Oberlin City Council meeting
5:00 pm
September 19, 2019

AGENDA
CITY COUNCIL MEETING
Gateway 1 & 2 – Oberlin, Kansas
September 5, 2019
5:00 PM

Meeting Called to Order – Mayor Brandon Oien

ROLL CALL of the Members of the City Council and determination of a quorum.
Marchello _____ Lohoefener____ Gawith ____ McHugh _____ McDougal _____

PLEDGE OF ALLEGIANCE to the Flag

OATH OF OFFICE – Heather Alwin, Municipal Judge, and Elisabeth Orr, Municipal Clerk

PUBLIC COMMENT

BOARD APPOINTMENTS

1. Arts and Humanities Commission – Reappoint Theresa Shaughnessy and Mirla Coleman for a three-year term ending July 2022.
2. Convention and Visitor's Bureau – Reappoint Halley Roberson for a two-year term ending August 2021.
3. Library Board – Reappoint Ruth Wolfram and Warren Bainter for four-year terms, ending April 2023
4. Board of Zoning Appeals (BOZA) Appoint David Slaughter to replace Nikki Sauvage, term ending August 2021. Appoint Chris Hackney to replace Tim Stallman, term ending May 2022.
5. Planning Commission - Appoint David Slaughter to replace Nikki Sauvage, term ending August 2021. Appoint Chris Hackney to replace Tim Stallman, term ending May 2022.
6. Public Building Commission – Appoint Chris Hackney to replace Brandon Oien, term ending May 2021. Reappoint Derek Chambers for a term of 3 years ending May 2022.
7. Tree Board Committee – Reappoint Jeremy Tally term to end December 2021

CONSENT AGENDA: Discussion and possible action by motion to approve the following items and or reports:

- Approval of minutes of previous meetings
- Appropriation Ordinance (Payment of Bills)
  Motion_____ Second_____

GATEWAY EVENTS UPDATE – Susan Unger

ADMINISTRATORS REPORT

1. Next Council Meeting October 3, 2019
2. CDBG Update
3. Miriam's Hope next meeting
4. Bucket Truck

NEW BUSINESS

1. Ordinance No. 911 Standard Traffic Ordinance (STO)
2. Ordinance No. 912 Uniform Public Offense Code (UPOC)
3. Skid Steer Proposal
4. ESP

OLD BUSINESS

1. Street Survey
2. Land Bid Results

REPORTS OF OTHER OFFICERS, BOARDS AND COMMITTEES

- Mayors Report
- Public Works Department
- Police – Police Chief August 2019 Report
- Board Reports – Chamber 2019 September Agenda
- Other Reports

ADJOURNMENT

Motion_____ Second_____

REGULAR COUNCIL MEETING – September 5, 2019 - GATEWAY- 5:00 p.m.

CALL TO ORDER – Mayor Brandon Oien called the meeting to order at 5:00 pm and all recited the Pledge of Allegiance to the Flag.

Roll Call of the Members of the City Council – Deb Lohoefener, Kristin McHugh, and Scott Gawith. Jim Marchello by phone. Majority of the Body Present.

Absent: City Attorney Steve Hirsch except by phone during executive session.

Others Present: City Administrator Halley Roberson, Treasurer Steve Zodrow, Foreman David Sporn, Police Chief Brad Burmaster, Police Officer Troy Haas, and Cynthia Haynes with the Oberlin Herald, Ruth Miesner, Heather McDougal, Brice Meitl, Pool Manager Jenn D'Amicao, Marilyn Black, Sharon Addleman, and City Clerk Sandy Rush.

CLOSE REGULAR MEETING, OPEN CDBG HEARING – McDougal moved, second by Gawith. **Motion carried.**

Treasurer Zodrow explained the hearing was a procedural requirement to fix the publication that ran incorrectly with the wrong year. He read outloud the description of the project and the projected total cost of $1,262,700. The grant will be for $600,000 for the Water Main Project if approved by the Kansas Small Cities Community Development Block Grant program. There were no questions asked.

CLOSE CDBG HEARING, OPEN REGULAR MEETING – Gawith moved, second by Lohoefener. **Motion carried.**

PUBLIC COMMENT

Heather McDougal with the Shelter House Strategic Doing group updated the Council on bids needed for improvements. She asked for and received permission to apply for grants to fund the improvement projects.

Ruth Miesner with the Sappa Park Signs and Benches Strategic Doing group reported the group had obtained KDOT rules for possible sign locations. They have located the quarry with the original stone for enough to build a new sign. A quote for benches was received, and Ms. Miesner said they are looking for grants.

Marilyn Black said she was unhappy with Eagle Cable since they had lost eight stations. Administrator Roberson reassured her, the company was going through changes and hopefully, it would improve soon.

Sharon Addleman commented the animal ordinance was vague and too lenient for possible problems that could occur since the zoning board had approved three properties to permit chickens, goats, pheasants, ducks, and rabbits. She told the council of a billy goat that had attacked a resident just outside of city limits and was worried without goat restrictions, there was

a possibility of another attack. She asked who would police all the new permitted locations. Mrs. Addleman asked the council to consider rewriting the ordinance.

BOARDS

LKM - Gawith moved, second by Lohoefener to approve the appointment of Administrator Roberson and Garret McDougal to the League of Kansas Municipalities as voting delegate and alternate voting delegate. **Motion carried.**

KMEA – Lohoefener moved, second by McHugh to approve the appointment of Garret McDougal to the Kansas Municipal Energy Agency Director 2. **Motion carried.**

POOL TEAM-LEADER REPORT – Jennifer D'Amico, pool manager, gave a 2019 season report to the council (attached).

ADMINISTRATORS REPORT

1. Next Council Meeting September 19, 2019
2. Miriam's Hope Testimonials attached in an effort for the council to get to know more about the group.
3. Electric Purchasing contract is two years away, but Roberson wanted the council to be aware of future federal incentives.
4. Bid Openings to will be held on September 18, 2019, at 2:30 pm for the purchase of 8 acres of city-owned land located east of town.
5. ESP Energy Audit Reminder of reviewing at the next council meeting.
6. Board Appointments will be made to update expired terms at a future meeting.

NEW BUSINESS

Ordinance No. 910 Regarding Snow Emergencies was presented by Administrator Roberson to clarify the removal of vehicles on certain streets during a snowstorm or the possibility of snow accumulation. McDougal moved, second by Gawith. **Motion carried.**

Street Survey – Administrator Roberson presented a draft of the requested street survey. The survey will not be ready until both streets have been completed to give a more accurate picture of the looks and the cost. Foreman Sporn commented his opinion was to do the whole street in concrete as opposed to just the sides. She asked if any of the council had suggestions, to please let her know.

OLD BUSINESS

KDHE Consent Agreement for Air Quality Permit and Approvals at the Power Plant – Administrator Roberson presented the agreement that the council considered previously. Attorney Steve Hirsch sent the agreement to another law firm for review, in an attempt to clarify how the city is to operate under an exempt status for the combustion engines located at the power plant. These were identified as having violations with the Kansas Air Quality Act and assessed a penalty. Roberson reminded them the amount assessed was $30,000 and reduced to $938. The

other law firm recommended signing the agreement. Gawith moved, second by Lohoefener. **Motion carried.**

EXECUTIVE SESSION

#1 Mayor Oien called for a 5-minute Executive Session under the attorney-client relationship exception. K.S.A. 75-4319(b) (2). To include mayor, administrator, city attorney by phone, and council starting at 6:10 p.m. McHugh moved, second by McDougal. **Motion carried**. The meeting resumed at 6:15 p.m. with no action.

REPORTS OF OTHER OFFICERS, BOARDS AND COMMITTEES

- Mayors Report – Oien thanked the crew for all their efforts after the storms as did the other councilmembers.
- Public Works Department – Foreman Sporn 9-3-19 Report
- Board Reports
  - EDC 7-8-19 Minutes, 8-19-19 Agenda, Financials thru Jul19
  - Library Aug19 Minutes

ADJOURNMENT

At 6:20 pm, McDougal moved, second by Gawith to adjourn. **Motion carried**.

ORDINANCE NO. 911

An Ordinance Regulating Traffic Within the Corporate Limits of the City of Oberlin, Kansas and elsewhere; Incorporating by Reference the "*Standard Traffic Ordinance* for Kansas Cities," Edition of 2019; With certain omissions, changes, and additions; Providing Certain Penalties and Repealing Ordinance No. 905

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF OBERLIN, KANSAS:

Section 1. INCORPORATING *STANDARD TRAFFIC ORDINANCE*. There is hereby incorporated by reference for the purpose of regulating traffic within the corporate limits of the City of Oberlin, Kansas, and any property owned by the City outside the corporate limits, that certain standard traffic ordinance known as the "*Standard Traffic Ordinance* for Kansas Cities", Edition of 2019, prepared and published in book form by the League of Kansas Municipalities, Topeka, Kansas. One official copy of said *Standard Traffic Ordinance* shall be marked or stamped "Official Copy as Adopted by Ordinance No.911", and to which shall be attached a copy of this ordinance, and filed with the City Clerk to be open to inspection and available to the public at all reasonable hours. The police department, municipal judge and all administrative departments of the City charged with enforcement of the ordinance shall be supplied, at the cost of the City, such number of official copies of such *Standard Traffic Ordinance* similarly marked, as may be deemed expedient.

Section 2. **TRAFFIC INFRACTIONS AND TRAFFIC OFFENSES.**

(a) An ordinance traffic infraction is a violation of any section of this ordinance that prescribes or requires the same behavior as that prescribed or required by a statutory provision that is classified as a traffic infraction in K.S.A. 8-2118.

(b) All traffic violations which are included within this ordinance, and which are not ordinance traffic infractions, as defined in subsection (a) of this section, shall be considered traffic offenses.

Section 3. **PENALTY FOR SCHEDULED FINES.** The fine for violation of an ordinance traffic infraction or any other traffic offense for which the municipal judge establishes a fine in a fine schedule shall not be less than Ten Dollars ($10) nor more than Five Hundred Dollars ($500), except for speeding which shall not be less than Ten Dollars ($10) nor more than Five Hundred Dollars ($500). A person tried and convicted for violation of an ordinance traffic infraction or other traffic offense for which a fine has been established in a schedule of fines shall pay a fine fixed by the court not to exceed Five Hundred Dollars ($500).

Section 4. **Repeal**. Ordinance No. 905 is repealed.

Section 5. **EFFECTIVE DATE**. This ordinance shall take effect and be in force from and after its publication in the official city newspaper.

Passed by the City Council this 19th day of September, 2019.

Approved by the Mayor this 19th day of September, 2019.

_____
Brandon Oien, Mayor

ATTEST:
(Seal)

_____
Sandy Rush, City Clerk

ORDINANCE NO. 912

An Ordinance Regulating Public Offenses Within the Corporate Limits
Of the City of Oberlin, Kansas and elsewhere; Incorporating By Reference the
Uniform Public Offense Code for Kansas Cities, Edition of 2019
Providing Certain Penalties and
Repealing Ordinance(s) No. 904

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF OBERLIN, KANSAS:

Section 1. INCORPORATING *Uniform Public Offense Code.* There is hereby incorporated by reference for the purpose of regulating public offenses within the corporate limits of the City of Oberlin, Kansas, and any property owned by the City outside the corporate limits that certain code known as the *Uniform Public Offense* Code, Edition of 2019, prepared and published in book form by the League of Kansas Municipalities, Topeka, Kansas. One official copy of said *Uniform Public Offense Code* shall be marked or stamped "Official Copy as Adopted by Ordinance No. 904 ," and to which shall be attached a copy of this ordinance, and filed with the city clerk to be open to inspection and available to the public at all reasonable hours.

Section 2. **Repeal.** Ordinance No. 904 is repealed.

Section 3. **Effective Date.** This ordinance shall take effect and be in force from and after its publication in the official city newspaper.

Passed by the City Council this 19th day of September 2019.

Approved by the Mayor this 19th day of September 2019.

_____
Brandon Oien, Mayor

ATTEST:
(Seal)

_____
Sandy Rush, City Clerk

Investment Grade Audit

Prepared for

City of Oberlin, Kansas

Oberlin, KS

July, 2019

Energy Solutions Professionals

9218 Metcalf | Suite 274
Overland Park, KS 66212
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1. Executive Summary

Energy Solutions Professionals' team appreciates the opportunity to have been of service to the City of Oberlin. We would like to thank all of the city staff that helped our team, and thank Halley Roberson, Steve Zodrow, and Dave Sporn in particular, for their support and leadership throughout the development of this Investment Grade Audit. We view the Investment Grade Audit (IGA) as the technical and financial corner-stone for effective facility planning. The IGA for the City of Oberlin was intended to identify all potential fast-payback energy-saving opportunities, while also evaluating much-needed facility upgrades. A primary goal of the audit was to identify energy saving opportunities which; if installed, would enable the City to redirect funds from the utility company to investment in your facilities. The objective was to identify an economically viable approach to reducing operating costs, improve the living environment, address critical infrastructure issues and positively impact the global environment. The measures recommended for inclusion in a comprehensive energy and facility improvement project would address all of these issues.

Many audits tend to focus solely on energy, technical and financial parameters; however, we purposely take a more holistic view that includes understanding your needs and the concerns of your community. The audit provides the basis from which decisions can be made which will impact your operating costs, comfort, and the environment for many years. As such, it is important to ensure that the solutions offered through this project maximize energy savings and comfort improvements, while enhancing the environment and local economy.

In the process of completing this IGA, Energy Solutions Professionals evaluated several individual Energy Conservation Measures and Facility Improvement Measures with a total guaranteed cost of $875,213, and a total projected annual savings of $770,428 over 15 years. Selection of the right mix of measures, based on actual needs and sound engineering principles, for inclusion is the key to success in developing an Energy Performance Contract.

City of Oberlin: ECM Summary Table for All Measures Evaluated

Energy Conservation Measure and Associated Building	Projected Annual Energy Savings	Annual O&M Savings	Avoided Future Cost Savings	Total Annual Savings	Turnkey Installed Price	Simple Payback
Lighting Improvements	**$13,478**	**$1,617**	**$0**	**$15,095**	**$246,108**	**16.3**
Airport-Lighting Improvements	$14	$2	$0	$16	$498	31.8
Cemetery Shed-Lighting Improvements	$8	$1	$0	$9	$306	34.2
Gateway-Lighting Improvements	$4,836	$580	$0	$5,416	$41,063	7.6
Library-Lighting Improvements	$643	$77	$0	$720	$5,816	8.1
Main Warehouse-Lighting Improvements	$174	$21	$0	$195	$2,541	13.0
Police-Lighting Improvements	$257	$31	$0	$288	$1,517	5.3
Pool Bath House-Lighting Improvements	$132	$16	$0	$148	$2,075	14.0
Power Plant-Lighting Improvements	$630	$76	$0	$706	$3,291	4.7
Sappa Park-Lighting Improvements	$1	$0	$0	$1	$402	359.2
Street Lights-Lighting Improvements	$6,783	$814	$0	$7,597	$188,598	24.8
Water Conservation Measures	**$2,394**	**$0**	**$0**	**$2,394**	**$22,421**	**9.4**
Airport-Water Conservation Measures	$184	$0	$0	$184	$2,106	11.4
Gateway-Water Conservation Measures	$1,453	$0	$0	$1,453	$13,704	9.4
Library-Water Conservation Measures	$297	$0	$0	$297	$2,858	9.6
Main Warehouse-Water Conservation Measures	$83	$0	$0	$83	$751	9.0
Police-Water Conservation Measures	$62	$0	$0	$62	$751	12.1
Pool Bath House-Water Conservation Measures	$63	$0	$0	$63	$1,501	23.8
Power Plant-Water Conservation Measures	$252	$0	$0	$252	$751	3.0
Building Envelope Improvements	**$1,259**	**$0**	**$0**	**$1,259**	**$22,563**	**17.9**
Airport-Building Envelope Improvements	$50	$0	$0	$50	$869	17.4
Cemetery Shed-Building Envelope Improvements	$66	$0	$0	$66	$1,808	27.4
Chemical Shed-Building Envelope Improvements	$239	$0	$0	$239	$1,426	6.0
Gateway-Building Envelope Improvements	$619	$0	$0	$619	$7,266	11.7
Library-Building Envelope Improvements	$107	$0	$0	$107	$1,287	12.0
Main Warehouse-Building Envelope Improvements	$93	$0	$0	$93	$9,038	97.2
Police-Building Envelope Improvements	$85	$0	$0	$85	$869	10.2
Window Film	**$1,578**	**$0**	**$0**	**$1,578**	**$8,392**	**5.3**
Gateway-Window Film	$1,273	$0	$0	$1,273	$7,198	5.7
Library-Window Film	$305	$0	$0	$305	$1,194	3.9
Destratification Fans	**$447**	**$0**	**$0**	**$447**	**$17,312**	**38.7**
Gateway-Destratification Fans	$447	$0	$0	$447	$17,312	38.7
Programmable WiFi Thermostats	**$1,046**	**$0**	**$0**	**$1,046**	**$14,363**	**13.7**
Gateway-Programmable WiFi Thermostats	$808	$0	$0	$808	$8,976	11.1
Library-Programmable WiFi Thermostats	$144	$0	$0	$144	$2,693	18.7
Main Warehouse-Programmable WiFi Thermostats	$94	$0	$0	$94	$2,693	28.7
Mechanical	**$2,722**	**$3,675**	**$0**	**$6,397**	**$199,515**	**31.2**
Power Plant-High Efficiency Motors	$669	$500	$0	$1,169	$19,927	17.0
Pool Boiler Room-Pool Cover	$184	$0	$0	$184	$47,427	257.8
Library-Split System Replacements	$253	$100	$0	$353	$63,653	180.3
Main Warehouse-Forced Air Furnace Replacement	$125	$75	$0	$200	$5,954	29.8
Power Plant-Boiler Replacement	$1,491	$3,000	$0	$4,491	$62,555	13.9
Process	**$16,334**	**$0**	**$0**	**$16,334**	**$339,215**	**20.8**
Water Meters	$16,334	$0	$0	$16,334	$339,215	20.8
Energy Management Support | Conservation Training	**$0**	**$0**	**$0**	**$0**	**$5,324**	**NA**
PROJECT TOTALS	**$39,258**	**$5,292**	**$0**	**$44,550**	**$875,213**	**19.6**

The City of Oberlin could elect to proceed with an "energy-only" project, which would optimize energy efficiency in your facilities. While this is certainly a viable option, it would result in a project that leaves many of the key operational problems unaddressed so we have included some further options that would positively leverage the energy savings, financing mechanism and cost-effective pricing scheme that Energy Solutions Professionals (ESP) offers. By blending fast payback items with critical infrastructure upgrade measures and using the savings to help pay for the improvements, the City of Oberlin **will be able to implement much-needed upgrades while reducing capital requirements.**

City of Oberlin: ECM Summary Table (Energy)

Select	Energy Conservation Measure and Associated Building	Projected Annual Energy Savings	Annual O&M Savings	Avoided Future Cost Savings	Total Annual Savings	Turnkey Installed Price	Simple Payback
	Lighting Improvements	**$6,672**	**$801**	**$0**	**$7,473**	**$56,303**	**7.5**
	Airport-Lighting Improvements						
	Cemetery Shed-Lighting Improvements						
x	Gateway-Lighting Improvements	$4,836	$580	$0	$5,416	$41,063	7.6
x	Library-Lighting Improvements	$643	$77	$0	$720	$5,816	8.1
x	Main Warehouse-Lighting Improvements	$174	$21	$0	$195	$2,541	13.0
x	Police-Lighting Improvements	$257	$31	$0	$288	$1,517	5.3
x	Pool Bath House-Lighting Improvements	$132	$16	$0	$148	$2,075	14.0
x	Power Plant-Lighting Improvements	$630	$76	$0	$706	$3,291	4.7
	Sappa Park-Lighting Improvements						
	Street Lights-Lighting Improvements						
	Water Conservation Measures	**$2,147**	**$0**	**$0**	**$2,147**	**$18,814**	**8.8**
	Airport-Water Conservation Measures						
x	Gateway-Water Conservation Measures	$1,453	$0	$0	$1,453	$13,704	9.4
x	Library-Water Conservation Measures	$297	$0	$0	$297	$2,858	9.6
x	Main Warehouse-Water Conservation Measures	$83	$0	$0	$83	$751	9.0
x	Police-Water Conservation Measures	$62	$0	$0	$62	$751	12.1
	Pool Bath House-Water Conservation Measures						
x	Power Plant-Water Conservation Measures	$252	$0	$0	$252	$751	3.0
	Building Envelope Improvements	**$1,050**	**$0**	**$0**	**$1,050**	**$10,847**	**10.3**
	Airport-Building Envelope Improvements						
	Cemetery Shed-Building Envelope Improvements						
x	Chemical Shed-Building Envelope Improvements	$239	$0	$0	$239	$1,426	6.0
x	Gateway-Building Envelope Improvements	$619	$0	$0	$619	$7,266	11.7
x	Library-Building Envelope Improvements	$107	$0	$0	$107	$1,287	12.0
	Main Warehouse-Building Envelope Improvements						
x	Police-Building Envelope Improvements	$85	$0	$0	$85	$869	10.2
	Window Film	**$1,578**	**$0**	**$0**	**$1,578**	**$8,392**	**5.3**
x	Gateway-Window Film	$1,273	$0	$0	$1,273	$7,198	5.7
x	Library-Window Film	$305	$0	$0	$305	$1,194	3.9
	Destratification Fans	**$0**	**$0**	**$0**	**$0**	**$0**	**NA**
	Gateway-Destratification Fans						
	Programmable WiFi Thermostats	**$1,046**	**$0**	**$0**	**$1,046**	**$14,363**	**13.7**
x	Gateway-Programmable WiFi Thermostats	$808	$0	$0	$808	$8,976	11.1
x	Library-Programmable WiFi Thermostats	$144	$0	$0	$144	$2,693	18.7
x	Main Warehouse-Programmable WiFi Thermostats	$94	$0	$0	$94	$2,693	28.7
	Mechanical	**$669**	**$500**	**$0**	**$1,169**	**$19,927**	**17.0**
x	Power Plant-High Efficiency Motors	$669	$500	$0	$1,169	$19,927	17.0
	Pool Boiler Room-Pool Cover						
	Library-Split System Replacements						
	Main Warehouse-Forced Air Furnace Replacement						
	Power Plant-Boiler Replacement						
	Process	**$0**	**$0**	**$0**	**$0**	**$0**	**NA**
	Water Meters						
x	**Energy Management Support | Conservation Training**	**$0**	**$0**	**$0**	**$0**	**$5,324**	**NA**
	Project Contingency (2.5% for Unforeseen Conditions)					**$3,349**	
	Payment & Performance Bonds					**$2,679**	
	Investment Grade Audit					**$17,363**	
	PROJECT TOTALS (for selected measures)	**$13,162**	**$1,301**	**$0**	**$14,463**	**$157,362**	**10.9**

City of Oberlin

Potential Cash Flow for Energy Performance Contract Project (Energy)

Project Costs			**Projected Annual Savings**		
Energy Measures Installed Cost	$	139,999	Utility Cost Savings	$	13,162
Investment Grade Audit Fee	$	17,363	O&M Savings	$	1,301
Closing Costs / Legal Fees	$	-	Repair & Replace Savings	$	-
Utility Incentives	$	-			
Def.Maint/Capital Contribution	$	-			
Net Capitalized Costs	$	157,362	**Total Annual Savings**	**$**	**14,463**
Annual Costs			**Finance Factors**		
On-Going Technical Service / M&V	$	-	Term (10 to 15 Year)	15.00	years
Avoided Future Costs	$	-	Rate (Range 2.8% to 3.8%)	3.50%	
			Escalation Rate	2.0%	
			Energy Escalation Rate	2.0%	

YEAR	PROJECTED UTILITY COST SAVINGS	GUARANTEED UTILITY COST SAVINGS	OPER & MAINT / R&R COST SAVINGS	AVOIDED FUTURE COST	TOTAL FUNDS AVAILABLE	DEBT SERVICE	ON-GOING TECHNICAL SERVICE FEE	GUARANTEED PROGRAM COST	PROJECTED EXCESS SAVINGS
Interim	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1	$13,162	$12,504	$1,301	$0	$13,805	$13,663	$0	$13,663	$800
2	$13,425	$12,754	$1,327	$0	$14,081	$13,663	$0	$13,663	$1,089
3	$13,694	$13,009	$1,354	$0	$14,363	$13,663	$0	$13,663	$1,385
4	$13,968	$13,269	$1,381	$0	$14,650	$13,663	$0	$13,663	$1,686
5	$14,247	$13,534	$1,409	$0	$14,943	$13,663	$0	$13,663	$1,993
6	$14,532	$13,805	$1,437	$0	$15,242	$13,663	$0	$13,663	$2,306
7	$14,823	$14,081	$1,466	$0	$15,547	$13,663	$0	$13,663	$2,626
8	$15,119	$14,363	$1,495	$0	$15,858	$13,663	$0	$13,663	$2,951
9	$15,421	$14,650	$1,525	$0	$16,175	$13,663	$0	$13,663	$3,283
10	$15,729	$14,943	$1,556	$0	$16,499	$13,663	$0	$13,663	$3,622
11	$16,044	$15,242	$1,587	$0	$16,829	$13,663	$0	$13,663	$3,968
12	$16,365	$15,547	$1,619	$0	$17,166	$13,663	$0	$13,663	$4,321
13	$16,692	$15,858	$1,651	$0	$17,509	$13,663	$0	$13,663	$4,680
14	$17,026	$16,175	$1,684	$0	$17,859	$13,663	$0	$13,663	$5,047
15	$17,367	$16,499	$1,718	$0	$18,217	$13,663	$0	$13,663	$5,422
16	$17,714	$16,829	$0	$0	$16,829	$0	$0	$0	$17,714
17	$18,068	$17,166	$0	$0	$17,166	$0	$0	$0	$18,068
18	$18,429	$17,509	$0	$0	$17,509	$0	$0	$0	$18,429
19	$18,798	$17,859	$0	$0	$17,859	$0	$0	$0	$18,798
20	$19,174	$18,216	$0	$0	$18,216	$0	$0	$0	$19,174
TOTALS:	**$319,797**	**$303,812**	**$22,510**	**$0**	**$326,322**	**$204,945**	**$0**	**$204,945**	**$137,362**

While this is certainly a viable option, it would result in a project that leaves many of the key operational issues unaddressed. Please note that at the terms illustrated this project generates over $800 positive cash flow in year one, and $137,362 over the next 20 years. The City of Oberlin can leverage that positive cash flow to help pay for other critical items that have longer payback periods but result in a more comprehensive or "holistic" project, but still partially paid for by savings.

Alternatively, an energy performance contract (EPC) provides a financing mechanism that would allow the City of Oberlin to install facility and process upgrades utilizing current budgeted dollars and with a guarantee that the reduction in utility and operational costs will help pay for the upgrades. Annual savings are structured to help cover annual debt service, and 100% of the project cost can be financed. In this type of self-funded project, the City of Oberlin does not need to provide money up front. Instead, a third party lease may be taken out to pay for the

improvements, and all project costs are guaranteed to be repaid by energy and operational cost savings over time.

The ECM Summary Table below illustrates a holistic project, Option 2, that includes HVAC improvements in the Library and Main Warehouse, street lighting lamp replacements, Power Plant hot-standby efficiency improvements, and a comprehensive replacement of the city's water meters.

City of Oberlin: ECM Summary Table (Holistic)

Select	Energy Conservation Measure and Associated Building	Projected Annual Energy Savings	Annual O&M Savings	Avoided Future Cost Savings	Total Annual Savings	Turnkey Installed Price	Simple Payback
	Lighting Improvements	**$13,455**	**$1,615**	**$0**	**$15,070**	**$244,901**	**16.3**
	Airport-Lighting Improvements						
	Cemetery Shed-Lighting Improvements						
x	Gateway-Lighting Improvements	$4,836	$580	$0	$5,416	$41,063	7.6
x	Library-Lighting Improvements	$643	$77	$0	$720	$5,816	8.1
x	Main Warehouse-Lighting Improvements	$174	$21	$0	$195	$2,541	13.0
x	Police-Lighting Improvements	$257	$31	$0	$288	$1,517	5.3
x	Pool Bath House-Lighting Improvements	$132	$16	$0	$148	$2,075	14.0
x	Power Plant-Lighting Improvements	$630	$76	$0	$706	$3,291	4.7
	Sappa Park-Lighting Improvements						
x	Street Lights-Lighting Improvements	$6,783	$814	$0	$7,597	$188,598	24.8
	Water Conservation Measures	**$2,147**	**$0**	**$0**	**$2,147**	**$18,814**	**8.8**
	Airport-Water Conservation Measures						
x	Gateway-Water Conservation Measures	$1,453	$0	$0	$1,453	$13,704	9.4
x	Library-Water Conservation Measures	$297	$0	$0	$297	$2,858	9.6
x	Main Warehouse-Water Conservation Measures	$83	$0	$0	$83	$751	9.0
x	Police-Water Conservation Measures	$62	$0	$0	$62	$751	12.1
	Pool Bath House-Water Conservation Measures						
x	Power Plant-Water Conservation Measures	$252	$0	$0	$252	$751	3.0
	Building Envelope Improvements	**$1,050**	**$0**	**$0**	**$1,050**	**$10,847**	**10.3**
	Airport-Building Envelope Improvements						
	Cemetery Shed-Building Envelope Improvements						
x	Chemical Shed-Building Envelope Improvements	$239	$0	$0	$239	$1,426	6.0
x	Gateway-Building Envelope Improvements	$619	$0	$0	$619	$7,266	11.7
x	Library-Building Envelope Improvements	$107	$0	$0	$107	$1,287	12.0
	Main Warehouse-Building Envelope Improvements						
x	Police-Building Envelope Improvements	$85	$0	$0	$85	$869	10.2
	Window Film	**$1,578**	**$0**	**$0**	**$1,578**	**$8,392**	**5.3**
x	Gateway-Window Film	$1,273	$0	$0	$1,273	$7,198	5.7
x	Library-Window Film	$305	$0	$0	$305	$1,194	3.9
	Destratification Fans	**$447**	**$0**	**$0**	**$447**	**$17,312**	**38.7**
x	Gateway-Destratification Fans	$447	$0	$0	$447	$17,312	38.7
	Programmable WiFi Thermostats	**$1,046**	**$0**	**$0**	**$1,046**	**$14,363**	**13.7**
x	Gateway-Programmable WiFi Thermostats	$808	$0	$0	$808	$8,976	11.1
x	Library-Programmable WiFi Thermostats	$144	$0	$0	$144	$2,693	18.7
x	Main Warehouse-Programmable WiFi Thermostats	$94	$0	$0	$94	$2,693	28.7
	Mechanical	**$2,538**	**$3,675**	**$0**	**$6,213**	**$152,088**	**24.5**
x	Power Plant-High Efficiency Motors	$669	$500	$0	$1,169	$19,927	17.0
	Pool Boiler Room-Pool Cover						
x	Library-Split System Replacements	$253	$100	$0	$353	$63,653	180.3
x	Main Warehouse-Forced Air Furnace Replacement	$125	$75	$0	$200	$5,954	29.8
x	Power Plant-Boiler Replacement	$1,491	$3,000	$0	$4,491	$62,555	13.9
	Process	**$16,334**	**$0**	**$0**	**$16,334**	**$339,215**	**20.8**
x	Water Meters	$16,334	$0	$0	$16,334	$339,215	20.8
x	**Energy Management Support | Conservation Training**	**$0**	**$0**	**$0**	**$0**	**$5,324**	**NA**
	Project Contingency (2.5% for Unforeseen Conditions)					**$20,281**	
	Payment & Performance Bonds					**$16,225**	
	Investment Grade Audit					**$17,363**	
	PROJECT TOTALS (for selected measures)	**$38,595**	**$5,290**	**$0**	**$43,885**	**$865,126**	**19.7**

The proforma, following, shows the city will receive $847,763 in energy and infrastructure improvements **now**, for a cost of $341,764 spread over 15 years, or on average, $22,784 per year.

