Energy Performance Project

Savings During Year One Report

January 2013 – December 2013

Town of Hamburg
Hamburg, NY

October 14, 2014

Prepared by:

Wendel Project No. 300813MV

TABLE OF CONTENTS

TITLE	SECTION
EXECUTIVE SUMMARY	1
INTRODUCTION	2
SAVINGS GRAPHS	3
SAVINGS SUMMARY SHEETS	4
LIGHTING & LIGHTING CONTROLS	5
ENERGY MANAGEMENT SYSTEM UPGRADES	6
BUILDING ENVELOPE IMPROVEMENTS	7
ICE RINK IMPROVEMENTS	8
DESTRATIFICATION FANS	9
LOW FLOW SHOWER HEADS	10
OPERATIONAL & MAINTENANCE SAVINGS	11
APPENDIX A – Utility Summary	•
APPENDIX B –Trend Data	•

Section 1

Executive Summary

EXECUTIVE SUMMARY

The Town of Hamburg has entered into an energy performance contract with Wendel Energy Services. This savings report includes savings achieved during year one starting January 2013 through and including December 2013. This project involved eight (8) facilities. The scope consisted of various energy conservation measures (ECMs), facility improvement measures and operational efficiency improvements as listed below:

- Lighting and Lighting Controls Upgrade
- Energy Management System Upgrades
- Building Envelope Improvements
- Ice Rink Improvements
- De-stratification Fans
- Low Flow Shower Heads

Savings Summary

The Town of Hamburg's Energy Performance Contract has achieved the following results during year one in 2013:

- $38,835 in energy savings
- $-225 in maintenance savings
- 218,090 kWh in electrical supply savings
- 434 kW in electrical demand savings
- 1,511 mmBtu in gas savings
- 27 kGal in water savings

Incentive Summary

In recognition of the electrical savings achieved, Wendel has secured $8,785 in incentive money from the New York State Energy Research and Development Authority (NYSERDA) and National Grid.

Emissions Summary

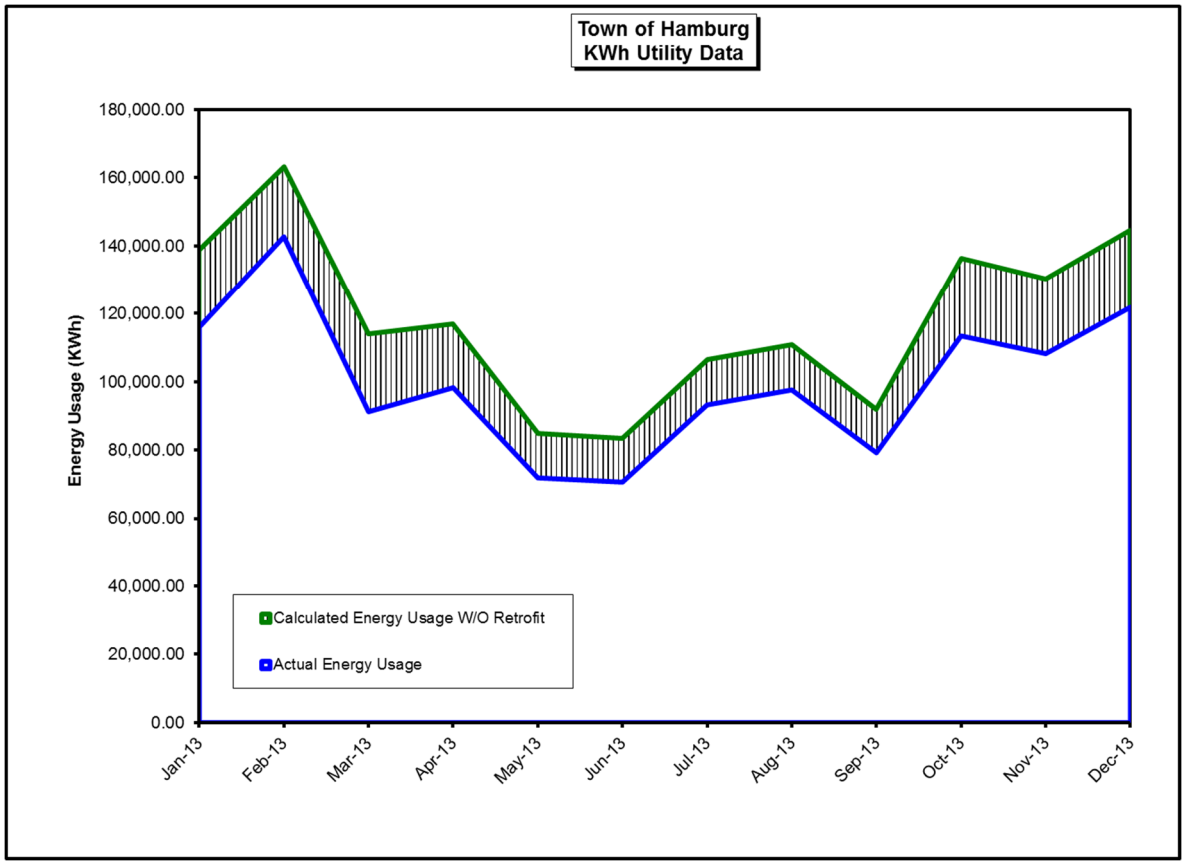
The reported energy savings not only benefits the Town of Hamburg financially, but also benefits the environment by reducing the below equivalent emissions

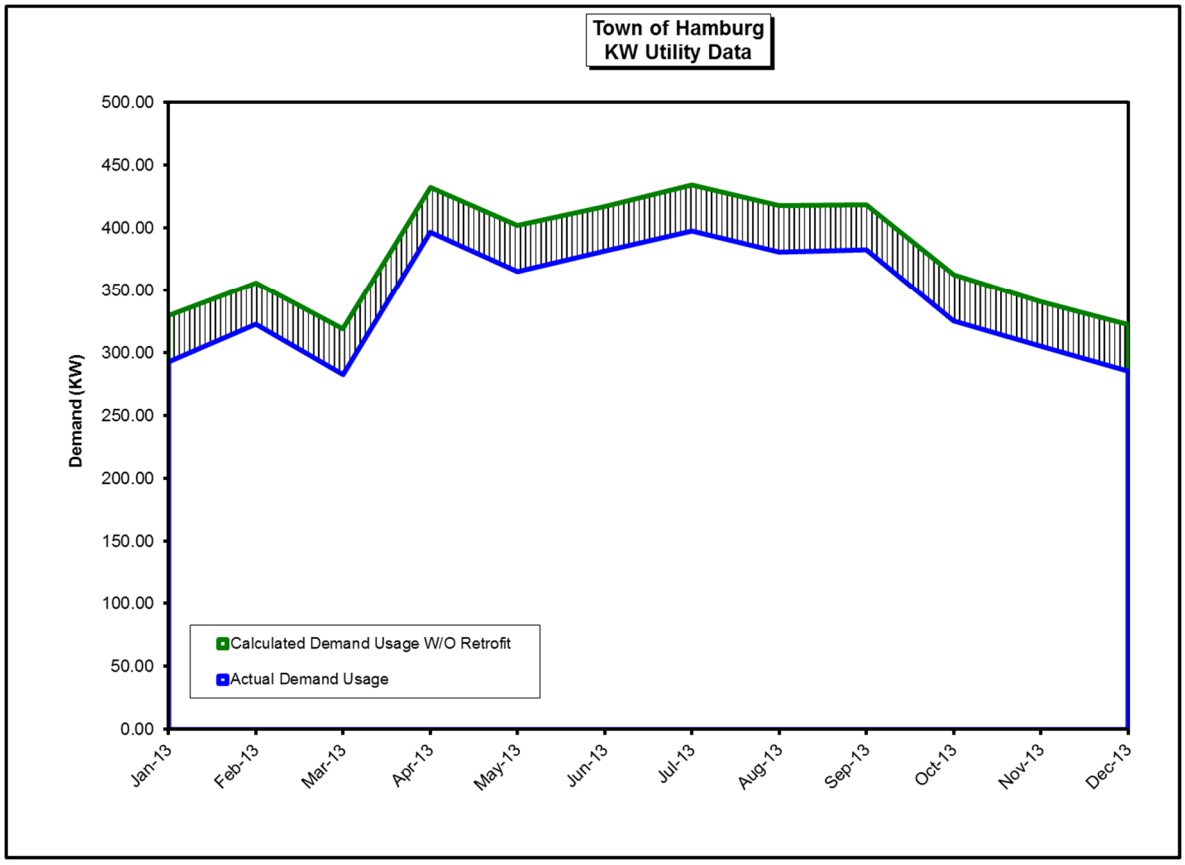
- 25 passenger vehicles removed from the road
- 301 Barrels of oil saved
- 11 houses energy use for 1 year
- 3,354 number of trees planted

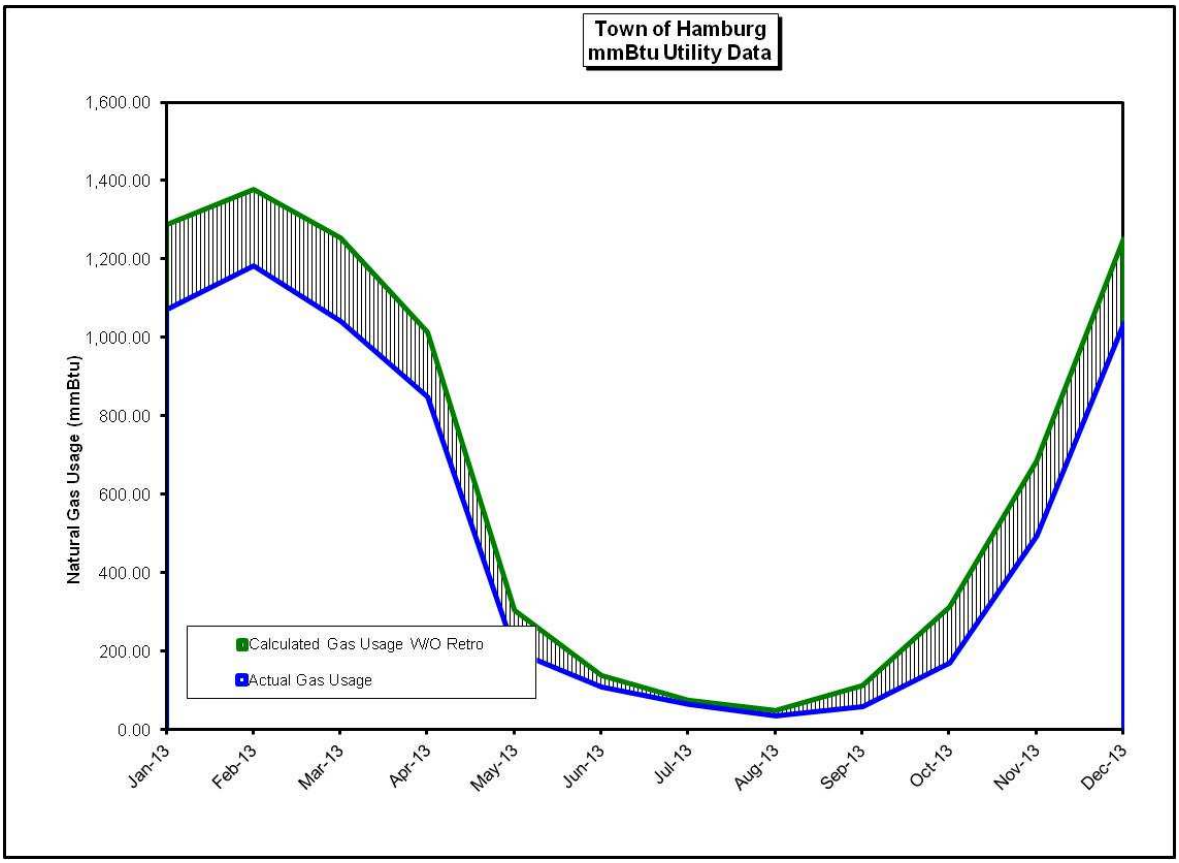
The emission reductions are calculated and shown below:

- 285,321 lbs of CO2 (Carbon Dioxide)
- 215 lbs of SO2 (Sulfur Dioxide)
- 1 lbs of N2O (Nitrous Oxide)

The following charts compare the actual energy usage to the calculated energy usage without implementation of the Performance Contract.


Town of Hamburg
KWh Utility Data
Energy Usage (KWh)
180,000.00
160,000.00
140,000.00
120,000.00
100,000.00
80,000.00
60,000.00
40,000.00
20,000.00
0.00
Calculated Energy Usage W/O Retrofit
Actual Energy Usage
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13


Town of Hamburg
KW Utility Data
Demand (KW)
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Calculated Demand Usage W/O Retrofit
Actual Demand Usage
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13


Town of Hamburg
mmBtu Utility Data
Natural Gas Usage (mmBtu)
1,600.00
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Calculated Gas Usage W/O Retro
Actual Gas Usage
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13

Section 2

Introduction

INTRODUCTION

Wendel Energy Services (WES) is responsible for monitoring the measurable energy savings produced by this project and providing an annual report of savings to the Town of Hamburg. The Savings During Year One Report contains the amount of total energy saved and the cost savings relative to the baselines established in the Performance Contract. The total measured savings during year one is $24,233. The total annual guaranteed savings consists of measurable savings. These savings are calculated based on Exhibit G of the Performance Contract during the Guarantee term of this contract. The total measured and stipulated savings during construction is $38,610.

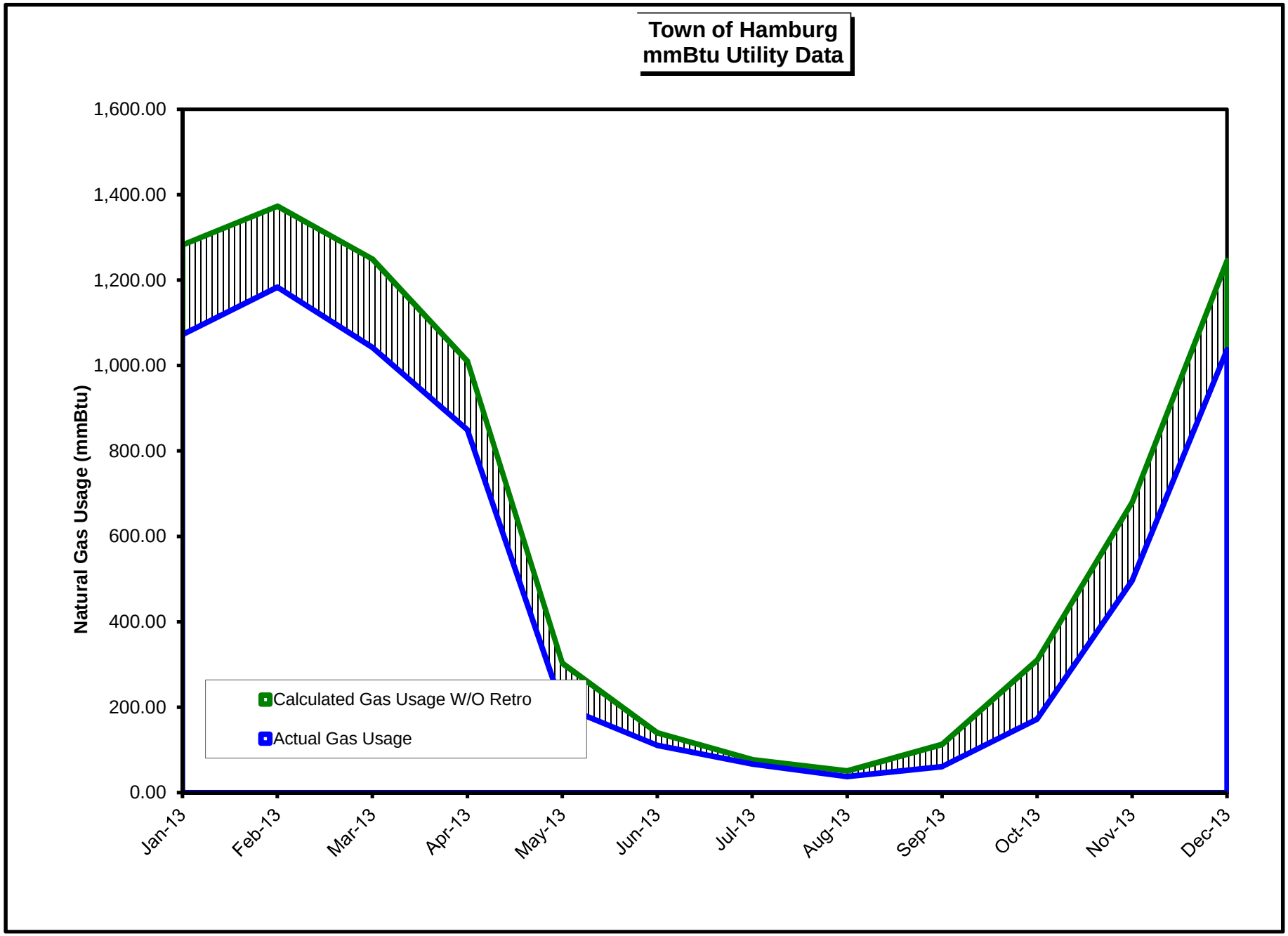
Performance contracts are implemented to save energy on building systems which are evaluated and have parameters that can be accurately measured or reasonably stipulated to obtain the energy savings calculated by engineers. Often times, variables outside the scope of a performance contract influence the energy consumption such that the actual energy savings are not reflected on the utility bills. Potential variables may include: additional loads added to a building (e.g., computers), changes in equipment run hours due to unexpected activities or due to planned changes of use (e.g., new evening sessions) and increases in utility prices.

