational Savings

No operational savings were claimed on this project.

Section 9: Adjustments

Adjustments are incorporated in the baseline projection for energy use to include changes in the number of days in a billing period as well as weather fluctuations.

No building changes have been identified by Medina during Performance Year One. In the future, we will request that changes in building operation be identified via a Building Change Form shown in Attachment D. This form will be sent to Medina on a quarterly basis; we ask that it be completed and returned in order that we may track and account for changes to your facilities.

The heating/ventilating units at Fenn and Garfield were replaced and air conditioning was added as part of the Energy Savings Program. The energy use associated with the air conditioning equipment is an adjustment to the baseline as addressed in Schedule F of the Contract: Savings Calculation Formulae: Methodology to Adjust Baseline.

The additional demand and energy use for these units is calculated based on the information in Table 9a and is included in the Electric Baseline.

School Name	Quantity	Unit Description
Fenn Elementary	1	Library/Computer Lab Unit 10 ton, EER=11, 2300 hrs
	1	Gym Unit 10 ton, EER=11, 2700 hrs
Garfield Elementary	1	Gym Unit 12 ton, EER=9.7, 2925 hrs

Table 9a

Section 10: Results

For Performance Year One, we projected $315,769 in total savings. These savings are a combination of weather/variable-dependent energy savings and water/sewer savings.

The actual utility savings for the combined Performance Year One and Interim Period are $909,147. Figure 10a identifies the total utility savings apportioned by electric, natural gas, and water/sewer.

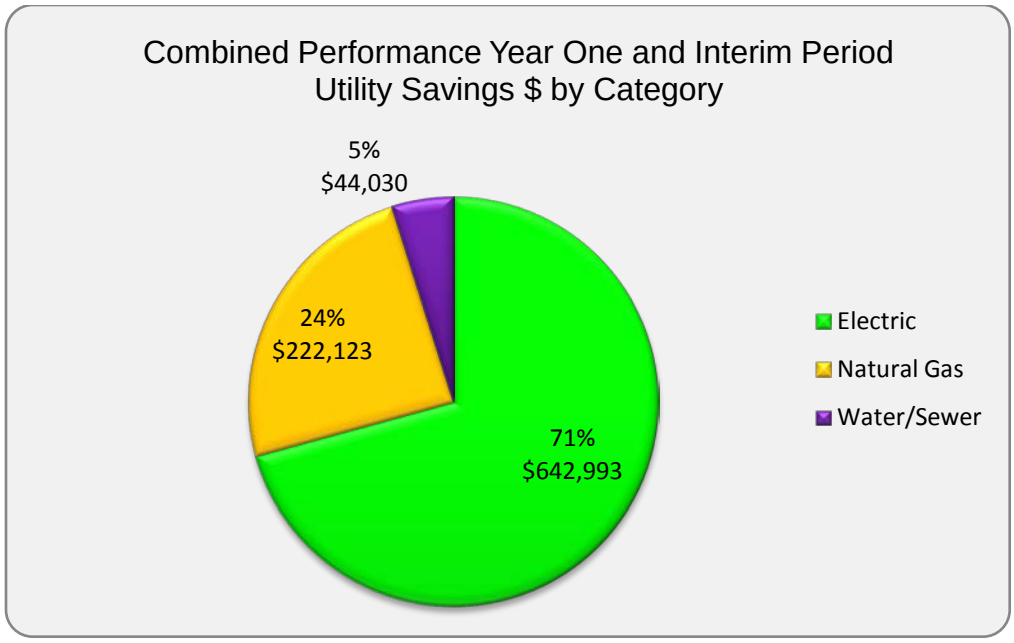


Figure 10a

The savings achieved by Medina City Schools for the combined Performance Year One and Interim Period (Installation) of the Energy Savings Program are $909,147.

Section 11: Conclusion

We at The Brewer-Garrett Company are pleased to be Medina's energy partner. We believe in bringing value to the partnership in areas outside of merely reporting energy savings.

One area in which we believe we can provide added value to Medina is in the administration of Demand Side Management (DSE2) Rider exemption documentation. As of the date of this report, First Energy's Demand Side Management Rider (DSE2) has not yet been approved by the PUCO. However, we look forward to working with Medina to complete the necessary documentation which will exempt Medina from this additional electric rider for future years.

We look forward to continuing this partnership and will work with Medina to maintain and enhance the levels of energy efficiency achieved to date.