City of Oberlin

Potential Cash Flow for Energy Performance Contract Project (Holistic)

Project Costs			**Projected Annual Savings**		
Energy Measures Installed Cost	$	847,763	Utility Cost Savings	$	38,595
Investment Grade Audit Fee	$	17,363	O&M Savings	$	5,290
Closing Costs / Legal Fees	$	-	Repair & Replace Savings	$	-
Utility Incentives	$	-			
Def.Maint/Capital Contribution	$	20,000			
Net Capitalized Costs	$	845,126	**Total Annual Savings**	**$**	**43,885**
Annual Costs			**Finance Factors**		
On-Going Technical Service / M&V	$	-	Term (10 to 15 Year)	15.00	years
Avoided Future Costs	$	-	Rate (Range 2.8% to 3.8%)	3.50%	
			Escalation Rate	2.0%	
			Energy Escalation Rate	2.0%	

YEAR	PROJECTED UTILITY COST SAVINGS	GUARANTEED UTILITY COST SAVINGS	OPER & MAINT / R&R COST SAVINGS	AVOIDED FUTURE COST	TOTAL FUNDS AVAILABLE	DEBT SERVICE	ON-GOING TECHNICAL SERVICE FEE	GUARANTEED PROGRAM COST	PROJECTED EXCESS SAVINGS
Interim	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1	$38,595	$36,665	$5,290	$0	$41,955	$73,378	$0	$73,378	($29,494)
2	$39,367	$37,399	$5,395	$0	$42,794	$73,378	$0	Step-Pay	($28,616)
3	$40,154	$38,147	$5,503	$0	$43,650	$73,378	$0	Step-Pay	($27,721)
4	$40,957	$38,910	$5,613	$0	$44,523	$73,378	$0	Step-Pay	($26,808)
5	$41,776	$39,688	$5,725	$0	$45,413	$73,378	$0	Step-Pay	($25,877)
6	$42,612	$40,482	$5,840	$0	$46,322	$73,378	$0	Step-Pay	($24,926)
7	$43,464	$41,292	$5,957	$0	$47,249	$73,378	$0	Step-Pay	($23,957)
8	$44,333	$42,118	$6,076	$0	$48,194	$73,378	$0	Step-Pay	($22,969)
9	$45,220	$42,960	$6,198	$0	$49,158	$73,378	$0	Step-Pay	($21,960)
10	$46,124	$43,819	$6,322	$0	$50,141	$73,378	$0	Step-Pay	($20,932)
11	$47,046	$44,695	$6,448	$0	$51,143	$73,378	$0	Step-Pay	($19,884)
12	$47,987	$45,589	$6,577	$0	$52,166	$73,378	$0	Step-Pay	($18,814)
13	$48,947	$46,501	$6,709	$0	$53,210	$73,378	$0	Step-Pay	($17,722)
14	$49,926	$47,431	$6,843	$0	$54,274	$73,378	$0	Step-Pay	($16,609)
15	$50,925	$48,380	$6,980	$0	$55,360	$73,378	$0	Step-Pay	($15,473)
16	$51,944	$49,348	$0	$0	$49,348	$0	$0	$0	$51,944
17	$52,983	$50,335	$0	$0	$50,335	$0	$0	$0	$52,983
18	$54,043	$51,342	$0	$0	$51,342	$0	$0	$0	$54,043
19	$55,124	$52,369	$0	$0	$52,369	$0	$0	$0	$55,124
20	$56,226	$53,416	$0	$0	$53,416	$0	$0	$0	$56,226
TOTALS:	**$937,753**	**$890,886**	**$91,476**	**$0**	**$982,362**	**$1,100,672**	**$0**	**$73,378**	**($71,444)**

The holistic approach, Option 2 above, yields $845,126 in upgrades and improvements NOW with no up-front capital, a financed cost of less than $350,000, and annual payments averaging less than $23,000 annually over 15 years. It also resolves the emissions compliance (KDHE Consent Agreement and Final Order or CAO) requirements by incorporating the LED streetlight conversion.

Though not listed here as a third option, ESP has been working with the City on exploring the feasibility of an integrated solar and wind power production facility. Recognizing budget constraints and realities, it is worth acknowledging that the initial feasibility analysis was completed and indicates a conservative potential revenue of $200,000 annually over 20 years

from the integrated solar and wind power production facility. The next steps in that development is a more detailed analysis and pre-engineering for a separate incremental fee. Some of that revenue could be allocated to the difference between the costs paid for through savings and total project costs of Option 2. The solar and wind facility would proceed under a separate agreement however, there are non-traditional revenue generation concepts that can have impacts far beyond this project. There are clearly advantages to working with ESP as a total solutions partner.

To date, ESP has reviewed historical utility data, performed site audits of the facilities, and has identified several options for energy conservation measures and facility improvement projects within your buildings. ESP has identified scopes of work for each of the measures and has obtained firm bids to construct the projects.

ESP performed this audit with the following objectives in mind:

- *To reduce the City of Oberlin's operating costs through energy efficiency*
- *To address critical needs in a manner which will minimize the need for capital improvements*
- *To develop a value-oriented paid-from-savings project*

An energy performance contract (EPC) provides a financing mechanism that would allow the City to install building upgrades utilizing current budgeted dollars and with a guarantee that the reduction in utility and operational costs will pay for the upgrades. Annual savings are structured to cover annual debt service and 100% of the project cost can be financed. In this type of a self-funded project, the City of Oberlin does not need to provide money up front. Instead, a third-party lease may be taken out to pay for the improvements and all project costs are guaranteed to be repaid by energy and operational cost savings over time.

Highlights of Findings / Results

- Savings, Comfort & Environment
  - Substantial energy savings in electric, gas and water usage and cost
  - Much improved comfort (reduce over-heating & optimized ventilation air)
  - Significant reduction in carbon emissions
- Maintenance Savings
  - Reduce maintenance costs
  - Standardized equipment, yields lower operating costs
- Facility & Financial Solutions
  - Leverage energy savings (current budget) enables upgrades TODAY – with minimal capital investment
  - Financing options and approach greatly reduce the need of capital outlay funds
  - The "Holistic Project" approach offers an effective way to plan and pay for major system replacement needs in a fiscally responsible manner

ESP evaluated a broad array of solution opportunities for the City of Oberlin. These included analysis of most major energy-consuming equipment and systems. Some of the measures do not have great savings-to-cost paybacks; however, they address current needs and greatly enhance comfort within the facilities, so these may warrant being included in a holistic project. The

following are brief descriptions (please refer to discussion in Section 4 for details on each item) of items:

- Lighting: optimize lighting while reducing energy cost
- Water Conservation: new domestic water devices enhance operation, save water and reduce maintenance costs
- Building Envelope: reduce infiltration at windows and doors which will save energy and improve comfort
- Window Film: install 2,215 square feet of low E window film at the Gateway and Library
- Destratification Fans: energy efficient motors that operate quietly to eliminate hot and cold spots throughout a space resulting in significant energy reduction and more comfort
- WiFi Thermostats: enable scheduling and temperature setpoint control and are accessible remotely
- Other: Library selected split unit replacements, Main Warehouse forced air furnace replacement, Power Plant high efficiency motors and boiler replacements, Pool Boiler Room pool cover installation

Financial Parameters

ESP's energy performance contracts are not "shared-savings" programs. Our projects are developed so that our clients retain 100% of the generated energy and operational savings after the project cost is paid. This is done specifically to ensure that a successful program is viewed in a positive light, versus generating negative feelings due to haggling over dividing the amount of excess savings.

If verified energy savings during any twelve-month period of this paid-from-savings program are inadequate to cover the annual costs of the program, ESP will reimburse the City of Oberlin for 100% of the shortfall. This shifts the risk of project performance onto our shoulders, ensuring you of an effective program.

Project funds are typically placed in an Escrow Account (controlled by the client) and project costs are paid on a percent-completion basis during the construction period. These costs are submitted on standard American Institute of Architects (AIA) Application for Payment documents that clearly depict project progress. Once construction is complete you are able to redirect dollars that had been budgeted for operational costs to make debt-service payments.

ESP's staff has extensive experience in helping to arrange financing, and is currently in contact with financial institutions that we have worked with in the past, as well as local banks, to identify the best financing option for the City of Oberlin. Financing does not represent a profit center for ESP. Our objective is to help you find the most cost-effective way to implement the project, so that you may maximize the value obtained from the savings generated through the energy efficiency measures. The primary deciding factor in choosing a financing option should be which avenue yields the best long-term value for your circumstance.

Benefits of a Performance Contract

The previous pages provide a synopsis of the costs, savings and financial parameters that would be associated with implementing an Energy Performance Contract (EPC) project at the City of Oberlin. The following verbiage provides a brief overview of the fundamental benefits of implementing these improvements with ESP, and utilizing an EPC Approach.

Energy Efficiency Performance Contracting is a procurement tool designed to help organizations improve the energy and operational efficiency of their facilities, stretch the effectiveness of existing budgeted dollars and address critical infrastructure needs. When properly applied and implemented, an EPC project provides unique benefits that will positively affect budgets, the facility environment and even the morale of everyone who uses or operates a facility for many years. This approach enables organizations to address many needs proactively, without having to come up with capital dollars or increase local taxes to pay for improvements, and provides a solid foundation for long-term facility planning.

Technical and financial aspects provide the cornerstone upon which every EPC is built. However, people and business concerns (comfort, environment, facility needs, and goals of administration) often become the critical factors when making decisions. The primary objective of energy-efficiency facility-improvement projects is typically to identify equipment, systems and/or processes that can be modified to reduce operating cost, and redirect these already budgeted operating cost dollars to pay for the improvements. This enables organizations to invest more in their own facilities and people, rather than in utility companies or outsourced services. The savings generated often enable organizations to tackle a myriad of infrastructure needs. This fact heightens the importance of understanding the technical, financial, business and people aspects you are facing, so that tangible needs and objectives may be addressed, maximizing the value of the project.

The good news is that the IGA we completed for the City of Oberlin identifies that there are indeed measures that can be implemented which would generate substantial savings, thereby creating a funding stream to help pay for implementing infrastructure upgrades.

There are many benefits associated with utilizing ESP and energy performance contracting to procure these improvements. We provide cost, savings and performance guarantees, so that the City of Oberlin can obtain improvements nearly risk-free. The cost guarantee ensures that the project will be implemented for the price agreed to up-front, and eliminates contractor-initiated change orders. The savings guarantee ensures that existing/budgeted dollars (plus agreed-to Avoided Future Cost Funds) may be redirected to fund the project over time; otherwise, ESP will pay. Performance is guaranteed via bonds and by the fact that only high-quality subcontractors and vendors will be utilized due to the long-term nature of the savings guarantee. This procurement approach also enables the benefits of reduced operating costs and enhanced facility environment to be secured much more quickly than what would be accomplished through traditional procurement methods. Finally, this approach offers exceptional control and flexibility; ESP ensures a project truly geared towards your specific goals.

ESP is committed to working with your staff to develop the most cost-effective approach to achieving your long-term goals and objectives. We appreciate the opportunity to be of service to the City of Oberlin, and we look forward to working with you to finalize the selection of the desired improvements.

Closing

Energy Solutions Professionals' team would truly welcome an opportunity to be of further service to Oberlin by implementing an EPC. Our goal is to help you implement a project that benefits everyone associated with the City—residents, administration/city council, staff and the community in general. We are confident that the scope(s) of work presented would materially benefit the overall environment, reduce utility usage and cost, enhance existing systems and reduce maintenance time/cost. We specifically structured this project to have a substantial impact on City facilities and the morale of the people impacted, while also offering compelling financial benefits.

2. Existing Conditions

Overall

The City of Oberlin contains twenty facilities that were evaluated as part of the original Investment Grade Audit contract. These buildings include: Airport, Cemetery Shed, Chemical Shed, Gateway, Library, Main Warehouse, Police, Pool Bath House/Boiler Room, Power Plant, Sappa Park, Sewer Plant, Water/Parks Block Bldg, Well #10, Well #11, Well #12, Well #5, Well #6, Wood Building, and Youth Ranch. During the course of completing the audit, the City of Oberlin and ESP mutually agreed to add Water Metering and Street Lighting. These ECMs were added at no additional cost per square foot to the City of Oberlin.

The type of building systems, the use of the building, the occupancy patterns, equipment type and usage all have an impact on what the building's energy use profile looks like. Building information was gathered during the site walk-through and has been used to understand each building's energy profile so that viable energy conservation projects can be identified.

ESP toured the facilities, evaluated the energy-consuming systems and spoke with both staff and contractors that have completed work within the building. The City of Oberlin has a combination of aging and past useful life equipment with the various systems in place. While some systems are old and beginning to fail due to their age, overall the facility is in a good state of repair, with common areas being functional and clean. The utility analysis, site visits and conversations with staff reveal that there are opportunities for substantially improving system efficiency and decreasing operating costs while enhancing comfort.

Our engineers conducted field survey(s) to gain an understanding of existing energy-consuming equipment and systems that are currently in place. The survey included evaluating the condition of equipment, mechanical rooms, occupied/office spaces (light-levels, temperatures, perceived comfort and other conditions), building envelope and process systems. The survey includes evaluating all primary utility consuming systems, such as:

- Heating, ventilating and air-conditioning equipment and their associated controls
- Interior and exterior lighting systems and controls
- Domestic water - devices, heating system, irrigation systems
- Building envelope (roof, window, door, insulation) assessment
- Temperature controls – type of controls, scheduling, sequence of operations, advanced saving measures

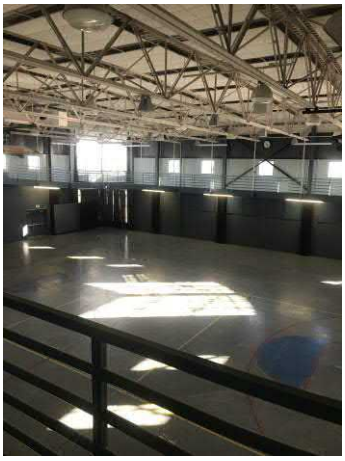
ESP evaluated all field data, and verified the validity of all information through engineering principles and common-sense analysis. We bridge the gap between theoretical and reality by comparing actual field readings with engineering calculations to verify heating/cooling load needs versus equipment sizing. A comparison of sizing, load calculations and actual operating conditions (comfort) yields insight on where improvement opportunities exist. Our evaluation took into account energy and operational efficiency, equipment end-of-life and life-cycle costing parameters to provide a true picture of the economic value of each measure considered (see Section 4 on Energy Conservation Measures).

Some items of note that were observed during the field survey include the following:

- Lighting in the various City facilities consist of a mixture of T12 fluorescent and incandescent lighting technology. Exterior fixtures attached to the buildings consist of a mixture of metal halide and high-pressure sodium.
- The street lighting throughout the City is primarily mercury vapor high pressure sodium bulbs but there are some mercury vapor lights as well.
- Plumbing fixtures throughout the City such as toilets, urinals, and faucets consist of a mixture of high-flow and low-flow. There are several opportunities to replace high-flow fixtures with new low-flow models that will greatly reduce water consumption.
- Several of the facilities have exterior doors and/or overhead doors that can be weather-stripped and sealed to prevent air loss. The Main Warehouse has a number of windows that can caulked to reduce air leakage.
- The split units, packaged rooftop units, and the unit heaters and controlled by a combination of both manual and programmable thermostats.
- The existing systems at the Main Warehouse consist of two Modine unit heaters with an input of 75,000 Btu/hr and a Bryant forced air furnaced rated at 150,000 Btu/hr (input) and 120,000 Btu/hr (output).
- The power plant consists of a series of engines and generators that are kept on hot standby. In order to maintain a hot standby condition, hot oil and water are continuously circulated throughout the jackets of the engines. For each engine, there are two pumps that run continuously. Several of these pumps are inefficient and can be replaced with high-efficient pumps. An old 1970's vintage hot water boiler maintains the temperature of the circulated hot water.
- The average annual water production for the past three years is 98,594,466 gallons. According to site personnel, the city averages a 10% annual water loss.
- The City of Oberlin is currently installing the following water meters:
    - 3/4" Kamstrup flowIQ 2100
    - 1" Kampstrup flowIQ 3101
    - 1.5" Sensus Omni
    - 2"-4" Sensus Omni
- The following is a list of the existing brands and types of meters currently in the system:
    - 3/4" Sensus Ipearl
    - 1" Sensus Ipearl
    - 3/4" and 1" Sensus SR

Airport – Hanger

Chemical Shed – Heater



Gateway – Gymnasium

Gateway – HW Heater

Library – Furnaces

Library – Thermostat

Main Warehouse – Furnace

Police – Furnace

Power Plant – HW Boiler

A table outlining the existing equipment and systems in the buildings is depicted below.

Existing Conditions: City of Oberlin

System/Equipment	Airport	Cemetery Shed	Chemical Shed	Gateway	Library	Main Warehouse	Police	Pool Bath House	Pool Boiler Room	Power Plant 1	Sappa Park	Water/Parks Block Bldg
Lighting												
Incandescent				x	x	x	x				x	x
T12 fluorescent	x	x	x	x	x	x	x			x	x	
T8 fluorescent								x	x			
Metal Halide HID				x		x						
High Pressure Sodium HID				x					x			
Air Distribution												
Roof Top Units				x								
Unit heaters			x	x		x						
Split units	x				x		x					
Window Air Conditioning Unit									x			
Heating Source												
Natural gas	x			x	x	x	x	x		x		
Electric			x									
Cooling Equipment												
Condensing unit	x			x	x		x		x			
Heating Equipment												
Furnace	x				x	x	x					
Unit heaters			x			x						
Direct Fired Natural Gas				x								
Controls												
Manual thermostats	x				x	x	x					
Programmable thermostats				x								
Plumbing Fixtures												
Faucets	x			x	x	x	x	x		x		
Toilets	x			x	x	x	x	x		x		
Urinals	x			x	x							
Domestic Hot Water												
Tank style water heater	x			x	x	x	x	x		x		

3. Utility Analysis

The analysis of the utility information is critical to understanding where energy dollars are being spent. A thorough analysis can yield clues with regard to confirming trends or identifying anomalies that can point towards opportunities for savings. In addition, a clear understanding of the utility rates and how they affect the true dollar savings that an energy project can provide is an important component in compiling a project that reflects a true and realistic result from a fiscal perspective.

Utility Profiles

Utility profiles provide insight into how energy is being consumed at the facility. The utility profiles are based on month by month data collected for each of the utilities in each building.

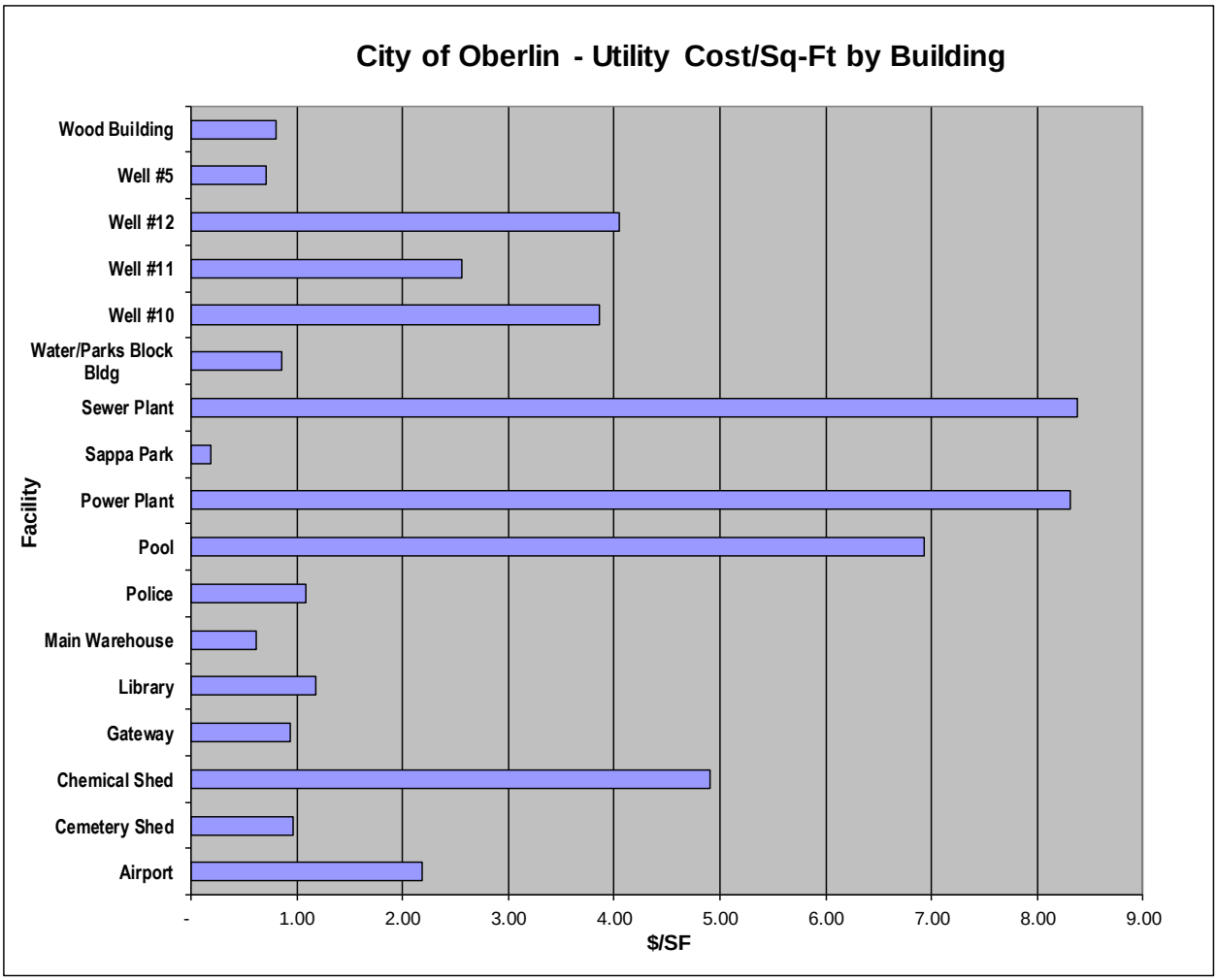
Historical Energy Use

The energy utilities evaluated for this project include electricity, natural gas, water and sewer. The following is a description of how each utility is utilized by the building, a description of the cost per unit energy, and how the utility cost is utilized within this energy audit to determine how the energy project will affect the overall utility costs. Historical utility data was reviewed from January 2016 through December 2018. The baseline energy data presented here represents the annual utility consumption and costs of each building.

City of Oberlin		Annual Consumption						Annual Costs						
Building	Square Footage	kWh	Therms	kgals	kWh /sq.ft.	Therms /sq. ft.	kgals /sq. ft.	Electric	Gas	Water	Electric $/sq.ft.	Gas $/sq.ft.	Water $/sq.ft.	Total $/sq.ft.
Airport	762	11,837	576	5,871.0	15.53	0.76	7.705	$ 1,184	$ 301	$ 176	1.55	0.39	0.23	2.18
Cemetery Shed	320	-	-	10,223.5	-	-	31.948	$ -	$ -	$ 307	-	-	0.96	0.96
Chemical Shed	264	12,965	-	-	49.11	-	-	$ 1,296	$ -	$ -	4.91	-	-	4.91
Gateway	26,250	189,720	10,636	10,269.0	7.23	0.41	0.391	$ 18,972	$ 5,321	$ 308	0.72	0.20	0.01	0.94
Library	2,821	21,658	1,845	-	7.68	0.65	-	$ 2,166	$ 1,172	$ -	0.77	0.42	-	1.18
Main Warehouse	6,000	10,597	5,227	-	1.77	0.87	-	$ 1,061	$ 2,621	$ -	0.18	0.44	-	0.61
Police	1,428	8,256	1,132	-	5.78	0.79	-	$ 826	$ 722	$ -	0.58	0.51	-	1.08
Pool	1,512	43,743	7,711	69,076.5	28.93	5.10	45.686	$ 4,374	$ 4,031	$ 2,072	2.89	2.67	1.37	6.93
Power Plant	6,396	359,800	35,857	-	56.25	5.61	-	$ 35,980	$ 17,223	$ -	5.63	2.69	-	8.32
Sappa Park	3,984	7,193	-	-	1.81	-	-	$ 719	$ -	$ -	0.18	-	-	0.18
Sewer Plant	648	54,244	-	-	83.71	-	-	$ 5,433	$ -	$ -	8.38	-	-	8.38
Water/Parks Block Bldg	2,400	20,433	-	-	8.51	-	-	$ 2,043	$ -	$ -	0.85	-	-	0.85
Well #10	385	14,885	-	-	38.66	-	-	$ 1,488	$ -	$ -	3.87	-	-	3.87
Well #11	276	7,077	-	-	25.64	-	-	$ 708	$ -	$ -	2.56	-	-	2.56
Well #12	320	12,958	-	-	40.49	-	-	$ 1,296	$ -	$ -	4.05	-	-	4.05
Well #5	140	986	-	-	7.04	-	-	$ 99	$ -	$ -	0.70	-	-	0.70
Wood Building	960	7,637	-	-	7.95	-	-	$ 764	$ -	$ -	0.80	-	-	0.80
TOTALS	**62,919**	**1,187,529**	**106,552**	**164,517**	**18.87**	**1.69**	**2.61**	**$ 118,763**	**$ 52,646**	**$ 4,935**	**1.89**	**0.84**	**0.08**	**2.80**

Total Cost and Cost-per-Square Foot

The table below presents the total cost of each utility and a cost-per-square foot analysis. This analysis normalizes the data based on building size and allows for a comparative analysis to be performed. This is helpful information in addition to looking at total energy consumption of the facilities.



Utility Rates

A good understanding of the utility rates is important when calculating energy savings as it's critical that correct rates are applied to provide a true representation of what the City of Oberlin should expect to see on their bills after a project is completed. Often times, energy analysts will inadvertently oversimplify rates and fail to provide a true picture of the dollar savings that can be achieved. This can easily happen when rates are tiered such that the base consumption of energy is charged at a higher rate. Within these situations, the more a consumer uses in a given month, the lower the cost per unit of energy becomes; hence when energy consumption is reduced, the lower cost per units may need to be applied to those savings as the base consumption remains.

An average cost of each utility has been calculated and these are the rates which are used for the purpose of calculating energy cost savings in this audit. The energy rates calculated are a reflection of the actual, current cost of utilities.

CITY OF OBERLIN, KS	Electric Consumption ($/kWh)	Natural Gas ($/ccf)	Water ($/kgal)	Sewer ($/kgal)
Airport	$0.100	$0.523	$5.000	$4.340
Cemetery Shed		$0.000		
Chemical Shed				
Gateway		$0.500		
Library		$0.727		
Main Warehouse		$0.501		
Police		$0.638		
Pool Bath House		$0.481		
Pool Boiler Room		$0.481		
Power Plant		$0.480		
Sappa Park		$0.000		
Sewer Plant				
Street Lights				
Water/Parks Block Bldg				
Well #10				
Well #11				
Well #12				
Well #5				
Well #6				
Wood Bldg				
Youth Ranch				

Electric

The City of Oberlin produces and distributes its own electricity. To determine a cost of electric energy to be used within this audit, several years of historical data was analyzed and the rate shown in the table above is used to calculate the expected energy cost savings.

Natural Gas

Midwest Energy is paid for the natural gas consumption. The average cost of natural gas used in the building is $0.541 per ccf for consumption.

To determine an average cost of natural gas for use in this energy audit, historical costs were evaluated for several prior years, and a conservative estimate of the near future natural gas price is calculated. Natural gas is the most volatile utility for the building, and it is impossible to predict future trends. The recommended approach is to analyze current and historical costs and use a conservative analysis.

Water and Sewer

Water utilities are provided by the City of Oberlin. Historical water consumption was evaluated to determine baseline use. The combined consumption of these meters was used to evaluate the buildings' historical consumption.

The rates used in the energy savings calculations in this energy study varied from building to building and are detailed in the table above.

4. Energy Conservation Measure

The tables on the following pages present the Energy Conservation Measures (ECMs) evaluated for your project. We have included three tables:

1. All Measures: This is a list of all of the measures we evaluated for your project.
2. Energy Option: These are the measures that were found to have good paybacks from energy savings and/or address critical system/infrastructure needs, while keeping the financing period as short as possible.
3. Holistic Option: Building upon the Energy Option, the Holistic Option includes additional ECMs that further address critical system/infrastructure needs. However, these line items do not have great paybacks. These ECMs include Street Lights – Lighting Improvements, Gateway – Destratification Fans, Library – Split System Replacements, Main Warehouse – Forced Furnace Replacement, Power Plant – Boiler Replacement, and Water Meter Replacements.

The ECM Summary tables contain the following information:

- **ECM Description:** a descriptive title for the improvements that were evaluated.
- **Energy Savings:** the projected amount of annual energy savings that will be accrued by implementing the measure.
- **Operation & Maintenance (O & M) Savings:** projected annual operations and maintenance savings that will be accrued by implementing the measure. This is from a reduction in materials/replacement parts, and/or outside maintenance/service costs; no savings for reduced internal labor costs are included.
- **Avoided Future Costs:** projected amount of future costs that will occur if the measure is not implemented and this amount should be budgeted annually.
- **Total Annual Savings:** the projected total annual savings from implementing the measure It is the sum of the Energy Savings, O&M Savings and Avoided Future Costs.
- **Turnkey Installed Cost:** the total cost for implementing the measure which includes labor, materials, permits, engineering, project management, construction management, commissioning, training, measurement and verification, overhead and profit.
- **Grants, Rebates, Tax Credits:** the amount of grant, rebate and/or tax credit dollars that could result from implementing the measure.
- **Simple Payback:** this is the number of years it will take for the savings to pay for the installation costs (exclusive of financing costs), and is calculated by dividing the Turnkey Installed Cost (minus any grants, rebates or tax credits) by the Total Annual Savings.