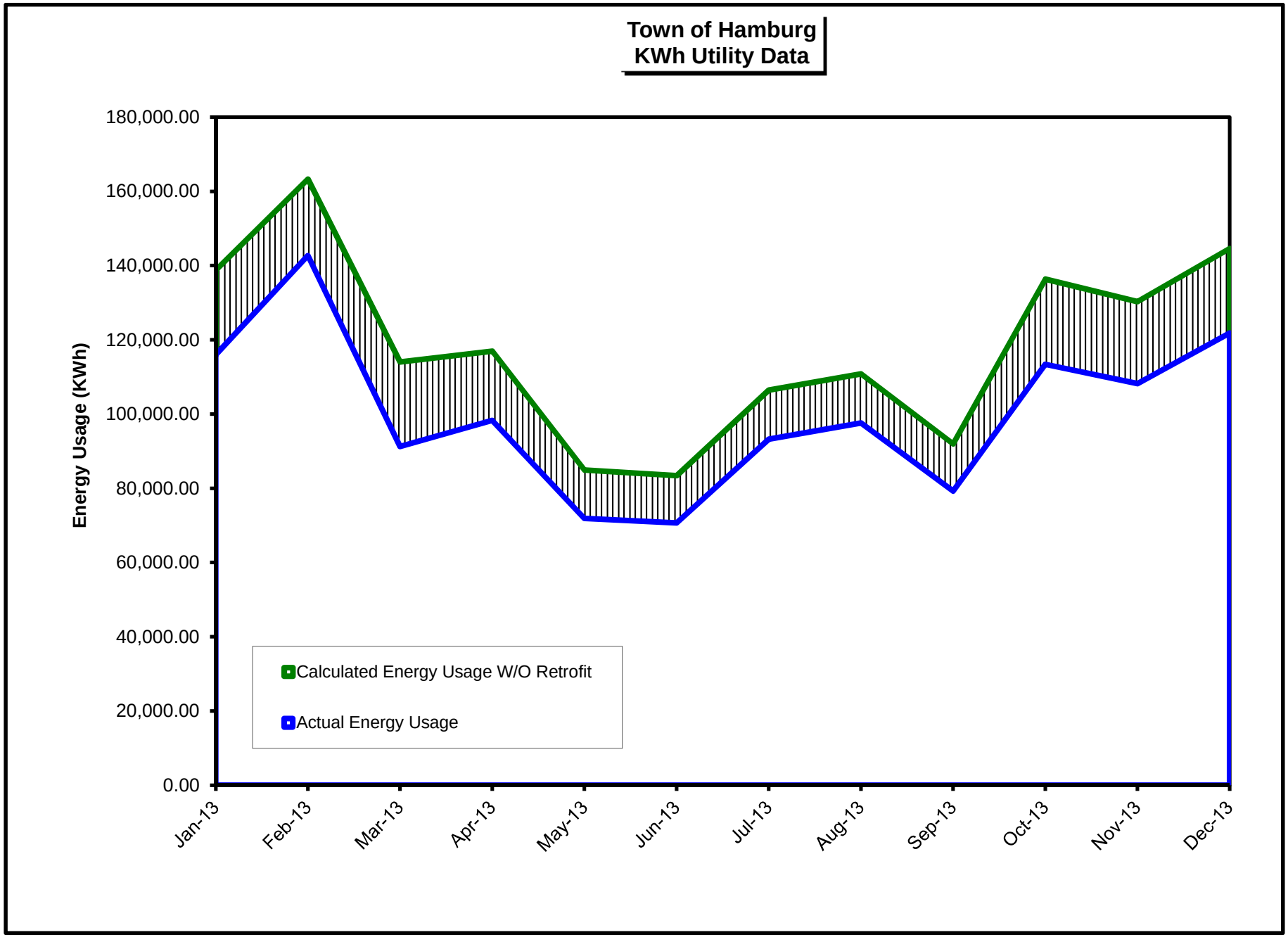
The general process WES followed involved analyzing the trended data and incorporating the results into the Comprehensive Energy Analysis (CEA) savings calculations to determine the actual measured savings as described in Exhibit G of the Performance Contract. Exhibit G, Calculation of Benchmarks & Performance Savings, was written based on techniques recommended in the International Performance Measurement and Verification Protocol (IPMVP).

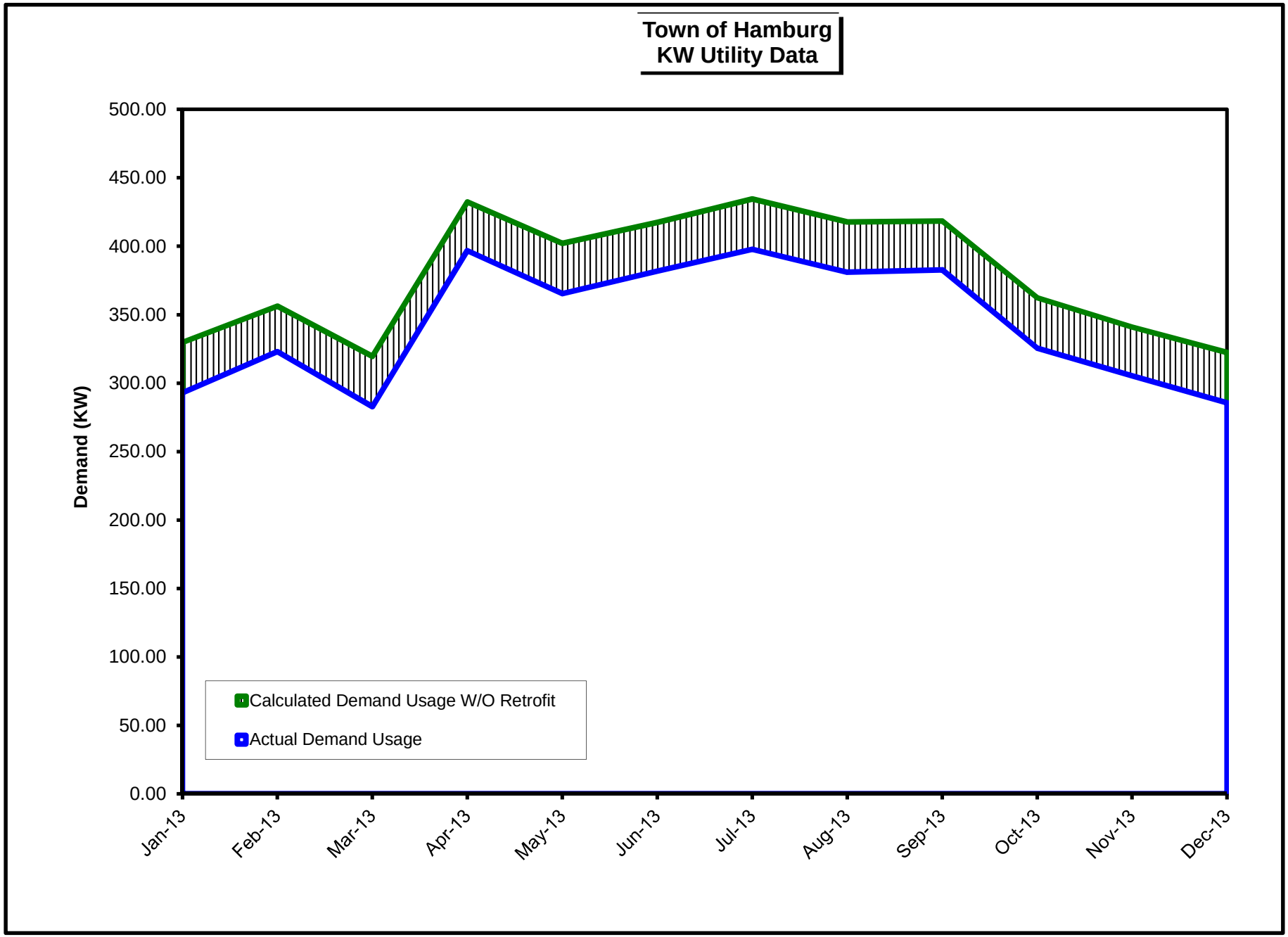
The Savings Report that follows contains the analysis of the measures implemented at each facility included in this Performance Contract. The evaluation of the energy savings by month are summarized based on the facilities where each measure was implemented.

Section 3

Savings Graphs


Town of Hamburg
mmBtu Utility Data
Natural Gas Usage (mmBtu)
1,600.00
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Calculated Gas Usage W/O Retro
Actual Gas Usage


Town of Hamburg
KWh Utility Data
Energy Usage (KWh)
180,000.00
160,000.00
140,000.00
120,000.00
100,000.00
80,000.00
60,000.00
40,000.00
20,000.00
0.00
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Calculated Energy Usage W/O Retrofit
Actual Energy Usage


Town of Hamburg
KW Utility Data
Demand (KW)
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Calculated Demand Usage W/O Retrofit
Actual Demand Usage

Section 4

Savings Summary Sheets

Town of Hamburg Dollar Savings Report

	Lighting Upgrades	Energy Management System Upgrades	Building Envelope Improvements	Brine Header Insulation	Low Emissivity Ceiling	Destratification Fans	Low Flow Shower Heads	Lighting O&M Savings	Low Flow Shower Heads O&M Savings	Total
Construction Period	$8,598.58	$4,071.73	$3,138.10	$754.41	$1,969.42	$521.25	$125.02	-$169.13	$33.93	$19,043.31
2013-2014	$16,544.93	$7,687.60	$7,365.67	$1,615.43	$4,217.12	$1,271.28	$133.30	-$304.00	$79.00	$38,610.32
2013-2015										$0
2013-2016										$0
2013-2017										$0
2013-2018										$0
2013-2019										$0
2013-2020										$0
2013-2021										$0
2013-2022										$0
2013-2023										$0
2013-2024										$0
2013-2025										$0
2013-2026										$0
2013-2027										$0
2013-2028										$0
Savings To Date	$25,143.51	$11,759.33	$10,503.77	$2,369.84	$6,186.54	$1,792.53	$258.31	-$473.13	$112.93	$57,653.63
Annual Guaranteed Savings	$10,819.59	$7,504.18	$7,957.26	$1,615.43	$4,217.12	$1,271.28	$133.30	-$304.67	$79.00	$33,292.49
Total Guaranteed Savings (15 yrs)	$162,293.85	$112,562.70	$119,358.90	$24,231.45	$63,256.80	$19,069.20	$1,999.50	-$4,570.05	$1,185.00	$499,387.35
Remaining Savings	$137,150.34	$100,803.37	$108,855.13	$21,861.61	$57,070.26	$17,276.67	$1,741.19	-$4,096.92	$1,072.07	$441,733.72

Town of Hamburg kWh Savings Report

	Lighting Upgrades	Energy Management System Upgrades	Building Envelope Improvements	Brine Header Insulation	Low Emissivity Ceiling	Destratification Fans	Low Flow Shower Heads	Total
Construction Period	74,932	1,752	-	8,962	21,427	(1,417)	0	105,657
2013-2014	154,538	1758	0	19,191	45,882	(3,279.00)	0	218,090
2013-2014								$0
2014-2015								$0
2015-2016								$0
2016-2017								$0
2017-2018								$0
2018-2019								$0
2019-2020								$0
2020-2021								$0
2021-2022								$0
2022-2023								$0
2023-2024								$0
2024-2025								$0
2025-2026								$0
2026-2027								$0
Savings To Date	229,470	3,510	N/A	28,153	67,309	(4,696)	N/A	323,747
Annual Guaranteed Savings	94,689	970	N/A	19,191	45,882	(3,279)	N/A	157,453
Total Guaranteed Savings (15 yrs)	1,420,335	14,550	N/A	287,865	688,230	(49,185)	N/A	2,361,795
Remaining Savings	1,190,865	11,040	N/A	259,712	620,921	(44,489)	N/A	2,038,048

Town of Hamburg kW Savings Report

	Lighting Upgrades	Energy Management System Upgrades	Building Envelope Improvements	Brine Header Insulation	Low Emissivity Ceiling	Destratification Fans	Low Flow Shower Heads	Total
Construction Period	288.9	0	0	0	0	0	0	289
2013-2014	433.6	0	0	0	0	0	0	434
2013-2014								0.0
2014-2015								0.0
2015-2016								0.0
2016-2017								0.0
2017-2018								0.0
2018-2019								0.0
2019-2020								0.0
2020-2021								0.0
2021-2022								0.0
2022-2023								0.0
2023-2024								0.0
2024-2025								0.0
2025-2026								0.0
2026-2027								0.0
Savings To Date	722	N/A	N/A	N/A	N/A	N/A	N/A	722
Annual Guaranteed Savings	433.6	N/A	N/A	N/A	N/A	N/A	N/A	434
Total Guaranteed Savings (15 yrs)	6,504	N/A	N/A	N/A	N/A	N/A	N/A	6504
Remaining Savings	5,782	N/A	N/A	N/A	N/A	N/A	N/A	5782

Town of Hamburg mmBtu Savings Report

	Lighting Upgrades	Energy Management System Upgrades	Building Envelope Improvements	Brine Header Insulation	Low Emissivity Ceiling	Destratification Fans	Low Flow Shower Heads	Total
Construction Period	-24	384	294	0	0	50	2	706
2013-2014	-36	735	690	0	0	115	5	1,511
2013-2014								0
2014-2015								0
2015-2016								0
2016-2017								0
2017-2018								0
2018-2019								0
2019-2020								0
2020-2021								0
2021-2022								0
2022-2023								0
2023-2024								0
2024-2025								0
2025-2026								0
2026-2027								0
Savings To Date	-59	1,119	984	N/A	N/A	165	8	2,217
Annual Guaranteed Savings	-30	735	743	N/A	N/A	115	5	1,568
Total Guaranteed Savings (15 yrs)	-450	11,025	11,145	N/A	N/A	1,725	75	23,520
Remaining Savings	-391	9,906	10,161	N/A	N/A	1,560	67	21,303

Town of Hamburg kGal Savings Report

	Lighting Upgrades	Energy Management System Upgrades	Building Envelope Improvements	Brine Header Insulation	Low Emissivity Ceiling	Destratification Fans	Low Flow Shower Heads	Total
Construction Period	0	0	0	0	0	0	12	12
2013-2014	0	0	0	0	0	0	27	27
2013-2014								0
2014-2015								0
2015-2016								0
2016-2017								0
2017-2018								0
2018-2019								0
2019-2020								0
2020-2021								0
2021-2022								0
2022-2023								0
2023-2024								0
2024-2025								0
2025-2026								0
2026-2027								0
Savings To Date	N/A	N/A	N/A	N/A	N/A	N/A	39	39
Annual Guaranteed Savings	N/A	N/A	N/A	N/A	N/A	N/A	27	27
Total Guaranteed Savings (15 yrs)	N/A	N/A	N/A	N/A	N/A	N/A	405	405
Remaining Savings	N/A	N/A	N/A	N/A	N/A	N/A	366	366

Town of Hamburg
Environmental Savings

Project No. 443801
Date. 10/7/14

Measure Summary		
Energy Savings		
Total Demand Savings	433.6	kW/Year
Electrical Energy Savings	218,090	kWh/Year
Fossil Fuel Savings	1,511	mmBtu/Year
Total Equivalent CO_2 Gas Savings[1]	285,321	lbs/Year

(1) Environmental CO_2 Gas Savings Estimated Using Conversions By: EPA

Environmental Savings from Energy Use Reduction (1 year)

285,321 lbs of CO_2 (Carbon Dioxide)
215 lbs of SO2 (Sulfur Dioxide)
1 lbs of N_2O (Nitrous Oxide)

Equivalent Savings for Comparison (1 year)

cars removed from the road	barrels of oil saved	houses energy use	number of trees planted
25	301	11	3,354

Section 5

Lighting & Lighting Controls

Lighting Savings Summary by Building - Savings Year 1

	Actual in 2013				Annual Guaranteed Savings			
	kW Savings	kWh Savings	mmBtu Savings	$ Savings	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Town Ice Arena	236.7	112,485.1	0.0	$11,930.41	236.7	59,381	0.0	$6,844
Town Hall	43.5	9,099.9	(7.8)	$935.98	43.3	7,690	(7.0)	$734
Buildings and Grounds	134.2	30,040.4	(25.6)	$3,298.60	134.2	24,845	(21.0)	$2,833
Town Park Fitness Center	2.1	372.1	0.0	$49.74	2.1	335	0.0	$46
Senior Adult Care	4.4	769.6	(0.7)	$87.64	4.4	693	(1.0)	$89
Senior Garage	12.5	1,771.1	(1.5)	$242.56	12.8	1,746	(1.0)	$272
Total	*433.6*	*154,538*	*(35.6)*	*$16,544.93*	*433.5*	*94,690*	*(30.0)*	*$10,818*

Lighting Savings Summary by Month - Savings Year 1

	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Jan-13	36.8	13,125.2	(3.0)	$1,405
Feb-13	33.3	11,855.0	(2.7)	$1,269
Mar-13	36.8	13,125.2	(3.0)	$1,405
Apr-13	35.6	12,701.8	(2.9)	$1,360
May-13	36.8	13,125.2	(3.0)	$1,405
Jun-13	35.6	12,701.8	(2.9)	$1,360
Jul-13	36.8	13,125.2	(3.0)	$1,405
Aug-13	36.8	13,125.2	(3.0)	$1,405
Sep-13	35.6	12,701.8	(2.9)	$1,360
Oct-13	36.8	13,125.2	(3.0)	$1,405
Nov-13	35.6	12,701.8	(2.9)	$1,360
Dec-13	36.8	13,125.2	(3.0)	$1,405
Total	*433.6*	*154,538*	*(35.6)*	*$16,545*

Annual Lighting & Lighting Controls Savings Report
Town Ice Arena

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	20.1	9,554	0.0	$1,013.27
Feb-13	18.2	8,629	0.0	$915.21
Mar-13	20.1	9,554	0.0	$1,013.27
Apr-13	19.5	9,245	0.0	$980.58
May-13	20.1	9,554	0.0	$1,013.27
Jun-13	19.5	9,245	0.0	$980.58
Jul-13	20.1	9,554	0.0	$1,013.27
Aug-13	20.1	9,554	0.0	$1,013.27
Sep-13	19.5	9,245	0.0	$980.58
Oct-13	20.1	9,554	0.0	$1,013.27
Nov-13	19.5	9,245	0.0	$980.58
Dec-13	20.1	9,554	0.0	$1,013.27
Total	*236.7*	*112,485*	*0.0*	$11,930.41

*Energy savings are calculated on an annual basis. Run hours are determined through a data collection process and verified using lighting loggers for a period of 2 weeks. This pattern is then extrapolated into annual run hours. For presentation purposes, the annual energy savings is divided into months based on the number of days in the month.