City of Oberlin: ECM Summary Table for All Measures Evaluated

Energy Conservation Measure and Associated Building	Projected Annual Energy Savings	Annual O&M Savings	Avoided Future Cost Savings	Total Annual Savings	Turnkey Installed Price	Simple Payback
Lighting Improvements	**$13,478**	**$1,617**	**$0**	**$15,095**	**$246,108**	**16.3**
Airport-Lighting Improvements	$14	$2	$0	$16	$498	31.8
Cemetery Shed-Lighting Improvements	$8	$1	$0	$9	$306	34.2
Gateway-Lighting Improvements	$4,836	$580	$0	$5,416	$41,063	7.6
Library-Lighting Improvements	$643	$77	$0	$720	$5,816	8.1
Main Warehouse-Lighting Improvements	$174	$21	$0	$195	$2,541	13.0
Police-Lighting Improvements	$257	$31	$0	$288	$1,517	5.3
Pool Bath House-Lighting Improvements	$132	$16	$0	$148	$2,075	14.0
Power Plant-Lighting Improvements	$630	$76	$0	$706	$3,291	4.7
Sappa Park-Lighting Improvements	$1	$0	$0	$1	$402	359.2
Street Lights-Lighting Improvements	$6,783	$814	$0	$7,597	$188,598	24.8
Water Conservation Measures	**$2,394**	**$0**	**$0**	**$2,394**	**$22,421**	**9.4**
Airport-Water Conservation Measures	$184	$0	$0	$184	$2,106	11.4
Gateway-Water Conservation Measures	$1,453	$0	$0	$1,453	$13,704	9.4
Library-Water Conservation Measures	$297	$0	$0	$297	$2,858	9.6
Main Warehouse-Water Conservation Measures	$83	$0	$0	$83	$751	9.0
Police-Water Conservation Measures	$62	$0	$0	$62	$751	12.1
Pool Bath House-Water Conservation Measures	$63	$0	$0	$63	$1,501	23.8
Power Plant-Water Conservation Measures	$252	$0	$0	$252	$751	3.0
Building Envelope Improvements	**$1,259**	**$0**	**$0**	**$1,259**	**$22,563**	**17.9**
Airport-Building Envelope Improvements	$50	$0	$0	$50	$869	17.4
Cemetery Shed-Building Envelope Improvements	$66	$0	$0	$66	$1,808	27.4
Chemical Shed-Building Envelope Improvements	$239	$0	$0	$239	$1,426	6.0
Gateway-Building Envelope Improvements	$619	$0	$0	$619	$7,266	11.7
Library-Building Envelope Improvements	$107	$0	$0	$107	$1,287	12.0
Main Warehouse-Building Envelope Improvements	$93	$0	$0	$93	$9,038	97.2
Police-Building Envelope Improvements	$85	$0	$0	$85	$869	10.2
Window Film	**$1,578**	**$0**	**$0**	**$1,578**	**$8,392**	**5.3**
Gateway-Window Film	$1,273	$0	$0	$1,273	$7,198	5.7
Library-Window Film	$305	$0	$0	$305	$1,194	3.9
Destratification Fans	**$447**	**$0**	**$0**	**$447**	**$17,312**	**38.7**
Gateway-Destratification Fans	$447	$0	$0	$447	$17,312	38.7
Programmable WiFi Thermostats	**$1,046**	**$0**	**$0**	**$1,046**	**$14,363**	**13.7**
Gateway-Programmable WiFi Thermostats	$808	$0	$0	$808	$8,976	11.1
Library-Programmable WiFi Thermostats	$144	$0	$0	$144	$2,693	18.7
Main Warehouse-Programmable WiFi Thermostats	$94	$0	$0	$94	$2,693	28.7
Mechanical	**$2,722**	**$3,675**	**$0**	**$6,397**	**$199,515**	**31.2**
Power Plant-High Efficiency Motors	$669	$500	$0	$1,169	$19,927	17.0
Pool Boiler Room-Pool Cover	$184	$0	$0	$184	$47,427	257.8
Library-Split System Replacements	$253	$100	$0	$353	$63,653	180.3
Main Warehouse-Forced Air Furnace Replacement	$125	$75	$0	$200	$5,954	29.8
Power Plant-Boiler Replacement	$1,491	$3,000	$0	$4,491	$62,555	13.9
Process	**$16,334**	**$0**	**$0**	**$16,334**	**$339,215**	**20.8**
Water Meters	$16,334	$0	$0	$16,334	$339,215	20.8
Energy Management Support | Conservation Training	**$0**	**$0**	**$0**	**$0**	**$5,324**	**NA**
PROJECT TOTALS	**$39,258**	**$5,292**	**$0**	**$44,550**	**$875,213**	**19.6**

City of Oberlin: ECM Summary Table (Energy)

Select	Energy Conservation Measure and Associated Building	Projected Annual Energy Savings	Annual O&M Savings	Avoided Future Cost Savings	Total Annual Savings	Turnkey Installed Price	Simple Payback
	Lighting Improvements	**$6,672**	**$801**	**$0**	**$7,473**	**$56,303**	**7.5**
	Airport-Lighting Improvements						
	Cemetery Shed-Lighting Improvements						
x	Gateway-Lighting Improvements	$4,836	$580	$0	$5,416	$41,063	7.6
x	Library-Lighting Improvements	$643	$77	$0	$720	$5,816	8.1
x	Main Warehouse-Lighting Improvements	$174	$21	$0	$195	$2,541	13.0
x	Police-Lighting Improvements	$257	$31	$0	$288	$1,517	5.3
x	Pool Bath House-Lighting Improvements	$132	$16	$0	$148	$2,075	14.0
x	Power Plant-Lighting Improvements	$630	$76	$0	$706	$3,291	4.7
	Sappa Park-Lighting Improvements						
	Street Lights-Lighting Improvements						
	Water Conservation Measures	**$2,147**	**$0**	**$0**	**$2,147**	**$18,814**	**8.8**
	Airport-Water Conservation Measures						
x	Gateway-Water Conservation Measures	$1,453	$0	$0	$1,453	$13,704	9.4
x	Library-Water Conservation Measures	$297	$0	$0	$297	$2,858	9.6
x	Main Warehouse-Water Conservation Measures	$83	$0	$0	$83	$751	9.0
x	Police-Water Conservation Measures	$62	$0	$0	$62	$751	12.1
	Pool Bath House-Water Conservation Measures						
x	Power Plant-Water Conservation Measures	$252	$0	$0	$252	$751	3.0
	Building Envelope Improvements	**$1,050**	**$0**	**$0**	**$1,050**	**$10,847**	**10.3**
	Airport-Building Envelope Improvements						
	Cemetery Shed-Building Envelope Improvements						
x	Chemical Shed-Building Envelope Improvements	$239	$0	$0	$239	$1,426	6.0
x	Gateway-Building Envelope Improvements	$619	$0	$0	$619	$7,266	11.7
x	Library-Building Envelope Improvements	$107	$0	$0	$107	$1,287	12.0
	Main Warehouse-Building Envelope Improvements						
x	Police-Building Envelope Improvements	$85	$0	$0	$85	$869	10.2
	Window Film	**$1,578**	**$0**	**$0**	**$1,578**	**$8,392**	**5.3**
x	Gateway-Window Film	$1,273	$0	$0	$1,273	$7,198	5.7
x	Library-Window Film	$305	$0	$0	$305	$1,194	3.9
	Destratification Fans	**$0**	**$0**	**$0**	**$0**	**$0**	**NA**
	Gateway-Destratification Fans						
	Programmable WiFi Thermostats	**$1,046**	**$0**	**$0**	**$1,046**	**$14,363**	**13.7**
x	Gateway-Programmable WiFi Thermostats	$808	$0	$0	$808	$8,976	11.1
x	Library-Programmable WiFi Thermostats	$144	$0	$0	$144	$2,693	18.7
x	Main Warehouse-Programmable WiFi Thermostats	$94	$0	$0	$94	$2,693	28.7
	Mechanical	**$669**	**$500**	**$0**	**$1,169**	**$19,927**	**17.0**
x	Power Plant-High Efficiency Motors	$669	$500	$0	$1,169	$19,927	17.0
	Pool Boiler Room-Pool Cover						
	Library-Split System Replacements						
	Main Warehouse-Forced Air Furnace Replacement						
	Power Plant-Boiler Replacement						
	Process	**$0**	**$0**	**$0**	**$0**	**$0**	**NA**
	Water Meters						
x	**Energy Management Support | Conservation Training**	**$0**	**$0**	**$0**	**$0**	**$5,324**	**NA**
	Project Contingency (2.5% for Unforeseen Conditions)					**$3,349**	
	Payment & Performance Bonds					**$2,679**	
	Investment Grade Audit					**$17,363**	
	PROJECT TOTALS (for selected measures)	**$13,162**	**$1,301**	**$0**	**$14,463**	**$157,362**	**10.9**

City of Oberlin: ECM Summary Table (Holistic)

Select	Energy Conservation Measure and Associated Building	Projected Annual Energy Savings	Annual O&M Savings	Avoided Future Cost Savings	Total Annual Savings	Turnkey Installed Price	Simple Payback
	Lighting Improvements	**$13,455**	**$1,615**	**$0**	**$15,070**	**$244,901**	**16.3**
	Airport-Lighting Improvements						
	Cemetery Shed-Lighting Improvements						
x	Gateway-Lighting Improvements	$4,836	$580	$0	$5,416	$41,063	7.6
x	Library-Lighting Improvements	$643	$77	$0	$720	$5,816	8.1
x	Main Warehouse-Lighting Improvements	$174	$21	$0	$195	$2,541	13.0
x	Police-Lighting Improvements	$257	$31	$0	$288	$1,517	5.3
x	Pool Bath House-Lighting Improvements	$132	$16	$0	$148	$2,075	14.0
x	Power Plant-Lighting Improvements	$630	$76	$0	$706	$3,291	4.7
	Sappa Park-Lighting Improvements						
x	Street Lights-Lighting Improvements	$6,783	$814	$0	$7,597	$188,598	24.8
	Water Conservation Measures	**$2,147**	**$0**	**$0**	**$2,147**	**$18,814**	**8.8**
	Airport-Water Conservation Measures						
x	Gateway-Water Conservation Measures	$1,453	$0	$0	$1,453	$13,704	9.4
x	Library-Water Conservation Measures	$297	$0	$0	$297	$2,858	9.6
x	Main Warehouse-Water Conservation Measures	$83	$0	$0	$83	$751	9.0
x	Police-Water Conservation Measures	$62	$0	$0	$62	$751	12.1
	Pool Bath House-Water Conservation Measures						
x	Power Plant-Water Conservation Measures	$252	$0	$0	$252	$751	3.0
	Building Envelope Improvements	**$1,050**	**$0**	**$0**	**$1,050**	**$10,847**	**10.3**
	Airport-Building Envelope Improvements						
	Cemetery Shed-Building Envelope Improvements						
x	Chemical Shed-Building Envelope Improvements	$239	$0	$0	$239	$1,426	6.0
x	Gateway-Building Envelope Improvements	$619	$0	$0	$619	$7,266	11.7
x	Library-Building Envelope Improvements	$107	$0	$0	$107	$1,287	12.0
	Main Warehouse-Building Envelope Improvements						
x	Police-Building Envelope Improvements	$85	$0	$0	$85	$869	10.2
	Window Film	**$1,578**	**$0**	**$0**	**$1,578**	**$8,392**	**5.3**
x	Gateway-Window Film	$1,273	$0	$0	$1,273	$7,198	5.7
x	Library-Window Film	$305	$0	$0	$305	$1,194	3.9
	Destratification Fans	**$447**	**$0**	**$0**	**$447**	**$17,312**	**38.7**
x	Gateway-Destratification Fans	$447	$0	$0	$447	$17,312	38.7
	Programmable WiFi Thermostats	**$1,046**	**$0**	**$0**	**$1,046**	**$14,363**	**13.7**
x	Gateway-Programmable WiFi Thermostats	$808	$0	$0	$808	$8,976	11.1
x	Library-Programmable WiFi Thermostats	$144	$0	$0	$144	$2,693	18.7
x	Main Warehouse-Programmable WiFi Thermostats	$94	$0	$0	$94	$2,693	28.7
	Mechanical	**$2,538**	**$3,675**	**$0**	**$6,213**	**$152,088**	**24.5**
x	Power Plant-High Efficiency Motors	$669	$500	$0	$1,169	$19,927	17.0
	Pool Boiler Room-Pool Cover						
x	Library-Split System Replacements	$253	$100	$0	$353	$63,653	180.3
x	Main Warehouse-Forced Air Furnace Replacement	$125	$75	$0	$200	$5,954	29.8
x	Power Plant-Boiler Replacement	$1,491	$3,000	$0	$4,491	$62,555	13.9
	Process	**$16,334**	**$0**	**$0**	**$16,334**	**$339,215**	**20.8**
x	Water Meters	$16,334	$0	$0	$16,334	$339,215	20.8
x	**Energy Management Support | Conservation Training**	**$0**	**$0**	**$0**	**$0**	**$5,324**	**NA**
	Project Contingency (2.5% for Unforeseen Conditions)					**$20,281**	
	Payment & Performance Bonds					**$16,225**	
	Investment Grade Audit					**$17,363**	
	PROJECT TOTALS (for selected measures)	**$38,595**	**$5,290**	**$0**	**$43,885**	**$865,126**	**19.7**

Lighting Improvements

New lighting technologies produce light at greater efficiencies than older systems. In addition to greater efficiency, lighting retrofits can also provide advantages such as increased light levels where needed, improving the color of the light, and the replacement of failing fixtures. Maintenance costs can also be reduced by installing new lamps and ballasts.

Fluorescent Upgrades

Existing T8 fluorescent lighting with electronic ballasts will be replaced with high efficiency LED lamp technology. The process of replacing older T8 lamps and electronic ballasts with the more efficient technology allows not only for longer lamp life and improved light quality, but also a reduction in energy consumption of up to 45% or more.

LED lamps offer an even higher efficiency and longer life than that of the new generation T8 technology.

In some situations, the existing fixtures are beyond their useful life, while in other situations, the configuration and use of the space has changed. Either of these conditions can necessitate that the entire fixture be replaced. Although the first cost is higher than just the straight retrofit, the savings can be even greater than that of the retrofit.

Incandescent to Fluorescent/ LED

Incandescent and tungsten halogen fixtures can be retrofitted with compact fluorescent lamps, LED lamps, or replaced with new fixtures. Due to the improved efficiency of fluorescent and LED lighting over the incandescent lighting, savings achieved can be near 70%-90%. Both fluorescent and LED technologies provide a much longer lamp life than that of incandescent lamps, which reduces overall lamp maintenance.

High Intensity Discharge (HID) to T5 Fluorescent, or LED

In many high ceiling applications HID lighting has been the commonly accepted solution. This is especially true in gymnasium, warehouse, garage and similar applications. Replacement of HID with T5 fluorescent (LED or Induction) fixtures in these areas provides several advantages. The overall quality and color rendering of the lighting is much better than that of all the various HID options. These technologies also have a much longer rated life than that of HID lamps, allowing for reduced maintenance and lamp replacement frequency. The third advantage is that of energy savings, since these technologies provide more light with less energy consumed. In addition, these fixtures can be turned off during low usage times and easily turned back on when needed. The HID technology requires several minutes to reach optimal lighting levels once they are turned on. This issue is often the reason that lighting is left on during unoccupied periods, consuming energy needlessly.

Occupancy Sensors

Occupancy sensors are a proven technology that provide for great energy efficiency. These devices are typically connected to the lighting in various spaces to allow the lighting to be turned off when a room or space is no longer occupied. Once someone enters the room the sensor or sensors detect occupancy and subsequently turn the lighting on. The ability to turn lights off automatically has proven to be more effective than relying on people to consistently turn lights off.

The facilities evaluated in the City of Oberlin primarily consist of a mixture of T12 and incandescent lighting. The efficiency of these fixtures can be greatly improved by retrofitting them or replacing them with LED technologies. A complete room by room audit of all of the lighting was

conducted to determine the opportunities for improvement as well as energy savings. Detailed data regarding the lighting opportunities is identified in the appendices of this report.
While investigating electrical rates for the various facilities it was discovered that the electricity cost for the street lighting was at a wholesale rate of $0.0167/kWh. This is the reason why the street lighting ECM has a 25-year payback.

Lighting Savings Calculations

Assumptions

- Refer to the appendix for more detailed information about the savings calculations for this ECM.

Example Calculation

Peak kW Savings

((Existing Lamp Wattage – New Lamp Wattage) x # of New Fixtures x # of Lamps per Fixture x 90% diversity factor / 1,000 Watts per kW) x 12 months = Annual peak demand savings (kW)

((32 W– 28W) x 100 fixtures x 2 lamps per fixture x .9 /1,000) x 12 months = 8.6 kW

kWh Savings

((Existing Lamp Wattage – New Lamp Wattage) x # of New Fixtures x # of Lamps per Fixture x annual hours of operation / 1,000 Watts per kW) = Annual electrical consumption savings (kWh)

((32 W– 28W) x 100 fixtures x 2 lamps per fixture x 2,340 hours /1,000) = 1,872 kWh

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Water Conservation Measures

New plumbing technologies provide excellent functionality while utilizing less water than older systems. In addition, automated controls on some plumbing fixtures provide even greater water efficiency. Other advanced water conservation measures, including water reclamation methods, allow for reducing overall usage of utility provided water.

Plumbing Fixtures

Improving water efficiency is accomplished by replacing water-consuming bathroom fixtures with more efficient fixtures. Prior to 1993, toilets and urinals were typically designed to flush a minimum of 3.5 gallons of water per flush. New technology greatly reduces this amount.
Measures within this project include low-flow showerheads, low-flow toilets and urinals, and sink faucet aerators. All of these devices will reduce the amount of water consumption, as well as conserve heating energy used for domestic hot water.
Automatic sensors can also be installed with new faucets to further improve water efficiency. Sensors on toilets and urinals provide a greater benefit with regard to convenience and cleanliness rather than water savings.

ESP analyzed the existing water fixtures throughout the City and concluded that there is an opportunity to retrofit or replace them with low flow technology. However, the simple payback for this work is high due to low water costs and limited usage; therefore, the retrofit will not pay for itself within the financed period.

Plumbing Fixture Savings Calculations

Assumptions

- An audit of the City included within the scope of this project was evaluated for water and sewer cost savings opportunities. Existing locations, quantities, and flow rates for toilets, urinals, and sink faucets were determined, as well as recommended low-flow efficiency upgrades.
- Water and sewer bills for the City were analyzed using the building size, occupancy rates, and other water uses such as irrigation to determine annual flush quantities for the toilets and urinals, as well as annual hours of operation for the sink faucets.
- Refer to the appendix for more detailed information about the savings calculations for this ECM.

Example Calculation

(Gallons per Flush for Existing Urinal – Gallons per Flush for New Urinal) x Quantity of Urinals x Annual Quantity of Flushes = Gallons of Water and Sewer Savings

(1.35 gpf - .125 gpf) x 10 urinals x 10,000 flushes per year = 122,500 gallons

Building Infiltration Improvements

Air infiltration is a significant source of heat loss and heat gain in buildings and results in higher energy consumption to compensate for the additional heating and cooling loads. Infiltration is most prominent when the air pressure inside the building is much greater than the air pressure outside the building, which is commonly the case on windy days. Research has shown that up to 30% of heating and cooling requirements can be attributed to air infiltration. Infiltration commonly occurs at joints in exterior windows and doors, as well as joints in walls from the floor all the way up to the roof. Reducing and better controlling air leakage can be accomplished several ways. Sealing of gaps and cracks using appropriate weather stripping, caulking and other retardants such as non-porous foam is a very effective method in minimizing air infiltration and maximizing energy efficiency.

Most of the buildings evaluated in this Investment Grade Audit present opportunities to reduce air infiltration. Weather stripping around exterior and overhead doors will improve overall energy efficiency and comfort. The Main Warehouse has windows that can be sealed around the perimeter to prevent air leakage. Implementing these measures will reduce gas or electric heating usage in the winter and electricity usage in the summer reducing utility costs as a result.

Window Film

Low-e window film combines both thermal insulation and heat-rejecting properties to maintain comfortable indoor temperatures. It is made for temperate regions that experience all four seasons.

The existing windows at the Gateway are energy inefficient and create uncomfortable conditions. To counteract this problem, ESP recommends installing low-e window film.

Air De-stratification Improvements

Heat rises especially in areas with high ceilings. This can cause high heating rates due to heating the air near the ceiling and not at ground level near the people. Additionally, the location of HVAC

equipment can cause large areas to have hot and cold spots. De-stratification is the process of mixing the internal air in a building to eliminate stratified layers and achieve temperature equalization throughout the building envelope. The design of the Zoo Fan addresses the issue of temperature differences in high ceiling areas. When air has little opportunity to move, dramatic temperature differences occur. Hot air rises pushing cooler air near the floor. This temperature difference can be as much as one degree per foot of height. Items such as lighting and ventilation ducts can increase this effect. Since people and thermostats are located near the floor it is imperative to even out this temperature difference. Zoo Fans get air moving. Their energy efficient motors operate quietly to eliminate hot and cold spots throughout a space. After installation, there is significant energy reduction. The result is a more comfortable space with reduced utility and maintenance costs.

The gymnasium at the Gateway is a great candidate for the installation of destratification fans to circulate air and keep the warm air from migrating to the ceiling. Destratification fans will keep the air temperature much more uniform and reduce heating costs.

WIFI Programmable Thermostats

One of the most basic energy saving functions of smart thermostats is temperature setback control during unoccupied periods. The basic rule for energy savings is that if it isn't being used, then turn it off. A smart thermostat should be used to turn off equipment during periods when it is not needed and HVAC equipment should be either turned off or the temperature set-point should be setback as far as possible to achieve maximum energy savings. Smart thermostats can be stand alone and detect occupancy to complete setback strategies, they can be programmed with actual scheduling, and where applicable can be connected through a wireless network and monitored remotely from a computer or a smart phone.

All of the buildings evaluated utilize manual or programmable thermostats on HVAC systems serving the spaces. Equipping these HVAC systems with WIFI programmable thermostats will garner energy savings for unoccupied periods at a lesser installation cost than that of a full-blown energy management system.

Split System Replacements

One of the most common types of heating and air conditioning is with a split air conditioner and furnace. The term split refers to the fact that the compressor/ condensing unit is located outside of the building and the air system side with the direct expansion (DX – contains refrigerant) cooling coil and the furnace are located inside the building. The advantages of this system are that it is very common in both residential and commercial construction, thus service and maintenance knowledge is readily available in most geographical locations. Another advantage is that the setup does not allow for simultaneous heating and cooling which is important with regard to energy efficiency.

In recent years, new technologies have generated units with higher efficiency both on the mechanical cooling and the gas furnace. Cooling efficiencies for these units are rated in SEER which is short for seasonal energy efficiency ratio. The higher the SEER rating is, the better the efficiency of the mechanical cooling. Units from generations past have typically been at 10 or lower. Newer more efficient units can reach SEER ratings up to 18.

The natural gas furnace portion of a split system is rated in terms of AFUE, which is short for annual fuel utilization efficiency. This is a measure of the combustion efficiency of the furnace or how much of the fuel is converted to heat and how much leaves the vent stack. Thus, the higher the AFUE is, the better the efficiency. Condensing furnaces are the latest technology to improve AFUE. Typical standard furnaces have AFUE ratings near 80%. Condensing furnaces can approach AFUE ratings of more than 92%. This significant increase in efficiency results in gas savings when replacing an old standard furnace with a new condensing furnace.

Even though the savings from these typically takes several years to pay back the overall cost of the replacement, it does provide quick paybacks when considering the incremental cost of installing high efficiency units versus installing standard efficiency units.

The Library has three split systems that are inefficient and nearing the end of their useful lives. The Main Warehouse has an old Bryant forced air furnace. Replacing these units with high-efficient models will garner energy consumption savings and avoid future replacement costs when failure inevitably occurs.

Pool Cover

A pool cover can generate energy savings by lowering water consumption due to reduced evaporation as well as heat loss during unoccupied hours.

High Efficiency Motors

The power plant consists of a series of engines and generators that are kept on hot standby. In order to maintain a hot standby condition, hot oil and water are continuously circulated throughout the jackets of the engines. For each engine, there are two pumps that run continuously. Several of these pumps are inefficient and can be replaced with high-efficient pumps.

ESP recommends replacing the existing motors with high efficiency motors.

HW Boiler Replacement

Boilers can come in a multitude of configurations and sizes. They can also be utilized for many applications from comfort heating to process needs in manufacturing facilities. Boilers can also utilize many different types of fuel or even electricity to fulfill their purpose. The two most common boiler types are steam boilers and hot water boilers. Both are used in various settings from manufacturing to institutional to even residential applications.

Although basic combustion efficiencies have not significantly improved over the years as a general rule, some newer boiler technologies allow for much improved efficiency. The most prominent is that of condensing style hot water boilers. The ability to reset the hot water temperature lower allows for boiler efficiencies to increase from the common 80% to 83% range to well up into the 95%+ range. This vast improvement in boiler efficiency can result in a significant reduction in energy consumption.

Although one of the most common applications of condensing boilers is the process of comfort heating spaces, there are other viable applications such as pool heating, domestic hot water heat-

ing, and others. Replacing older boilers may be necessary due to the age and condition of the existing equipment. A new replacement boiler can provide a boost of efficiency just due to being newer and in good condition; however, end users can often take advantage of the newer technologies to capture greater efficiencies and thus reduce energy consumption.

The existing hot water boiler at the Power Plant is not as efficient as newer condensing style hot water boilers. ESP is recommending replacing the existing boiler with a new condensing hot water boiler that would meet the peak heating load. The new condensing boiler can modulate to meet the load, meaning excessive short cycling is eliminated and efficiency is maximized.

Water Meters

ESP tested 13 water meters of various sizes in order to verify their accuracy. Water meters have a guaranteed accuracy of 98.5%. The test results uncovered that the average accuracy of the water meters was 96.2%. Based on the 3-year average billed water and water produced, and applying the 2.3% delta, it was calculated that the city could recover 2,049 kgal annually by replacing the old water meters.

Energy Management Support | Conservation Training

The integration of new mechanical systems and upgraded controls/EMS within existing configurations at multiple buildings requires ongoing collaboration in order to ensure long-term success. To promote best practices, identify and resolve emerging issues in a timely fashion with the City of Oberlin facilities team, and conduct outreach among employees and staff, ESP will provide additional technical and program support through the first twenty-four months of the contract. This support will include the following services following project completion:

- Kick-off on-site workshop training with facilities team to provide checklists and guidance on overall ECMs and best practices
- Remote monitoring to track conditions and assess seasonal issues as identified by the City of Oberlin staff (access via VPN or secure client software)
- Coordination of warranty issues and pending deadlines
- Online survey of City of Oberlin facilities on energy perceptions within buildings and emerging issues
- Development of Energy Guidelines for the city
- Outreach/energy conservation training (1-2 seminars depending upon availability)
- A dedicated ESP contact to maintain active communication with the city, with on-site review (2/year)

5. Project Implementation

General Discussion

Our management plan involves three primary stages: project development, project implementation, and performance management. The project development stage usually includes a preliminary analysis to confirm economic viability and that an IGA is warranted. This report is a direct result of our IGA, and reflects that substantial opportunities exist for the City of Oberlin to garner savings on the projects under review. The implementation stage is typically much faster-track than traditional construction, and our unique management and delivery approach enables us to complete implementation in a cost-effective manner for our clients. The final stage is performance management, which encompasses construction closeout through the finance period.

ESP's team members have vast experience working in critical office and facility support settings and understand that your primary mission and objective is to provide services for the effective operation of the building. We will develop an implementation plan that will have minimal adverse affects on the day-to-day (core mission) operation of Oberlin's facilities.

ESP will have sole-source responsibility for each phase of the work. We provide the audit, engineering, project and construction management, business and financial services required to manage every aspect of the project. We are committed to installing energy efficiency improvements that maximize savings, improve the facility environment and meet your long-term needs and objectives. To ensure that we meet our common goals, we take great strides in developing energy conservation measures that are fundamentally sound. We analyze each recommendation to be sure that it has a positive impact from a technical, financial, business, and people perspective.

There are many advantages associated with using our unique process. The result is a truly holistic project that is co-authored by the City of Oberlin staff and ESP's highly experienced professionals. We assure you that the focus will remain on YOUR objectives and needs, so that the project is a success in Oberlin's eyes. ECMs and ongoing services have been mutually developed and selected to maximize dollar savings and facility improvements. Our approach minimizes costs and risks for you, while enhancing the overall environment.

Project/Construction Management

Construction Process

Communication and collaborative team-work are essential for effective construction management on an energy performance contract. The bulk of work will consist of retrofitting or replacing equipment in areas that are currently occupied and fully operational. Hence, communication and planning become essential to making sure that disruption of the day-to-day operations is kept to a minimum level. We will have an Energy Solutions Professionals' Construction Manager on-site at critical periods during the entire implementation process.

This on-site Construction Manager (CM) will be the liaison between ESP, the City of Oberlin and all sub-contractors and vendors. He will coordinate all on-site issues and be the person that contractors and your staff go to on a daily-basis to resolve any on-site issues. The CM will chair the regularly scheduled on-site construction meetings and distribute meeting minutes from these meetings. He is the master scheduler for all construction activities, and must adjust this schedule as needed to minimize negative impact on the day-to-day operations of the City. In addition, this person will be responsible for the field-verifying that work is being completed per design intent,

and ensuring scope is completed on time and within budget. The CM will help collect field-data to be used for fulfilling the measurement & verification plan and Post Implementation Report.

We understand the difference between "substantial" and "final" completion. It is not uncommon for efforts to get lax after substantial completion has been achieved. This is when equipment is in a state of operability, but has not received final check-out. We have a process whereby our CM oversees site-walkthroughs and creation, tracking and completion of punch-list items for all scopes of work. No work will be considered final until our CM and a city staff member inspect the work and mutually agree that it is FINAL. We have forms; created specifically for each job, which will be utilized for the walkthrough and punch-list signoff.

Communication and Scheduling

There are a myriad of factors that must be weighed when putting together the implementation schedule for an EPC. First and foremost, we will schedule all endeavors in a manner to minimize disruption of the daily-operations for the City of Oberlin. We need to consider weather factors and try to schedule equipment replacements to not impact occupant comfort. It is important to maximize dollar savings generated by the program, so we will try to get the primary energy-saving measures installed as early in the process as possible. We will also ensure that all of our subcontractors are aware that we intend to have a MINIMAL impact on your day-to-day operation. Hence, it may be beneficial to complete any HVAC renovations during mild-temperature months in the spring/fall as opposed to summer or winter months. We recognize that equipment lead-time impacts construction schedules; it is important not to have construction crews on-site with no materials to be installing Therefore, we have specialized methods for ensuring effective material handling and implementation scheduling.