Annual Lighting & Lighting Controls Savings Report
Town Hall

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	3.7	773	(0.7)	$79.49
Feb-13	3.3	698	(0.6)	$71.80
Mar-13	3.7	773	(0.7)	$79.49
Apr-13	3.6	748	(0.6)	$76.93
May-13	3.7	773	(0.7)	$79.49
Jun-13	3.6	748	(0.6)	$76.93
Jul-13	3.7	773	(0.7)	$79.49
Aug-13	3.7	773	(0.7)	$79.49
Sep-13	3.6	748	(0.6)	$76.93
Oct-13	3.7	773	(0.7)	$79.49
Nov-13	3.6	748	(0.6)	$76.93
Dec-13	3.7	773	(0.7)	$79.49
Total	*43.5*	*9,100*	*(7.8)*	$935.98

*Energy savings are calculated on an annual basis. Run hours are determined through a data collection process and verified using lighting loggers for a period of 2 weeks. This pattern is then extrapolated into annual run hours. For presentation purposes, the annual energy savings is divided into months based on the number of days in the month.

Annual Lighting & Lighting Controls Savings Report
Buildings and Grounds

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	11.4	2,551	(2.2)	$280.15
Feb-13	10.3	2,304	(2.0)	$253.04
Mar-13	11.4	2,551	(2.2)	$280.15
Apr-13	11.0	2,469	(2.1)	$271.12
May-13	11.4	2,551	(2.2)	$280.15
Jun-13	11.0	2,469	(2.1)	$271.12
Jul-13	11.4	2,551	(2.2)	$280.15
Aug-13	11.4	2,551	(2.2)	$280.15
Sep-13	11.0	2,469	(2.1)	$271.12
Oct-13	11.4	2,551	(2.2)	$280.15
Nov-13	11.0	2,469	(2.1)	$271.12
Dec-13	11.4	2,551	(2.2)	$280.15
Total	*134.2*	*30,040*	*(25.6)*	$3,298.60

*Energy savings are calculated on an annual basis. Run hours are determined through a data collection process and verified using lighting loggers for a period of 2 weeks. This pattern is then extrapolated into annual run hours. For presentation purposes, the annual energy savings is divided into months based on the number of days in the month.

Annual Lighting & Lighting Controls Savings Report
Town Park Fitness

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.2	32	0.0	$4.22
Feb-13	0.2	29	0.0	$3.82
Mar-13	0.2	32	0.0	$4.22
Apr-13	0.2	31	0.0	$4.09
May-13	0.2	32	0.0	$4.22
Jun-13	0.2	31	0.0	$4.09
Jul-13	0.2	32	0.0	$4.22
Aug-13	0.2	32	0.0	$4.22
Sep-13	0.2	31	0.0	$4.09
Oct-13	0.2	32	0.0	$4.22
Nov-13	0.2	31	0.0	$4.09
Dec-13	0.2	32	0.0	$4.22
Total	*2.1*	*372*	*0.0*	$49.74

*Energy savings are calculated on an annual basis. Run hours are determined through a data collection process and verified using lighting loggers for a period of 2 weeks. This pattern is then extrapolated into annual run hours. For presentation purposes, the annual energy savings is divided into months based on the number of days in the month.

Annual Lighting & Lighting Controls Savings Report
Senior Adult Care

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.4	65	(0.1)	$7.44
Feb-13	0.3	59	(0.1)	$6.72
Mar-13	0.4	65	(0.1)	$7.44
Apr-13	0.4	63	(0.1)	$7.20
May-13	0.4	65	(0.1)	$7.44
Jun-13	0.4	63	(0.1)	$7.20
Jul-13	0.4	65	(0.1)	$7.44
Aug-13	0.4	65	(0.1)	$7.44
Sep-13	0.4	63	(0.1)	$7.20
Oct-13	0.4	65	(0.1)	$7.44
Nov-13	0.4	63	(0.1)	$7.20
Dec-13	0.4	65	(0.1)	$7.44
Total	*4.4*	*770*	*(0.7)*	$87.64

*Energy savings are calculated on an annual basis. Run hours are determined through a data collection process and verified using lighting loggers for a period of 2 weeks. This pattern is then extrapolated into annual run hours. For presentation purposes, the annual energy savings is divided into months based on the number of days in the month.

Annual Lighting & Lighting Controls Savings Report
Senior Garage

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	1.1	150	(0.1)	$20.60
Feb-13	1.0	136	(0.1)	$18.61
Mar-13	1.1	150	(0.1)	$20.60
Apr-13	1.0	146	(0.1)	$19.94
May-13	1.1	150	(0.1)	$20.60
Jun-13	1.0	146	(0.1)	$19.94
Jul-13	1.1	150	(0.1)	$20.60
Aug-13	1.1	150	(0.1)	$20.60
Sep-13	1.0	146	(0.1)	$19.94
Oct-13	1.1	150	(0.1)	$20.60
Nov-13	1.0	146	(0.1)	$19.94
Dec-13	1.1	150	(0.1)	$20.60
Total	*12.5*	*1,771*	*(1.5)*	$242.56

*Energy savings are calculated on an annual basis. Run hours are determined through a data collection process and verified using lighting loggers for a period of 2 weeks. This pattern is then extrapolated into annual run hours. For presentation purposes, the annual energy savings is divided into months based on the number of days in the month.

Annual Lighting Savings Report for Town Ice Arena

Report Run Date: 1/1/2014

Line#	Floor	Location	Use Code	Annual Hours	Normalized Peak hours	Existing Quantity	Watts Before	Existing Description	Watts After	Retrofit Description	Quantity Installed	Sensor Type	Date Installed	Days In Use	Baseline Burn Hours	Sensor % Savings	Actual Burn Hours	Hours Saved By Sensors	KW Saved with New Lights	KWh Saved with New Lights
1	1	Hall	H2	5703	5703	26	32	1-F32T8/1-EB	32	Leave as is	26		01-Jan-13	365	5702.6667		5703	0	0.00	0
2	1	Hall	H2	5703	5703	6	32	1-F32T8/1-EB	32	Leave as is	6		01-Jan-13	365	5702.6667		5703	0	0.00	0
3	1	Skates	O1	2080	2080	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	2080		2080	0	0.00	0
4	1	Proshop	O1	2080	2080	8	32	1-F32T8/1-EB	32	Leave as is	8		01-Jan-13	365	2080		2080	0	0.00	0
5	1	Mens Room 1	T2	5703	5703	2	88	3-F32T8/1-EB	49	2-F28T8/1-NEB/RETRO/REFL	2		01-Jan-13	365	5702.6667		5703	0	0.94	445
6	1	Womens Room 1	T2	5703	5703	3	88	3-F32T8/1-EB	49	2-F28T8/1-NEB/RETRO/REFL	3		01-Jan-13	365	5702.6667		5703	0	1.40	667
7	1	Snacks	T2	5703	5703	3	32	1-F32T8/1-EB	32	Leave as is	3		01-Jan-13	365	5702.6667		5703	0	0.00	0
8	1	Office	O2	5703	5703	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	5702.6667		5703	0	0.00	0
9	1	Hall	H2	5703	5703	5	32	1-F32T8/1-EB	32	Leave as is	5		01-Jan-13	365	5702.6667		5703	0	0.00	0
10	1	Locker Ent	H2	5703	5703	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	5702.6667		5703	0	0.00	0
11	1	First Aid	O2	5703	5703	2	32	1-F32T8/1-EB	32	Leave as is	2		01-Jan-13	365	5702.6667		5703	0	0.00	0
12	1	First Aid	O2	5703	5703	1	58	2-F32T8/1-EB	58	Leave as is	1		01-Jan-13	365	5702.6667		5703	0	0.00	0
13	1	Office	O2	5703	5703	1	58	2-F32T8/1-EB	58	Leave as is	1		01-Jan-13	365	5702.6667		5703	0	0.00	0
14	1	Restroom	T2	5703	5703	3	32	1-F32T8/1-EB	32	Leave as is	3		01-Jan-13	365	5702.6667		5703	0	0.00	0
15	1	Shower	T2	5703	5703	1	58	2-F32T8/1-EB	58	Leave as is	1		01-Jan-13	365	5702.6667		5703	0	0.00	0
16	1	Hall	H2	5703	5703	8	32	1-F32T8/1-EB	32	Leave as is	8		01-Jan-13	365	5702.6667		5703	0	0.00	0
17	1	Restroom	T2	5703	5703	3	32	1-F32T8/1-EB	32	Leave as is	3		01-Jan-13	365	5702.6667		5703	0	0.00	0
18	1	Locker Room	O1	2080	2080	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	2080		2080	0	0.00	0
19	1	Locker Room	O1	2080	2080	1	32	1-F32T8/1-EB	32	Leave as is	1		01-Jan-13	365	2080		2080	0	0.00	0
20	1	Locker Room	O1	2080	2080	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	2080		2080	0	0.00	0
21	1	Locker Room	O1	2080	2080	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	2080		2080	0	0.00	0
22	1	Locker Room	O1	2080	2080	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	2080		2080	0	0.00	0
23	1	Office	O1	2080	2080	4	32	1-F32T8/1-EB	32	Leave as is	4		01-Jan-13	365	2080		2080	0	0.00	0
24	1	Ice Rink	G2	5703	5703	30	1080	1-MH1000/1-EMB	468	8-F54HOT5/2-NEB/REFIX/P	30		01-Jan-13	365	5702.6667		5703	0	220.32	104701
25	1	Ice Rink	G2	5703	5703	5	460	1-MH400/1-EMB	226	4-F54HOT5/1-NEB/REFIX/P	5		01-Jan-13	365	5702.6667		5703	0	14.04	6672
26	1	Mechanical RM	M4	1040	1040	4	114	4-F32T8/1-EB	114	Leave as is	4		01-Jan-13	365	1040		1040	0	0.00	0
27	1	Compressor RM	M4	1040	1040	4	114	4-F32T8/1-EB	114	Leave as is	4		01-Jan-13	365	1040		1040	0	0.00	0
																	Total	**Savings**	236.70	112485

Annual Lighting Savings Report for Town Hall

Report Run Date: 1/1/2014

Line#	Floor	Location	Use Code	Annual Hours	Normalized Peak hours	Existing Quantity	Watts Before	Existing Description	Watts After	Retrofit Description	Quantity Installed	Sensor Type	Date Installed	Days In Use	Baseline Burn Hours	Sensor % Savings	Acutal Burn Hours	Hours Saved By Sensors	KW Saved with New Lights	KWh Saved with New Lights
1	B	Long Hall	H2	3900	3900	6	74	2-F32T8/1-EB	74	Leave as is	6		01-Jan-13	365	3900		3900		0.00	0
2	B	Men's	T2	3900	3900	4	74	2-F32T8/1-EB	74	Leave as is	4		01-Jan-13	365	3900		3900		0.00	0
3	B	Boiler	S4	1040	1040	3	74	2-F32T8/1-EB	74	Leave as is	3		01-Jan-13	365	1040		1040		0.00	0
4	B	ilding and Groun	H1	2210	2210	2	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	2		01-Jan-13	365	2210		2210		0.89	164
5	B	Meter Room	M4	1040	1040	2	74	2-F32T8/1-EB	74	Leave as is	2		01-Jan-13	365	1040		1040		0.00	0
6	B	B&G Storage	S4	1040	1040	1	114	4-F32T8/1-EB	114	Leave as is	1		01-Jan-13	365	1040		1040		0.00	0
7	B	ilding and Groun	H1	2210	2210	2	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	2		01-Jan-13	365	2210		2210		0.89	164
8	B	Office	O1	2210	2210	1	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	1		01-Jan-13	365	2210		2210		0.44	82
9	B	John Office	O1	2210	2210	2	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	2		01-Jan-13	365	2210		2210		0.89	164
10	B	Shop	O1	2210	2210	10	114	4-F32T8/1-EB	114	Leave as is	10		01-Jan-13	365	2210		2210		0.00	0
11	B	Shop	O1	2210	2210	4	74	2-F32T8/1-EB	74	Leave as is	4		01-Jan-13	365	2210		2210		0.00	0
12	B	Conference Room	O1	2210	2210	15	88	3-F32T8/1-EB	88	Leave as is	15		01-Jan-13	365	2210		2210		0.00	0
13	B	onference Room 7	O1	2210	2210	11	88	3-F32T8/1-EB	88	Leave as is	11		01-Jan-13	365	2210		2210		0.00	0
14	B	Storage	S4	1040	1040	2	88	3-F32T8/1-EB	88	Leave as is	2		01-Jan-13	365	1040		1040		0.00	0
15	B	Stairs	H2	3900	3900	9	74	2-F32T8/1-EB	74	Leave as is	9		01-Jan-13	365	3900		3900		0.00	0
16	1	Hall	H2	3900	3900	15	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	15		01-Jan-13	365	3900		3900		6.66	2165
17	1	Attorney	O1	2210	2210	4	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	4		01-Jan-13	365	2210		2210		1.78	327
18	1	Conference 1	O1	2210	2210	4	74	2-F32T8/1-EB	74	Leave as is	4		01-Jan-13	365	2210		2210		0.00	0
19	1	Hall	H2	3900	3900	11	47	2-F20T12/1-SMB	47	Leave as is	11		01-Jan-13	365	3900		3900		0.00	0
20	1	Hall	H2	3900	3900	4	74	2-F32T8/1-EB	74	Leave as is	4		01-Jan-13	365	3900		3900		0.00	0
21	1	Supervisor	O1	2210	2210	5	74	2-F32T8/1-EB	74	Leave as is	5		01-Jan-13	365	2210		2210		0.00	0
22	1	Lobby	V2	3900	3900	6	58	2-F32T8/1-EB	39	3-F15T8/1-EB/RETRO/REFL	6		01-Jan-13	365	3900		3900		1.37	445
23	1	Assembly	O1	2210	2210	14	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	14		01-Jan-13	365	2210		2210		6.22	1145
24	1	Tax Collector	O1	2210	2210	14	74	2-F32T8/1-EB	74	Leave as is	14		01-Jan-13	365	2210		2210		0.00	0
25	1	Storage	S4	1040	1040	1	37	2-CF17W/DRM	37	Leave as is	1		01-Jan-13	365	1040		1040		0.00	0
26	1	Financial	O1	2210	2210	46	58	2-F32T8/1-EB	39	3-F15T8/1-EB/RETRO/REFL	46		01-Jan-13	365	2210		2210		10.49	1932
27	1	Clark Amil	O1	2210	2210	27	74	2-F32T8/1-EB	74	Leave as is	27		01-Jan-13	365	2210		2210		0.00	0
28	1	Courthouse	O1	2210	2210	18	58	2-F32T8/1-EB	39	3-F15T8/1-EB/RETRO/REFL	18		01-Jan-13	365	2210		2210		4.10	756
29	1	gineering Front O	O1	2210	2210	6	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	6		01-Jan-13	365	2210		2210		2.66	491
30	1	gineering Front O	O1	2210	2210	1	58	2-F32T8/1-EB	39	3-F15T8/1-EB/RETRO/REFL	1		01-Jan-13	365	2210		2210		0.50	42
31	1	Back Offices	O1	2210	2210	11	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	11		01-Jan-13	365	2210		2210		4.88	899
32	1	Gerry's Office	O1	2210	2210	4	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	4		01-Jan-13	365	2210		2210		1.78	327
																		Savings	43.54	9100

Annual Lighting Savings Report for Town Park Fitness Center

Report Run Date: 1/1/2014

Line#	Floor	Location	Use Code	Annual Hours	Normalized Peak hours	Existing Quantity	Watts Before	Existing Description	Watts After	Retrofit Description	Quantity Installed	Sensor Type	Date Installed	Days In Use	Baseline Burn Hours	Sensor % Savings	Actual Burn Hours	Hours Saved By Sensors	KW Saved with New Lights	KWh Saved with New Lights
1	B	Garage	M1	2080	2080	6	32	1-F32T8/1-EB	32	Leave as is	6		01-Jan-13	365	2080		2080	0	0.00	0
2	B	Garage	M1	2080	2080	1	74	2-F40T12/1-SMB	49	2-F28T8/1-EB/RETRO	1		01-Jan-13	365	2080		2080	0	0.30	52
3	B	Mechanical	M1	2080	2080	7	32	1-F32T8/1-EB	32	Leave as is	7		01-Jan-13	365	2080		2080	0	0.00	0
4	B	First Aid	O2	3640	3640	9	47	2-F20T12/1-SMB	47	Leave as is	9		01-Jan-13	365	3640		3640	0	0.00	0
5	B	Bathroom	T1	2080	2080	2	100	INC 100W	23	1-SLS-20W	2		01-Jan-13	365	2080		2080	0	1.85	320
6	B	Emplyee Area	M1	2080	2080	9	32	1-F32T8/1-EB	32	Leave as is	9		01-Jan-13	365	2080		2080	0	0.00	0
7	B	Emplyee Area	M4	1040	1040	1	114	4-F32T8/1-EB	114	Leave as is	1		01-Jan-13	365	1040		1040	0	0.00	0
8	B	Stairs	H1	2080	2080	3	47	2-F20T12/1-SMB	47	Leave as is	3		01-Jan-13	365	2080		2080	0	0.00	0
9	B	Free Weight Area	O2	3640	3640	9	58	2-F32T8/1-EB	58	Leave as is	9		01-Jan-13	365	3640		3640	0	0.00	0
10	B	Machines	O2	3640	3640	8	148	4-F40T12/2-SMB	148	Leave as is	8		01-Jan-13	365	3640		3640	0	0.00	0
11	B	Machines	O2	3640	3640	4	28	CF 26W	28	Leave as is	4		01-Jan-13	365	3640		3640	0	0.00	0
12	B	Workout Area	O2	3640	3640	12	148	4-F40T12/2-SMB	148	Leave as is	12		01-Jan-13	365	3640		3640	0	0.00	0
13	B	Day Care	O1	2080	2080	5	148	4-F40T12/2-SMB	148	Leave as is	5		01-Jan-13	365	2080		2080	0	0.00	0
14	B	Day Care	O1	2080	2080	6	47	2-F20T12/1-SMB	47	Leave as is	6		01-Jan-13	365	2080		2080	0	0.00	0
																	Total	**Savings**	2.15	372

Annual Lighting Savings Report for Buildings & Grounds

Report Run Date: 1/1/2014

Line#	Floor	Location	Use Code	Annual Hours	Normalized Peak hours	Existing Quantity	Watts Before	Existing Description	Watts After	Retrofit Description	Quantity Installed	Sensor Type	Date Installed	Days In Use	Baseline Burn Hours	Sensor % Savings	Acutal Burn Hours	Hours Saved By Sensors	KW Saved with New Lights	KWh Saved with New Lights
1	1	ain Garage Low	S1	2600	2600	32	460	1-MH400/1-EMB	221	6-F32T8/1-NEB/REFIX	32		01-Jan-13	365	2600		2600	0	91.78	19885
2	1	ain Garage Uppe	S1	2600	2600	5	460	1-MH400/1-EMB	54	2-F32T8/1-NEB/REFIX/8'IND	10		01-Jan-13	365	2600		2600	0	21.12	4576
3	1	Signal Shop	S2	3640	3640	2	460	1-MH400/1-EMB	0	Remove	0		01-Jan-13	365	3640		3640	0	11.04	3349
4	1	Signal Shop	O1	2600	2600	2	236	4-F32T8/1-EB	236	Leave as is	2		01-Jan-13	365	2600		2600	0	0.00	0
5	1	L Bay	M1	2600	2600	2	58	2-F32T8/1-EB	58	Leave as is	2		01-Jan-13	365	2600		2600	0	0.00	0
6	1	L Bay	M1	2600	2600	2	136	2-F96T12/1-SMB	98	4-F28T8/1-NEB/RETRO	2		01-Jan-13	365	2600		2600	0	0.90	195
7	1	Chemical Rm	S4	1040	1040	2	236	4-F32T8/1-EB	236	Leave as is	2		01-Jan-13	365	1040		1040	0	0.00	0
8	1	Parts Rm	S1	2600	2600	3	236	4-F32T8/1-EB	236	Leave as is	3		01-Jan-13	365	2600		2600	0	0.00	0
9	1	Mechanics Office	O1	2600	2600	4	33	2-F17T8/1-EB	33	Leave as is	4		01-Jan-13	365	2600		2600	0	0.00	0
10	1	Wood Shop	O1	2600	2600	12	236	4-F32T8/1-EB	236	Leave as is	12		01-Jan-13	365	2600		2600	0	0.00	0
11	1	Break Room	O1	2600	2600	6	118	2-F96T12/1-SMB	118	Leave as is	6		01-Jan-13	365	2600		2600	0	0.00	0
12	1	Office	O1	2600	2600	12	114	4-F32T8/1-EB	72	3-F28T8/1-NEB/RETRO/REFL	12		01-Jan-13	365	2600		2600	0	6.05	1310
13	1	Office	O1	2600	2600	2	114	4-F32T8/1-EB	72	3-F28T8/1-NEB/RETRO/REFL	2		01-Jan-13	365	2600		2600	0	1.01	218
14	1	Storage Rm	S1	2600	2600	2	114	4-F32T8/1-EB	72	3-F28T8/1-NEB/RETRO/REFL	2		01-Jan-13	365	2600		2600	0	1.01	218
15	1	Office	O1	2600	2600	1	33	2-F17T8/1-EB	33	Leave as is	1		01-Jan-13	365	2600		2600	0	0.00	0
16	1	Women's Room	T1	2600	2600	3	60	INC 60W	23	1-R40-20W	3		01-Jan-13	365	2600		2600	0	1.33	289
17	1	Women's Room	T1	2600	2600	5	33	2-F17T8/1-EB	33	Leave as is	5		01-Jan-13	365	2600		2600	0	0.00	0
18	1	Laundry	M1	2600	2600	1	32	1-F32T8/1-EB	32	Leave as is	1		01-Jan-13	365	2600		2600	0	0.00	0
19	1	Hall	H2	3640	3640	3	23	CF 20W	23	Leave as is	3		01-Jan-13	365	3640		3640	0	0.00	0
20	1	Men's Room	T1	2600	2600	13	33	2-F17T8/1-EB	33	Leave as is	13		01-Jan-13	365	2600		2600	0	0.00	0
21	1	Men's Room	T1	2600	2600	3	23	CF 20W	23	Leave as is	3		01-Jan-13	365	2600		2600	0	0.00	0
22	1	Office	O1	2600	2600	6	33	2-F17T8/1-EB	33	Leave as is	6		01-Jan-13	365	2600		2600	0	0.00	0
																	Total	**Savings**	134.23	30040

Annual Lighting Savings Report for Senior Garage

Report Run Date: 1/1/2014

Line#	Floor	Location	Use Code	Annual Hours	Normalized Peak hours	Existing Quantity	Watts Before	Existing Description	Watts After	Retrofit Description	Quantity Installed	Sensor Type	Date Installed	Days In Use	Baseline Burn Hours	Sensor % Savings	Acutal Burn Hours	Hours Saved By Sensors	KW Saved with New Lights	KWh Saved with New Lights
1	1	Garage	O1	260	260	5	280	MH250/1-EMB	106	4-F28T8/1-EB/REFIX/PEN	5	WV	1/1/13	365	260	15%	221	39	10.44	247
2	1	Garage	O3	8760	8760	1	280	MH250/1-EMB	106	4-F28T8/1-EB/REFIX/PEN	1		1/1/13	365	8760	0%	8760	0	2.09	1524
																	Total	**Savings**	12.53	1771

Annual Lighting Savings Report for Senior Adult Day Care

Report Run Date: 1/1/2014

Line#	Floor	Location	Use Code	Annual Hours	Normalized Peak hours	Existing Quantity	Watts Before	Existing Description	Watts After	Retrofit Description	Quantity Installed	Sensor Type	Date Installed	Days In Use	Baseline Burn Hours	Sensor % Savings	Acutal Burn Hours	Hours Saved By Sensors	KW Saved with New Lights	KWh Saved with New Lights
1	1	Activities	O1	2080	2080	10	112	4-F32T8/1-EB	75	3-F28T8/1-EB/RETRO/REFL	10		01-Jan-13	365	2080		2080		4	770
2	1	Activities	O1	2080	2080	15	114	4-F32T8/1-EB	114	Leave as is	15		01-Jan-13	365	2080		2080		0	0
3	1	Lobby	O1	2080	2080	3	32	1-F32T8/1-EB	32	Leave as is	3		01-Jan-13	365	2080		2080		0	0
4	1	Lobby	O1	2080	2080	2	114	4-F32T8/1-EB	114	Leave as is	2		01-Jan-13	365	2080		2080		0	0
5	1	Lobby	O1	2080	2080	24	47	2-F20T12/1-SMB	47	Leave as is	24		01-Jan-13	365	2080		2080		0	0
6	1	Lobby Train	O1	2080	2080	3	114	4-F32T8/1-EB	114	Leave as is	3		01-Jan-13	365	2080		2080		0	0
7	B	Train	O1	2080	2080	8	74	2-F32T8/1-EB	74	Leave as is	8		01-Jan-13	365	2080		2080		0	0
8	B	Train	O1	2080	2080	1	74	2-F32T8/1-EB	74	Leave as is	1		01-Jan-13	365	2080		2080		0	0
9	B	Back	O1	2080	2080	10	74	2-F32T8/1-EB	74	Leave as is	10		01-Jan-13	365	2080		2080		0	0
																	Total	**Savings**	4.44	770

Section 6

Energy Management System Upgrades

Energy Management System Savings Summary by Building - Savings Year 1

	Actual in 2013				Annual Guaranteed Savings			
	kW Savings	kWh Savings	mmBtu Savings	$ Savings	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Town Hall	0.0	1,758	186	$2,004	0.0	970	186	$1,893
Buildings and Grounds	0.0	0.0	116	$1,207	0.0	0	116	$1,174
Highway Department Office	0.0	0.0	62	$759	0.0	0	62	$631
Highway Department Garage	0.0	0.0	308	$3,055	0.0	0	308	$3,129
Senior Garage	0.0	0.0	63	$663	0.0	0	63	$677
Total	*0.0*	*1,758*	*735*	*$7,688*	*0.0*	*970*	*735*	*$7,504*

Energy Management System Savings Summary by Month - Savings Year 1

	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Jan-13	0.0	149.3	101.1	$1,050
Feb-13	0.0	134.9	91.0	$946
Mar-13	0.0	149.3	99.1	$1,030
Apr-13	0.0	144.5	76.9	$801
May-13	0.0	149.3	53.3	$559
Jun-13	0.0	144.5	16.0	$174
Jul-13	0.0	149.3	7.2	$84
Aug-13	0.0	149.3	8.5	$97
Sep-13	0.0	144.5	27.8	$296
Oct-13	0.0	149.3	66.1	$690
Nov-13	0.0	144.5	88.3	$918
Dec-13	0.0	149.3	100.2	$1,041
Total	*0.0*	*1,758*	*735*	*$7,688*

Energy Management System Upgrades Savings Report
Town Hall

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	149	27	$278.92
Feb-13	0.0	135	24	$251.20
Mar-13	0.0	149	26	$273.47
Apr-13	0.0	145	20	$211.04
May-13	0.0	149	13	$144.52
Jun-13	0.0	145	3	$39.45
Jul-13	0.0	149	0	$14.47
Aug-13	0.0	149	1	$18.07
Sep-13	0.0	145	6	$72.77
Oct-13	0.0	149	17	$180.42
Nov-13	0.0	145	23	$243.08
Dec-13	0.0	149	26	$276.39
Total	*0.0*	*1,758*	*186*	$2,003.82

Energy Management System Upgrades Savings Report
Buildings and Grounds

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	16	$171.90
Feb-13	0.0	0	15	$154.80
Mar-13	0.0	0	16	$168.43
Apr-13	0.0	0	12	$128.80
May-13	0.0	0	8	$86.18
Jun-13	0.0	0	2	$19.35
Jul-13	0.0	0	0	$3.23
Aug-13	0.0	0	1	$5.52
Sep-13	0.0	0	4	$40.61
Oct-13	0.0	0	10	$109.08
Nov-13	0.0	0	14	$149.24
Dec-13	0.0	0	16	$170.29
Total	*0.0*	*0*	*116*	$1,207.45

Energy Management System Upgrades Savings Report
Highway Department Office

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	9	$108.00
Feb-13	0.0	0	8	$97.25
Mar-13	0.0	0	9	$105.81
Apr-13	0.0	0	7	$80.92
May-13	0.0	0	4	$54.14
Jun-13	0.0	0	1	$12.16
Jul-13	0.0	0	0	$2.03
Aug-13	0.0	0	0	$3.47
Sep-13	0.0	0	2	$25.51
Oct-13	0.0	0	6	$68.53
Nov-13	0.0	0	8	$93.76
Dec-13	0.0	0	9	$106.98
Total	*0.0*	*0*	*62*	$758.56

Energy Management System Upgrades Savings Report
Highway Department Garage

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	44	$434.89
Feb-13	0.0	0	39	$391.63
Mar-13	0.0	0	43	$426.10
Apr-13	0.0	0	33	$325.84
May-13	0.0	0	22	$218.02
Jun-13	0.0	0	5	$48.96
Jul-13	0.0	0	1	$8.17
Aug-13	0.0	0	1	$13.97
Sep-13	0.0	0	10	$102.73
Oct-13	0.0	0	28	$275.95
Nov-13	0.0	0	38	$377.54
Dec-13	0.0	0	43	$430.80
Total	*0.0*	*0*	*308*	$3,054.62

Energy Management System Upgrades Savings Report
Senior Garage

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	5	$56.32
Feb-13	0.0	0	5	$50.87
Mar-13	0.0	0	5	$56.32
Apr-13	0.0	0	5	$54.51
May-13	0.0	0	5	$56.32
Jun-13	0.0	0	5	$54.51
Jul-13	0.0	0	5	$56.32
Aug-13	0.0	0	5	$56.32
Sep-13	0.0	0	5	$54.51
Oct-13	0.0	0	5	$56.32
Nov-13	0.0	0	5	$54.51
Dec-13	0.0	0	5	$56.32
Total	*0.0*	*0*	*63*	$663.16

Date: 4/30/2014

Buildings & Grounds Garage

Fin Tube System - Overheating and Temperature Setback Savings

Calculated By: JGD

Reviewed By: KLK

Assumptions / Recorded Data		
Heating Setpoints		
Occ. Indoor Temp:	65 ˚F	Note1
Reduced Occ Temp:	65 ˚F	
Unocc. Indoor Temp:	58 ˚F	
Peak Heating Load:	315 MBH	
System Efficiency:	80%	
Electric Rate:	$0.07 /kWh	
Natural Gas Rate:	$10.45 /mmBtu	

Existing Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	1
Unoccupied	7	0	7
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	8.93%	71.43%	8.93%

	Bin Temperature Data (Heating Only)				Occ. % Load	Reduced Occ. % Load	Unocc. % Load	Existing Conditions					Proposed Conditions					Total Energy Savings (mmBtu)	Total Reduced Cost ($)
	Bin Temp	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
		0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
Heating Season (mmBtu)	-17.5	0	0	0	100%	100%	92%	315	0.0	288	0.0	0.0	315	0.0	288	0.0	0.0	0.0	$0.00
	-12.5	1	0	0	94%	94%	85%	296	0.3	269	0.0	0.3	296	0.0	269	0.2	0.3	0.0	$0.25
	-7.5	0	0	1	88%	88%	79%	277	0.3	250	0.0	0.3	277	0.0	250	0.2	0.3	0.0	$0.25
	-2.5	3	0	1	82%	82%	73%	258	1.0	231	0.0	1.0	258	0.1	231	0.8	0.9	0.1	$1.02
	2.5	12	5	6	76%	76%	67%	239	5.5	212	0.0	5.5	239	1.2	212	3.8	5.0	0.5	$4.98
	7.5	39	13	20	70%	70%	61%	220	15.8	193	0.0	15.8	220	3.2	193	11.1	14.3	1.5	$16.05
	12.5	71	40	61	64%	64%	55%	201	34.5	174	0.0	34.5	201	8.1	174	22.9	31.0	3.5	$36.79
	17.5	106	60	81	58%	58%	49%	181	44.8	155	0.0	44.8	181	10.8	155	29.0	39.8	5.0	$52.39
	22.5	152	117	133	52%	52%	43%	162	65.3	136	0.0	65.3	162	17.7	136	39.7	57.4	7.8	$81.88
	27.5	227	185	213	45%	45%	37%	143	89.5	117	0.0	89.5	143	24.6	117	52.9	77.4	12.1	$126.76
	32.5	352	277	308	39%	39%	31%	124	116.3	97	0.0	116.3	124	31.9	97	66.3	98.2	18.2	$190.10
	37.5	279	240	261	33%	33%	25%	105	82.0	78	0.0	82.0	105	23.1	78	43.9	67.0	15.0	$156.61
	42.5	245	191	215	27%	27%	19%	86	56.0	59	0.0	56.0	86	15.3	59	28.0	43.3	12.7	$132.33
	47.5	243	181	231	21%	21%	13%	67	43.8	40	0.0	43.8	67	11.5	40	19.4	30.9	12.9	$135.10
	52.5	249	184	223	15%	15%	7%	48	31.3	21	0.0	31.3	48	8.3	21	10.1	18.4	12.9	$134.83
	57.5	257	193	225	9%	9%	1%	29	19.3	2	0.0	19.3	29	5.2	2	0.9	6.1	13.2	$138.09

Calculations

1. % Load = actual delta T / max design delta T (where T = Temperature)
2. MBH = Peak Heating Load x % Load
3. mmBtu = MBH / 1,000 x % Occupied x BIN Hours

Notes

1. Setpoint was recorded during site visits.

Annual Savings Summary	
Fuel (mmBtu)	116
Fuel Costs ($)	$1,207.45

Date: 4/30/2014

Town Hall

PTAC Units - Temperature Setback Savings - Heating & Cooling

Calculated By: JGD

Reviewed By: KLK

Assumptions / Recorded Data			
Heating Setpoints		***Cooling Setpoints***	
Occ. Indoor Temp:	70 ˚F	Occ. Indoor Temp:	75 ˚F
Reduced Occ Temp:	70 ˚F	Reduced Occ Temp:	75 ˚F
Unocc. Indoor Temp:	64 ˚F	Unocc. Indoor Temp:	80 ˚F
Peak Heating Load:	197 MBH	Peak Heating Load:	16 Tons
System Efficiency:	80%	System Efficiency:	1 kW/Ton
Electric Rate:	$0.06 /kWh		
Natural Gas Rate:	$10.16 /mmBtu		

Existing Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	1
Unoccupied	7	0	7
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	8.93%	71.43%	8.93%

	Bin Temperature Data (Heating Only)				Occ. % Load	Reduced Occ. % Load	Unocc. % Load	Existing Conditions					Proposed Conditions					Total Energy Savings (mmBtu / kWh)	Total Reduced Cost ($)
	Bin Temp	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu / kWh)	Occupied		Unoccupied		Total Usage (mmBtu / kWh)		
		0 - 8	8 - 16	16 - 24				Load (MBH / Tons)	Usage (mmBtu / kWh)	Load (MBH / Tons)	Usage (mmBtu / kWh)		Load (MBH / Tons)	Usage (mmBtu / kWh)	Load (MBH / Tons)	Usage (mmBtu / kWh)			
Heating Season (mmBtu)	-17.5	0	0	0	100%	100%	93%	197	0.0	184	0.0	0.0	197	0.0	184	0.0	0.0	0.0	$0.00
	-12.5	1	0	0	94%	94%	87%	186	0.2	172	0.0	0.2	186	0.0	172	0.2	0.2	0.0	$0.13
	-7.5	0	0	1	89%	89%	82%	175	0.2	161	0.0	0.2	175	0.0	161	0.1	0.2	0.0	$0.13
	-2.5	3	0	1	83%	83%	76%	163	0.7	150	0.0	0.7	163	0.1	150	0.5	0.6	0.0	$0.50
	2.5	12	5	6	77%	77%	70%	152	3.5	139	0.0	3.5	152	0.8	139	2.5	3.3	0.2	$2.45
	7.5	39	13	20	71%	71%	65%	141	10.1	127	0.0	10.1	141	2.0	127	7.3	9.4	0.8	$7.89
	12.5	71	40	61	66%	66%	59%	130	22.3	116	0.0	22.3	130	5.2	116	15.3	20.5	1.8	$18.09
	17.5	106	60	81	60%	60%	53%	118	29.2	105	0.0	29.2	118	7.0	105	19.6	26.7	2.5	$25.75
	22.5	152	117	133	54%	54%	47%	107	43.0	94	0.0	43.0	107	11.7	94	27.4	39.1	4.0	$40.25
	27.5	227	185	213	49%	49%	42%	96	59.9	82	0.0	59.9	96	16.4	82	37.3	53.7	6.1	$62.31
	32.5	352	277	308	43%	43%	36%	85	79.2	71	0.0	79.2	85	21.7	71	48.3	70.0	9.2	$93.45
	37.5	279	240	261	37%	37%	30%	73	57.1	60	0.0	57.1	73	16.1	60	33.5	49.6	7.6	$76.99
	42.5	245	191	215	31%	31%	25%	62	40.3	48	0.0	40.3	62	11.0	48	22.9	33.9	6.4	$65.05
	47.5	243	181	231	26%	26%	19%	51	33.2	37	0.0	33.2	51	8.7	37	18.0	26.7	6.5	$66.41
	52.5	249	184	223	20%	20%	13%	39	25.9	26	0.0	25.9	39	6.8	26	12.5	19.3	6.5	$66.28
	57.5	257	193	225	14%	14%	7%	28	19.0	15	0.0	19.0	28	5.1	15	7.2	12.3	6.7	$67.88
	62.5	258	217	243	0%	0%	0%												
	67.5	248	240	267	0%	0%	0%												
	72.5	139	266	222	0%	0%	0%												
Cooling Season (kWh)	77.5	39	244	131	11%	11%	0%	1.8	755.9	1.8	0.0	755.9	1.8	345.9	0.0	0.0	345.9	410.0	$25.83
	82.5	4	172	61	33%	33%	11%	5.5	1,298.2	5.5	0.0	1,298.2	5.5	704.8	1.8	197.8	902.6	395.6	$24.93
	87.5	0	81	17	56%	56%	33%	9.1	894.7	9.1	0.0	894.7	9.1	542.1	5.5	211.6	753.7	141.1	$8.89
	92.5	0	18	1	78%	78%	56%	12.8	242.8	12.8	0.0	242.8	12.8	165.5	9.1	55.3	220.7	22.1	$1.39
	97.5	0	1	0	100%	100%	78%	16.4	16.4	16.4	0.0	16.4	16.4	11.7	12.8	3.7	15.4	1.0	$0.07