The fundamental approach is to determine what your desired completion date is, and then work back from there to determine what has to happen to accommodate the required end-date. All the factors mentioned above must be considered and will be included in the creation of the final schedule. We utilize scheduling software that allows all construction parameters; including equipment lead-time and delivery, labor hours, available work-hours, holidays, etc., to be factored into the schedule. The schedule allows identification of critical milestones that must be hit in order for subsequent work to be completed on-time. The construction and project managers will monitor this software on a regular basis, and update the project status based on real-time field conditions. This, coupled with dynamic/regular communication with all parties, helps us keep on-time.

We have honed our project planning processes over many years of experience, and practical job-site interaction. As mentioned above, ESP holds regularly scheduled construction meetings throughout the implementation phase of the projects. Our CM is tasked with providing an agenda and meeting minutes from the previous meeting prior to each meeting. This ensures that our meetings proceed in an orderly, timely manner, which enhances productivity for all involved. We do not believe in meeting simply for the sake of meeting, and will vary the frequency of the meeting based on the level of activity on-site.

We work with your staff to understand scheduling requirements based on facility activity, and relay this to our subcontractors. The subcontractors and our team then develop a three-week look-ahead schedule that identifies where they would LIKE to work 3-weeks out, where they PLAN to work 2-weeks out and where they WILL BE that particular week. This schedule is then shared with the City of Oberlin project team so they can communicate with appropriate facility personnel to confirm whether the proposed schedule will work. This typically yields enough "lead-time" for your staff to approve scheduling at each facility, and (when necessary) for our subcontractors to

adjust their plans to accommodate your needs, without suffering a dramatic loss in production time.

There are several factors that have a significant impact on effective project scheduling. Clearly, sound communication channels and proactive planning are two of the primary items that can help projects proceed through implementation and not allow the development of "mountains out of mole hills". It is highly likely that something will go wrong; such as equipment delivery delays, subcontractors not properly staffed, uncooperative weather, an activity precludes getting work done in an area as scheduled or other similar issues characteristic of a major construction project. It is the effectiveness of the schedule planning and communication channels that will determine whether a minor issue develops into a major problem.

Proactive use of scheduling software and regular communication can help avert trouble, and certainly reduces the chance of major problems. ESP's project team works closely with our client, vendors and subcontractors to develop a schedule; utilizing Microsoft Project software, that reflects realistic delivery times, committed installation times and buy-in from client staff regarding access and availability to conduct work in given areas. We then tie-together all activities so that everyone can clearly see the impact that each function has on the other (i.e. installation is impacted by availability of space to be "disrupted" and is tied to equipment delivery, which is tied to submittal approval, etc.). Demonstrating this co-dependency allows us to track the key milestones and address each step as it becomes important in the overall project schedule. Holding regularly scheduled construction meetings to review project status, update project schedule and discuss each component's progress provides a proactive platform from which effective project scheduling can be built.

Change Order/Scope Alterations

Our projects come with a Guaranteed Cost commitment, so there will be no contractor-driven change orders that increase the price to provide the scope of work identified in our Energy Performance Contract document. The entire project is completed through a negotiated process, so there is the flexibility to make scope alterations that impact the work done and the cost to provide the work. Clients sometimes decide they would prefer to adjust the scope by adding and subtracting things from the "contractual" scope. Also, it is not uncommon for us to discover a more effective way of implementing a scope of work, and offer a price deduct; which then enables the client to ask for additional scope (in a different area) to be provided. We will keep a detailed log that identifies all cost adds and deducts and the associated scope of work change. Unless you specifically request changes that cause there to be a cost increase or decrease, this log must balance to "zero" at project completion.

Project Timeline

Upon execution of the contract documents, a preliminary schedule will be developed and reviewed with the City of Oberlin. That schedule will be refined and detailed per the above.

The first step once a contract is executed is to complete the formal design for the various measures. ESP and the City of Oberlin will review submittals to ensure the proper equipment is ordered and purchased during this initial two-week period.

All of the measures will be installed with respect to creating minimal interference to the daily operation of the building occupants. ESP will work with the City of Oberlin and the subcontractors to expedite the schedule where possible to complete early and begin to garner energy savings.

6. Financing

The primary objective of an EPC is to help clients identify energy efficiency and facility improvement needs, then provide a creative avenue for funding these improvements. In essence, the goal is to allow organizations to redirect funds that are budgeted for utility and operational expenses to pay for energy-saving, facility improvements. This maximizes the value of these funds by investing them in your own organization as opposed to utility companies. ESP can facilitate acquiring third-party funding to pay for the portion of the project costs not covered by rebate funds today, and the savings are used to make the principal and interest payments over time.

Utilizing an EPC approach to securing critical infrastructure needs offers some significant financial/other benefits for the City of Oberlin. You are guaranteed that energy savings will pay for the improvements, which typically enables you to address many upgrades without needing to increase costs or spend available capital. The finance company looks to the energy-savings as the payment stream; and since the City of Oberlin has historically paid your utilities and the savings is guaranteed by ESP, the financiers are willing to offer very competitive interest rates. ESP provides a direct guarantee to the City that savings will be achieved, and commits to paying the City for any shortfall (either annually or one lump-sum at end of construction). While the improvements are designed to reduce energy consumption, we also focus on ensuring that comfort and overall environment are enhanced as well.

If verified energy savings during any twelve-month period of the paid-from-savings program are inadequate to cover the annual costs of the program, ESP would reimburse the City of Oberlin for 100% of the shortfall. We are assuming the risk that the program will reduce energy consumption (and related costs) and/or operating expenses enough to cover the project's costs.

Our energy services programs are not "shared-savings programs." Our projects are developed so that the City of Oberlin will retain 100% of the generated energy and operational savings after project costs are paid. Therefore, you will decide how to use these savings, possibly in other budget areas or to fund facility infrastructure improvements needs.

Financing Options

Although financing is typically an integral part of every EPC program, it does not constitute a profit center for ESP. We are more than willing to evaluate all avenues of potential financing, including working with clients who decide to self-finance projects. We have strong relationships with many of the leading national lending institutions, so we are able to obtain very effective terms and rates. We work with your staff and administration in selecting a financing arrangement that best meets YOUR needs.

We do not require that our clients utilize an outsourced financing mechanism. ESP strives to work with clients to find the approach that offers the best long-term value for your situation. ESP would welcome an opportunity to be of service regardless of which approach or funding stream the City of Oberlin chooses to utilize. We strive to assist in identifying the best long-term financial solution for the building(s).

Several potential sources exist for obtaining the funds necessary to enter a proposed Energy Savings Performance Contract with ESP such as:

1) **Lease-Purchase Financing**: ESP offers a variety of lease-purchase finance packages (through independent finance companies) designed to meet our customer's specific needs. Lease-purchase financing will take the savings gained from the installation of the energy-efficient

equipment and use it to cover lease costs, equipment, engineering, and energy study fees, without affecting your cash flow or existing capital budgets.

2) **Traditional Loan**: Some finance providers may be more comfortable utilizing a traditional loan format for financing. ESP is familiar with this process and simply suggests that a thorough evaluation of the different financing arrangements be conducted to ensure the best-value funding mechanism is utilized.

3) **Capital Outlay or Other Internal Funding**: We do not require that our clients utilize an outsourced financing mechanism. We are more than willing to work with your staff and administration to utilize whatever funds will yield the best long-term financial solution for your organization.

4) **Energy-Efficiency Grant Funding**: There may be Federal, State and Utility/or grant programs available – specifically with respect to installation of a wind generator. ESP has assisted many of our clients with securing these funds when they are available. These funds can be applied to a Performance Contracting procurement plan.

We have extensive experience in helping to arrange financing and will lend our expertise to find the best possible solution for our Clients. Our objective is to help find the most cost-effective way to implement the project, which maximizes the value obtained from the savings generated through the energy efficient measures. This may include electing to utilize capital funds to pay for the measures identified for inclusion in the program. The primary deciding factor is determining which avenue yields the best long-term value for our Client.

The following pages show the energy and holistic cash flow tables.

City of Oberlin

Potential Cash Flow for Energy Performance Contract Project (Energy)

Project Costs		
Energy Measures Installed Cost	$	139,999
Investment Grade Audit Fee	$	17,363
Closing Costs / Legal Fees	$	-
Utility Incentives	$	-
Def.Maint/Capital Contribution	$	-
Net Capitalized Costs	$	157,362

Projected Annual Savings		
Utility Cost Savings	$	13,162
O&M Savings	$	1,301
Repair & Replace Savings	$	-
Total Annual Savings	**$**	**14,463**

Annual Costs		
On-Going Technical Service / M&V	$	-
Avoided Future Costs	$	-

Finance Factors		
Term (10 to 15 Year)	15.00	years
Rate (Range 2.8% to 3.8%)	3.50%	
Escalation Rate	2.0%	
Energy Escalation Rate	2.0%	

YEAR	PROJECTED UTILITY COST SAVINGS	GUARANTEED UTILITY COST SAVINGS	OPER & MAINT / R&R COST SAVINGS	AVOIDED FUTURE COST	TOTAL FUNDS AVAILABLE	DEBT SERVICE	ON-GOING TECHNICAL SERVICE FEE	GUARANTEED PROGRAM COST	PROJECTED EXCESS SAVINGS
Interim	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1	$13,162	$12,504	$1,301	$0	$13,805	$13,663	$0	$13,663	$800
2	$13,425	$12,754	$1,327	$0	$14,081	$13,663	$0	$13,663	$1,089
3	$13,694	$13,009	$1,354	$0	$14,363	$13,663	$0	$13,663	$1,385
4	$13,968	$13,269	$1,381	$0	$14,650	$13,663	$0	$13,663	$1,686
5	$14,247	$13,534	$1,409	$0	$14,943	$13,663	$0	$13,663	$1,993
6	$14,532	$13,805	$1,437	$0	$15,242	$13,663	$0	$13,663	$2,306
7	$14,823	$14,081	$1,466	$0	$15,547	$13,663	$0	$13,663	$2,626
8	$15,119	$14,363	$1,495	$0	$15,858	$13,663	$0	$13,663	$2,951
9	$15,421	$14,650	$1,525	$0	$16,175	$13,663	$0	$13,663	$3,283
10	$15,729	$14,943	$1,556	$0	$16,499	$13,663	$0	$13,663	$3,622
11	$16,044	$15,242	$1,587	$0	$16,829	$13,663	$0	$13,663	$3,968
12	$16,365	$15,547	$1,619	$0	$17,166	$13,663	$0	$13,663	$4,321
13	$16,692	$15,858	$1,651	$0	$17,509	$13,663	$0	$13,663	$4,680
14	$17,026	$16,175	$1,684	$0	$17,859	$13,663	$0	$13,663	$5,047
15	$17,367	$16,499	$1,718	$0	$18,217	$13,663	$0	$13,663	$5,422
16	$17,714	$16,829	$0	$0	$16,829	$0	$0	$0	$17,714
17	$18,068	$17,166	$0	$0	$17,166	$0	$0	$0	$18,068
18	$18,429	$17,509	$0	$0	$17,509	$0	$0	$0	$18,429
19	$18,798	$17,859	$0	$0	$17,859	$0	$0	$0	$18,798
20	$19,174	$18,216	$0	$0	$18,216	$0	$0	$0	$19,174
TOTALS:	**$319,797**	**$303,812**	**$22,510**	**$0**	**$326,322**	**$204,945**	**$0**	**$204,945**	**$137,362**

City of Oberlin

Potential Cash Flow for Energy Performance Contract Project (Holistic)

Project Costs		
Energy Measures Installed Cost	$	847,763
Investment Grade Audit Fee	$	17,363
Closing Costs / Legal Fees	$	-
Utility Incentives	$	-
Def.Maint/Capital Contribution	$	20,000
Net Capitalized Costs	$	845,126

Projected Annual Savings		
Utility Cost Savings	$	38,595
O&M Savings	$	5,290
Repair & Replace Savings	$	-
Total Annual Savings	**$**	**43,885**

Annual Costs		
On-Going Technical Service / M&V	$	-
Avoided Future Costs	$	-

Finance Factors		
Term (10 to 15 Year)	15.00	years
Rate (Range 2.8% to 3.8%)	3.50%	
Escalation Rate	2.0%	
Energy Escalation Rate	2.0%	

YEAR	PROJECTED UTILITY COST SAVINGS	GUARANTEED UTILITY COST SAVINGS	OPER & MAINT / R&R COST SAVINGS	AVOIDED FUTURE COST	TOTAL FUNDS AVAILABLE	DEBT SERVICE	ON-GOING TECHNICAL SERVICE FEE	GUARANTEED PROGRAM COST	PROJECTED EXCESS SAVINGS
Interim	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1	$38,595	$36,665	$5,290	$0	$41,955	$73,378	$0	$73,378	($29,494)
2	$39,367	$37,399	$5,395	$0	$42,794	$73,378	$0	Step-Pay	($28,616)
3	$40,154	$38,147	$5,503	$0	$43,650	$73,378	$0	Step-Pay	($27,721)
4	$40,957	$38,910	$5,613	$0	$44,523	$73,378	$0	Step-Pay	($26,808)
5	$41,776	$39,688	$5,725	$0	$45,413	$73,378	$0	Step-Pay	($25,877)
6	$42,612	$40,482	$5,840	$0	$46,322	$73,378	$0	Step-Pay	($24,926)
7	$43,464	$41,292	$5,957	$0	$47,249	$73,378	$0	Step-Pay	($23,957)
8	$44,333	$42,118	$6,076	$0	$48,194	$73,378	$0	Step-Pay	($22,969)
9	$45,220	$42,960	$6,198	$0	$49,158	$73,378	$0	Step-Pay	($21,960)
10	$46,124	$43,819	$6,322	$0	$50,141	$73,378	$0	Step-Pay	($20,932)
11	$47,046	$44,695	$6,448	$0	$51,143	$73,378	$0	Step-Pay	($19,884)
12	$47,987	$45,589	$6,577	$0	$52,166	$73,378	$0	Step-Pay	($18,814)
13	$48,947	$46,501	$6,709	$0	$53,210	$73,378	$0	Step-Pay	($17,722)
14	$49,926	$47,431	$6,843	$0	$54,274	$73,378	$0	Step-Pay	($16,609)
15	$50,925	$48,380	$6,980	$0	$55,360	$73,378	$0	Step-Pay	($15,473)
16	$51,944	$49,348	$0	$0	$49,348	$0	$0	$0	$51,944
17	$52,983	$50,335	$0	$0	$50,335	$0	$0	$0	$52,983
18	$54,043	$51,342	$0	$0	$51,342	$0	$0	$0	$54,043
19	$55,124	$52,369	$0	$0	$52,369	$0	$0	$0	$55,124
20	$56,226	$53,416	$0	$0	$53,416	$0	$0	$0	$56,226
TOTALS:	**$937,753**	**$890,886**	**$91,476**	**$0**	**$982,362**	**$1,100,672**	**$0**	**$73,378**	**($71,444)**

7. Measurement & Verification

Measurement and Verification (M&V) provides a means of proving that the savings that are guaranteed under a performance contract are truly achieved. This is accomplished by using a combination of engineering calculations, system measurements, whole facility measurements and/or simulations to clearly identify that the savings achieved met the stated goals for guaranteed energy savings.

There are three primary cost factors that impact the overall utility costs for facilities.

1. The efficiency or rate at which the equipment/system consumes energy
2. The number of hours equipment operates for its stated purpose
3. The unit cost for the energy type being impacted

It needs to be recognized that a change in any one of these three parameters could dramatically impact the utility costs within a given facility.

The main objective for the Measurement and Verification Plan is to provide clear evidence that each energy conservation measure actually had the impact on the primary cost factor that was expected. Further, it is important to balance the verification methodology versus the magnitude of savings generated; that is, don't spend an inordinate amount of time and money to verify a measure that has a relatively small magnitude of savings. Similarly, do not spend lots of time or money verifying measures for which there is a proven track-record and high degree of confidence in the calculation of the savings.

ESP clients can have confidence in our M&V practices and procedures. We follow the guidelines of the International Performance Measurement & Verification Protocol (IPMVP) when conducting M&V. The IPMVP is the industry standard for conducting M&V and was originally developed by the Department of Energy as a framework for conducting M&V. The table below presents the four basic M&V options outlined in the IPMVP. We'll work with you to mutually determine the amount of measurement and verification that is most appropriate for your project, and the methods that will be used to measure and verify the savings.

IPMVP option	How savings are calculated	Typical applications
A. Retrofit isolation: Key parameter measurement *Savings* are determined by field measurement of the key performance parameter(s) which define the *energy* use of the *ECM*'s affected system(s) and/or the success of the project. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the measured parameter, and the length of the *reporting period*. Parameters not selected for field measurement are *estimated. Estimates* can be based on historical data, manufacturer's specifications, or engineering judgment. Documentation of the source or justification of the *estimated* parameter is required. The plausible *savings* error arising from *estimation* rather than measurement is evaluated.	Engineering calculation of *baseline* and *reporting period energy* from: •short-term or continuous measurements of key operating parameter(s); and •*estimated* values *Routine* and *non-routine adjustments* as required.	A lighting retrofit where power draw is the key performance parameter that is measured periodically. Estimate operating hours of the lights based on building schedules and occupant behavior.
B. Retrofit isolation: All parameter measurement *Savings* are determined by field measurement of the *energy* use of the *ECM*-affected system. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the *savings* and the length of the *reporting period*.	Short-term or continuous measurements of *baseline* and *reporting period energy*, and/or engineering computations using measurements of proxies of *energy* use. Routine and non-routine adjustments as required.	This applies to variable-speed drive and controls to a motor to adjust pump flow. Measure electric power with a kW meter installed on the electrical supply to the motor, which reads the power every minute. During the *baseline period,* this meter is in place for a week to verify *constant* loading. Then the meter is in place throughout the *reporting period* to track variations in power use.
C. Whole facility *Savings* are determined by measuring energy use at the whole *facility* or sub-*facility* level. Continuous measurements of the entire *facility's energy* use are taken throughout the *reporting period*.	Analysis of whole *facility baseline* and *reporting period* (utility) meter data. *Routine adjustments* as required, using techniques such as simple comparison or regression analysis. *Non-routine adjustments* as required.	This applies to a multifaceted energy management program affecting many systems in a *facility*. Measure energy use with the gas and electric utility meters for a twelve month *baseline period* and throughout the *reporting period*.
D. Calibrated simulation *Savings* are determined through simulation of the *energy* use of the whole *facility,* or of a sub-*facility*. Simulation routines are demonstrated to adequately model actual *energy* performance measured in the *facility*. This option usually requires considerable skill in calibrated simulation.	Energy use simulation, calibrated with hourly or monthly utility billing data. (Energy end use metering may be used to help refine input data.)	This applies to multifaceted energy management programs affecting many systems in a facility but where no meter existed in the *baseline* period. Energy use measurements, after installation of gas and electric meters, are used to calibrate a simulation. *Baseline* energy use, determined using the calibrated simulation, is compared to a simulation of *reporting period* energy use.

General Overview

The reason for M&V is simple. The City of Oberlin is building a project based upon energy savings where there needs to be some means of proving that the savings are truly achieved. ESP's only objective with respect to M&V is to provide the evidence that our clients need to feel comfortable about the results, for the least cost possible. It is important to note that every dollar spent on annual M&V reduces up-front dollars available for facility infrastructure improvement by $7 to $10 dollars. For example, if the annual M&V fee is $10,000, this reduces the amount of up-front improvements the City of Oberlin receives by $70,000 to $100,000, which is significant. Hence, at ESP we work diligently to jointly develop an M&V Plan that will yield the proof and comfort you need that the savings are achieved, while minimizing cost.

Our team members have experience implementing, providing and receiving all of the M&V options identified in the IPMVP International table above. Every project requires an application-specific M&V evaluation, because each will have its own unique set of improvement measures, and differing levels of client parameters to meet. It is important to note that a measurement and verification plan could combine one or any number of the options identified in the IPMVP option table.

While the above is fundamentally true, ESP is convinced that there may be value in utilizing prescriptive, equipment specific measurement to prove as much of the savings as possible. We prefer to quantify the energy savings by measuring efficiency and operating points (energy consumption, flows. temperatures, etc.) both before and after retrofit work is completed, and then compare the readings. Today's technology offers numerous devices that can be used for accurately taking these pre and post measurements. If the efficiency improved and/or the energy consumption decreased by the guaranteed values, then you know the savings area achievable.

ESP's objective is to clearly quantify savings for the purpose of adhering to the requirements associated with the funds and provide the comfort level to the City that savings are being achieved, while minimizing the on-going cost to you for attaining this assurance. We can provide the measurements on a one-time, multiple-year or continuous basis. However, there are diminishing returns when too much money is spent verifying the savings, so we will work with your staff to determine the best approach for your given application.

Site-Specific Observation for the City of Oberlin

ESP's members strongly believe that proving the savings guarantee through methods that yield a clear understanding by all parties is essential. The proposed grouping of energy conservation measures offers a diverse level of complexity for proving the savings.

ESP is a strong proponent of more targeted measurements to prove energy savings. This approach looks specifically at the equipment involved in creating the savings. This method is very effective in very clearly and quickly identifying measures that are performing and underperforming at the equipment level. In the unlikely event that the equipment is underperforming, a remediation plan can be put in place so that savings are still realized at the expected levels.

The following table gives some examples for different energy conservation measures and a sound method for determining savings performance. Some, none, or all of these could be incorporated into a project for the City of Oberlin. The ECMs that you elect to move forward with, will dictate which method will be used, and may likely include a combination of methods.

ESP is committed to working with your team to put together an M&V Plan that clearly defines how the savings will be verified and ultimately achieved based upon the improvement you select

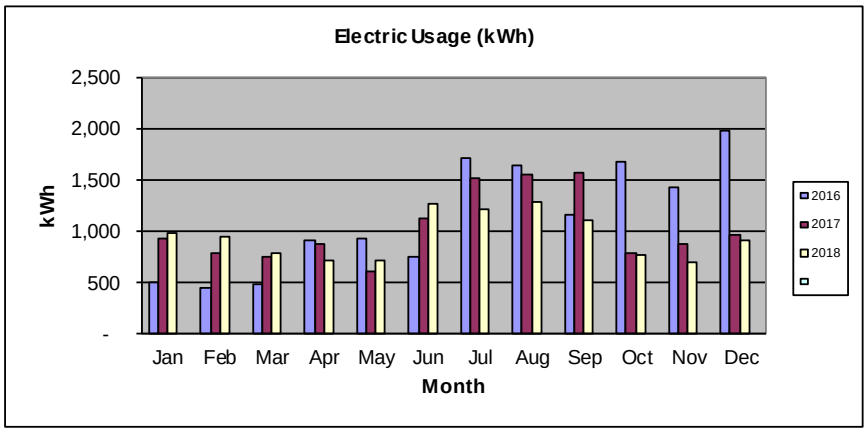
to be included in your project. Any potential on-going cost associated with this plan will be quantified and contractually identified prior to executing the EPC document.

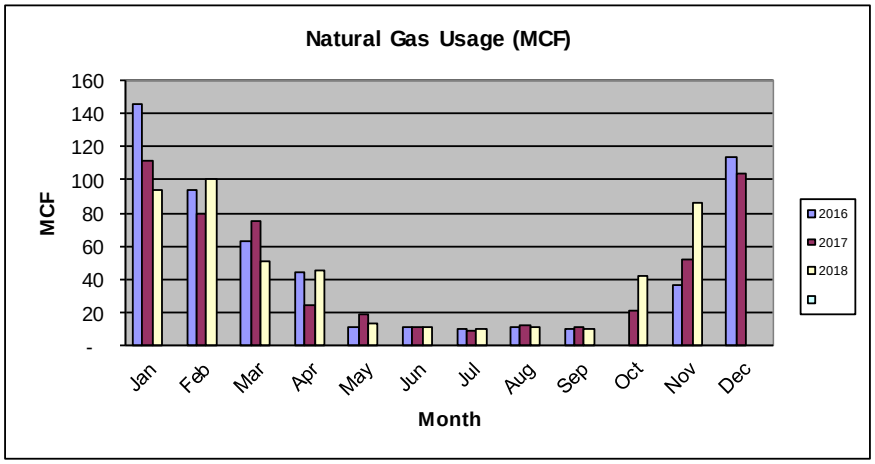
ECM	Measurement methodology	Energy parameter	Efficiency parameter	Measurement parameters	Comments
Lighting retrofits	Pre & post installation	kW & kWh	kW/fixture	kW	Measure statistically significant quantity of each fixture type.
Lighting occupancy controls	Calculated	kWh	Electric usage	N/A	
Water efficiency improvements	Pre & post installation	Gallons per minute (GPM) / gallons per flush	GPM / GPF	Gallons	Measure statistically significant quantity of each fixture type.
Building infiltration improvements	Calculated	kWh & natural gas	Heating energy	N/A	
WiFi programmable thermostats	Commissioning & verification	kWh & natural gas	Operational	Schedules, setpoints, sequence	Setpoints and schedules are confirmed.
Split Unit Replacements	Calculated	kWh	Electric usage	N/A	
High Efficiency Motor Replacements	Calculated	kWh	Electric usage	N/A	
Hot Water Boiler Replacement	Calculated	Natural gas	Gas usage	N/A	
Water Meters	Calculated	Meter accuracy	Meter accuracy	N/A	

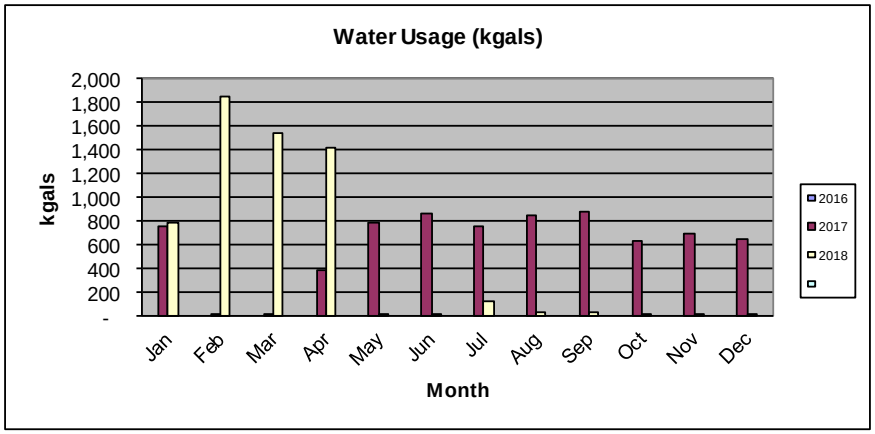
Appendix A – Utility Charts

The following charts detail the annual utility costs for the building evaluated.