Calculations

1. % Load = actual delta T / max design delta T (where T = Temperature)
2. MBH = Peak Heating Load x % Load
3. mmBtu = MBH / 1,000 x % Occupied x BIN Hours
4. Ton = Peak Cooling Load x % Load
5. kWh = Ton x kW/Ton x % Occupied x BIN Hours

Annual Savings Summary	
Electric (kWh)	969.8
Electric Costs ($)	$61.10
Fuel (mmBtu)	58
Fuel Costs ($)	$593.56

Date: 4/30/2014

Town Hall

AC Unit - Temperature Setback and Occupancy ControlsSavings

Calculated By: JGD

Reviewed By: KLK

Assumptions / Recorded Data

Cooling Setpoints

Occ. Indoor Temp:	75	˚F
Reduced Occ Temp:	75	˚F
Unocc. Indoor Temp:	85	˚F
Peak Heating Load:	6	Tons
System Efficiency:	1	kW/Ton
Electric Rate:	$0.06	/kWh
Natural Gas Rate:	$10.16	/mmBtu

Existing System Schedule

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed System Schedule

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	0	4	0
Unoccupied	8	4	8
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	0.00%	35.71%	0.00%

	Bin Temperature Data (Heating Only)				Occ. % Load	Reduced Occ. % Load	Unocc. % Load	Existing Conditions					Proposed Conditions					Total Energy Savings (mmBtu / kWh)	Total Reduced Cost ($)
	Bin Temp	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu / kWh)	Occupied		Unoccupied		Total Usage (mmBtu / kWh)		
		0 - 8	8 - 16	16 - 24				Load (MBH / Tons)	Usage (mmBtu / kWh)	Load (MBH / Tons)	Usage (mmBtu / kWh)		Load (MBH / Tons)	Usage (mmBtu / kWh)	Load (MBH / Tons)	Usage (mmBtu / kWh)			
Cooling Season (kWh)	77.5	39	244	131	11%	11%	0%	0.7	276.0	0.7	0.0	276.0	0.7	58.1	0.0	0.0	58.1	217.9	$13.73
	82.5	4	172	61	33%	33%	0%	2.0	474.0	2.0	0.0	474.0	2.0	122.9	0.0	0.0	122.9	351.1	$22.12
	87.5	0	81	17	56%	56%	11%	3.3	326.7	3.3	0.0	326.7	3.3	96.4	0.7	46.0	142.5	184.2	$11.60
	92.5	0	18	1	78%	78%	33%	4.7	88.7	4.7	0.0	88.7	4.7	30.0	2.0	25.1	55.1	33.5	$2.11
	97.5	0	1	0	100%	100%	56%	6.0	6.0	6.0	0.0	6.0	6.0	2.1	3.3	2.1	4.3	1.7	$0.11

Calculations

1. % Load = actual delta T / max design delta T (where T = Temperature)
2. MBH = Peak Heating Load x % Load
3. mmBtu = MBH / 1,000 x % Occupied x BIN Hours
4. Ton = Peak Cooling Load x % Load
5. kWh = Ton x kW/Ton x % Occupied x BIN Hours

Annual Savings Summary

Electric (kWh)	788.5
Electric Costs ($)	$49.67

Date: 4/30/2014

Town Hall

Fin Tube System - Overheating and Temperature Setback Savings

Calculated By: JGD

Reviewed By: KLK

Assumptions / Recorded Data		
Heating Setpoints		
Occ. Indoor Temp:	72 ˚F	Note1
Reduced Occ Temp:	70 ˚F	
Unocc. Indoor Temp:	64 ˚F	
Peak Heating Load:	313 MBH	
System Efficiency:	80%	
Electric Rate:	$0.06 /kWh	
Natural Gas Rate:	$10.16 /mmBtu	

Existing Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	1
Unoccupied	7	0	7
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	8.93%	71.43%	8.93%

	Bin Temperature Data (Heating Only)				Occ. % Load	Reduced Occ. % Load	Unocc. % Load	Existing Conditions					Proposed Conditions					Total Energy Savings (mmBtu)	Total Reduced Cost ($)
	Bin Temp	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
		0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
Heating Season (mmBtu)	-17.5	0	0	0	100%	100%	91%	313	0.0	285	0.0	0.0	313	0.0	285	0.0	0.0	0.0	$0.00
	-12.5	1	0	0	94%	94%	85%	295	0.3	267	0.0	0.3	295	0.0	267	0.2	0.3	0.0	$0.26
	-7.5	0	0	1	89%	89%	80%	278	0.3	250	0.0	0.3	277	0.0	250	0.2	0.3	0.0	$0.26
	-2.5	3	0	1	83%	83%	74%	260	1.0	233	0.0	1.0	259	0.1	233	0.8	0.9	0.1	$1.04
	2.5	12	5	6	78%	77%	69%	243	5.6	215	0.0	5.6	241	1.3	215	3.8	5.1	0.5	$5.15
	7.5	39	13	20	72%	71%	63%	226	16.2	198	0.0	16.2	224	3.3	198	11.3	14.6	1.6	$16.62
	12.5	71	40	61	66%	66%	58%	208	35.8	180	0.0	35.8	206	8.3	180	23.7	32.0	3.8	$38.39
	17.5	106	60	81	61%	60%	52%	191	47.1	163	0.0	47.1	188	11.2	163	30.5	41.7	5.4	$54.96
	22.5	152	117	133	55%	54%	46%	173	69.6	145	0.0	69.6	170	18.5	145	42.5	61.0	8.5	$86.80
	27.5	227	185	213	50%	49%	41%	156	97.2	128	0.0	97.2	152	26.1	128	57.9	83.9	13.3	$135.16
	32.5	352	277	308	44%	43%	35%	138	129.4	110	0.0	129.4	134	34.4	110	74.9	109.4	20.1	$203.73
	37.5	279	240	261	39%	37%	30%	121	94.1	93	0.0	94.1	116	25.5	93	51.9	77.4	16.6	$169.06
	42.5	245	191	215	33%	31%	24%	103	67.1	75	0.0	67.1	98	17.5	75	35.6	53.1	14.1	$143.21
	47.5	243	181	231	27%	26%	18%	86	56.1	58	0.0	56.1	80	13.8	58	27.9	41.7	14.4	$146.43
	52.5	249	184	223	22%	20%	13%	68	44.7	40	0.0	44.7	63	10.9	40	19.4	30.3	14.5	$146.97
	57.5	257	193	225	16%	14%	7%	51	34.2	23	0.0	34.2	45	8.1	23	11.2	19.3	14.9	$151.44

Calculations

1. % Load = actual delta T / max design delta T (where T = Temperature)
2. MBH = Peak Heating Load x % Load
3. mmBtu = MBH / 1,000 x % Occupied x BIN Hours

Notes

1. Assumes 50% areas are overheated base on failed control valves

Annual Savings Summary	
Fuel (mmBtu)	128
Fuel Costs ($)	$1,299.48

Senior Garage
FIN Tube Radiant - Temperature Setback and Overheating Savings - Heating

Assumptions:

Occ. Indoor Temp.	74
Reduced Occ Temp,	74
Unocc. Indoor Temp.	64
Peak Heating Load	134 MBH

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	1
Unoccupied	7	0	7
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	8.93%	71.43%	8.93%

Bin Temperature Data (Heating Only)				Occ	Red. Occ	Unocc	Existing Conditions					Proposed Condiitions					Total	Total
	Hours/Bin			% Load	% Load	% Load	Occupied		Unoccupied		Total	Occupied		Unoccupied		Total	Reduced	Reduced
Bin Temp	0 - 8	8 - 16	16 - 24	at IAT = 74	at IAT = 74	at IAT = 64	Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Usage (mmBtu)	Usage (mmBtu)	Cost ($)
-17.5	0	0	0	100%	100%	89%	134	0.0	120	0.0	0.0	134	0.0	120	0.0	0.0	0.0	$0.00
-12.5	1	0	0	95%	95%	84%	127	0.1	112	0.0	0.1	127	0.0	112	0.1	0.1	0.0	$0.14
-7.5	0	0	1	89%	89%	78%	120	0.1	105	0.0	0.1	120	0.0	105	0.1	0.1	0.0	$0.14
-2.5	3	0	1	84%	84%	73%	112	0.4	98	0.0	0.4	112	0.0	98	0.4	0.4	0.1	$0.57
2.5	12	5	6	78%	78%	67%	105	2.4	90	0.0	2.4	105	0.5	90	1.6	2.2	0.3	$2.79
7.5	39	13	20	73%	73%	62%	98	7.0	83	0.0	7.0	98	1.4	83	4.8	6.2	0.8	$9.01
12.5	71	40	61	67%	67%	56%	90	15.5	76	0.0	15.5	90	3.6	76	10.0	13.6	1.9	$20.64
17.5	106	60	81	62%	62%	51%	83	20.5	68	0.0	20.5	83	4.9	68	12.8	17.7	2.8	$29.39
22.5	152	117	133	56%	56%	45%	76	30.4	61	0.0	30.4	76	8.2	61	17.9	26.1	4.3	$45.93
27.5	227	185	213	51%	51%	40%	68	42.7	54	0.0	42.7	68	11.7	54	24.3	36.0	6.7	$71.11
32.5	352	277	308	45%	45%	34%	61	57.1	46	0.0	57.1	61	15.7	46	31.5	47.1	10.0	$106.64
37.5	279	240	261	40%	40%	29%	54	41.8	39	0.0	41.8	54	11.8	39	21.8	33.6	8.2	$87.85
42.5	245	191	215	34%	34%	23%	46	30.1	32	0.0	30.1	46	8.2	32	15.0	23.2	7.0	$74.23
47.5	243	181	231	29%	29%	18%	39	25.5	24	0.0	25.5	39	6.7	24	11.7	18.4	7.1	$75.78
52.5	249	184	223	23%	23%	13%	32	20.7	17	0.0	20.7	32	5.5	17	8.1	13.6	7.1	$75.63
57.5	257	193	225	18%	18%	7%	24	16.4	10	0.0	16.4	24	4.4	10	4.7	9.1	7.3	$77.46
Total	2,236	1,686	1,979					311			311		83		165	247	63	$677.33

Calculations:

% Load = actual delta T / max design delta T
where T= temperature
MBH = Peak Heating Load x % Load
mmBtu = MBH / 1,000 x % Occupied x BIN Hours

689 Annual Heat Load
829 Annual Btu Usage

7.7% Savings

Annual Savings Summary	
Fuel (mmBtu)	63
Cost ($)	$677.33

Date: 4/30/2014

Highway Offices

Fin Tube System - Overheating and Temperature Setback Savings

Calculated By: JGD

Reviewed By: KLK

Assumptions / Recorded Data		
Heating Setpoints		
Occ. Indoor Temp:	72 ˚F	Note1
Reduced Occ Temp:	70 ˚F	
Unocc. Indoor Temp:	64 ˚F	
Peak Heating Load:	152 MBH	
System Efficiency:	80%	
Electric Rate:	$0.07 /kWh	
Natural Gas Rate:	$12.21 /mmBtu	

Existing Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	1
Unoccupied	7	0	7
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	8.93%	71.43%	8.93%

	Bin Temperature Data (Heating Only)				Occ. % Load	Reduced Occ. % Load	Unocc. % Load	Existing Conditions					Proposed Conditions					Total Energy Savings (mmBtu)	Total Reduced Cost ($)
	Bin Temp	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
		0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
Heating Season (mmBtu)	-17.5	0	0	0	100%	100%	91%	152	0.0	138	0.0	0.0	152	0.0	138	0.0	0.0	0.0	$0.00
	-12.5	1	0	0	94%	94%	85%	144	0.1	130	0.0	0.1	143	0.0	130	0.1	0.1	0.0	$0.15
	-7.5	0	0	1	89%	89%	80%	135	0.1	121	0.0	0.1	135	0.0	121	0.1	0.1	0.0	$0.15
	-2.5	3	0	1	83%	83%	74%	127	0.5	113	0.0	0.5	126	0.0	113	0.4	0.5	0.0	$0.61
	2.5	12	5	6	78%	77%	69%	118	2.7	104	0.0	2.7	117	0.6	104	1.9	2.5	0.2	$3.01
	7.5	39	13	20	72%	71%	63%	110	7.9	96	0.0	7.9	109	1.6	96	5.5	7.1	0.8	$9.70
	12.5	71	40	61	66%	66%	58%	101	17.4	87	0.0	17.4	100	4.0	87	11.5	15.5	1.8	$22.41
	17.5	106	60	81	61%	60%	52%	93	22.9	79	0.0	22.9	91	5.4	79	14.8	20.2	2.6	$32.08
	22.5	152	117	133	55%	54%	46%	84	33.8	70	0.0	33.8	83	9.0	70	20.6	29.6	4.1	$50.67
	27.5	227	185	213	50%	49%	41%	76	47.2	62	0.0	47.2	74	12.7	62	28.1	40.8	6.5	$78.90
	32.5	352	277	308	44%	43%	35%	67	62.9	53	0.0	62.9	65	16.7	53	36.4	53.1	9.7	$118.93
	37.5	279	240	261	39%	37%	30%	59	45.7	45	0.0	45.7	56	12.4	45	25.2	37.6	8.1	$98.68
	42.5	245	191	215	33%	31%	24%	50	32.6	37	0.0	32.6	48	8.5	37	17.3	25.8	6.8	$83.60
	47.5	243	181	231	27%	26%	18%	42	27.3	28	0.0	27.3	39	6.7	28	13.5	20.3	7.0	$85.48
	52.5	249	184	223	22%	20%	13%	33	21.7	20	0.0	21.7	30	5.3	20	9.4	14.7	7.0	$85.79
	57.5	257	193	225	16%	14%	7%	25	16.6	11	0.0	16.6	22	3.9	11	5.5	9.4	7.2	$88.40

Calculations

1. % Load = actual delta T / max design delta T (where T = Temperature)
2. MBH = Peak Heating Load x % Load
3. mmBtu = MBH / 1,000 x % Occupied x BIN Hours

Notes

1. Assumes 50% areas are overheated base on failed control valves

Annual Savings Summary	
Fuel (mmBtu)	62
Fuel Costs ($)	$758.56

Date: 4/30/2014

Highway Garage

Fin Tube System - Overheating and Temperature Setback Savings

Calculated By: JGD

Reviewed By: KLK

Assumptions / Recorded Data		
Heating Setpoints		
Occ. Indoor Temp:	65 ˚F	Note1
Reduced Occ Temp:	65 ˚F	
Unocc. Indoor Temp:	58 ˚F	
Peak Heating Load:	840 MBH	
System Efficiency:	80%	
Electric Rate:	$0.07 /kWh	
Natural Gas Rate:	$9.92 /mmBtu	

Existing Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	8	8	8
Unoccupied	0	0	0
Weekends			
Occupied	8	8	8
Unoccupied	0	0	0
% Occupied	100.00%	100.00%	100.00%

Proposed Building Schedule			
Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	1
Unoccupied	7	0	7
Weekends			
Occupied	0	0	0
Unoccupied	8	8	8
% Occupied	8.93%	71.43%	8.93%

	Bin Temperature Data (Heating Only)				Occ. % Load	Reduced Occ. % Load	Unocc. % Load	Existing Conditions					Proposed Conditions					Total Energy Savings (mmBtu)	Total Reduced Cost ($)
	Bin Temp	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
		0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
Heating Season (mmBtu)	-17.5	0	0	0	100%	100%	92%	840	0.0	769	0.0	0.0	840	0.0	769	0.0	0.0	0.0	$0.00
	-12.5	1	0	0	94%	94%	85%	789	0.8	718	0.0	0.8	789	0.1	718	0.7	0.7	0.1	$0.64
	-7.5	0	0	1	88%	88%	79%	738	0.7	667	0.0	0.7	738	0.1	667	0.6	0.7	0.1	$0.64
	-2.5	3	0	1	82%	82%	73%	687	2.7	616	0.0	2.7	687	0.2	616	2.2	2.5	0.3	$2.58
	2.5	12	5	6	76%	76%	67%	636	14.6	565	0.0	14.6	636	3.3	565	10.1	13.4	1.3	$12.60
	7.5	39	13	20	70%	70%	61%	585	42.2	514	0.0	42.2	585	8.5	514	29.5	38.1	4.1	$40.62
	12.5	71	40	61	64%	64%	55%	535	91.9	463	0.0	91.9	535	21.6	463	61.0	82.6	9.4	$93.07
	17.5	106	60	81	58%	58%	49%	484	119.5	412	0.0	119.5	484	28.8	412	77.3	106.1	13.4	$132.53
	22.5	152	117	133	52%	52%	43%	433	174.0	361	0.0	174.0	433	47.2	361	105.9	153.1	20.9	$207.15
	27.5	227	185	213	45%	45%	37%	382	238.6	311	0.0	238.6	382	65.5	311	140.9	206.3	32.3	$320.69
	32.5	352	277	308	39%	39%	31%	331	310.1	260	0.0	310.1	331	85.0	260	176.6	261.6	48.5	$480.93
	37.5	279	240	261	33%	33%	25%	280	218.4	209	0.0	218.4	280	61.5	209	117.0	178.5	39.9	$396.19
	42.5	245	191	215	27%	27%	19%	229	149.1	158	0.0	149.1	229	40.7	158	74.7	115.4	33.7	$334.78
	47.5	243	181	231	21%	21%	13%	178	116.7	107	0.0	116.7	178	30.6	107	51.7	82.3	34.5	$341.77
	52.5	249	184	223	15%	15%	7%	127	83.5	56	0.0	83.5	127	22.1	56	27.0	49.1	34.4	$341.09
	57.5	257	193	225	9%	9%	1%	76	51.5	5	0.0	51.5	76	13.8	5	2.5	16.3	35.2	$349.35