Airport







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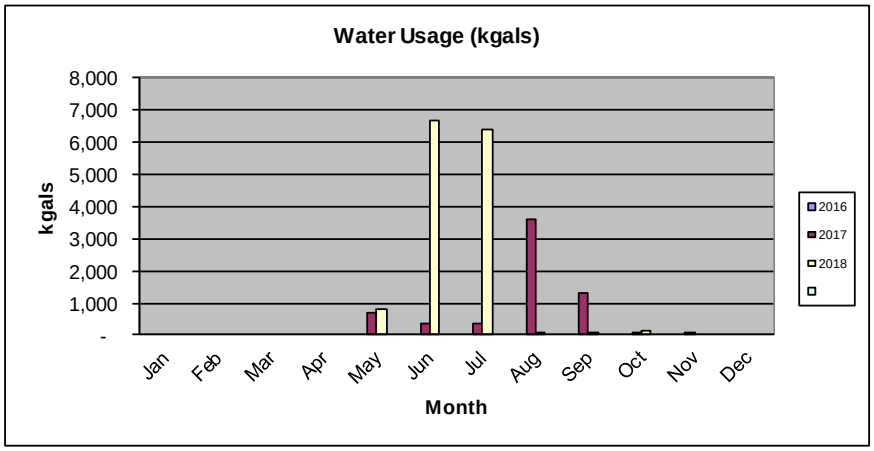
Cemetery Shed



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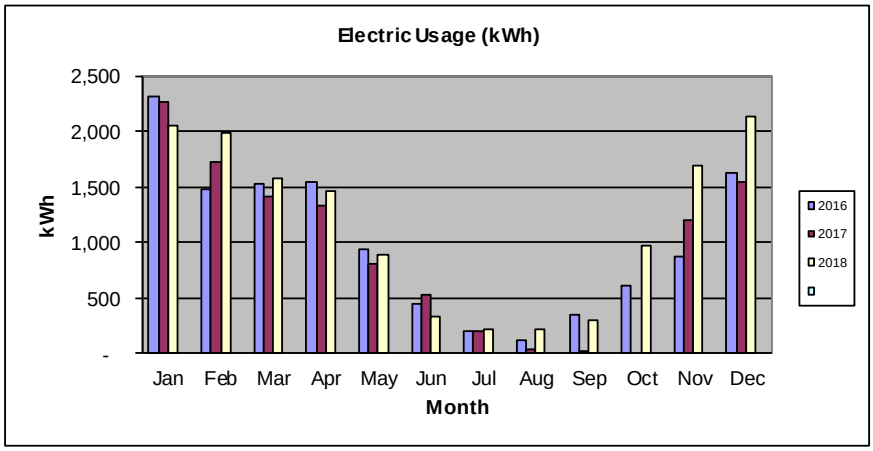
Chemical Shed



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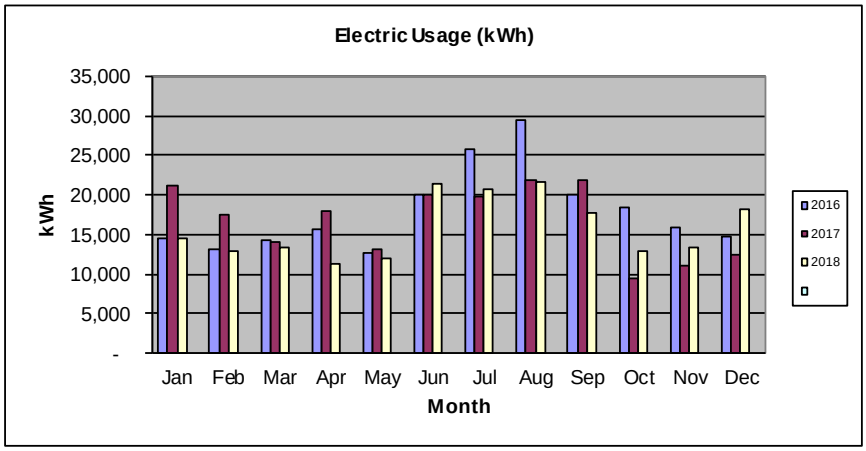
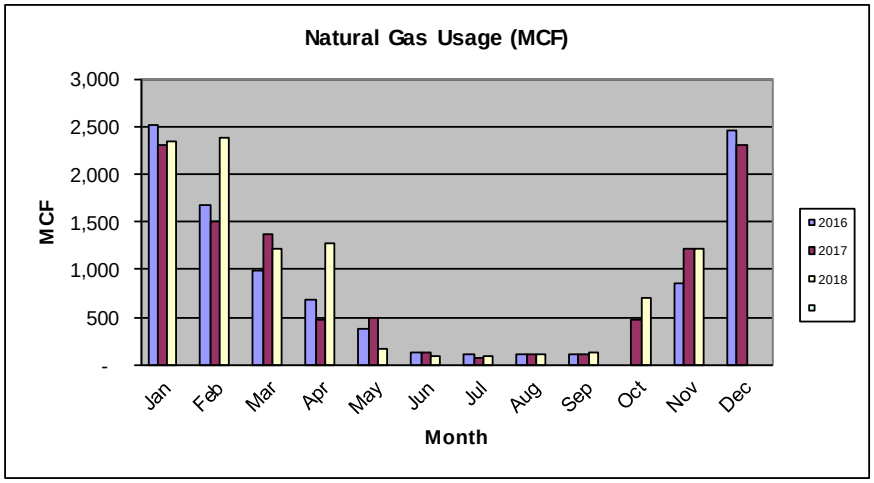
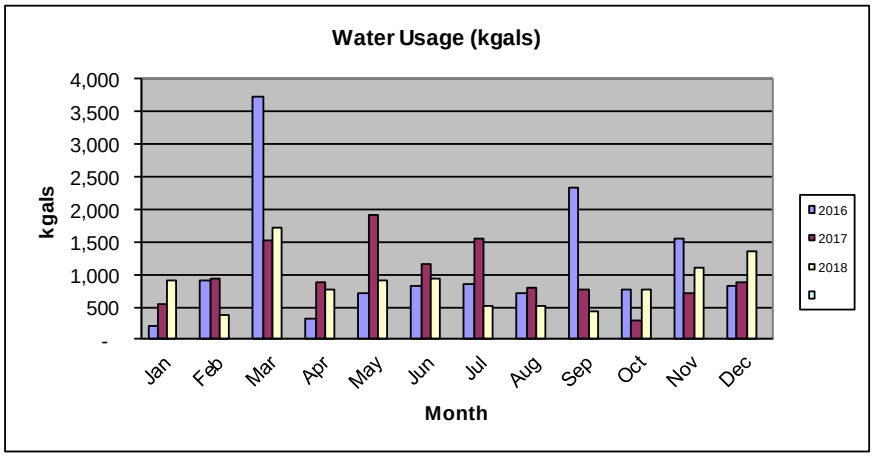
Gateway







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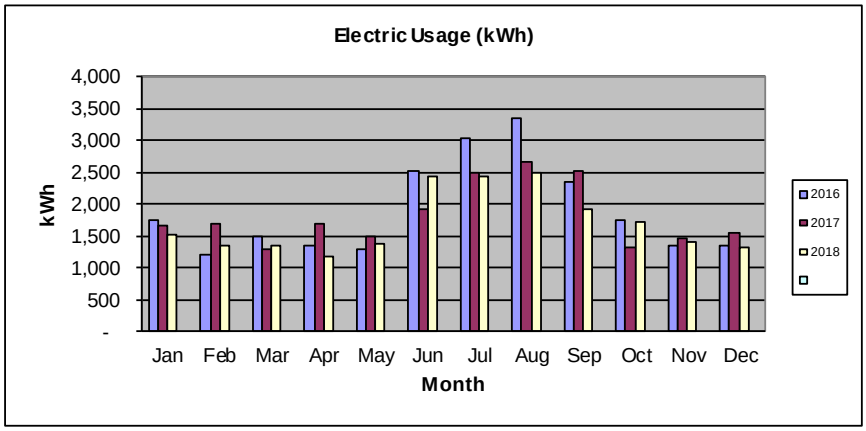
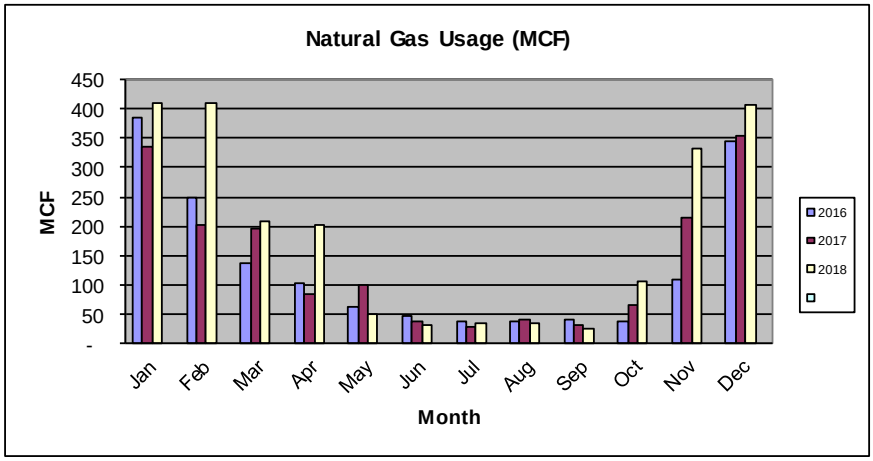
Library





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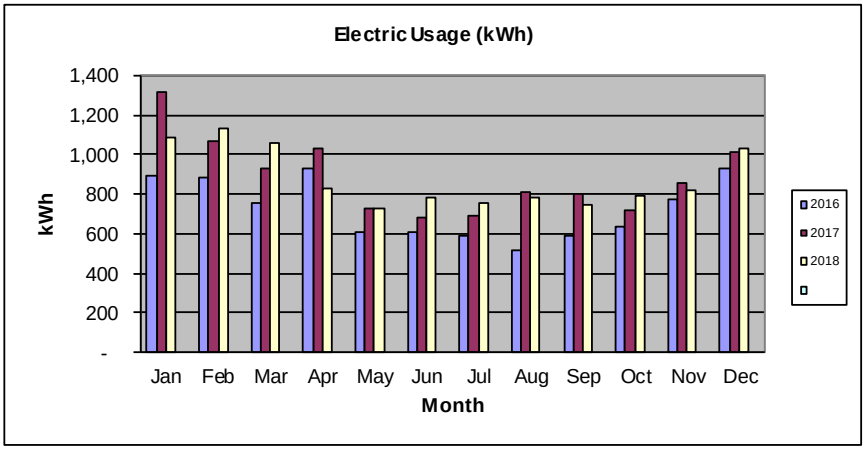
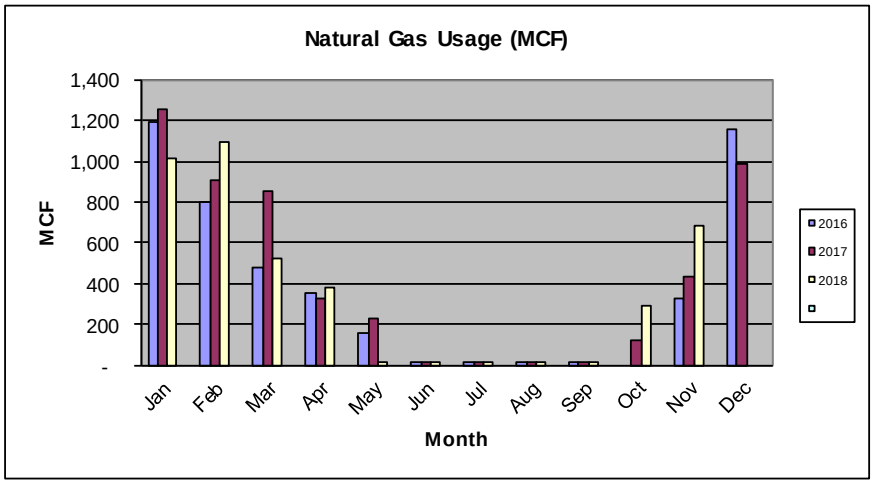
Main Warehouse





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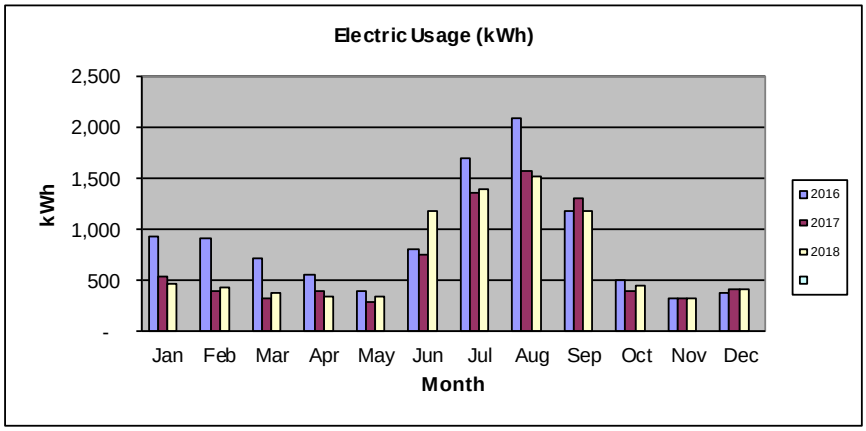
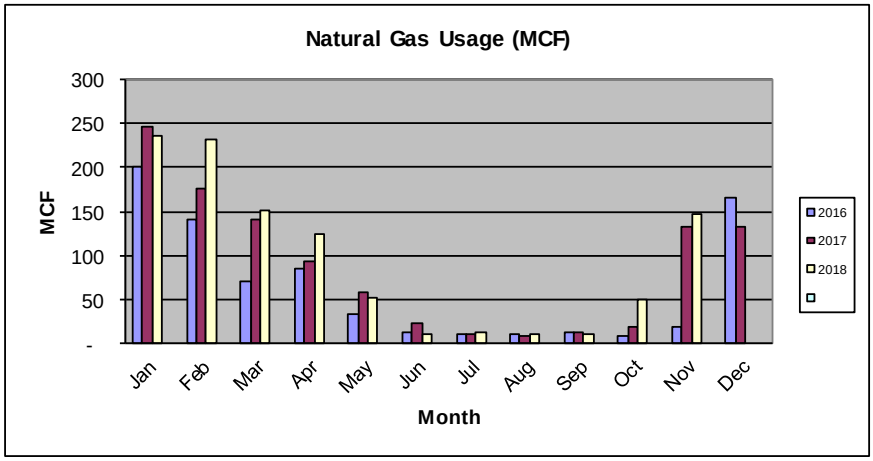
Police





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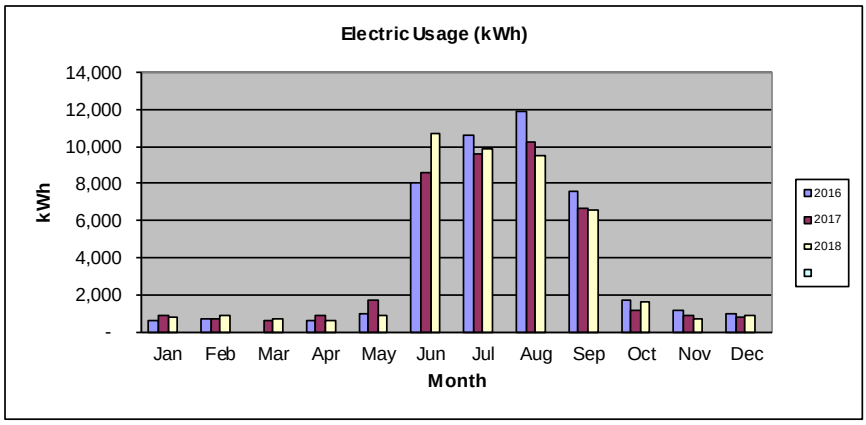
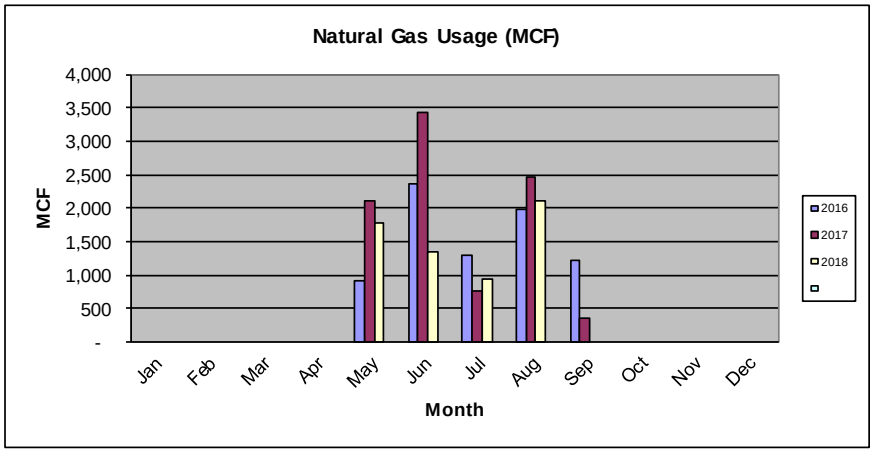
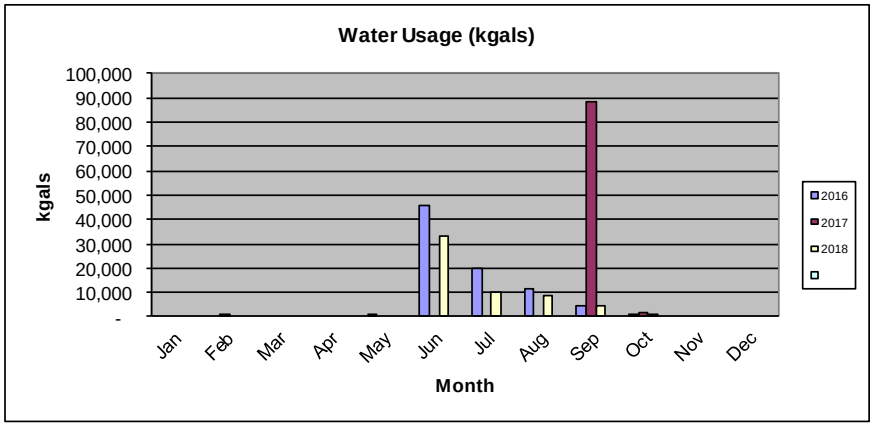
Pool Bath House







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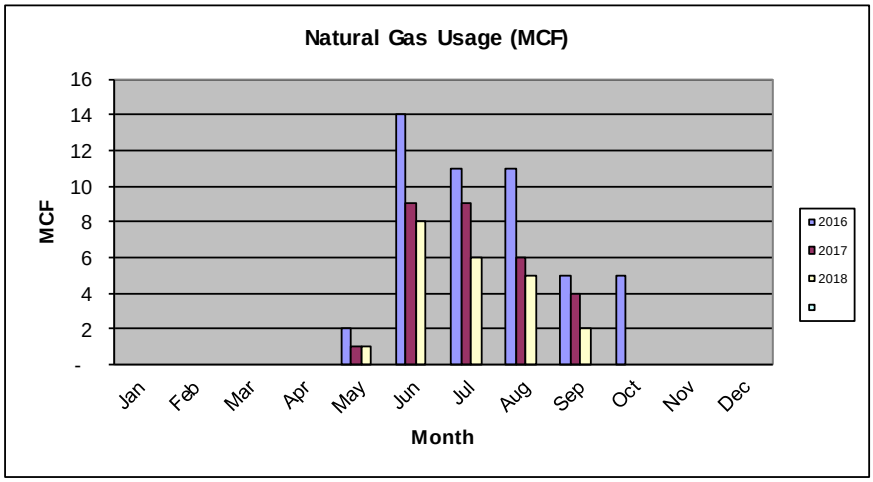
Pool Boiler Room



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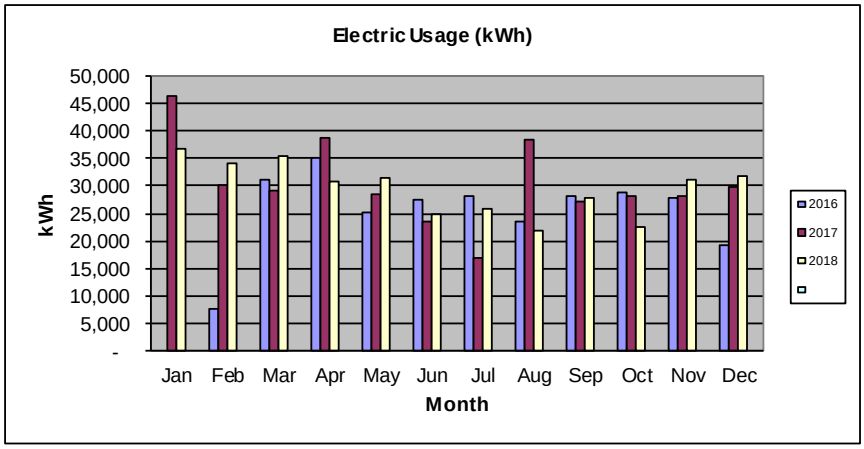
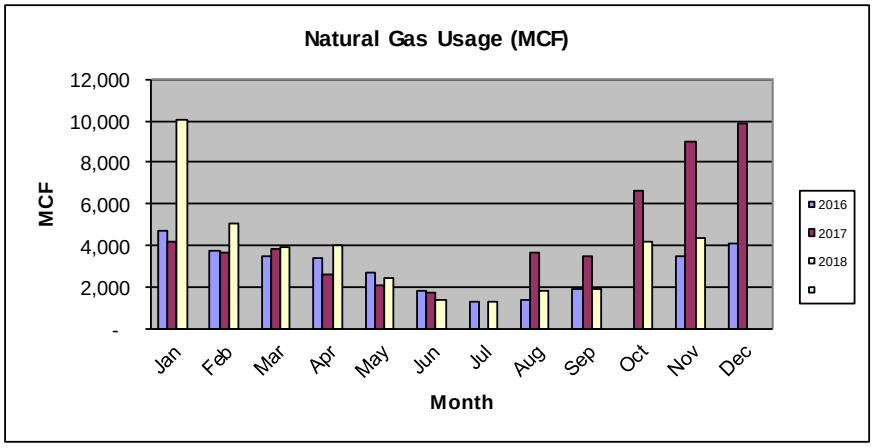
Power Plant





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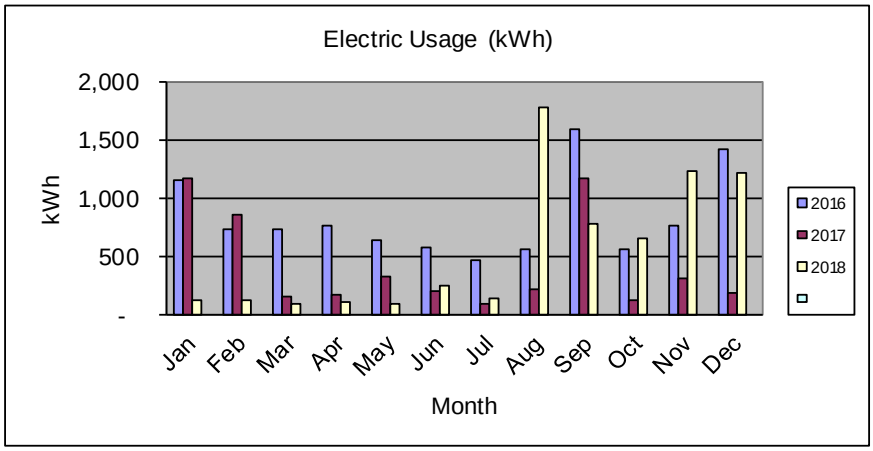
Sappa Park



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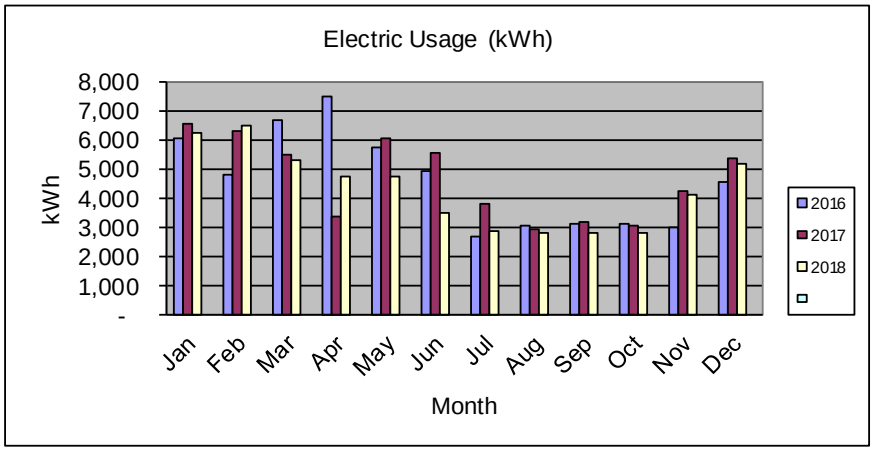
Sewer Plant



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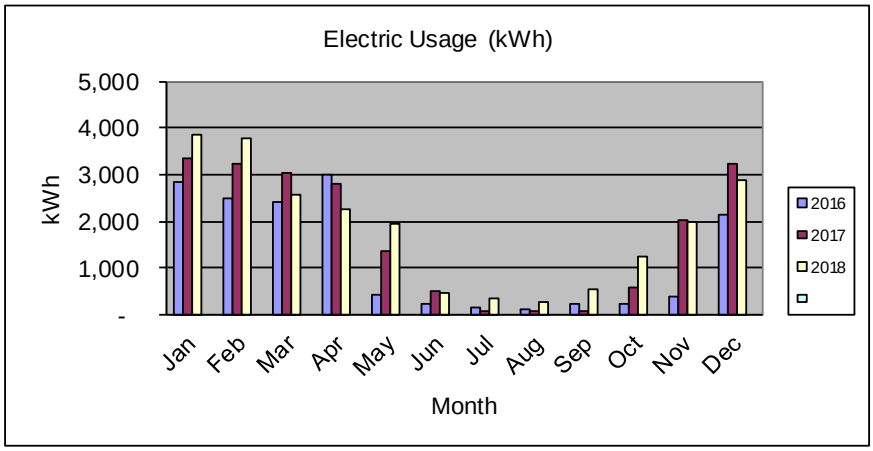
Water/Parks Block Bldg



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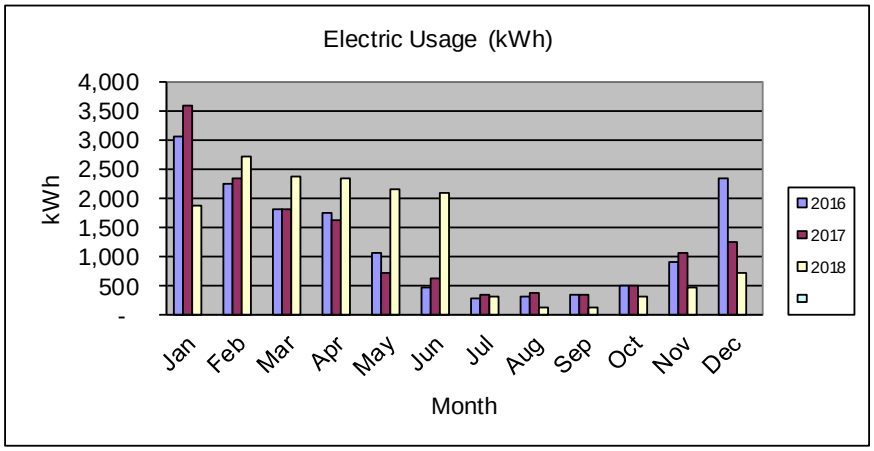
Well #10



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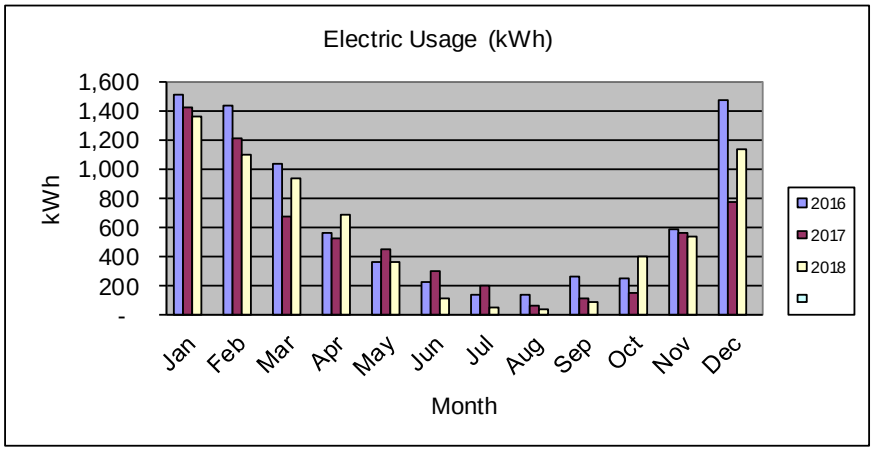

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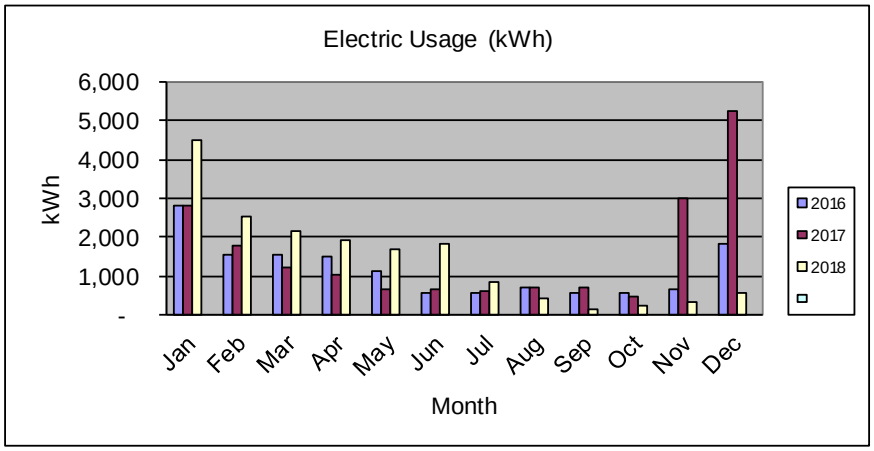

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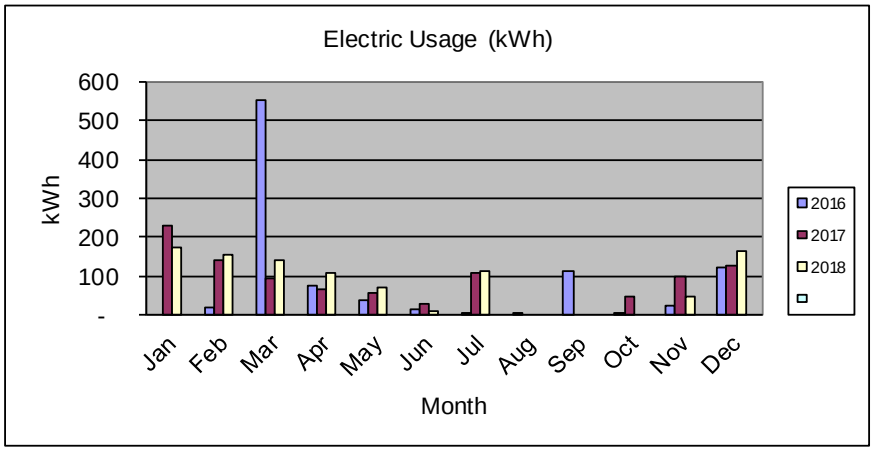

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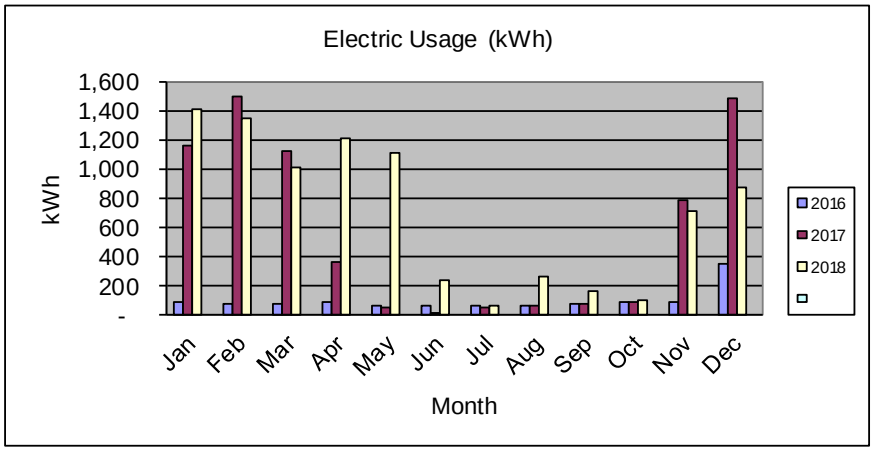
Wood Building



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Appendix B – Savings Calculations

LIGHTING IMPROVEMENTS SAVINGS CALCULATIONS

City of Oberlin - KS	Existing Condition							Proposed Solution				
Area Name	Product Type	QTY	Lamps/Fixture	Watts/Lamp	Fixture Wattage	Total kW	Rate Schedule	Measure Type	ECM	QTY	Input Wattage	Total kW
						176.94				1,456		33.88
Airport | | Airport 1832 N Hwy 83	4'-S-2L-4'-F40T12-Total75W	3	2	40	75	0.225	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	6	10.8	0.065
Airport | | Airport 1832 N Hwy 83 | | Quonset hut hanger	4'-S-2L-4'-F40T12-Total75W	4	2	40	75	0.300	All of Oberlin Elect rate	Lamp	Par38-20w-30K 90CRI	5	20	0.100
Cemetary and Chemical Shed KS | | Cemetary & Chemical sheds -2	8'-S-2L-8'-F95T12-Total176W	2	2	95	176	0.352	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	12	10.8	0.130
Gateway | | Gateway; 1 Morgan Dr. | | 2nd floor lobby	A1x4T-2L-4'-F40T12-Total75W	3	2	40	75	0.225	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Gateway | | Gateway; 1 Morgan Dr. | | 2nd floor lobby	BR38-INC-150W	5	1	150	150	0.750	All of Oberlin Elect rate	Lamp	IDO-801B-22W-50-E26	61	22	1.342
Gateway | | Gateway; 1 Morgan Dr. | | 2nd floor lobby	A2x4T-4L-4'-F40T12-Total149W	3	4	40	149	0.447	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	6	10.8	0.065
Gateway | | Gateway; 1 Morgan Dr. | | 2nd floor lobby	4'-W-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Luminaire	SYHU-HB-P10521-D-N-50	20	105	2.100
Gateway | | Gateway; 1 Morgan Dr. | | 2nd floor lobby | | Bathrooms M F	A2x4T-4L-4'-F40T12-Total149W	4	4	40	149	0.596	All of Oberlin Elect rate	Retrofit Kit	LM-A30-4-15X4-50K-D	30	60	1.800
Gateway | | Gateway; 1 Morgan Dr. | | Arena	HB-1L-HID-MH-400W-Total464W	20	1	400	464	9.280	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	28	10.8	0.302
Gateway | | Gateway; 1 Morgan Dr. | | Arena	8'-AW-2L-8'-F95T12-Total176W	30	2	95	176	5.280	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	16	10.8	0.173
Gateway | | Gateway; 1 Morgan Dr. | | City office	A2x4T-4L-4'-F32T8-Total119W	2	4	32	119	0.238	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	16	10.8	0.173
Gateway | | Gateway; 1 Morgan Dr. | | City office	A2x4T-4L-4'-F40T12-Total149W	8	4	40	149	1.192	All of Oberlin Elect rate	Lamp	FF-T82-A2-WAB-7-40	20	7	0.140
Gateway | | Gateway; 1 Morgan Dr. | | Elevator	4'-S-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	24	10.8	0.259
Gateway | | Gateway; 1 Morgan Dr. | | Elevator Room 1st floor	4'-W-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Lamp	PLT-11025	5	16	0.080
Gateway | | Gateway; 1 Morgan Dr. | | Exterior	SB-AR-1L-HID-HPS-150W-Total174W	5	1	150	174	0.870	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	14	10.8	0.151
Gateway | | Gateway; 1 Morgan Dr. | | Exterior	FT-WP-1L-HID-HPS-250W-Total290W	1	1	250	290	0.290	All of Oberlin Elect rate	Luminaire	WM25W27VXXKYY	3	25	0.075
Gateway | | Gateway; 1 Morgan Dr. | | Exterior	SB-AR-1L-HID-HPS-400W-Total464W	5	1	400	464	2.320	All of Oberlin Elect rate	Retrofit Kit	LM-A30-4-15X4-50K-D	2	60	0.120
Gateway | | Gateway; 1 Morgan Dr. | | Exterior	WP-1L-HID-HPS-70W-Total82W	6	1	70	82	0.492	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	8	10.8	0.086
Gateway | | Gateway; 1 Morgan Dr. | | Exterior	8'-S-2L-8'-F95T12-Total176W	1	2	95	176	0.176	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	32	10.8	0.346
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen	A2x4T-4L-4'-F40T12-Total149W	14	4	40	149	2.086	All of Oberlin Elect rate	Lamp	A19-8.5w-27K	2	9.5	0.019
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen	A2x4T-4L-4'-F40T12-Total149W	14	4	40	149	2.086	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	4	10.8	0.043
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen	4'-S-2L-4'-F40T12-Total75W	2	2	40	75	0.150	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	8	10.8	0.086
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen	4'-W-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen | | Cooler freezer	A19-INC-60W	2	1	60	60	0.120	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen | | Elect rm	4'-W-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen | | Pantry	A2x4T-4L-4'-F40T12-Total149W	3	4	40	149	0.447	All of Oberlin Elect rate	Luminaire	MAL0445W27V50KDT3	5	40	0.200
Gateway | | Gateway; 1 Morgan Dr. | | Kitchen | | Storage	A2x4T-4L-4'-F40T12-Total149W	3	4	40	149	0.447	All of Oberlin Elect rate	Luminaire	WP70W27V50KYY	1	70	0.070
Gateway | | Gateway; 1 Morgan Dr. | | Level 1 hall	A2x4T-4L-4'-F40T12-Total149W	6	4	40	149	0.894	All of Oberlin Elect rate	Luminaire	SB2-100-AW-50K-D30-SAA	5	100	0.500
Gateway | | Gateway; 1 Morgan Dr. | | Level 1 hall | | Bathrooms M F	A2x4T-4L-4'-F40T12-Total149W	4	4	40	149	0.596	All of Oberlin Elect rate	Luminaire	WM25W27VXXKYY	6	25	0.150
Gateway | | Gateway; 1 Morgan Dr. | | Level 1 hall | | Bathrooms M F	2'-S-2L-2'-F20T12-Total38W	10	2	20	38	0.380	All of Oberlin Elect rate	Retrofit Kit	LM-A30-4-15X4-50K-D	1	60	0.060
Gateway | | Gateway; 1 Morgan Dr. | | Level 1 hall | | Bathrooms M F	4'-S-2L-4'-F40T12-Total75W	12	2	40	75	0.900	All of Oberlin Elect rate	Luminaire	SB-100W1N50T3	15	100	1.500
Gateway | | Gateway; 1 Morgan Dr. | | Main entrance	HID-MH-250W	5	1	250	250	1.250	All of Oberlin Elect rate	Luminaire	MAL0445W27V50KDT3	21	40	0.840
Gateway | | Gateway; 1 Morgan Dr. | | Meeting rooms	A2x4T-4L-4'-F40T12-Total149W	20	4	40	149	2.980	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	56	10.8	0.605
Gateway | | Gateway; 1 Morgan Dr. | | Meeting rooms	6"RC-1L-A19-INC-60W-Total60W	12	1	60	60	0.720	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	56	10.8	0.605
Gateway | | Gateway; 1 Morgan Dr. | | Meeting rooms | | Linen and laundry	4'-W-2L-4'-F40T12-Total75W	4	2	40	75	0.300	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	4	10.8	0.043
Gateway | | Gateway; 1 Morgan Dr. | | Meeting rooms | | Storage and sink room	A2x4T-4L-4'-F40T12-Total149W	3	4	40	149	0.447	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Gateway | | Gateway; 1 Morgan Dr. | | Mgr	2'-S-2L-2'-F20T12-Total38W	1	2	20	38	0.038	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	24	10.8	0.259
Gateway | | Gateway; 1 Morgan Dr. | | Mgr	A2x4T-4L-4'-F40T12-Total149W	9	4	40	149	1.341	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	8	10.8	0.086
Gateway | | Gateway; 1 Morgan Dr. | | Stairwells front n back	A2x4T-4L-4'-F40T12-Total149W	6	4	40	149	0.894	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Gateway | | Gateway; 1 Morgan Dr. | | Supplies	A2x4T-4L-4'-F40T12-Total149W	8	4	40	149	1.192	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	39	10.8	0.421
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	GEN-1L-INC-120W-Total120W	2	1	120	120	0.240	All of Oberlin Elect rate	Lamp	GREENCREATIVE-97973	6	25	0.150
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	BR38-INC-150W	6	1	150	150	0.900	All of Oberlin Elect rate	Lamp	Luxrite LR20580 FC12T9/CW 32-Watt 12 IN	2	16	0.032
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	BR38-INC-150W	16	1	150	150	2.400	All of Oberlin Elect rate	Lamp	A19-8.5w-27K	4	9.5	0.038
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	BR38-INC-150W	9	1	150	150	1.350	All of Oberlin Elect rate	Lamp	PT2-40W-30K-E39	5	40	0.200
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	A19-INC-100W	9	1	100	100	0.900	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	4	10.8	0.043
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	PAR38-INC-65W	4	1	65	65	0.260	All of Oberlin Elect rate	Lamp	A19-8.5w-27k	6	9.5	0.057
Gateway | | Gateway; 1 Morgan Dr. | | Theatre	A19-INC-60W	4	1	60	60	0.240	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	68	10.8	0.734
Gateway | | Gateway; 1 Morgan Dr. | | Theatre | | Dressing & Restroom	A1x4T-2L-4'-F40T12-Total75W	2	2	40	75	0.150	All of Oberlin Elect rate	Retrofit Kit	LM-A30-4-15X4-50K-D	6	60	0.360
Gateway | | Gateway; 1 Morgan Dr. | | Theatre | | Dressing & Restroom	2x4T-4L-4'-F40T12-Total149W	2	4	40	149	0.298	All of Oberlin Elect rate	Luminaire	SYHU-HB-P10521-D-N-50	1	105	0.105
Gateway | | Gateway; 1 Morgan Dr. | | Theatre lobby & Entrance ceiling cans 9"	BR38-INC-150W	8	1	150	150	1.200	All of Oberlin Elect rate	Retrofit Kit	LM-A30-4-15X4-50K-D	13	60	0.780
Library | | Library 104 E Oak | | Lower Level	4'-S-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	80	10.8	0.864
Library | | Library 104 E Oak | | Lower Level	4'-W-3L-4'-F40T12-Total112W	13	3	40	112	1.456	All of Oberlin Elect rate	Lamp	A19-8.5w-27k	12	9.5	0.114
Library | | Library 104 E Oak | | Lower Level	GEN-1L-INC-300W-Total300W	6	1	300	300	1.800	All of Oberlin Elect rate	Lamp	FF-T82-A2-WAB-7-40	2	7	0.014
Library | | Library 104 E Oak | | Lower Level	12"-CircF-32W	2	1	32	32	0.064	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	36	10.8	0.389
Library | | Library 104 E Oak | | Main floor	A1x4T-2L-4'-F40T12-Total75W	2	2	40	75	0.150	All of Oberlin Elect rate	Retrofit Kit	LM-EXPS-50-A11-D	70	0	0.000
Library | | Library 104 E Oak | | Main floor	A19-INC-60W	6	1	60	60	0.360	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	12	10.8	0.130
Library | | Library 104 E Oak | | Main floor	2x4T-4L-4'-F40T12-Total149W	17	4	40	149	2.533	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	36	10.8	0.389
Library | | Library 104 E Oak | | Main floor	8'-S-2L-8'-F95T12-Total176W	6	2	95	176	1.056	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Library | | Library 104 E Oak | | Main floor | | Main Bathrooms	A19-INC-60W	4	1	60	60	0.240	All of Oberlin Elect rate	Lamp	A19-8.5w-27K	1	9.5	0.010
New Lights - City Wide | | Oberlin In-general	New #1	70	0	0	0	0.000	All of Oberlin Elect rate	Lamp	SATCO-S8647	2	19	0.038
Police | | Police 107 W. Commercial	A2x4T-4L-4'-F40T12-Total149W	9	4	40	149	1.341	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Police | | Police 107 W. Commercial	4'-S-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Police | | Police 107 W. Commercial	A19-INC-60W	1	1	60	60	0.060	All of Oberlin Elect rate	Lamp	Fulight LED F15T8	2	7	0.014
Police | | Police 107 W. Commercial	A21-INC-150W	2	1	150	150	0.300	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	12	10.8	0.130
Police | | Police 107 W. Commercial	4'-S-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Retrofit Kit	LM-A30-4-15X4-50K-D	18	60	1.080
Police | | Police 107 W. Commercial	4'-S-1L-4'-F40T12-Total38W	2	1	40	38	0.076	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	8	10.8	0.086
Pool | | Pool; 124 S. Marks | | Bath house	4'-VT-2L-4'-F32T8-Total60W	14	2	32	60	0.840	All of Oberlin Elect rate	Lamp	IDO-802B-45W-50-e26	38	45	1.710
Pool | | Pool; 124 S. Marks | | Boiler Room	4'-VT-2L-4'-F32T8-Total60W	7	2	32	60	0.420	All of Oberlin Elect rate	Lamp	A19-8.5w-27K	7	9.5	0.067
Pool | | Pool; 124 S. Marks | | Boiler Room	WP-1L-HID-HPS-70W-Total82W	3	1	70	82	0.246	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	2	10.8	0.022
Power Plant | | Power Plant 1, 217 S. Rodehaver	1.5'-T12-LF-15W	2	1	15	15	0.030	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	4	10.8	0.043
Power Plant | | Power Plant 1, 217 S. Rodehaver	4'-S-2L-4'-F40T12-Total75W	6	2	40	75	0.450	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	24	10.8	0.259
Power Plant | | Power Plant 1, 217 S. Rodehaver	8'-S-2L-8'-F95T12-Total176W	18	2	95	176	3.168	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	12	10.8	0.130
Sappa Park | | Sappa Park 1875 1300th Rd	A19-INC-60W	7	1	60	60	0.420	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	12	10.8	0.130
Sappa Park | | Sappa Park 1875 1300th Rd	4'-S-2L-4'-F40T12-Total75W	1	2	40	75	0.075	All of Oberlin Elect rate	Luminaire	MAL0445W27V50KDT3	280	40	11.200
Sappa Park | | Sappa Park 1875 1300th Rd	4'-S-1L-4'-F40T12-Total38W	4	1	40	38	0.152	All of Oberlin Elect rate	Lamp	FF-T84-A2-WAB-10-40	32	10.8	0.346
Street Lights | | Street/Hwy/Pole Lights | | Acorn, Decorative non LED	GEN-1L-HID-MV-100W-Total125W	61	1	100	125	7.625	All of Oberlin Elect rate	Lamp	PLT-11025	2	16	0.032
Street Lights | | Street/Hwy/Pole Lights | | Globe, Decorative non LED	GEN-1L-HID-MV-175W-Total201W	38	1	175	201	7.638	All of Oberlin Elect rate	Lamp	Par38-20w-30K 90CRI	6	20	0.120
Street Lights | | Street/Hwy/Pole Lights | | Hwy Dusk to Dawn	CH-AR-1L-HID-MV-400W-Total464W	15	1	400	464	6.960	All of Oberlin Elect rate	Lamp	Par38-20w-30K 90CRI	16	20	0.320
Street Lights | | Street/Hwy/Pole Lights | | Hwy Dusk to Dawn	CH-AR-1L-HID-HPS-250W-Total290W	21	1	250	290	6.090	All of Oberlin Elect rate	Lamp	Par38-20w-30K 90CRI	9	20	0.180
Street Lights | | Street/Hwy/Pole Lights | | Street Lights Dusk to Dawn	CH-AR-1L-HID-MV-250W-Total290W	280	1	250	290	81.200	All of Oberlin Elect rate	Lamp	A19-15W-30K	9	15	0.135
Warehouse | | Main Whse 213 S. Rodehaver	HB-1L-HID-MH-400W-Total464W	1	1	400	464	0.464	All of Oberlin Elect rate	Lamp	Par30-112W-30K	4	10	0.040
Warehouse | | Main Whse 213 S. Rodehaver	8'-S-2L-8'-F95T12-Total176W	13	2	95	176	2.288	All of Oberlin Elect rate	Lamp	A19-8.5w-27K	4	9.5	0.038
Warehouse | | Main Whse 213 S. Rodehaver | | bldg B	GEN-1L-INC-120W-Total120W	5	1	120	120	0.600	All of Oberlin Elect rate	Lamp	Par38-20w-30K 90CRI	8	20	0.160

WATER EFFICIENCY SAVINGS CALCULATIONS

Water Efficiency Savings Calculations

Building	Retrofit	Room Type	Fixture	Qty	Existing Flow Rate	New Flow Rate	Units	Delta in Gallons	New Qty	use per day (flush / minutes per day)	Water Savings (Gal/day)	Water Savings (Gal/year)	Water Savings (kGal/year)
Totals				53					53		691	252045	252.0
Gateway	Reduced Flow Toilet Flush-o-Meter	Lower Level Men's Room	Toilets	4	3.50	1.28	gpf	2.22	4	8	71	25930	25.9
Gateway	Reduced Flow Urinal Flush-o-Meter	Lower Level Men's Room	Urinals	5	2.00	0.13	gpf	1.88	5	8	75	27375	27.4
Gateway	Reduced Flow Sink Aerators	Lower Level Men's Room	Sinks	3	1.50	0.50	gpm	1.00	3	8	24	8760	8.8
Gateway	Reduced Flow Toilet Flush-o-Meter	Lower Level Women's Room	Toilets	9	3.50	1.28	gpf	2.22	9	8	160	58342	58.3
Gateway	Reduced Flow Sink Aerators	Lower Level Women's Room	Sinks	4	1.50	0.50	gpm	1.00	4	8	32	11680	11.7
Gateway	Reduced Flow Sink Aerators	Office Next to Kitchen	Sinks	1	1.25	0.50	gpm	0.75	1	8	6	2190	2.2
Gateway	Reduced Flow Sink Aerators	Upper Level Meeting Room	Sinks	1	0.94	0.50	gpm	0.44	1	8	4	1278	1.3
Gateway	Reduced Flow Toilet Flush-o-Meter	Upper Level Men's Room	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Gateway	Reduced Flow Sink Aerators	Upper Level Men's Room	Sinks	1	1.50	0.50	gpm	1.00	1	8	8	2920	2.9
Gateway	Reduced Flow Toilet Flush-o-Meter	Upper Level Women's Room	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Gateway	Reduced Flow Sink Aerators	Upper Level Women's Room	Sinks	1	0.83	0.50	gpm	0.33	1	8	3	973	1.0
Main Warehouse	Reduced Flow Toilet Flush-o-Meter	Restroom	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Main Warehouse	Reduced Flow Sink Aerators	Restroom	Sinks	1	1.25	0.50	gpm	0.75	1	8	6	2190	2.2
Pool	Reduced Flow Toilet Flush-o-Meter	Restroom	Toilets	2	1.60	1.28	gpf	0.32	2	8	5	1869	1.9
Pool	Reduced Flow Sink Aerators	Restroom	Sinks	2	1.25	0.50	gpm	0.75	2	8	12	4380	4.4
Library	Reduced Flow Toilet Flush-o-Meter	Upper Level Restroom	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Library	Reduced Flow Sink Aerators	Upper Level Restroom	Sinks	1	1.07	0.50	gpm	0.57	1	8	5	1669	1.7
Library	Reduced Flow Toilet Flush-o-Meter	Lower Level Men's Room	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Library	Reduced Flow Urinal Flush-o-Meter	Lower Level Men's Room	Urinals	1	2.00	0.13	gpf	1.88	1	8	15	5475	5.5
Library	Reduced Flow Sink Aerators	Lower Level Men's Room	Sinks	1	1.50	0.50	gpm	1.00	1	8	8	2920	2.9
Library	Reduced Flow Toilet Flush-o-Meter	Lower Level Women's Room	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Library	Reduced Flow Sink Aerators	Lower Level Women's Room	Sinks	1	1.25	0.50	gpm	0.75	1	8	6	2190	2.2
Airport	Reduced Flow Toilet Flush-o-Meter	Men's Room	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Airport	Reduced Flow Urinal Flush-o-Meter	Men's Room	Urinals	1	2.00	0.13	gpf	1.88	1	8	15	5475	5.5
Airport	Reduced Flow Sink Aerators	Men's Room	Sinks	1	0.68	0.50	gpm	0.18	1	8	1	531	0.5
Airport	Reduced Flow Toilet Flush-o-Meter	Women's Room	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Airport	Reduced Flow Sink Aerators	Women's Room	Sinks	1	0.68	0.50	gpm	0.18	1	8	1	531	0.5
Police	Reduced Flow Toilet Flush-o-Meter	Restroom	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Police	Reduced Flow Sink Aerators	Restroom	Sinks	1	0.54	0.50	gpm	0.04	1	8	0	104	0.1
Power Plant	Reduced Flow Toilet Flush-o-Meter	Restroom	Toilets	1	3.50	1.28	gpf	2.22	1	8	18	6482	6.5
Power Plant	Reduced Flow Sink Aerators	Restroom	Sinks	1	7.50	0.50	gpm	7.00	1	8	56	20440	20.4

BUILDING ENVELOPE SAVINGS CALCULATIONS

Presents the following

Audit / Proposal

to

Energy Solutions Professionals (ESP)

6400 W. 95th Street, Suite 202
Overland Park, KS. 66212

Customer Contact ---- Ron LaCombe

M: 816-799-5944
ron@energyesp.com

Building Envelope Solutions, LLC proposes to upgrade the building envelope for the following buildings noted below. We have reviewed and audited the following buildings and have prepared this quote based on these audits.

Project Site: **City of Oberlin**
Quote Date: **January 23, 2019** **Revision A**

Audit Date: January 17, 2019
Assessor(s): George Kutschenreuter
Calculation Method: **EGAM NR-04-01A (Derived from EC-128 - Energy Canada study 128, and ASHRAE Calculations)**

Air leakage is defined as, "the uncontrolled migration of conditioned air through the building envelope". Caused by pressure differences due to wind, chimney (or stack) effect and mechanical systems it has been shown to represent the single largest source of heat loss or gain through the building envelopes of nearly all types of buildings. Tests carried out by the National Research Council of Canada on High Rise Commercial and Residential Buildings, Schools, Supermarkets and Houses have shown levels as high as 20% or 30% of heat loss **could** be attributed to Air Leakage. Typical savings however tend to be in the 5% to 15% range though. Beyond representing potential for energy savings uncontrolled air leakage can affect thermal comfort of occupants air quality through ingress of contaminants from outside and the imbalance of mechanical systems, and the structural integrity of the building envelope through moisture migration. Control of air leakage involves the sealing of gaps cracks and holes using appropriate materials such as Fire Retardant, Poly Urethane Foam, caulks, and appropriate weather stripping materials. The goal is to create a continuous plane of 'air-tightness' to completely encompass the Building Envelope, including the need to "decouple" floor —to- floor, and to "compartmentalize" components of the building in order to equalize pressure differences.

Sites at City of Oberlin include; Airport, Chemical Shed, Gateway, Library, Main Warehouse, Police, which all show cost and savings per location.

All buildings reviewed by BES were included in the following scope.

Project Scope:

The following project Pricing includes materials, and installation for each of the buildings, based on the audit quantities listed. Additionally prints detailing scope of work indicting final location for the upgrades at each site are available.

Drawing Details: Colors of Marks/Lines reference shown on drawings with color coded template on drawing.

Projected Project Schedule.

This project is estimated to take roughly 1 Week to complete including all mobilization, installation, and clean up with roughly 2 - 3 installers and 1 PM on site full time. Please refer to the BES Installation protocol for details of our installation process.

Airport

1832 N Hwy 83
Macon, MO 63552

VISUAL COMMENTS or RECOMMENDATIONS:

The exterior doors should be weather-stripped to reduce air loss.

COST AND PAYBACK ANALYSIS:

Annual Cost of Leakage (Therms):	-
Annual Cost of Leakage (Kwh):	-
Annual Cost of Leakage:	-
Price to Rectify Air Leakage:	-
Payback in years:	-

TYPE OF MEASURES:

	Building Level	quantity or distance
Ext. Door(s) to be weather-stripped & sealed.	All Levels	2 Doors

AIR LEAKAGE:

	feet	inches		
Doors	40	3/32	0.31	sq ft
Totals	-		0.31	sq ft
			0.03	sq meter

ASSUMPTIONS & CALCULATIONS:

Power Rate	per Kwh
Heating Fuel	perTherm
Building K	120

Example Calculation

$$\frac{(\text{leakage x bldg "K"}) \text{ x } (\text{wind P factor}) \text{ x } (\text{HDD x 24 x 60}) \text{ x } (.075) \text{ x } (.243)}{100{,}000 \text{ x System Efficiency\%}}$$

Chemical Shed

215 S Rodehaver
Oberlin, KS 67749

VISUAL COMMENTS or RECOMMENDATIONS:

The exterior door and overhead should be weather-stripped to reduce air loss.

COST AND PAYBACK ANALYSIS:

Annual Cost of Leakage (Therms):	-
Annual Cost of Leakage (Kwh):	-
Annual Cost of Leakage:	-
Price to Rectify Air Leakage:	-
Payback in years:	-

TYPE OF MEASURES:

	Building Level	quantity or distance
Ext. Door(s) to be weather-stripped & sealed.	All Levels	1 Doors
Over-head Door(s) to be sealed on 4 sides.	All Levels	1 OHDoors

AIR LEAKAGE:

	feet	inches		
Doors	20	1/16	0.10	sq ft
OHDoors	30	3/32	0.23	sq ft
Totals	-		0.34	sq ft
			0.03	sq meter

ASSUMPTIONS & CALCULATIONS:

Power Rate	per Kwh
Heating Fuel	per Kwh
Building K	140

Example Calculation

$$\frac{(\text{leakage x bldg "K"}) \times (\text{wind P factor}) \times (\text{HDD x 24 x 60}) \times (.075) \times (.243)}{100{,}000 \times \text{System Efficiency\%}}$$

BES - ENERGY CONSERVATION STUDY

Gateway

1 Morgan Dr
Oberlin, KS 67749

VISUAL COMMENTS or RECOMMENDATIONS:

The exterior doors should be weather-stripped to reduce air loss.

COST AND PAYBACK ANALYSIS:

Annual Cost of Leakage (Therms):	-
Annual Cost of Leakage (Kwh):	-
Annual Cost of Leakage:	-
Price to Rectify Air Leakage:	-
Payback in years:	-

TYPE OF MEASURES:

	Building Level	quantity or distance
Ext. Door(s) to be weather-stripped & sealed.	All Levels	6 Doors
Ext. Door(s) to be weather-stripped & sealed.	All Levels	11 Doors

AIR LEAKAGE:

	feet	inches		
Doors	120	1/16	0.63	sq ft
Doors	220	3/32	1.72	sq ft
Totals	-		2.34	sq ft
			0.22	sq meter

ASSUMPTIONS & CALCULATIONS:

Power Rate	per Kwh
Heating Fuel	perTherm
Building K	130

Example Calculation

$$\frac{(\text{leakage x bldg "K"}) \times (\text{wind P factor}) \times (\text{HDD x 24 x 60}) \times (.075) \times (.243)}{100{,}000 \times \text{System Efficiency\%}}$$

Library

104 E Oak
Oberlin, KS 67749

VISUAL COMMENTS or RECOMMENDATIONS:

The exterior doors should be weather-stripped to reduce air loss.

COST AND PAYBACK ANALYSIS:

Annual Cost of Leakage (Therms):	-
Annual Cost of Leakage (Kwh):	-
Annual Cost of Leakage:	-
Price to Rectify Air Leakage:	-
Payback in years:	-

TYPE OF MEASURES:

	Building Level	quantity or distance
Ext. Door(s) to be weather-stripped & sealed.	All Levels	3 Doors

AIR LEAKAGE:

	feet	inches		
Doors	60	1/16	0.31	sq ft
Totals	-		0.31	sq ft
			0.03	sq meter

ASSUMPTIONS & CALCULATIONS:

Power Rate		per Kwh
Heating Fuel		perTherm
Building K	130	

Example Calculation

$$\frac{(\text{leakage x bldg "K"}) \times (\text{wind P factor}) \times (\text{HDD x 24 x 60}) \times (.075) \times (.243)}{100{,}000 \times \text{System Efficiency\%}}$$

BES - ENERGY CONSERVATION STUDY

Main Warehouse

213 S Rodehaver
Oberlin, KS 67749

VISUAL COMMENTS or RECOMMENDATIONS:

The exterior doors including overeads should be weather-stripped to reduce air loss. The windows should be sealed around the perimeter with to prevent air infiltration.

COST AND PAYBACK ANALYSIS:

Annual Cost of Leakage (Therms):	-
Annual Cost of Leakage (Kwh):	-
Annual Cost of Leakage:	-
Price to Rectify Air Leakage:	-
Payback in years:	-

TYPE OF MEASURES:

	Building Level	quantity or distance
Ext. Door(s) to be weather-stripped & sealed.	All Levels	3 Doors
Window System(s) to be sealed.	All Levels	8 Windows
Over-head Door(s) to be sealed on 4 sides.	All Levels	5 OHDoors

AIR LEAKAGE:

	feet	inches		
Doors	60	3/32	0.47	sq ft
Windows	288	1/64	0.38	sq ft
OHDoors	184	1/8	1.92	sq ft
Totals	-		2.76	sq ft
			0.26	sq meter

ASSUMPTIONS & CALCULATIONS:

Power Rate	per Kwh
Heating Fuel	perTherm
Building K	145

Example Calculation

$$\frac{(\text{leakage x bldg "K"}) \times (\text{wind P factor}) \times (\text{HDD x 24 x 60}) \times (.075) \times (.243)}{100{,}000 \times \text{System Efficiency\%}}$$

Police

107 W Commercial
Oberlin, KS 67749

VISUAL COMMENTS or RECOMMENDATIONS:

The exterior doors should be weather-stripped to reduce air loss.

COST AND PAYBACK ANALYSIS:

Annual Cost of Leakage (Therms):	-
Annual Cost of Leakage (Kwh):	-
Annual Cost of Leakage:	-
Price to Rectify Air Leakage:	-
Payback in years:	-

TYPE OF MEASURES:

	Building Level	quantity or distance
Ext. Door(s) to be weather-stripped & sealed.	All Levels	2 Doors

AIR LEAKAGE:

	feet	inches		
Doors	40	3/32	0.31	sq ft
Totals	-		0.31	sq ft
			0.03	sq meter

ASSUMPTIONS & CALCULATIONS:

Power Rate		per Kwh
Heating Fuel		perTherm
Building K	120	

Example Calculation

$$\frac{(\text{leakage x bldg "K"}) \times (\text{wind P factor}) \times (\text{HDD x 24 x 60}) \times (.075) \times (.243)}{100{,}000 \times \text{System Efficiency\%}}$$

Superior Materials

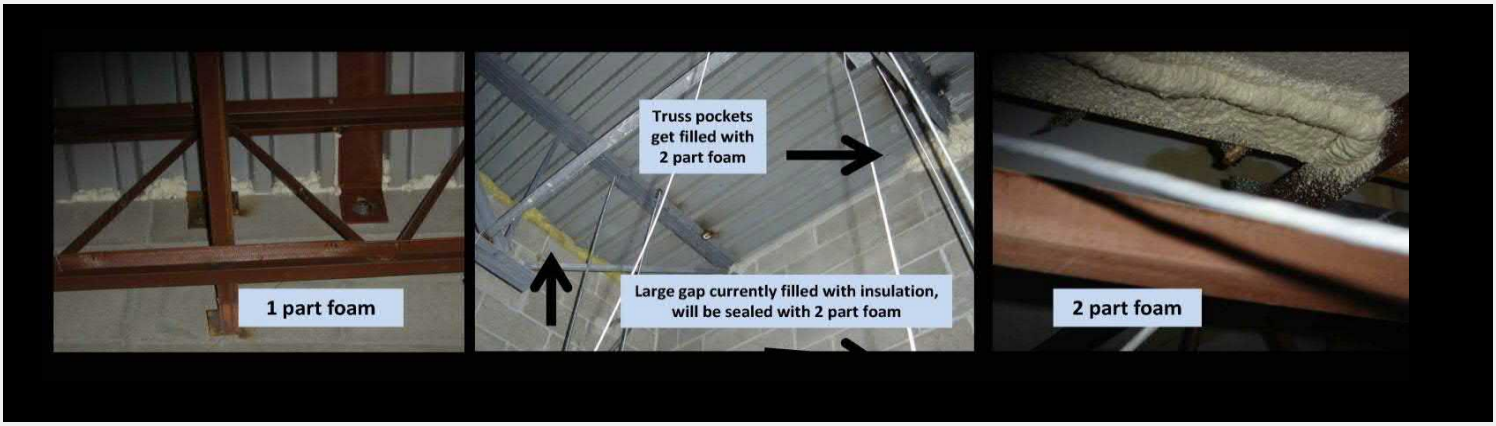
It is in the best interest of Building Envelope Solutions, and any BES Clients, that BES utilizes the highest quality materials and that these materials are installed with careful attention to detail..