Calculations

1. % Load = actual delta T / max design delta T (where T = Temperature)
2. MBH = Peak Heating Load x % Load
3. mmBtu = MBH / 1,000 x % Occupied x BIN Hours

Annual Savings Summary	
Fuel (mmBtu)	308
Fuel Costs ($)	$3,054.62

Section 7

Building Envelope Improvements

Building Envelope Improvements Savings Summary by Building - Savings Year 1

	Actual in 2013				Annual Guaranteed Savings			
	kW Savings	kWh Savings	mmBtu Savings	$ Savings	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Town Ice Arena	0.0	0.0	131	$1,373.98	0.0	0	131	$1,374
Town Hall	0.0	0.0	106	$1,076.26	0.0	0	124	$1,262
Highway Department Office	0.0	0.0	83	$1,016.01	0.0	0	107	$1,305
Town Park Fitness Center	0.0	0.0	222	$2,323.38	0.0	0	233	$2,440
Senior Adult Care	0.0	0.0	148	$1,576.05	0.0	0	148	$1,576
Total	*0.0*	*0*	*690*	*$7,365.67*	*0.0*	*0*	*743*	*$7,957*

Building Envelope Improvements Savings Summary by Month - Savings Year 1

	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Jan-13	0.0	0	101	$1,077.44
Feb-13	0.0	0	91	$970.26
Mar-13	0.0	0	99	$1,055.66
Apr-13	0.0	0	76	$807.28
May-13	0.0	0	40	$427.66
Jun-13	0.0	0	9	$96.04
Jul-13	0.0	0	1	$16.03
Aug-13	0.0	0	3	$27.41
Sep-13	0.0	0	19	$201.51
Oct-13	0.0	0	64	$683.67
Nov-13	0.0	0	88	$935.40
Dec-13	0.0	0	100	$1,067.31
Total	*0.0*	*0*	*690*	*$7,366*

Annual Building Envelope Improvements Savings Report
Town Ice Arena

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	21	$224.40
Feb-13	0.0	0	19	$202.08
Mar-13	0.0	0	21	$219.87
Apr-13	0.0	0	16	$168.14
May-13	0.0	0	0	$0.00
Jun-13	0.0	0	0	$0.00
Jul-13	0.0	0	0	$0.00
Aug-13	0.0	0	0	$0.00
Sep-13	0.0	0	0	$0.00
Oct-13	0.0	0	14	$142.39
Nov-13	0.0	0	19	$194.81
Dec-13	0.0	0	21	$222.29
Total	*0.0*	*0*	*131*	$1,373.98

Annual Building Envelope Improvements Savings Report
Town Hall

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	15	$153.22
Feb-13	0.0	0	14	$137.98
Mar-13	0.0	0	15	$150.13
Apr-13	0.0	0	11	$114.80
May-13	0.0	0	8	$76.82
Jun-13	0.0	0	2	$17.25
Jul-13	0.0	0	0	$2.88
Aug-13	0.0	0	0	$4.92
Sep-13	0.0	0	4	$36.20
Oct-13	0.0	0	10	$97.23
Nov-13	0.0	0	13	$133.05
Dec-13	0.0	0	15	$151.78
Total	*0.0*	*0*	*106*	$1,076.26

Annual Building Envelope Improvements Savings Report
Highway Department Office

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	12	$144.65
Feb-13	0.0	0	11	$130.26
Mar-13	0.0	0	12	$141.73
Apr-13	0.0	0	9	$108.38
May-13	0.0	0	6	$72.52
Jun-13	0.0	0	1	$16.29
Jul-13	0.0	0	0	$2.72
Aug-13	0.0	0	0	$4.65
Sep-13	0.0	0	3	$34.17
Oct-13	0.0	0	8	$91.79
Nov-13	0.0	0	10	$125.58
Dec-13	0.0	0	12	$143.29
Total	*0.0*	*0*	*83*	$1,016.01

Annual Building Envelope Improvements Savings Report
Town Park Fitness

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	32	$330.78
Feb-13	0.0	0	28	$297.88
Mar-13	0.0	0	31	$324.09
Apr-13	0.0	0	24	$247.84
May-13	0.0	0	16	$165.83
Jun-13	0.0	0	4	$37.24
Jul-13	0.0	0	1	$6.22
Aug-13	0.0	0	1	$10.63
Sep-13	0.0	0	7	$78.14
Oct-13	0.0	0	20	$209.89
Nov-13	0.0	0	27	$287.16
Dec-13	0.0	0	31	$327.67
Total	*0.0*	*0*	*222*	$2,323.38

Annual Building Envelope Improvements Savings Report
Senior Adult Care

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	0	21	$224.38
Feb-13	0.0	0	19	$202.06
Mar-13	0.0	0	21	$219.85
Apr-13	0.0	0	16	$168.12
May-13	0.0	0	11	$112.49
Jun-13	0.0	0	2	$25.26
Jul-13	0.0	0	0	$4.22
Aug-13	0.0	0	1	$7.21
Sep-13	0.0	0	5	$53.01
Oct-13	0.0	0	13	$142.38
Nov-13	0.0	0	18	$194.80
Dec-13	0.0	0	21	$222.27
Total	*0.0*	*0*	*148*	$1,576.05

Town Park Fitness Center

Project Name: Town of Hamburg ECM# 4
Project Number: 3008-09NFT
Calculated By: JGD / ZeroDraft
Checked By: AMB
Date: 10/7/2014

Infiltration Rates $Q = k \times dP^n \times A$

k =	20	
(dP)^n =	7.44	
A =	7.26	ft^2
Q =	**1079.96**	cfm

Natural Gas Heating System Cost = (Q x DD x Price per therm)/2890

Q =	1079.96	cfm
DD =	5940	
Price/therm =	1.05	dollars
Energy Savings =	**221.97**	**mmBtu**
Estimated Savings =	**$2,323.38**	

Hole area "A" is based upon:

329 feet of door/hatch perimeter at 1/16"
226 feet of window frame perimeter at 1/64"
8 feet of miscellaneous sealing at 1/16"
1000 feet of rim joist/wall intersection at 1/16"

Total square feet = 7.26 ft^2

Highway Office

Project Name: Town of Hamburg ECM# 4
Project Number: 3008-11EPC
Calculated By: JGD / ZeroDraft
Checked By: AMB
Date: 10/7/2014

Infiltration Rates $Q = k \times dP^n \times A$

k =	20	
(dP)^n =	7.44	
A =	2.72	ft^2
Q =	**404.94**	cfm

Natural Gas Heating System Cost = (Q x DD x Price per therm)/2890

Q =	404.94	cfm
DD =	5940	
Price/therm =	1.22	dollars
Energy Savings =	**83.23**	**mmBtu**

Estimated Savings = $1,016.01

Hole area "A" is based upon:

235 feet of door/hatch perimeter at 1/16"
396 feet of window frame perimeter at 1/64"
594 feet of operable window sash perimeter at 1/32"
20 feet of A/C unit sealing at 1/8"

Total square feet = 2.72 ft^2

Town Ice Rink

Project Name: Town of Hamburg ECM# 4
Project Number: 3008-11EPC
Calculated By: JGD / ZeroDraft
Checked By: AMB
Date: 10/7/2014

Infiltration Rates Q = k x dPn x A

k =	20	
(dP)^n =	7.44	
A =	4.29	ft^2
Q =	**638.60**	cfm

Natural Gas Heating System Cost = (Q x DD x Price per therm)/2890

Q =	638.60	cfm
DD =	5940	
Price/therm =	1.05	dollars
Energy Savings =	**131.26**	**mmBtu**
Estimated Savings =	**$1,373.98**	

Hole area "A" is based upon:

366 feet of door/hatch perimeter at 1/16"
464 feet of window frame perimeter at 1/64"
320 feet of operable window sash perimeter at 1/32"
150 feet of roof/wall intersection at 1/16"
8 roof mechanical roof ventilators at 64 feet at 1/32"

Total square feet = 4.29 ft^2

Senior Adult Daycare

Project Name: Town of Hamburg ECM# 4
Project Number: 3008-09NFT
Checked By: JGD / ZeroDraft
Project #: 3008-11EPC
Date: 10/7/2014

Infiltration Rates $Q = k \times dP^n \times A$

k =	20	
(dP)^n =	7.44	
A =	4.83	ft^2
Q =	**718.43**	cfm

Natural Gas Heating System Cost = (Q x DD x Price per therm)/2890

Q =	718.43	cfm
DD =	5940	
Price/therm =	1.07	dollars
Energy Savings =	**147.66**	**mmBtu**
Estimated Savings =	**$1,576.05**	

Hole area "A" is based upon:

86 feet of door/hatch perimeter at 1/16"
176 feet of window frame perimeter at 1/64"
2.125 sq. feet of gap around train car
270 feet of roof/wall intersection at 1/16"
150 feet of rim joist at 1/32"

Total square feet = 4.83 ft^2

Town Hall

Project Name: Town of Hamburg ECM# 4
Project Number: 3008-11EPC
Checked By: JGD / ZeroDraft
Project #: 3008-09NFT
ECM #: 4

Infiltration Rates $Q = k \times dP^n \times A$

k =	20	
(dP)^n =	7.44	
A =	3.46	ft^2
Q =	**515.38**	cfm

Natural Gas Heating System Cost = (Q x DD x Price per therm)/2890

Q =	515.38	cfm
DD =	5940	
Price/therm =	1.02	dollars
Energy Savings =	**105.93**	**mmBtu**
Estimated Savings =	**$1,076.26**	

Hole area "A" is based upon:

286 feet of door/hatch perimeter at 1/16"
1280 feet of window frame perimeter at 1/64"
156 feet of miscellaneous caulking at 1/64"
5 roof mechanical roof ventilators at 40 feet at 1/32"

Total square feet = 3.46 ft^2

Section 8

Ice Rink Improvements

Ice Rink Improvements Savings Summary by Building - Savings Year 1

	Actual in 2013				Annual Guaranteed Savings			
	kW Savings	kWh Savings	mmBtu Savings	$ Savings	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Brine Header Insulation	0.0	19,190.7	0.0	$1,615.43	0.0	19,191	0	$1,615
Low E Ceiling	0.0	45,882.2	0.0	$4,217.12	0.0	45,882	0	$4,217
Total	*0.0*	*65,073*	*0*	*$5,832.55*	*0.0*	*65,073*	*0*	*$5,832*

Ice Rink Improvements Savings Summary by Month - Savings Year 1

	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Jan-13	0.0	10,026.2	0.0	$900
Feb-13	0.0	9,055.9	0.0	$813
Mar-13	0.0	10,026.2	0.0	$900
Apr-13	0.0	6,209.2	0.0	$550
May-13	0.0	0.0	0.0	$0
Jun-13	0.0	0.0	0.0	$0
Jul-13	0.0	0.0	0.0	$0
Aug-13	0.0	0.0	0.0	$0
Sep-13	0.0	0.0	0.0	$0
Oct-13	0.0	10,026.2	0.0	$900
Nov-13	0.0	9,702.8	0.0	$871
Dec-13	0.0	10,026.2	0.0	$900
Total	*0.0*	*65,073*	*0*	*$5,833*

Ice Rink Improvements Savings Report
Town Ice Arena - Brine Header Insulation

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	2,806	0	$236.22
Feb-13	0.0	2,535	0	$213.36
Mar-13	0.0	2,806	0	$236.22
Apr-13	0.0	2,716	0	$228.60
May-13	0.0	0	0	$0.00
Jun-13	0.0	0	0	$0.00
Jul-13	0.0	0	0	$0.00
Aug-13	0.0	0	0	$0.00
Sep-13	0.0	0	0	$0.00
Oct-13	0.0	2,806	0	$236.22
Nov-13	0.0	2,716	0	$228.60
Dec-13	0.0	2,806	0	$236.22
Total	*0.0*	*19,191*	*0*	$1,615.43

Ice Rink Improvements Savings Report
Town Ice Arena - Low Emissivity Ceiling

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	7,220	0	$663.61
Feb-13	0.0	6,521	0	$599.39
Mar-13	0.0	7,220	0	$663.61
Apr-13	0.0	3,494	0	$321.10
May-13	0.0	0	0	$0.00
Jun-13	0.0	0	0	$0.00
Jul-13	0.0	0	0	$0.00
Aug-13	0.0	0	0	$0.00
Sep-13	0.0	0	0	$0.00
Oct-13	0.0	7,220	0	$663.61
Nov-13	0.0	6,987	0	$642.20
Dec-13	0.0	7,220	0	$663.61
Total	*0.0*	*45,882*	*0*	$4,217.12

Project Name:	Town of Hamburg
Project Number:	3008-11EPC
Calculated By:	JGD
Checked By:	AMB
Date:	4/30/2014

LOW EMISSIVITY CEILING

Existing Condition:

The ceiling of the ice rink is coated with white paint, which radiates a considerable amount of heat to the ice below.

Proposed Condition:

An aluminum faced surface installed under the ceiling would have a lower emissivity and transmit a lower heat load to the ice below.

Given and Assumed Data:

Temperature of ceiling	T_c =	45	
Temperature of ice	T_i =	28	
Length of ice area	y =	200	
Width of ice area	x =	85	
Mid-height of room	d =	25	
Emissivity of existing ceiling	ε_c =	0.93	
Emissivity of proposed ceiling	ε_p =	0.03	
Emissivity of ice	ε_i =	0.95	
COP of refrigeration system	=	4.5	
Cost/kWh of electricity	=	0.092	
Total # of days per year of operation	=	197	days/year

Conversion Factors:

		3	
σ = Stefan-Boltzmann Constant	σ =	1.714E-09	Btu/(hr-ft^2-°R^4)

Theory: $q_r = A\, f_{ci}\, \sigma(T_c^4 - T_i^4)$

where
q_r = heat load from radiation
A = area
T = temperature in degrees Rankin
f_{ci} = configuration factor

Project Name: Town of Hamburg
Project Number: 3008-11EPC
Calculated By: JGD
Checked By: AMB
Date: 4/30/2014

Calculations:

Area of Ceiling				
length x width	A_c	=	17,000	sq ft
Area of Ice				
length x width	A_i	=	17,000	sq ft
Ratio, width to height				
width/height		=	3.4	
Ratio, length to height				
length/height		=	8.0	
Angle Factor				
from chart on page 34.3	F_{ci}	=	0.70	
Existing Configuration Factor				
$\{1/F_{ci} + (1/\varepsilon_c-1)+A_c/A_i*(1/\varepsilon_i-1)\}^{-1}$	f_{ci}	=	0.64248	
Existing Radiant Heat Load				
$q_r = A\, f_{ci}\, \sigma(T_c^4 - T_i^4)$	q_r	=	155,542	Btu/hr
Existing kW Load on Compressor from Ceiling				
Btu/hr/COP/3413		=	10.17	kW
Existing kWh Used by Compressor for Ceiling				
kW * days * 24		=	48,096	kWh/yr
Proposed Configuration Factor				
$\{1/F_{ci} + (1/\varepsilon_p-1)+A_c/A_i*(1/\varepsilon_i-1)\}^{-1}$	f_{ci}	=	0.029573	
Proposed Radiant Heat Load				
$q_r = A\, f_{ci}\, \sigma(T_c^4 - T_i^4)$		=	7,160	Btu/hr
Proposed kW Load on Compressor from Ceiling				
Btu/hr/COP/3413		=	0.47	kW
Proposed kWh Load on Compressor for Ceiling				
kW * days * 24		=	2,214	kWh/yr
Projected kWh Savings				
Present kWh - Projected kWh			45,882	kWh/yr
Projected kWh Cost Savings				
Present kWh Cost - Projected kWh Cost			$ 4,217	

References:

ASHRAE Refrigeration Handbook, 1998, page 36.3

Project Name:	Town of Hamburg		ECM# 5
Project Number:	3008-11EPC		
Calculated By:	JGD		
Checked By:	AMB		
Date:	4/30/2014		

Brine Header Insulation

Given and Assumed Data:

Total # of days per year of operation	=	197	days/year
COP of refrigeration system	=	3.0	
Cost/kWh of electricity	=	$0.08	
Brine Supply Temperature	=	10	°F
Brine Return Temperature	=	20	°F
Main Supply Header Diameter	=	0.67	feet
Main Supply Header Length	=	90	feet
Main Return Header Diameter	=	0.7	feet
Main Reurn Header Length	=	90	feet
Supply Diameter	=	0.2	feet
Exposed Supply Length	=	4	feet
Supply Lines	=	168	
Return Diameter	=	0.2	feet
Exposed Return Length	=	3	feet
Return Lines	=	168	
Ambient Air Temperature	=	60	°F

Existing Condition:

Surface Area of Exposed Supply	=	540.4	sqft
Surface Area of Exposed Return	=	457.7	sqft
Existing Insulation R-Value	=	1.0	hr-ft2-°F/Btu
Existing Heat Gain of Supply Header	=	27,018	Btu / Hr
Existing Heat Gain of Return Header	=	18,307	Btu / Hr
Total System Heat Gain	=	45,324	Btu / Hr
Total System Heat Gain (Annual)	=	17,858	Tons

Proposed Condition:

Surface Area of Exposed Supply	=	540.4	sqft
Surface Area of Exposed Return	=	457.7	sqft
Proposed Insulation R-Value	=	12.0	hr-ft2-°F/Btu
Proposed Heat Gain of Supply Header	=	2,251	Btu / Hr
Proposed Heat Gain of Return Header	=	1,526	Btu / Hr
Total System Heat Gain	=	3,777	Btu / Hr
Total System Heat Gain (Annual)	=	1,488	Tons

Energy Savings:

Total Annual System Heat Gain Reduction	=	16,370	Tons
Total Annual Energy Savings	=	19,190.69	kWh
Total Annual Energy Savings	=	$1,615.43	