We utilize caulk(s) that carry a 50 year warranty from the manufacturer. If properly placed, and applied in areas with typical/standard exposures to UV, etc, the material will perform well for the expected life.

Our door sealing materials consist of a heavy metal aluminum carrier, and strip of Q-lon which is a formed & angled sponge wrapped in vinyl. It's applied to the door frames, secured with screws, and caulked for added durability and air sealing through the carrier. This is a very long life material, and provided it's not physically cut or damaged, we expect it to last 10-20 years.

The sweeps utilize a double fin film seal between a set of brushes, also embedded in a heavy aluminum carrier. The material is typically placed under the kick plate of the door, and secured in the same method as the rest of the door seal. Due to brushing the ground, the sweep protects the film to keep the seal tight,

Our Foams are typically not exposed to UVA or UVB rays. If not exposed to these rays, or covered with paint when in areas that are exposed, the foam has a minimum of 25 year life span according to the manufacturers. The reality is that these foams have been in the field longer than this, but there is not a lot of data for the anticipated life span past 25 years. We apply 1 and 2 part foam depending on the type of joint we are sealing, and it's visibility to the public eye.



For additional questions regarding the products, or use of the BES Products, please contact us at any time.

WINDOW FILM SAVINGS CALCULATIONS

Building Envelope Solutions, LLC

Presents the following

Audit / Proposal
to
Energy Solutions Professionals (ESP)

6400 W. 95th Street, Suite 202
Overland Park, KS. 66212

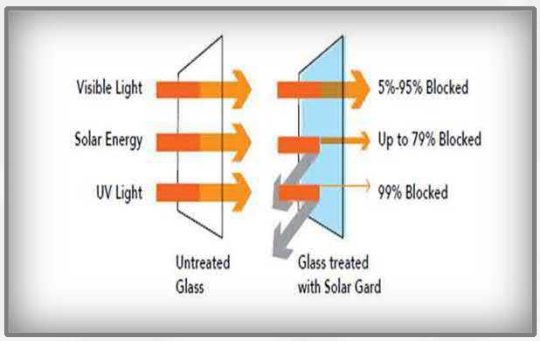
Customer Contact ---- **Ron LaCombe**
M: 816-799-5944
ron@energyesp.com

Building Envelope Solutions, LLC proposes to upgrade the building envelope for the following buildings noted below. We have reviewed and audited the following buildings and have prepared this quote based on these audits.

Project Site: **City of Oberlin**

Quote Date: **January 23, 2019**

Audit Date: January 17, 2019
Assessor(s): George Kutschenreuter



Project Scope:

Install 2,215 square feet of Low E Window Film at the City of Oberlin. See next page for project details.

Projected Project Schedule.

TBD, or Performed during Envelope Installation.

Estimated time to complete is 2 Weeks.

Thank you for your interest in BES.

Building Envelope Solutions, LLC. is a full service provider air sealing solutions. We perform audits/building assessments, testing, thermal imaging, blower door verfication, project management, and installation for building envelope projects.

Building Envelope Solutions, LLC
2559 Badger Ave., Oshkosh, WI 54904
www.ECMHoldingGroup.com

Total Project Pricing

Building	Window Qty		therms	kwh			
Gateway	242	1896	794	30,651			
Library	10	319	155	4,424			
Total Project	**252**	**2,215**	**949**	**35,075**			

Film to be installed:
Llumar E1220 SR CDF (Silver)

DESTRATIFICATION FANS SAVINGS CALCULATIONS

Presents the following

Audit/Proposal

to

Energy Solutions Professionals

6400 W 95th St, Suite 202
Overland Park, KS 66212

Customer Contact -- David Chandler

Reduce Energy Costs and Increase Comfort by Installing Destratification Fans

Project Site: **City of Oberlin**

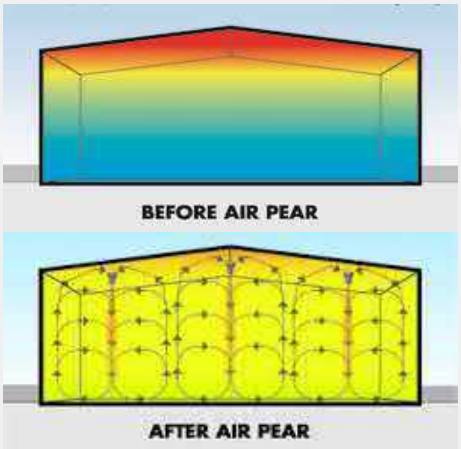
Quote Date: **1/23/2019**

Assessor: George Kutschenreuter

Everyone knows hot air rises. In high ceiling areas, this produces layers of stratified air.
Thermal Destratification is the process of mixing the internal air to eliminate stratified layers and achieve temperature equalization throughout the building envelope.

The design of the **Air Pear** will address the issue of temperature differences in high ceiling areas by efficiently moving hot air to the ground and homogenizing the air throughout the space.

When air has little opportunity to move, dramatic temperature differences occur. Hot air rises pushing cooler air near the floor. This temperature difference can be as much as one degree per foot of height. Items such as lighting and ventilation ducts can increase this effect. Since people and thermostats are located near the floor it is imperative to even out this temperature difference.



Air Pear fans get air moving. Their energy efficient motors operate quietly to eliminate hot and cold spots throughout a space. After installation, there is significant energy reduction. The result is a more comfortable space with reduced utility and maintenance costs.

Multiple fans can be connected to a single variable speed controller. **Air Pears'** optional wireless Fan Center Manager controller can operate up to 100 fans using an easy web based interface. Fans can be ordered in white, black, grey, or custom colored to match any area.

Project Scope:

The following project pricing includes materials and installation for each building / area based on the quantities listed.

Projected Project Schedule:

Installation should take roughly 2-4 hours for a certified electrician per fan installed.

Warranty:

A 3-year parts / components warranty is provided on all fans by Arius, LLC. A fan refurbishment program is available after three years. ECM offers a standard 1-year warranty period for installations to be free from defects in material and workmanship.

ENERGY CONSERVATION MEASURES

ECM Holding Group, LLC.
2559 Badger Ave., Oshkosh, WI 54904
www.ECMHoldingGroup.com

Total Project Details

Building Name	Fan	Qty	Color
Gateway Gym	E-145P4	6	White
Total Project		**6**	

ENERGY CONSERVATION MEASURES

PROGRAMMABLE WIFI THERMOSTATS SAVINGS CALCULATIONS

City of Oberlin, KS
Gateway
Prog Stat Savings

Basis

Fan operation type:	CV	Constant Volume: **CV**, VFD: **VFD**, Inlet Vane: **IV**, Discharge Damper: **DD**
Total fan motor hp:	2.0	hp
Motor load factor:	65%	
Existing average motor eff:	85.0%	

Load profile characteristics

Full load heating:	180	MBtu/hr	Full load cooling:	10	tons
Heating efficiency:	70%		Avg. Cooling efficiency:	1.20	kW/ton (include pumps & cooling tower fans in kW/ton if applicable)
Heating full load at:	5°		Cooling full load at:	95°	
Heating zero load at:	50°		Cooling zero load at:	55°	
Delta:	45°		Delta:	40°	

Annual Heating Savings: 322 therms
Annual Electric Savings: 6,474 kWh
(No Electric Demand Savings Claimed)

Schedule

First month of cooling season:	4	April
Last month of cooling season:	9	September

Weather data: Goodland/Renner Field

Load Adjustments

Setpoint adjustment moderator (Deadband): 0.5 — Dampers ΔT changes in setpoints. (If <1, reduces load change.)

Existing			*Proposed*		
Unoccupied setback ends:	0		Unoccupied setback ends:	6	
Unoccupied setback begins:	24		Unoccupied setback begins:	18	
Weekends unoccupied?:	N	Yes / No	Weekends unoccupied?:	Y	Yes / No
Occupied cooling space temperature:	72°		Occupied cooling space temperature:	72°	
Cooling setup temperature:	72°		Cooling setup temperature:	80°	
Fan mode during unoccupied cooling:	Cycle		Fan mode during unoccupied cooling:	Cycle	**On**, **Off**, **Cycle**
Occupied heating space temperature:	72°		Occupied heating space temperature:	70°	
Heating setback temperature:	72°		Heating setback temperature:	65°	
Fan mode during unoccupied heating:	Cycle		Fan mode during unoccupied heating:	Cycle	**On**, **Off**, **Cycle**
Occupied Percent Outside Air:	0%		Occupied Percent Outside Air:	0%	
Unoccupied Percent Outside Air:	0%		Unoccupied Percent Outside Air:	0%	

Bin	Occupied Cooling										Unoccupied Cooling										Savings	
Average	Cooling Hours		Load Profile		ConstVol cfm		ConstVol Fan		Cooling Energy		Cooling Hours		Load Profile		ConstVol cfm		ConstVol Fan		Cooling Energy			
(°F)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (kW)	Proposed (kW)	Existing (kW)	Proposed (kW)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (pk kW)	Proposed (pk kW)	Existing (kW)	Proposed (kW)	Fan (kWh)	Cooling (kWh)
107.5°	2.0	1.4	100%	100%	100%	100%	1.1	1.1	12.0	12.0	0.0	0.6	100%	100%		100%	0.0	1.1	0.0	12.0	0	0
102.5°	20.0	13.2	100%	100%	100%	100%	1.1	1.1	12.0	12.0	0.0	6.8	100%	100%		100%	0.0	1.1	0.0	12.0	0	0
97.5°	92.0	60.4	100%	100%	100%	100%	1.1	1.1	12.0	12.0	0.0	31.6	100%	96%		100%	0.0	1.1	0.0	11.6	1	14
92.5°	183.0	113.0	94%	94%	100%	100%	1.1	1.1	11.3	11.3	0.0	70.0	94%	84%		100%	0.0	1.1	0.0	10.1	13	84
87.5°	251.0	143.9	81%	81%	100%	100%	1.1	1.1	9.8	9.8	0.0	107.1	81%	71%		100%	0.0	1.1	0.0	8.6	35	128
82.5°	323.0	168.6	69%	69%	100%	100%	1.1	1.1	8.3	8.3	0.0	154.4	69%	59%		100%	0.0	1.1	0.0	7.1	73	185
77.5°	392.0	169.1	56%	56%	100%	100%	1.1	1.1	6.8	6.8	0.0	222.9	56%	46%		100%	0.0	1.1	0.0	5.6	137	267
72.5°	466.0	163.0	44%	44%	100%	100%	1.1	1.1	5.3	5.3	0.0	303.0	44%	34%		100%	0.0	1.1	0.0	4.1	229	364
67.5°	581.0	174.5	31%	31%	100%	100%	1.1	1.1	3.8	3.8	0.0	406.5	31%	21%		100%	0.0	1.1	0.0	2.6	365	488
62.5°	570.0	159.6	19%	19%	100%	100%	1.1	1.1	2.3	2.3	0.0	410.4	19%	9%		100%	0.0	1.1	0.0	1.1	427	492
57.5°	426.0	117.9	6%	6%	100%	100%	1.1	1.1	0.8	0.8	0.0	308.1	6%	0%		100%	0.0	1.1	0.0	0.0	351	231
52.5°	354.0	96.4	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	257.6	0%	0%		100%	0.0	1.1	0.0	0.0	294	0
47.5°	274.0	73.6	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	200.4	0%	0%		100%	0.0	1.1	0.0	0.0	229	0
42.5°	190.0	48.4	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	141.6	0%	0%		100%	0.0	1.1	0.0	0.0	162	0
37.5°	126.0	32.1	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	93.9	0%	0%		100%	0.0	1.1	0.0	0.0	107	0
32.5°	75.0	18.8	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	56.3	0%	0%		100%	0.0	1.1	0.0	0.0	64	0
27.5°	44.0	10.5	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	33.5	0%	0%		100%	0.0	1.1	0.0	0.0	38	0
22.5°	15.0	2.7	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	12.3	0%	0%		100%	0.0	1.1	0.0	0.0	14	0
17.5°	1.0	0.2	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	0.8	0%	0%		100%	0.0	1.1	0.0	0.0	1	0
12.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
7.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
2.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-2.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-7.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-12.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
	4,385	1,567									0	2,818									2,539	2,254

Bin	Occupied Heating										Unoccupied Heating										Savings	
Average	Heating Hours		Load Profile		ConstVol cfm		ConstVol Fan		Heating Energy		Heating Hours		Load Profile		ConstVol cfm		ConstVol Fan		Heating Energy			
(°F)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (kW)	Proposed (kW)	Existing (therm/hr)	Proposed (therm/hr)	(hrs)	(hrs)	Existing	Retrofit	Existing	Retrofit	Existing (pk kW)	Retrofit (pk kW)	Existing (therm/hr)	Proposed (therm/hr)	Fan (kWh)	Heating (therm)
107.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
102.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
97.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
92.5°	1.0	1.0	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
87.5°	10.0	10.0	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
82.5°	24.0	23.2	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	0.8	0%	0%		100%	0.0	1.1	0.0	0.0	1	0
77.5°	34.0	31.5	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	2.5	0%	0%		100%	0.0	1.1	0.0	0.0	3	0
72.5°	60.0	53.5	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	6.5	0%	0%		100%	0.0	1.1	0.0	0.0	7	0
67.5°	100.0	83.8	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	16.2	0%	0%		100%	0.0	1.1	0.0	0.0	18	0
62.5°	140.0	107.8	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	32.2	0%	0%		100%	0.0	1.1	0.0	0.0	37	0
57.5°	200.0	141.6	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	58.4	0%	0%		100%	0.0	1.1	0.0	0.0	67	0
52.5°	273.0	175.0	0%	0%	100%	100%	1.1	1.1	0.0	0.0	0.0	98.0	0%	0%		100%	0.0	1.1	0.0	0.0	112	0
47.5°	338.0	194.5	6%	5%	100%	100%	1.1	1.1	0.1	0.1	0.0	143.5	6%	0%		100%	0.0	1.1	0.1	0.0	164	16
42.5°	413.0	210.1	17%	16%	100%	100%	1.1	1.1	0.3	0.3	0.0	202.9	17%	9%		100%	0.0	1.1	0.3	0.2	211	33
37.5°	512.0	226.0	28%	26%	100%	100%	1.1	1.1	0.5	0.5	0.0	286.0	28%	20%		100%	0.0	1.1	0.5	0.4	261	47
32.5°	637.0	242.2	39%	37%	100%	100%	1.1	1.1	0.7	0.7	0.0	394.8	39%	31%		100%	0.0	1.1	0.7	0.6	310	64
27.5°	581.0	213.2	50%	48%	100%	100%	1.1	1.1	0.9	0.9	0.0	367.8	50%	42%		100%	0.0	1.1	0.9	0.8	242	60
22.5°	395.0	138.3	61%	59%	100%	100%	1.1	1.1	1.1	1.1	0.0	256.8	61%	53%		100%	0.0	1.1	1.1	1.0	137	42
17.5°	267.0	94.7	72%	70%	100%	100%	1.1	1.1	1.3	1.3	0.0	172.3	72%	64%		100%	0.0	1.1	1.3	1.2	70	29
12.5°	163.0	55.0	83%	81%	100%	100%	1.1	1.1	1.5	1.4	0.0	108.0	83%	76%		100%	0.0	1.1	1.5	1.4	30	18
7.5°	102.0	37.3	94%	92%	100%	100%	1.1	1.1	1.7	1.6	0.0	64.8	94%	87%		100%	0.0	1.1	1.7	1.6	10	11
2.5°	58.0	20.0	100%	97%	100%	100%	1.1	1.1	1.8	1.7	0.0	38.0	100%	98%		100%	0.0	1.1	1.8	1.8	1	3
-2.5°	32.0	11.6	100%	97%	100%	100%	1.1	1.1	1.8	1.8	0.0	20.4	100%	100%		100%	0.0	1.1	1.8	1.8	0	1
-7.5°	14.0	3.9	100%	97%	100%	100%	1.1	1.1	1.8	1.8	0.0	10.1	100%	100%		100%	0.0	1.1	1.8	1.8	0	0
-12.5°	3.0	0.7	100%	98%	100%	100%	1.1	1.1	1.8	1.8	0.0	2.3	100%	100%		100%	0.0	1.1	1.8	1.8	0	0
	4,357	2,075									0	2,282									1,680	322

City of Oberlin, KS
Warehouse
Prog Stat Savings

Basis

Fan operation type:	CV	Constant Volume: **CV**, VFD: **VFD**, Inlet Vane: **IV**, Discharge Damper: **DD**
Total fan motor hp:	1.0	hp
Motor load factor:	50%	
Existing average motor eff:	90.0%	

Load profile characteristics

Full load heating:	220	MBtu/hr	Full load cooling:	0	tons
Heating efficiency:	70%		Avg. Cooling efficiency:	1.20	kW/ton (include pumps & cooling tower fans in kW/ton if applicable)
Heating full load at:	5°		Cooling full load at:	90°	
Heating zero load at:	50°		Cooling zero load at:	55°	
Delta:	45°		Delta:	35°	

Annual Heating Savings: 75 therms
Annual Electric Savings: 561 kWh
(No Electric Demand Savings Claimed)

Schedule

First month of cooling season:	5	May
Last month of cooling season:	9	September

Weather data: Goodland/Renner Field

Load Adjustments

Setpoint adjustment moderator (Deadband): 0

Dampers ΔT changes in setpoints. (If <1, reduces load change.)

Existing			*Proposed*		
Unoccupied setback ends:	0		Unoccupied setback ends:	5	
Unoccupied setback begins:	24		Unoccupied setback begins:	19	
Weekends unoccupied?:	N	Yes / No	Weekends unoccupied?:	Y	Yes / No
Occupied cooling space temperature:	72°		Occupied cooling space temperature:	72°	
Cooling setup temperature:	72°		Cooling setup temperature:	78°	
Fan mode during unoccupied cooling:	Cycle		Fan mode during unoccupied cooling:	Cycle	**On**, **Off**, **Cycle**
Occupied heating space temperature:	72°		Occupied heating space temperature:	70°	
Heating setback temperature:	72°		Heating setback temperature:	65°	
Fan mode during unoccupied heating:	On		Fan mode during unoccupied heating:	On	**On**, **Off**, **Cycle**
Occupied Percent Outside Air:	0%		Occupied Percent Outside Air:	0%	
Unoccupied Percent Outside Air:	0%		Unoccupied Percent Outside Air:	0%	

Bin	Occupied Cooling										Unoccupied Cooling										Savings	
Bin Average	Cooling Hours		Load Profile		ConstVol cfm		ConstVol Fan		Cooling Energy		Cooling Hours		Load Profile		ConstVol cfm		ConstVol Fan		Cooling Energy		Fan	Cooling
(°F)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (kW)	Proposed (kW)	Existing (kW)	Proposed (kW)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (pk kW)	Proposed (pk kW)	Existing (kW)	Proposed (kW)	(kWh)	(kWh)
107.5°	2.0	1.4	100%	100%	100%	100%	0.4	0.4	0.0	0.0	0.0	0.6	100%	100%		100%	0.0	0.4	0.0	0.0	0	0
102.5°	20.0	13.4	100%	100%	100%	100%	0.4	0.4	0.0	0.0	0.0	6.6	100%	100%		100%	0.0	0.4	0.0	0.0	0	0
97.5°	92.0	61.3	100%	100%	100%	100%	0.4	0.4	0.0	0.0	0.0	30.8	100%	100%		100%	0.0	0.4	0.0	0.0	0	0
92.5°	183.0	116.0	100%	100%	100%	100%	0.4	0.4	0.0	0.0	0.0	67.0	100%	100%		100%	0.0	0.4	0.0	0.0	0	0
87.5°	249.0	148.4	93%	93%	100%	100%	0.4	0.4	0.0	0.0	0.0	100.6	93%	93%		100%	0.0	0.4	0.0	0.0	3	0
82.5°	311.0	170.8	79%	79%	100%	100%	0.4	0.4	0.0	0.0	0.0	140.2	79%	79%		100%	0.0	0.4	0.0	0.0	12	0
77.5°	374.0	176.1	64%	64%	100%	100%	0.4	0.4	0.0	0.0	0.0	197.9	64%	64%		100%	0.0	0.4	0.0	0.0	29	0
72.5°	443.0	177.6	50%	50%	100%	100%	0.4	0.4	0.0	0.0	0.0	265.4	50%	50%		100%	0.0	0.4	0.0	0.0	55	0
67.5°	539.0	190.4	36%	36%	100%	100%	0.4	0.4	0.0	0.0	0.0	348.6	36%	36%		100%	0.0	0.4	0.0	0.0	93	0
62.5°	515.0	171.9	21%	21%	100%	100%	0.4	0.4	0.0	0.0	0.0	343.1	21%	21%		100%	0.0	0.4	0.0	0.0	112	0
57.5°	363.0	119.1	7%	7%	100%	100%	0.4	0.4	0.0	0.0	0.0	243.9	7%	7%		100%	0.0	0.4	0.0	0.0	94	0
52.5°	272.0	87.1	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	184.9	0%	0%		100%	0.0	0.4	0.0	0.0	77	0
47.5°	175.0	55.8	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	119.2	0%	0%		100%	0.0	0.4	0.0	0.0	49	0
42.5°	87.0	26.9	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	60.1	0%	0%		100%	0.0	0.4	0.0	0.0	25	0
37.5°	32.0	9.0	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	23.0	0%	0%		100%	0.0	0.4	0.0	0.0	10	0
32.5°	6.0	2.1	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	3.9	0%	0%		100%	0.0	0.4	0.0	0.0	2	0
27.5°	3.0	0.8	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	2.2	0%	0%		100%	0.0	0.4	0.0	0.0	1	0
22.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
17.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
12.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
7.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
2.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-2.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-7.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-12.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
	3,666	1,528									0	2,138									561	0

Bin	Occupied Heating										Unoccupied Heating										Savings	
Bin Average	Heating Hours		Load Profile		ConstVol cfm		ConstVol Fan		Heating Energy		Heating Hours		Load Profile		ConstVol cfm		ConstVol Fan		Heating Energy		Fan	Heating
(°F)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (kW)	Proposed (kW)	Existing (therm/hr)	Proposed (therm/hr)	(hrs)	(hrs)	Existing	Retrofit	Existing	Retrofit	Existing (kW)	Retrofit (kW)	Existing (therm/hr)	Proposed (therm/hr)	(kWh)	(therm)
107.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
102.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
97.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
92.5°	1.0	1.0	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
87.5°	12.0	12.0	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
82.5°	36.0	34.5	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	1.5	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
77.5°	52.0	47.6	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	4.4	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
72.5°	83.0	72.9	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	10.1	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
67.5°	142.0	118.4	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	23.6	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
62.5°	195.0	150.4	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	44.6	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
57.5°	263.0	188.2	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	74.8	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
52.5°	355.0	233.5	0%	0%	100%	100%	0.4	0.4	0.0	0.0	0.0	121.5	0%	0%		100%	0.0	0.4	0.0	0.0	0	0
47.5°	437.0	262.3	6%	5%	100%	100%	0.4	0.4	0.1	0.1	0.0	174.7	6%	6%		100%	0.0	0.4	0.1	0.1	0	3
42.5°	516.0	283.4	17%	16%	100%	100%	0.4	0.4	0.4	0.3	0.0	232.6	17%	17%		100%	0.0	0.4	0.4	0.4	0	7
37.5°	606.0	307.1	28%	26%	100%	100%	0.4	0.4	0.6	0.6	0.0	298.9	28%	28%		100%	0.0	0.4	0.6	0.6	0	11
32.5°	706.0	325.3	39%	37%	100%	100%	0.4	0.4	0.9	0.8	0.0	380.7	39%	39%		100%	0.0	0.4	0.9	0.9	0	14
27.5°	622.0	281.9	50%	48%	100%	100%	0.4	0.4	1.1	1.1	0.0	340.1	50%	50%		100%	0.0	0.4	1.1	1.1	0	14
22.5°	410.0	179.6	61%	59%	100%	100%	0.4	0.4	1.3	1.3	0.0	230.4	61%	61%		100%	0.0	0.4	1.3	1.3	0	10
17.5°	268.0	119.4	72%	70%	100%	100%	0.4	0.4	1.6	1.5	0.0	148.6	72%	72%		100%	0.0	0.4	1.6	1.6	0	7
12.5°	163.0	70.4	83%	81%	100%	100%	0.4	0.4	1.8	1.8	0.0	92.6	83%	83%		100%	0.0	0.4	1.8	1.8	0	4
7.5°	102.0	46.4	94%	92%	100%	100%	0.4	0.4	2.1	2.0	0.0	55.6	94%	94%		100%	0.0	0.4	2.1	2.1	0	3
2.5°	58.0	25.4	100%	97%	100%	100%	0.4	0.4	2.2	2.1	0.0	32.6	100%	100%		100%	0.0	0.4	2.2	2.2	0	2
-2.5°	32.0	14.5	100%	97%	100%	100%	0.4	0.4	2.2	2.1	0.0	17.5	100%	100%		100%	0.0	0.4	2.2	2.2	0	1
-7.5°	14.0	5.3	100%	97%	100%	100%	0.4	0.4	2.2	2.1	0.0	8.7	100%	100%		100%	0.0	0.4	2.2	2.2	0	0
-12.5°	3.0	1.0	100%	98%	100%	100%	0.4	0.4	2.2	2.1	0.0	2.0	100%	100%		100%	0.0	0.4	2.2	2.2	0	0
	5,076	2,780									0	2,296									0	75

City of Oberlin, KS
Library
Prog Stat Savings

Basis

Fan operation type:	CV	Constant Volume: **CV**, VFD: **VFD**, Inlet Vane: **IV**, Discharge Damper: **DD**
Total fan motor hp:	2.0	hp
Motor load factor:	50%	
Existing average motor eff:	85.0%	

Load profile characteristics

Full load heating:	342	MBtu/hr	Full load cooling:	10	tons
Heating efficiency:	70%		Avg. Cooling efficiency:	1.20	kW/ton (include pumps & cooling tower fans in kW/ton if applicable)
Heating full load at:	5°		Cooling full load at:	85°	
Heating zero load at:	50°		Cooling zero load at:	50°	
Delta:	45°		Delta:	35°	

Annual Heating Savings: 59 therms
Annual Electric Savings: 1,015 kWh
(No Electric Demand Savings Claimed)

Schedule

First month of cooling season:	4	April
Last month of cooling season:	9	September

Weather data: Goodland/Renner Field

Load Adjustments

Setpoint adjustment moderator (Deadband): 0 — Dampers ΔT changes in setpoints. (If <1, reduces load change.)