Section 9

De-stratification Fans

Destratification Fans Savings Summary by Building - Savings Year 1

	Actual in 2013				Annual Guaranteed Savings			
	kW Savings	kWh Savings	mmBtu Savings	$ Savings	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Buildings and Grounds	0.0	(3279)	115	$1,271	0.0	(3279)	115	$1,271
Total	*0.0*	*(3279)*	*115*	*$1,271*	*0.0*	*(3279)*	*115*	*$1,271*

Destratification Fans Savings Summary by Month - Savings Year 1

	kW Savings	kWh Savings	mmBtu Savings	$ Savings
Jan-13	0.0	(467)	11.7	$181
Feb-13	0.0	(420)	10.5	$163
Mar-13	0.0	(457)	11.7	$177
Apr-13	0.0	(350)	11.0	$136
May-13	0.0	(234)	10.3	$91
Jun-13	0.0	(53)	7.0	$20
Jul-13	0.0	(9)	4.9	$3
Aug-13	0.0	(15)	5.7	$6
Sep-13	0.0	(110)	8.6	$43
Oct-13	0.0	(296)	11.2	$115
Nov-13	0.0	(405)	11.2	$157
Dec-13	0.0	(462)	11.7	$179
Total	*0.0*	*(3279)*	*115*	*$1,271*

Destratification Fans Savings Report
Buildings and Grounds

Year 1

	kW Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	0.0	(467)	12	$180.99
Feb-13	0.0	(420)	11	$162.99
Mar-13	0.0	(457)	12	$177.33
Apr-13	0.0	(350)	11	$135.61
May-13	0.0	(234)	10	$90.74
Jun-13	0.0	(53)	7	$20.38
Jul-13	0.0	(9)	5	$3.40
Aug-13	0.0	(15)	6	$5.82
Sep-13	0.0	(110)	9	$42.76
Oct-13	0.0	(296)	11	$114.85
Nov-13	0.0	(405)	11	$157.13
Dec-13	0.0	(462)	12	$179.29
Total	*0.0*	(3279)	*115*	$1,271.28

Project Name:	Town of Hamburg	ECM #	6
Project Number:	3008-11EPC		
Calculated By:	JGD		
Checked By:	KLK		
Date:	7/23/10		

INSTALL CEILING FANS

Proposed Building HVAC Set-Back Schedule

Weekdays	12 AM - 8 AM	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied (OH)	2	8	0
Unoccupied (UH)	6	0	8
Weekends			
Occupied (OH)	0	0	0
Unoccupied (UH)	8	8	8
% Occupied	17.86%	71.43%	0.00%

Given and Assumed Data:

Temp at Thermostat	(Occupied)	Tt	=	70	F
Temp at Thermostat	(Unoccupied)	Tt	=	64	F
Ceiling Height		Ht	=	25	Ft
Area of Ceiling		Ac	=	20,000	Sq Ft
Area of Walls		Aw	=	15,000	Sq Ft
"U" Factor of Ceiling		Uc	=	0.053	Btuh/Sq Ft/F
"U" Factor of Wall		Uw	=	0.071	Btuh/Sq Ft/F
Hours Per Year	(Occupied)	Hr	=	1,407	Hrs/Year
Hours Per Year	(Unoccupied)	Hr	=	3,321	Hrs/Year
Efficiency of Heating Unit		%	=	80%	
Motor Hp			=	1	Hp
Motor Efficiency			=	80%	
Drive Efficiency			=	97%	
Max % Speed			=	90%	
Operating Horsepower of Fan		Hp	=	0.9301	Hp
One Horsepower				0.7457	kW/Hp
Cost of 1kWh				$0.07	$/kWh
Cost of 1 Unit of Fuel				$10.45	$/Unit

Project Name:	Town of Hamburg	ECM #	6
Project Number:	3008-11EPC		
Calculated By:	JGD		
Checked By:	KLK		
Date:	7/23/10		

Calculations:

Occupied

Temp at Ceiling Tc= Tt + 0.01(Ht - 5)(Tt) See Ref	Tc	=	85	F
Average Wall Temp Tw=(Tc-Tt)/2+Tt	Tw	=	78	F
Energy Savings Qc = Ac (U)(Tc-Tt)(Hr)	Qc	=	22.8	mmBtu
Energy Savings Qw = Aw (U)(Tw-Tt)(Hr)	Qw	=	11.6	mmBtu
$ Saved Per Year = Qc+Qw(Cost of Fuel)/(Btu/Unit x Eff)		=	$450	Per Year

Unoccupied

Temp at Ceiling Tc= Tt + 0.01(Ht - 5)(Tt) See Ref	Tc	=	79	F
Average Wall Temp Tw=(Tc-Tt)/2+Tt	Tw	=	72	F
Energy Savings Q = A (U)(Tc-Tt)(Hr)	Qc	=	53.7	mmBtu
Energy Savings Qw = Aw (U)(Tw-Tt)(Hr)	Qw	=	27.3	mmBtu
$ Saved Per Year = Q(Cost of Fuel)/(Btu/Unit x Eff)		=	$1,058	Per Year
No. of Fans Required = Area Ceiling/ Manuf Area		=	1	Fans
Cost of Oper Fans = No. Fans(Hp Fan)(Hr)(0.7457)($/kWh)		=	$237	

Savings:

Annual Heating Savings	=	115.4	mmBtu
Annual Electric Savings	=	-3279	kWh
Net Savings = $ Saved - Cost of Op Fans	=	$1,271	Per Year

References:

Severns, William H. and Fellows, Julian R. - Air Conditioning and Refrigeration
John Wiley & Sons, Inc 1962 Pg 81

Section 10

Low Flow Shower Heads

Low Flow Shower Heads Savings Summary by Building - Savings Year 1

	Actual in 2013				Annual Guaranteed Savings			
	kGal Savings	kWh Savings	mmBtu Savings	$ Savings	kGal Savings	kWh Savings	mmBtu Savings	$ Savings
Town Ice Arena	27	0.0	5	$133.30	27.0	0	5	$133
Total	*27*	*0*	*5*	*$133.30*	*27.0*	*0*	*5*	*$133*

Low Flow Shower Heads Savings Summary by Month - Savings Year 1

	kGal Savings	kWh Savings	mmBtu Savings	$ Savings
Jan-13	3.9	0.0	0.8	$19
Feb-13	3.5	0.0	0.7	$18
Mar-13	3.9	0.0	0.8	$19
Apr-13	3.8	0.0	0.7	$19
May-13	0.0	0.0	0.0	$0
Jun-13	0.0	0.0	0.0	$0
Jul-13	0.0	0.0	0.0	$0
Aug-13	0.0	0.0	0.0	$0
Sep-13	0.0	0.0	0.0	$0
Oct-13	3.9	0.0	0.8	$19
Nov-13	3.8	0.0	0.7	$19
Dec-13	3.9	0.0	0.8	$19
Total	*26.7*	*0*	*5*	*$133*

Low Flow Shower Heads Savings Report
Town Ice Arena

Year 1

	kGal Savings	kWh Savings	mmBtu Savings	Energy Bill Savings
Jan-13	3.9	0	0.76	$19.49
Feb-13	3.5	0	0.69	$17.61
Mar-13	3.9	0	0.76	$19.49
Apr-13	3.8	0	0.73	$18.86
May-13	0.0	0	0.00	$0.00
Jun-13	0.0	0	0.00	$0.00
Jul-13	0.0	0	0.00	$0.00
Aug-13	0.0	0	0.00	$0.00
Sep-13	0.0	0	0.00	$0.00
Oct-13	3.9	0	0.76	$19.49
Nov-13	3.8	0	0.73	$18.86
Dec-13	3.9	0	0.76	$19.49
Total	*26.7*	*0*	*5.2*	$133.30

Project:	Town of Hamburg	ECM# 7
Building:	Town Ice Rink	
Date:	4/30/2014	
Calculated By:	JGD	
Reviewed By:	AMB	

Hot Water Savings

Town Ice Rink

Natural Gas $/therm	$	1.047
Cost of Hot Water/kgal	$	7.09
Percentage of Hot Water to produce 80 Deg. F Mix for faucet usage		30.00%
Percentage of Hot Water to produce 104 Deg. F Mix for shower usage		70.00%
	7892.73%	

Before Upgrades

Fixtures	No.	Use Rate	Frequency	Days	**Yearly Use**
4" and 8" Center Sets	0	0.66 gpm	4Mins/Day	197	0 kgals
4" and 8" Center Sets	0	0.66 gpm	4Mins/Day	197	0 kgals
4" & 8" Center Sets	**0**	0.66 gpm	4Mins/Day	197	0 kgals
4" Center Sets	0	0.66 gpm	4Mins/Day	197	0 kgals
4" Center Sets	0	0.66 gpm	4Mins/Day	197	0 kgals
8" Center Sets	0	0.66 gpm	4Mins/Day	197	0 kgals
8" Center Sets	0	0.66 gpm	4Mins/Day	197	0 kgals
Misc Faucet	0	0.66 gpm	4Mins/Day	197	0 kgals
Single faucets	0	0.66 gpm	4Mins/Day	197	0 kgals
Old Gooseneck Faucet	0	0.66 gpm	4Mins/Day	197	0 kgals
High Flow Dish Sprayer	0	2.10 gpm	60Mins/Day	197	0 kgals
4" and 8" Misc.	0	0.15 gpm	4Mins/Day	197	0 kgals
Kitchen Sink	0	1.40 gpm	60Mins/Day	197	0 kgals
Kitchen Sink	0	2.10 gpm	60Mins/Day	197	0 kgals
Whirlpool	0	28 Galls/Use	2Use/Day	197	0 kgals
Unimat 35 Washing Machine	0	35 Galls/Load	6 Loads/Day	197	0 kgals
2.5 GPM Shower Heads	9	2.50 gpm	6Mins/Day	197	26 kgals
2.0 GPM Shower Heads	0	2.00 gpm	6Mins/Day	197	0 kgals
Hand Held Shower Heads	0	1.75 gpm	6Mins/Day	197	0 kgals
Low flow Shower Heads	0	1.75 gpm	6Mins/Day	197	0 kgals
Total					**26 kgals**

Project: Town of Hamburg ECM# 7
Building: Town Ice Rink
Date: 4/30/2014
Calculated By: JGD
Reviewed By: AMB

Hot Water Savings

Town Ice Rink

Cost of Natural Gas: $ 1.047 per therm

Cold Water Temperature: 55 F
Domestic Hot Water Temperature: 120 F
Converter Efficiency: 80%
Water Density: 8.33 lb/gal
Water Specific Heat: 1 Btu/(lb-F)
Cost per kgal DHW = $ 7.09 per kgal

	After Upgrades					Savings		
Upgrade Fixtures	No.	Use Rate	Frequency	Days	**Yearly Use**	**Water**	**Fuel (mmBtu)**	**Fuel $ Savings**
0.5 Gpm Aerator	0	0.15 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
1.5 Gpm Aerator	0	0.45 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
1.0 Gpm Aerator	0	0.30 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
4" Push Button Faucets	0	0.15 gpm	2Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
4" Faucets	0	0.15 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
8" Push Button Faucets	0	0.15 gpm	2Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
8" Faucets	0	0.15 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
Sensor Faucet	0	0.15 gpm	2Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
Pushbutton F.	0	0.15 gpm	2Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
New Gooseneck Faucet	0	0.15 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
1.28 Hand Held Sprayer	0	0.90 gpm	60Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
No Upgrade	0	0.15 gpm	4Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
No Upgrade	0	1.40 gpm	60Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
2.0 Gpm Aerator	0	1.40 gpm	60Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
No Upgrade	0	28 Galls/Use	2Use/Day	197	0 kgals	0 kgals	0.00	$0.00
No Upgrade	0	35 Galls/Load	6 Loads/Day	197	0 kgals	0 kgals	0.00	$0.00
1.75 Gpm S H	9	1.75 gpm	6Mins/Day	197	18 kgals	8 kgals	5.19	$54.37
1.5 Gpm S H	0	1.50 gpm	6Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
1.5 Gpm Hand Held Replacement	0	1.50 gpm	6Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
No Upgrade	0	1.75 gpm	6Mins/Day	197	0 kgals	0 kgals	0.00	$0.00
Total					**165 kgals**	**27 kgals**	**5.19**	**$54.37**

Section 11

Operational & Maintenance Savings

Low Flow Shower Maintenance Savings Summary by Building - Year 1

	Actual in 2013 - 2014	Annual Guaranteed Savings
	Maintenance Savings	Maintenance Savings
Town Ice Arena	$79	$79
Total	*$79*	*$79*

Low Flow Shower Maintenance Savings Summary by Month - Savings Year 1

	Maintenance Savings
Jan-13	$7
Feb-13	$6
Mar-13	$7
Apr-13	$6
May-13	$7
Jun-13	$6
Jul-13	$7
Aug-13	$7
Sep-13	$6
Oct-13	$7
Nov-13	$6
Dec-13	$7
Total	*$79*

Annual Lighting Maintenance Savings Report
Town Ice Arena - Low Flow Shower Heads
Maintenance Savings

2013

	Maintenance Savings
Jan-13	$6.70
Feb-13	$6.05
Mar-13	$6.70
Apr-13	$6.49
May-13	$6.70
Jun-13	$6.49
Jul-13	$6.70
Aug-13	$6.70
Sep-13	$6.49
Oct-13	$6.70
Nov-13	$6.49
Dec-13	$6.70
Total	*$78.93*

Lighting Maintenance Savings Summary by Building - Savings Year 1

	Actual in 2013 - 2014	Annual Guaranteed Savings
	Maintenance Savings	**Maintenance Savings**
Town Ice Arena	-$370	-$370
Town Hall	$3	$3
Buildings and Grounds	$40	$40
Town Park Fitness Center	$3	$3
Senior Adult Day Care	$10	$10
Senior Garage	$10	$10
Total	*-$304*	*-$304*

Lighting Maintenance Savings Summary by Month - Savings Year 1

	Maintenance Savings
Jan-13	-$26
Feb-13	-$23
Mar-13	-$26
Apr-13	-$25
May-13	-$26
Jun-13	-$25
Jul-13	-$26
Aug-13	-$26
Sep-13	-$25
Oct-13	-$26
Nov-13	-$25
Dec-13	-$26
Total	*-$304*

Annual Lighting Maintenance Savings Report
Town Ice Arena - Lighting
Maintenance Savings

2013

	Maintenance Savings
Jan-13	-$31.42
Feb-13	-$28.38
Mar-13	-$31.42
Apr-13	-$30.41
May-13	-$31.42
Jun-13	-$30.41
Jul-13	-$31.42
Aug-13	-$31.42
Sep-13	-$30.41
Oct-13	-$31.42
Nov-13	-$30.41
Dec-13	-$31.42
Total	*-$370.00*

Annual Lighting Maintenance Savings Report
Buildings and Grounds - Lighting
Maintenance Savings

2013

	Maintenance Savings
Jan-13	$3.40
Feb-13	$3.07
Mar-13	$3.40
Apr-13	$3.29
May-13	$3.40
Jun-13	$3.29
Jul-13	$3.40
Aug-13	$3.40
Sep-13	$3.29
Oct-13	$3.40
Nov-13	$3.29
Dec-13	$3.40
Total	*$40.00*

Annual Lighting Maintenance Savings Report
Town Hall - Lighting
Maintenance Savings

2013

	Maintenance Savings
Jan-13	$0.25
Feb-13	$0.23
Mar-13	$0.25
Apr-13	$0.25
May-13	$0.25
Jun-13	$0.25
Jul-13	$0.25
Aug-13	$0.25
Sep-13	$0.25
Oct-13	$0.25
Nov-13	$0.25
Dec-13	$0.25
Total	*$3.00*

Annual Lighting Maintenance Savings Report
Town Park Fitness Center - Lighting
Maintenance Savings

2013

	Maintenance Savings
Jan-13	$0.25
Feb-13	$0.23
Mar-13	$0.25
Apr-13	$0.25
May-13	$0.25
Jun-13	$0.25
Jul-13	$0.25
Aug-13	$0.25
Sep-13	$0.25
Oct-13	$0.25
Nov-13	$0.25
Dec-13	$0.25
Total	*$3.00*

Annual Lighting Maintenance Savings Report
Senior Adult Day Care - Lighting
Maintenance Savings

2013

	Maintenance Savings
Jan-13	$0.85
Feb-13	$0.77
Mar-13	$0.85
Apr-13	$0.82
May-13	$0.85
Jun-13	$0.82
Jul-13	$0.85
Aug-13	$0.85
Sep-13	$0.82
Oct-13	$0.85
Nov-13	$0.82
Dec-13	$0.85
Total	*$10.00*

Annual Lighting Maintenance Savings Report
Senior Garage - Lighting
Maintenance Savings

2013

	Maintenance Savings
Jan-13	$0.85
Feb-13	$0.77
Mar-13	$0.85
Apr-13	$0.82
May-13	$0.85
Jun-13	$0.82
Jul-13	$0.85
Aug-13	$0.85
Sep-13	$0.82
Oct-13	$0.85
Nov-13	$0.82
Dec-13	$0.85
Total	*$10.00*