Existing			*Proposed*		
Unoccupied setback ends:	0		Unoccupied setback ends:	5	
Unoccupied setback begins:	24		Unoccupied setback begins:	19	
Weekends unoccupied?:	N	Yes / No	Weekends unoccupied?:	N	Yes / No
Occupied cooling space temperature:	72°		Occupied cooling space temperature:	72°	
Cooling setup temperature:	72°		Cooling setup temperature:	80°	
Fan mode during unoccupied cooling:	Cycle		Fan mode during unoccupied cooling:	Cycle	**On**, **Off**, **Cycle**
Occupied heating space temperature:	72°		Occupied heating space temperature:	71°	
Heating setback temperature:	72°		Heating setback temperature:	68°	
Fan mode during unoccupied heating:	On		Fan mode during unoccupied heating:	On	**On**, **Off**, **Cycle**
Occupied Percent Outside Air:	0%		Occupied Percent Outside Air:	0%	
Unoccupied Percent Outside Air:	0%		Unoccupied Percent Outside Air:	0%	

Bin	Occupied Cooling										Unoccupied Cooling										Savings	
Bin Average	Cooling Hours		Load Profile		ConstVol cfm		ConstVol Fan		Cooling Energy		Cooling Hours		Load Profile		ConstVol cfm		ConstVol Fan		Cooling Energy		Fan	Cooling
(°F)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (kW)	Proposed (kW)	Existing (kW)	Proposed (kW)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (pk kW)	Proposed (pk kW)	Existing (kW)	Proposed (kW)	(kWh)	(kWh)
107.5°	2.0	2.0	100%	100%	100%	100%	0.9	0.9	12.0	12.0	0.0	0.0	100%	100%			0.0	0.0	0.0	0.0	0	0
102.5°	20.0	18.8	100%	100%	100%	100%	0.9	0.9	12.0	12.0	0.0	1.3	100%	100%		100%	0.0	0.9	0.0	12.0	0	0
97.5°	92.0	85.8	100%	100%	100%	100%	0.9	0.9	12.0	12.0	0.0	6.3	100%	100%		100%	0.0	0.9	0.0	12.0	0	0
92.5°	183.0	162.4	100%	100%	100%	100%	0.9	0.9	12.0	12.0	0.0	20.6	100%	100%		100%	0.0	0.9	0.0	12.0	0	0
87.5°	251.0	209.8	100%	100%	100%	100%	0.9	0.9	12.0	12.0	0.0	41.3	100%	100%		100%	0.0	0.9	0.0	12.0	0	0
82.5°	323.0	250.5	93%	93%	100%	100%	0.9	0.9	11.1	11.1	0.0	72.5	93%	93%		100%	0.0	0.9	0.0	11.1	5	0
77.5°	392.0	262.6	79%	79%	100%	100%	0.9	0.9	9.4	9.4	0.0	129.4	79%	79%		100%	0.0	0.9	0.0	9.4	24	0
72.5°	466.0	267.9	64%	64%	100%	100%	0.9	0.9	7.7	7.7	0.0	198.1	64%	64%		100%	0.0	0.9	0.0	7.7	62	0
67.5°	581.0	300.4	50%	50%	100%	100%	0.9	0.9	6.0	6.0	0.0	280.6	50%	50%		100%	0.0	0.9	0.0	6.0	123	0
62.5°	570.0	281.3	36%	36%	100%	100%	0.9	0.9	4.3	4.3	0.0	288.8	36%	36%		100%	0.0	0.9	0.0	4.3	163	0
57.5°	426.0	208.5	21%	21%	100%	100%	0.9	0.9	2.6	2.6	0.0	217.5	21%	21%		100%	0.0	0.9	0.0	2.6	150	0
52.5°	354.0	171.5	7%	7%	100%	100%	0.9	0.9	0.9	0.9	0.0	182.5	7%	7%		100%	0.0	0.9	0.0	0.9	149	0
47.5°	274.0	131.5	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	142.5	0%	0%		100%	0.0	0.9	0.0	0.0	125	0
42.5°	190.0	88.1	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	101.9	0%	0%		100%	0.0	0.9	0.0	0.0	89	0
37.5°	126.0	58.5	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	67.5	0%	0%		100%	0.0	0.9	0.0	0.0	59	0
32.5°	75.0	34.4	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	40.6	0%	0%		100%	0.0	0.9	0.0	0.0	36	0
27.5°	44.0	19.6	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	24.4	0%	0%		100%	0.0	0.9	0.0	0.0	21	0
22.5°	15.0	5.6	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	9.4	0%	0%		100%	0.0	0.9	0.0	0.0	8	0
17.5°	1.0	0.4	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	0.6	0%	0%		100%	0.0	0.9	0.0	0.0	1	0
12.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
7.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
2.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-2.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-7.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
-12.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
	4,385	2,559									0	1,826									1,015	0

Bin	Occupied Heating										Unoccupied Heating										Savings	
Bin Average	Heating Hours		Load Profile		ConstVol cfm		ConstVol Fan		Heating Energy		Heating Hours		Load Profile		ConstVol cfm		ConstVol Fan		Heating Energy		Fan	Heating
(°F)	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing (kW)	Proposed (kW)	Existing (therm/hr)	Proposed (therm/hr)	(hrs)	(hrs)	Existing	Retrofit	Existing	Retrofit	Existing (kW)	Retrofit (kW)	Existing (therm/hr)	Proposed (therm/hr)	(kWh)	(therm)
107.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
102.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
97.5°	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
92.5°	1.0	1.0	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
87.5°	10.0	10.0	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	0.0	0%	0%			0.0	0.0	0.0	0.0	0	0
82.5°	24.0	23.4	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	0.6	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
77.5°	34.0	32.1	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	1.9	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
72.5°	60.0	55.0	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	5.0	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
67.5°	100.0	87.5	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	12.5	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
62.5°	140.0	115.0	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	25.0	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
57.5°	200.0	154.4	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	45.6	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
52.5°	273.0	196.1	0%	0%	100%	100%	0.9	0.9	0.0	0.0	0.0	76.9	0%	0%		100%	0.0	0.9	0.0	0.0	0	0
47.5°	338.0	224.9	6%	5%	100%	100%	0.9	0.9	0.2	0.2	0.0	113.1	6%	6%		100%	0.0	0.9	0.2	0.2	0	2
42.5°	413.0	253.0	17%	16%	100%	100%	0.9	0.9	0.6	0.6	0.0	160.0	17%	17%		100%	0.0	0.9	0.6	0.6	0	5
37.5°	512.0	285.1	28%	27%	100%	100%	0.9	0.9	0.9	0.9	0.0	226.9	28%	28%		100%	0.0	0.9	0.9	0.9	0	8
32.5°	637.0	322.6	39%	38%	100%	100%	0.9	0.9	1.3	1.3	0.0	314.4	39%	39%		100%	0.0	0.9	1.3	1.3	0	11
27.5°	581.0	286.6	50%	49%	100%	100%	0.9	0.9	1.7	1.7	0.0	294.4	50%	50%		100%	0.0	0.9	1.7	1.7	0	11
22.5°	395.0	189.4	61%	60%	100%	100%	0.9	0.9	2.1	2.0	0.0	205.6	61%	61%		100%	0.0	0.9	2.1	2.1	0	8
17.5°	267.0	128.9	72%	71%	100%	100%	0.9	0.9	2.5	2.4	0.0	138.1	72%	72%		100%	0.0	0.9	2.5	2.5	0	6
12.5°	163.0	76.1	83%	82%	100%	100%	0.9	0.9	2.8	2.8	0.0	86.9	83%	83%		100%	0.0	0.9	2.8	2.8	0	4
7.5°	102.0	50.1	94%	93%	100%	100%	0.9	0.9	3.2	3.2	0.0	51.9	94%	94%		100%	0.0	0.9	3.2	3.2	0	3
2.5°	58.0	27.4	100%	99%	100%	100%	0.9	0.9	3.4	3.4	0.0	30.6	100%	100%		100%	0.0	0.9	3.4	3.4	0	1
-2.5°	32.0	15.8	100%	99%	100%	100%	0.9	0.9	3.4	3.4	0.0	16.3	100%	100%		100%	0.0	0.9	3.4	3.4	0	1
-7.5°	14.0	5.9	100%	99%	100%	100%	0.9	0.9	3.4	3.4	0.0	8.1	100%	100%		100%	0.0	0.9	3.4	3.4	0	0
-12.5°	3.0	1.1	100%	99%	100%	100%	0.9	0.9	3.4	3.4	0.0	1.9	100%	100%		100%	0.0	0.9	3.4	3.4	0	0
	4,357	2,541									0	1,816									0	59

HIGH EFFICIENCY MOTORS SAVINGS CALCULATIONS

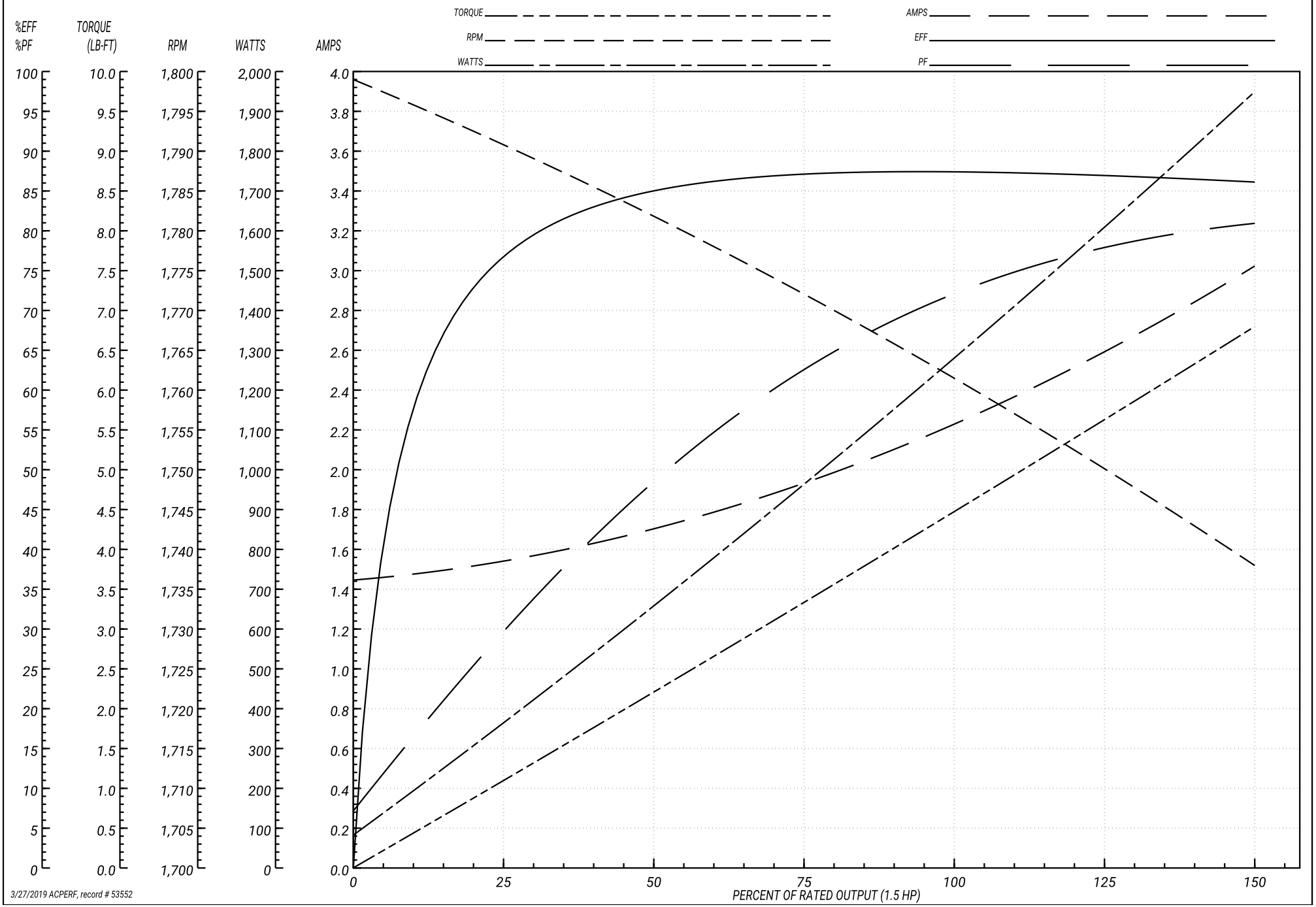
BALDOR ELECTRIC COMPANY

WINDING # 35WGL155

Typical performance - not guaranteed values.

1.5 HP 3 PH 60 HZ 1750 RPM 460 V 3526M

TORQUES(LB-FT): PO=20.6 PU=10.1 LR=14.4 LRA=19.3



3/27/2019 ACPERF, record # 53552

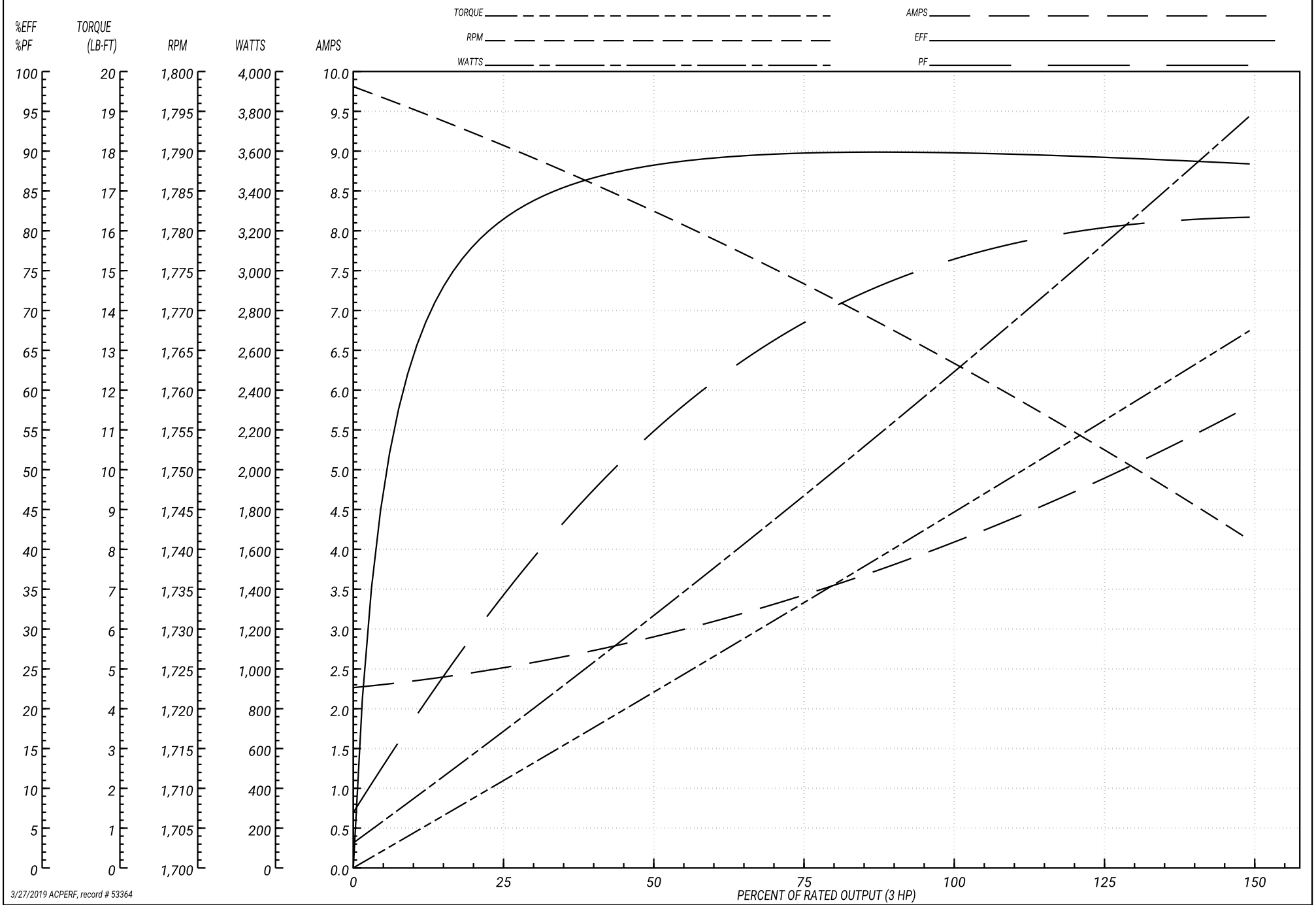
BALDOR ELECTRIC COMPANY

WINDING # 36WGS266

Typical performance - not guaranteed values.

3 HP 3 PH 60 HZ 1760 RPM 460 V 3632M

TORQUES(LB-FT): PO=37.6 PU=15.2 LR=21.7 LRA=32.7



3/27/2019 ACPERF, record # 53364

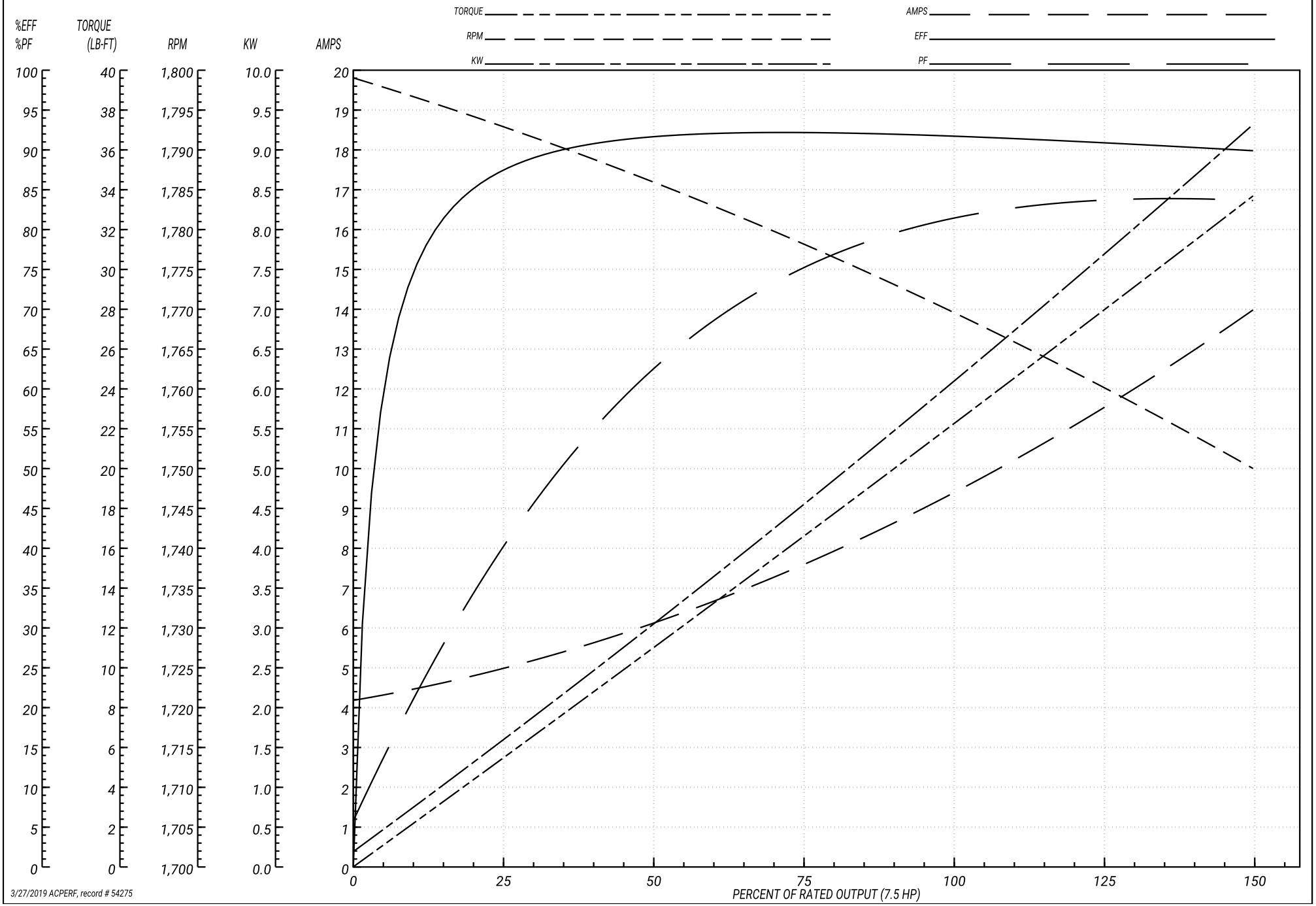
BALDOR ELECTRIC COMPANY

WINDING # 37WGR872

Typical performance - not guaranteed values.

7.5 HP 3 PH 60 HZ 1770 RPM 460 V 3738M

TORQUES(LB-FT): PO=70.9 PU=32.6 LR=43 LRA=70.9



3/27/2019 ACPERF, record # 54275

Motor Replacement

Service	HP	Current Efficiency Note 1	New Efficiency	Load Factor	Annual Hours of Operation	Existing kWh	New kWh	kWh Savings
Lube Filter Pump	1.5	78.1%	87.5%	75.0%	8,760	9,413	8,402	1,011
Radiator Circ Pump	7.5	83.8%	92.0%	75.0%	8,760	43,865	39,956	3,910
Radiator Circ Pump	3.0	81.2%	90.0%	75.0%	8,760	18,108	16,337	1,771

POOL COVER SAVINGS CALCULATIONS

ENERGY SMART POOLS

Pool Cover Analysis

U.S. Department of Energy

March 08, 2019

Oberlin Pool

Annual Energy/Water Savings Analysis:

Pool Cover Only Energy Savings		$1,726
Pump Motor Electrical		0
Water Consumption/Cost Savings Due to Reduced Evaporation	37,607 gals.	37
Total Annual Energy & Water Savings		$1,764

Annual Energy/Water Cost Analysis:

Pool Heating Costs w/o Pool Cover		$1,845
Pump Motor Electrical Cost		1,155
Ventilation Motor Electrical Cost (indoor only)		0
Water Consumption/Cost Due to Evaporation	58,401 gals.	58
Total Annual Energy & Water Costs		$3,059
Pool Heating Costs with Pool Cover Only		$118
Pump Motor Electrical Cost		1,155
Ventilation Motor Electrical Cost (indoor only)		0
Water Consumption/Cost Due to Evaporation	20,793 gals.	20
Total Annual Energy & Water Costs		$1,294

System Cost/Payback Analysis:

Pool Cover System	$1
Payback Years	0.00

Organization			**Default ID**	Generic
Contact	Miss		**Type Owner**	Unknown
Address			**Type Pool**	Outdoor
City, St Zip			**Weather Site**	KANSAS, KANSAS CITY
Phone	- -		**Windspeed %**	15
			Shading Factor %	0

	Mon	Day	Sun	Mon	Tue	Wed	Thur	Fri	Sat
Open	5	27	1:00PM	1:00PM	1:00PM	1:00PM	1:00PM	1:00PM	1:00PM
Close	9	2	8:00PM	8:00PM	8:00PM	8:00PM	8:00PM	8:00PM	6:00PM

General Pool Data		Indoor Pool Data		Pool Cover Data		Solar Heating Data	
Pool Area	4320			**Cover Type**	Insulated	**Collector Type**	None
Pool Temp (F)	80	**Room Temp (F)**	0	**System**	Automatic		
Activity Level	High	**Room Humidity %**	0	**Cover R-Value**	4.0		
Pool Htr Fuel	Natural Gas	**Vent Htr Fuel**		**Pool Area Covered %**	100		
Fuel Cost	$1.000	**Fuel Cost**	$0.000	**Installed Cost**	$1		
Pool Heater Eff %	84	**Vent Heater Eff %**	0	**Water Cost $/k gal**	$1.00		
Pump Motor HP	10.00	**Vent Motor HP**	0.00	**Pump Motor Hrs/day**	24.0		
Pump Motor Eff %	85	**Vent Motor Eff %**	0	**Vent Motor Hrs/day**	0.0		
Pump Run Hrs/day	24.0	**Vent Run Hrs/day**	0.0				
Pump Motor Load %	80	**Vent Motor Load %**	0				

Comments

SPLIT SYSTEM REPLACEMENTS SAVINGS CALCULATIONS

City of Oberlin - SS Replacement

Library

Tons = 15

(Building Tons = 15

Consists of Three Units

	Existing kW/ton	New kW/ton	kW/ton % Savings	Building Cooling Usage (kWh)	Split System Cooling (kWh)	Net Split System cooling usage (kWh)	Building cooling demand (kW)	Net Split System cooling demand (kW)	New Split Unit usage (kWh)	Demand Savings (kW)	Electric Usage Savings (kWh)
JAN	1.4	1.1	23%	-	-	-	-	-	-	-	-
FEB	1.4	1.1	23%	-	-	-	-	-	-	-	-
MAR	1.4	1.1	23%	-	-	-		-	-	-	-
APR	1.4	1.1	23%	-	-	-		-	-	-	-
MAY	1.4	1.1	23%	-	-	-		-	-	-	-
JUN	1.4	1.1	23%	888	888	888	6	6	888	1	201
JUL	1.4	1.1	23%	1,247	1,247	1,247	9	9	1,247	2	282
AUG	1.4	1.1	23%	1,432	1,432	1,432	9	9	1,432	2	324
SEP	1.4	1.1	23%	871	871	871	6	6	871	1	197
OCT	1.4	1.1	23%	-	-	-		-	-	-	-
NOV	1.4	1.1	23%	-	-	-	-	-	-	-	-
DEC	1.4	1.1	23%	-	-	-	-	-	-	-	-
				4,437					Total	7	1,004

NEW SYSTEM

SEER: 15

Existing Htg Efficiency	New Htg Efficiency	Existing Heating (Therm)	Net Split System (Therm)	Split System Htg load (MBTU)	New Split System (Therm)	Savings (Therm)
78%	90%	341	341	265,590	295	45
78%	90%	275	275	214,110	238	37
78%	90%	170	170	132,210	147	23
78%	90%	110	110	85,800	95	15
78%	90%	44	44	33,930	38	6
78%	90%	-	-	-	-	-
78%	90%	-	-	-	-	-
78%	90%	-	-	-	-	-
78%	90%	-	-	-	-	-
78%	90%	54	54	41,730	46	7
78%	90%	242	242	188,370	209	32
78%	90%	348	348	271,050	301	46
		1,581			Total	211

NEW SYSTEM

AFUE: 90%

FORCED AIR FURNACE REPLACEMENT SAVINGS CALCULATIONS

City of Oberlin - Furnace Replacement
Main Warehouse

Existing Htg Efficiency	New Htg Efficiency	Existing Heating (Therm)	Net Split System (Therm)	Split System Htg load (Therm)	New Split System (Therm)	Savings (Therm)	
80%	90%	1,138	506	405	450	56	
80%	90%	919	408	327	363	45	
80%	90%	604	269	215	239	30	
80%	90%	340	151	121	134	17	
80%	90%	121	54	43	48	6	
80%	90%	-	-	-	-	-	
80%	90%	-	-	-	-	-	
80%	90%	-	-	-	-	-	
80%	90%	-	-	-	-	-	
80%	90%	196	87	70	77	10	
80%	90%	673	299	239	266	33	
80%	90%	1,058	470	376	418	52	
		5,049			Total	249	Therm

BOILER REPLACEMENT SAVINGS CALCULATIONS

City of Oberlin - Boiler Replacement

Power Plant

Existing Htg Efficiency	New Htg Efficiency	Existing Heating (Therm)	System Output (Therm)	Split System Htg load (Therm)	Savings (Therm)
78%	90%	4,424	3,450	3,834	383
78%	90%	3,696	2,883	3,203	320
78%	90%	3,762	2,935	3,261	326
78%	90%	3,326	2,595	2,883	288
78%	90%	2,413	1,882	2,091	209
78%	90%	1,656	1,292	1,435	144
78%	90%	867	677	752	75
78%	90%	1,624	1,267	1,407	141
78%	90%	1,932	1,507	1,674	167
78%	90%	4,152	3,239	3,598	360
78%	90%	3,928	3,064	3,404	340
78%	90%	4,060	3,167	3,519	352
		35,840		Total	3,106

WATER METER SAVINGS CALCULATIONS

TEST RESULTS

ESP - Oberlin, KS Meters

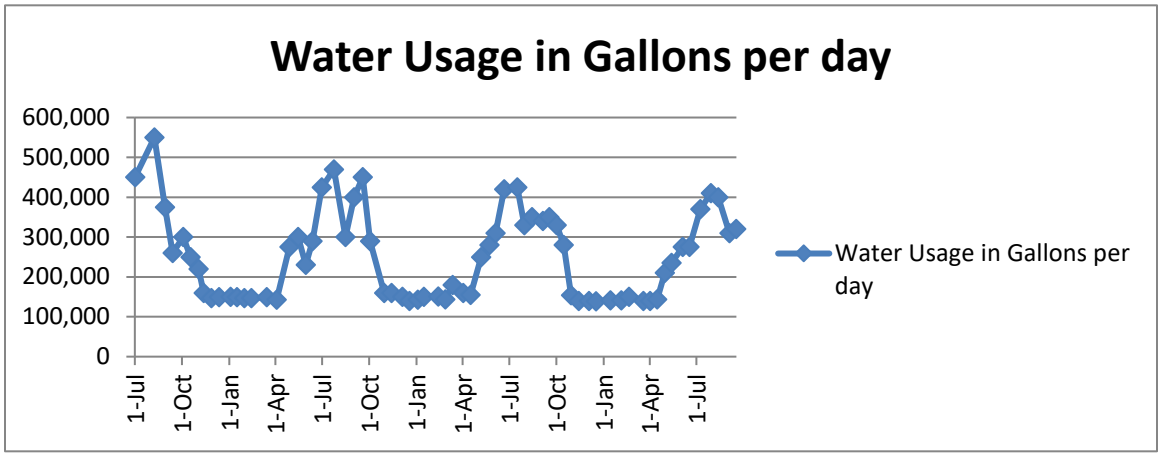
#	SIZE	MAKE	MODEL	SERIAL #	Start Read	End Read	HIGH	INTER	LOW	Weighted Average
1	5/8" x 3/4"	Rockwell	SR	36564125	98327.67	98343.08	104.74%	102.91%	0.00%	87.7%
2	5/8" x 3/4"	Sensus	SR II	53252203	69000.97	69017.21	101.46%	102.16%	95.91%	101.1%
3	5/8" x 3/4"	Sensus	SR	63828163	225918.79	225935.01	101.61%	101.42%	93.68%	100.3%
4	5/8" x 3/4"	Sensus	SR	63148257	230607.97	230624.39	102.58%	102.91%	97.47%	102.0%
5	5/8" x 3/4"	Rockwell	SR	17142212	98133.80	98148.59	100.64%	98.43%	0.00%	84.0%
6	5/8" x 3/4"	Rockwell	SR	25351919	39226.03	39240.71	99.81%	98.43%	0.00%	83.9%
7	3/4"	Sensus	SR	71708842	170984.08	171000.91	101.90%	101.78%	100.72%	101.6%
8	3/4"	Sensus	SR	68172830	65857.46	65874.30	101.91%	101.78%	100.16%	101.6%
9	3/4"	Sensus	SR	66668498	106934.89	106951.65	101.84%	101.78%	100.17%	101.5%
10	3/4"	Sensus	SR	66967983	41758.42	41775.26	101.84%	102.52%	100.72%	102.1%
11	3/4"	Sensus	SR	66668500	133818.75	133835.62	102.13%	101.78%	100.73%	101.7%
12	3/4"	Sensus	SR	66668945	291854.09	291870.93	101.84%	101.78%	100.17%	101.5%
13	1"	Sensus	SR	63949045	170372.80	170387.67	100.97%	95.45%	0.00%	82.0%

Average	96.2%	
Guaranteed Meter Accuracy	98.5%	
Recovery	2.3%	
3 Year Average Billed Water	88,687	kgal
3 Year Average Produced Water	98,594	kgal
Current Delta	9,908	kgal
New Billed Water Applying Recovery	90,736	kgal
New Delta	7,859	kgal
Amount of Water Recovered	2,049	kgal

To: Mayor and Oberlin City Council

From: City Foreman David Sporn

1. The most recent sewer lagoon expansion has been working well. We have not had to discharge to the creek since its installation. No discharge means that we remain in compliance because regulated samples are only taken if the lagoons run water to the creek.
2. The street project on Ash will continue to move forward without delay unless rains come again. I anticipate final completion within two weeks; however we are having trouble with our skid steer producing leaks. I need to have a council decision ASAP on precedence so I can plan our next project.
3. Up In Smoke was this weekend at Sappa and I believe everything went well. I had no contacts due to utilities.
4. Millers Engineers had completed the proposed drawings for the next water project and will be sending me a copy. On their arrival the Water Dept. and I will go over them to ensure they suit Oberlin's needs.
5. Things coming up in the future before the end of the year….
    a. Water tower inspections
    b. Sewer jetting
    c. IES project
    d. Breaker installation at the South sub station
6. Water Usage:



7. Permits:
    a. Right of Way for phone service repair
    b. Sewer for line repair
    c. 2 Electric for meter base repair

Questions/Comments?

OBERLIN POLICE DEPARTMENT

107 W. Commercial
P O Box 237
Oberlin KS. 67749-0237
oberlinpd3@ruraltel.net

MONTHLY ACTIVITY REPORT TO COUNCIL
MONTH OF AUGUST, 2019

CITY COURT: FINES COLLECTED IN AUGUST, 2019 - $4,097.00 –YTD $31,952.80

CITY COURT CASES FILED

1 – POSSESSION OF MARIJUANA
1 – POSSESSION OF DRUG PARAPHERNALIA
1 – NO CITY DOG TAGS
5 – MAXIMUM SPEED LIMITS
1 – NO DRIVER'S LICENSE

DISTRICT COURT CASES / OTHER FILED

1 – DRIVING UNDER THE INFLUENCE
1 – DOMESTIC BATTERY
1 – MAXIMUM SPEED LIMITS

ANIMAL CONTROL: NONE

CODE ENFORCEMENT: 1 – HEALTH NUISANCE
1 – TREES AND USE OF LAND

Chamber Board Meeting

September 12, 2019

1. **Attendance**
2. **Financials**

   Treasurer's report - Jill Reichert

   Hope to have DAD reports next month

3. **Past Events**

4. **Future Events**

   Up in Smoke BBQ- - Sponsorships, teams, other - Cynthia/Heather/Shayla/Jill

   Tailgate on Friday, Sept. 20 (Homecoming) - need workers

   U.S. 36 meeting treasure hunt - Shayla

   Ribbon cuttings ???- Carolyn Hackney

   Craft Fair - Carolyn

   Other Upcoming events - Shayla??

   Need to have someone run a candidates forum - Cynthia

5. **Old/New Business under Chamber**

   Speaker system under canopies grant - Shayla??

   Christmas decorations - Heather McDougal

   Other business???