Appendix A

Utility Summary

Building Name: Town of Hamburg Total
Address: Hamburg, NY 14075

Utility Company: National Grid & NYSEG
Date: 10/14/2014

wendel

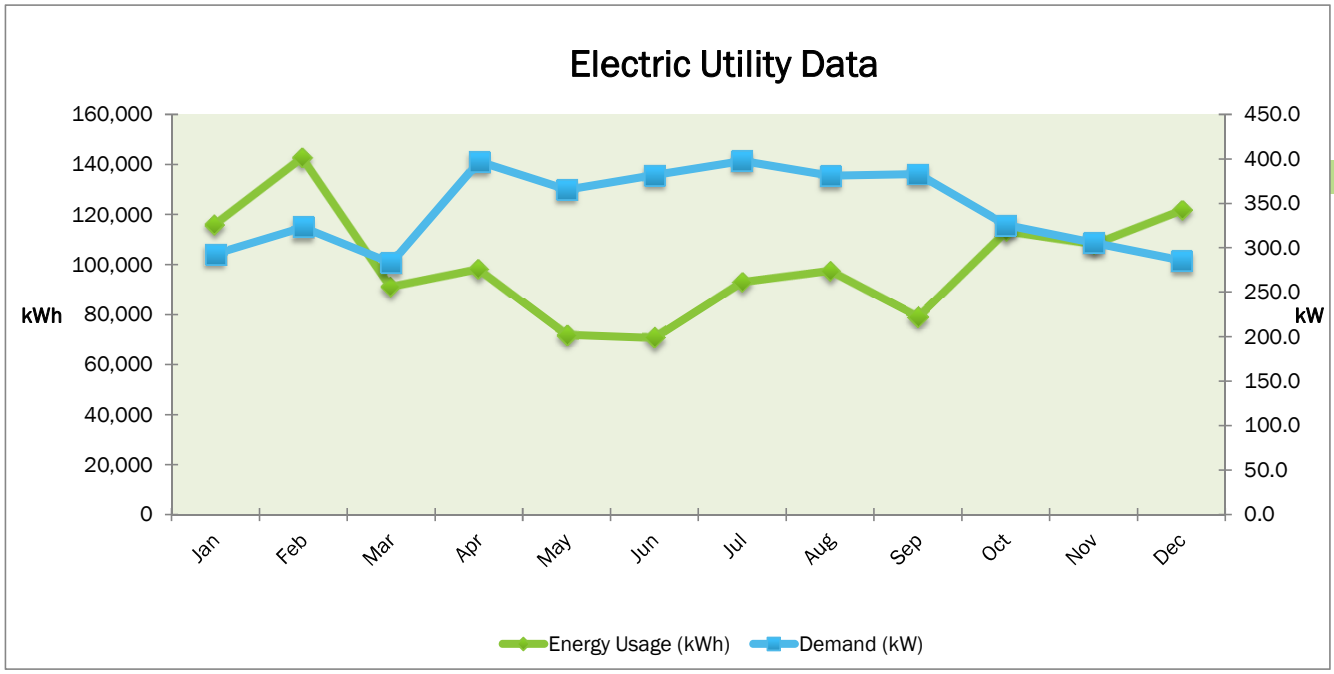
ANNUAL ELECTRIC UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Period	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Supply & Delivery Cost	Total Cost	Billing Days	Load Factor
2013	Jan	293.0	$3,047	115,979	$7,626	$10,673	31	0.53
2013	Feb	323.0	$3,359	142,696	$11,197	$14,556	28	0.66
2013	Mar	282.8	$2,941	91,231	$3,895	$6,836	31	0.43
2013	Apr	396.8	$4,127	98,268	$6,195	$10,322	30	0.34
2013	May	365.4	$3,800	71,886	$4,591	$8,391	31	0.26
2013	Jun	381.8	$3,971	70,652	$4,776	$8,747	30	0.26
2013	Jul	397.8	$4,137	93,225	$6,964	$11,101	31	0.31
2013	Aug	381.0	$3,962	97,602	$7,277	$11,239	30	0.36
2013	Sep	382.8	$3,981	79,240	$5,622	$9,603	31	0.28
2013	Oct	325.6	$3,386	113,409	$6,427	$9,813	31	0.47
2013	Nov	305.4	$3,176	108,200	$5,257	$8,433	30	0.49
2013	Dec	285.6	$2,970	121,819	$7,205	$10,175	31	0.57
	Avg./Totals:	343	$42,858	1,204,207	$77,031	$119,890	365	0.41

Table Formulas:

Hours per Month (h) = G x 24
Total Cost (F) = B + D + E
Load Factor (H) = C / (A x (h x 24))

Summary	
Energy Intensity (kWh/sq.ft.):	#DIV/0!
Cost Intensity ($/sq.ft.):	#DIV/0!
Blended Cost (inc.demand) / kWh:	$0.100
Avg. Cost / kW:	*$10.40*
Avg. Cost / kWh:	*$0.06*



Building Name: Town Ice Arena
Address: 2980 Lakeview Road
Lake View, NY 14085
Facility Area: 55,550 sq.ft.

Utility Company: National Grid
Acct. No.: 92287-00104
Date: 10/7/2014

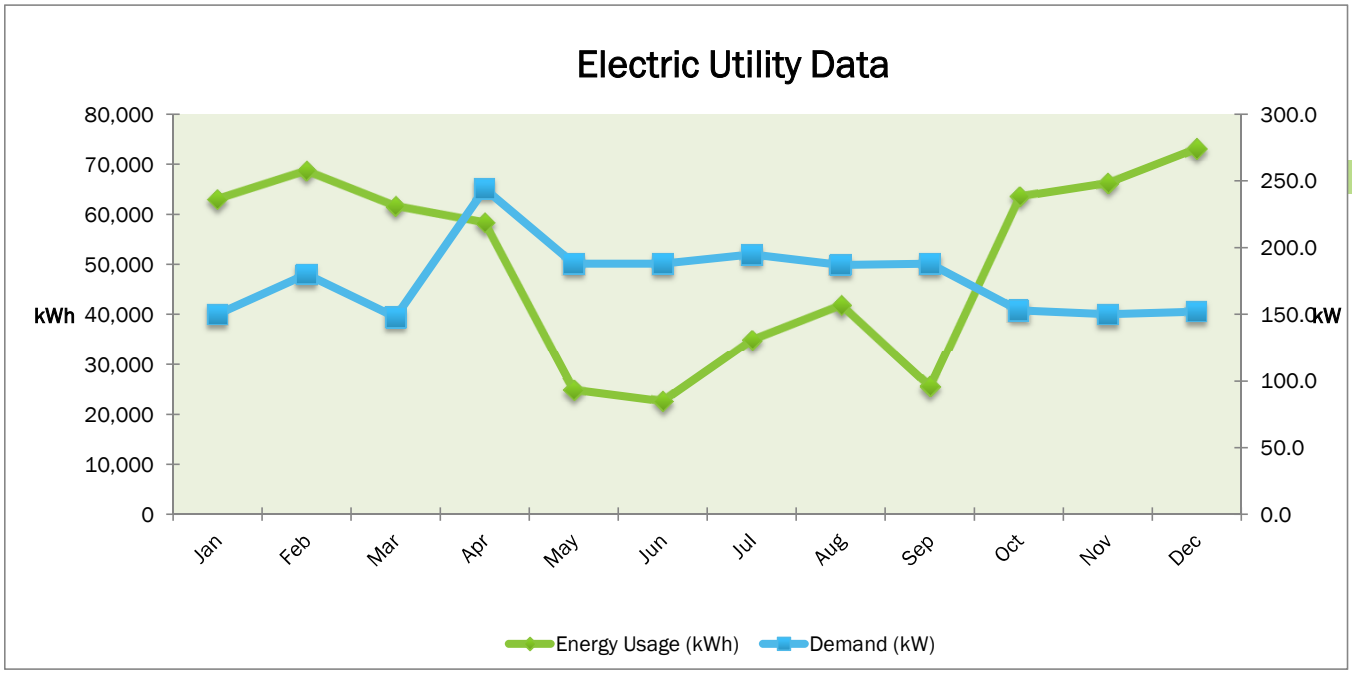
ANNUAL ELECTRIC UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Period	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Supply & Delivery Cost	Total Cost	Billing Days	Load Factor
2013	Jan	150.0	$1,560	62,905	$3,904	$5,464	31	0.56
2013	Feb	180.0	$1,872	68,563	$5,637	$7,509	28	0.57
2013	Mar	148.0	$1,539	61,577	$2,544	$4,084	31	0.56
2013	Apr	244.0	$2,538	58,299	$3,631	$6,169	30	0.33
2013	May	188.0	$1,955	24,904	$1,620	$3,575	31	0.18
2013	Jun	188.0	$1,955	22,635	$1,544	$3,499	30	0.17
2013	Jul	195.0	$2,028	35,007	$2,257	$4,285	31	0.24
2013	Aug	187.0	$1,945	41,952	$3,232	$5,176	30	0.31
2013	Sep	188.0	$1,955	25,558	$1,728	$3,684	31	0.18
2013	Oct	153.0	$1,591	63,498	$4,193	$5,784	31	0.56
2013	Nov	150.0	$1,560	66,278	$3,701	$5,261	30	0.61
2013	Dec	152.0	$1,581	73,135	$5,174	$6,755	31	0.65
	Avg./Totals:	**177**	**$22,079**	**604,311**	**$39,165**	**$61,245**	**365**	**0.41**

Table Formulas:

Hours per Month (h) = G x 24
Total Cost (F) = B + D + E
Load Factor (H) = C / (A x (h x 24))

Summary	
Energy Intensity (kWh/sq.ft.):	10.88
Cost Intensity ($/sq.ft.):	$1.10
Blended Cost (inc.demand) / kWh:	$0.101
Avg. Cost / kW:	***$10.40***
Avg. Cost / kWh:	***$0.06***



Building Name: Town Hall
Address: 6100 South Park Avenue
Hamburg, NY 14075
Facility Area: 35,763 sq.ft.

Utility Company: NYSEG
Acct. No.: 1001-3106-801
Date: 10/7/2014

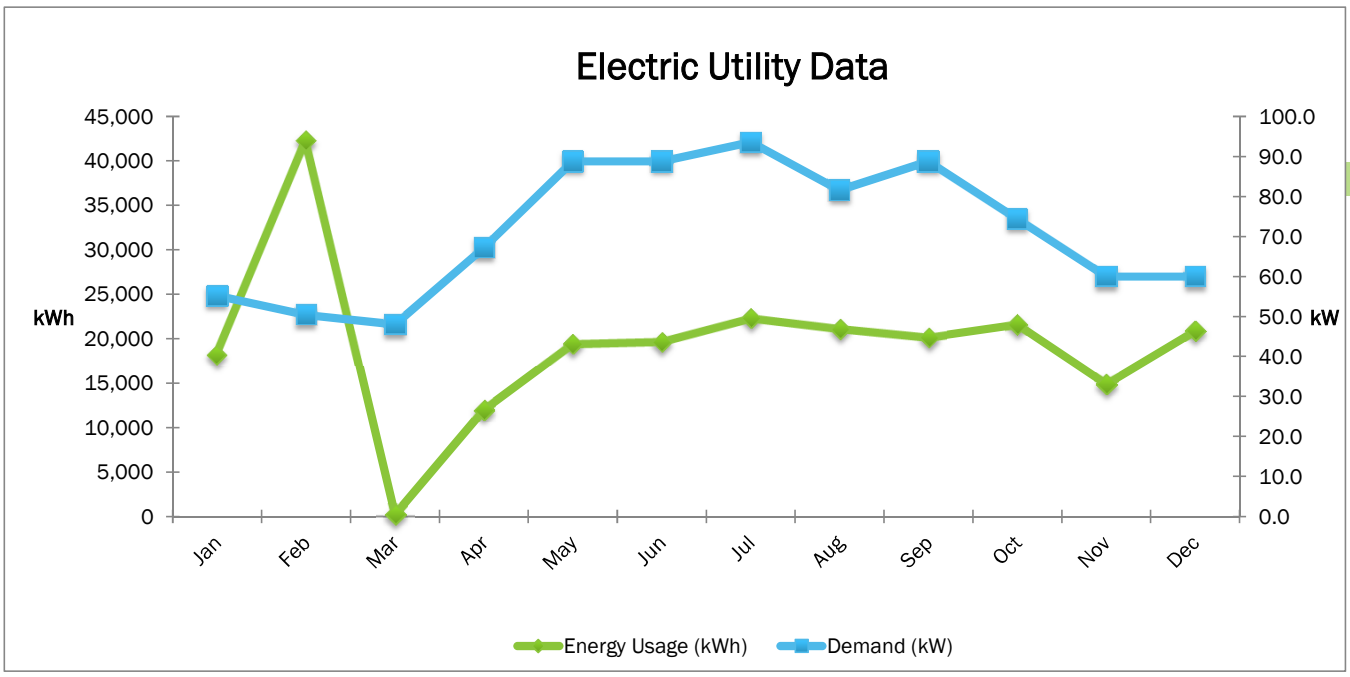
ANNUAL ELECTRIC UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Period	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Supply & Delivery Cost	Total Cost	Billing Days	Load Factor
2013	Jan	55.2	$442	18,240	$1,576	$2,017	31	0.44
2013	Feb	50.4	$403	42,240	$2,905	$3,308	28	1.25
2013	Mar	48.0	$384	240	$76	$460	31	0.01
2013	Apr	67.2	$538	12,000	$900	$1,437	30	0.25
2013	May	88.8	$710	19,440	$1,312	$2,022	31	0.29
2013	Jun	88.8	$710	19,680	$1,566	$2,276	30	0.31
2013	Jul	93.6	$749	22,320	$1,976	$2,725	31	0.32
2013	Aug	81.6	$653	21,120	$1,647	$2,299	30	0.36
2013	Sep	88.8	$710	20,160	$1,679	$2,389	31	0.31
2013	Oct	74.4	$595	21,600	$420	$1,016	31	0.39
2013	Nov	60.0	$480	14,880	$193	$673	30	0.34
2013	Dec	60.0	$480	20,880	$279	$759	31	0.47
	Avg./Totals:	**71**	**$6,854**	**232,800**	**$14,528**	**$21,382**	**365**	**0.39**

Table Formulas:

Hours per Month (h) = G x 24
Total Cost (F) = B + D + E
Load Factor (H) = C / (A x (h x 24))

Summary	
Energy Intensity (kWh/sq.ft.):	6.51
Cost Intensity ($/sq.ft.):	$0.60
Blended Cost (inc.demand) / kWh:	$0.092
Avg. Cost / kW:	***$8.00***
Avg. Cost / kWh:	***$0.06***



Building Name: Highway Department Complex / Senior Garage
Address: 2720 Lakeview RD
Hamburg NY, 14075
Facility Area: 7,656 sq.ft.

Utility Company: National Grid
Acct. No.: 16349-39102
Date: 10/7/2014

wendel

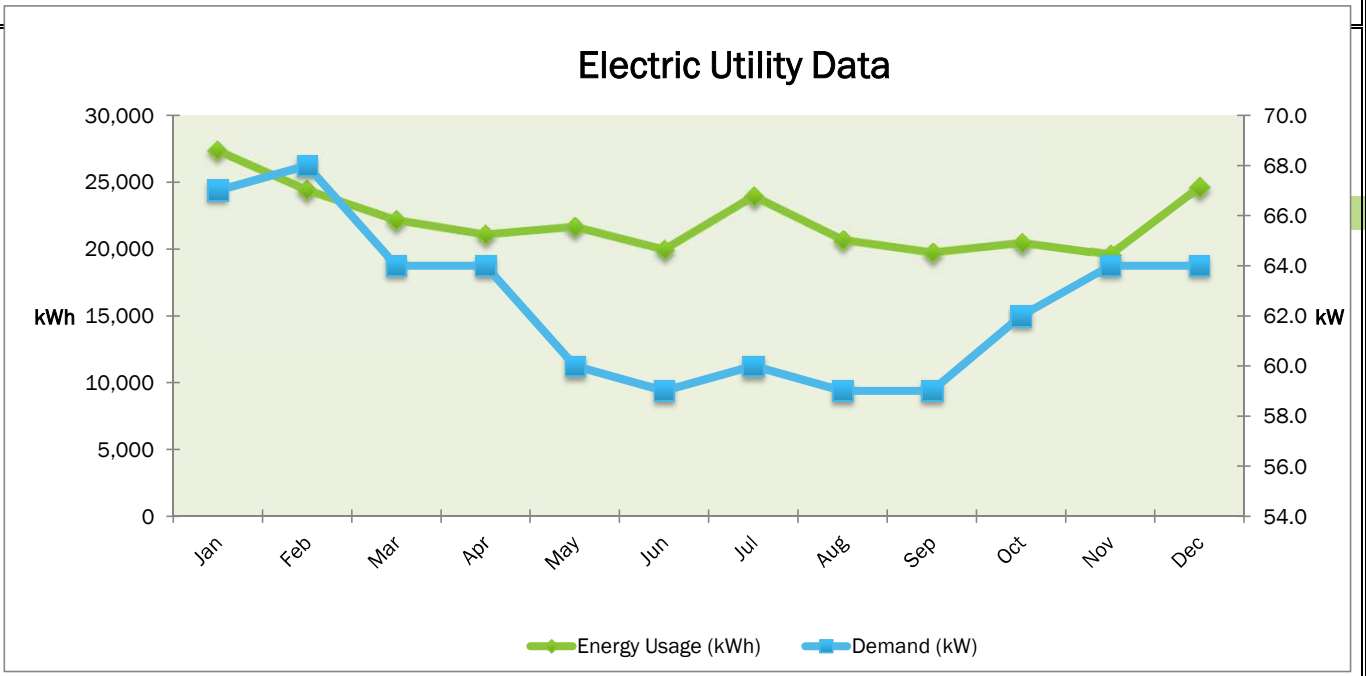
ANNUAL ELECTRIC UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Period	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Supply & Delivery Cost	Total Cost	Billing Days	Load Factor
2013	Jan	67.0	$698	27,354	$1,748	$2,446	31	0.55
2013	Feb	68.0	$709	24,413	$2,090	$2,799	28	0.53
2013	Mar	64.0	$667	22,174	$943	$1,610	31	0.47
2013	Apr	64.0	$667	21,089	$1,299	$1,966	30	0.46
2013	May	60.0	$625	21,662	$1,449	$2,075	31	0.49
2013	Jun	59.0	$615	19,977	$1,399	$2,014	30	0.47
2013	Jul	60.0	$625	23,938	$2,007	$2,632	31	0.54
2013	Aug	59.0	$615	20,690	$1,396	$2,011	30	0.49
2013	Sep	59.0	$615	19,762	$1,382	$1,997	31	0.45
2013	Oct	62.0	$646	20,471	$1,351	$1,997	31	0.44
2013	Nov	64.0	$667	19,562	$1,122	$1,789	30	0.42
2013	Dec	64.0	$667	24,604	$1,862	$2,529	31	0.52
	Avg./Totals:	**63**	**$7,815**	**265,696**	**$18,050**	**$25,865**	**365**	**0.49**

Table Formulas:

Hours per Month (h) = G x 24
Total Cost (F) = B + D + E
Load Factor (H) = C / (A x (h x 24))

Summary	
Energy Intensity (kWh/sq.ft.):	34.70
Cost Intensity ($/sq.ft.):	$3.38
Blended Cost (inc.demand) / kWh:	$0.097
Avg. Cost / kW:	***$10.42***
Avg. Cost / kWh:	***$0.07***



Building Name: Town Park Fitness Center
Address: 4420 Lake Shore Road
Hamburg, NY 14075
Facility Area: 3,060 sq.ft.

Utility Company: National Grid
Acct. No.: 12449-01103
Date: 10/7/2014

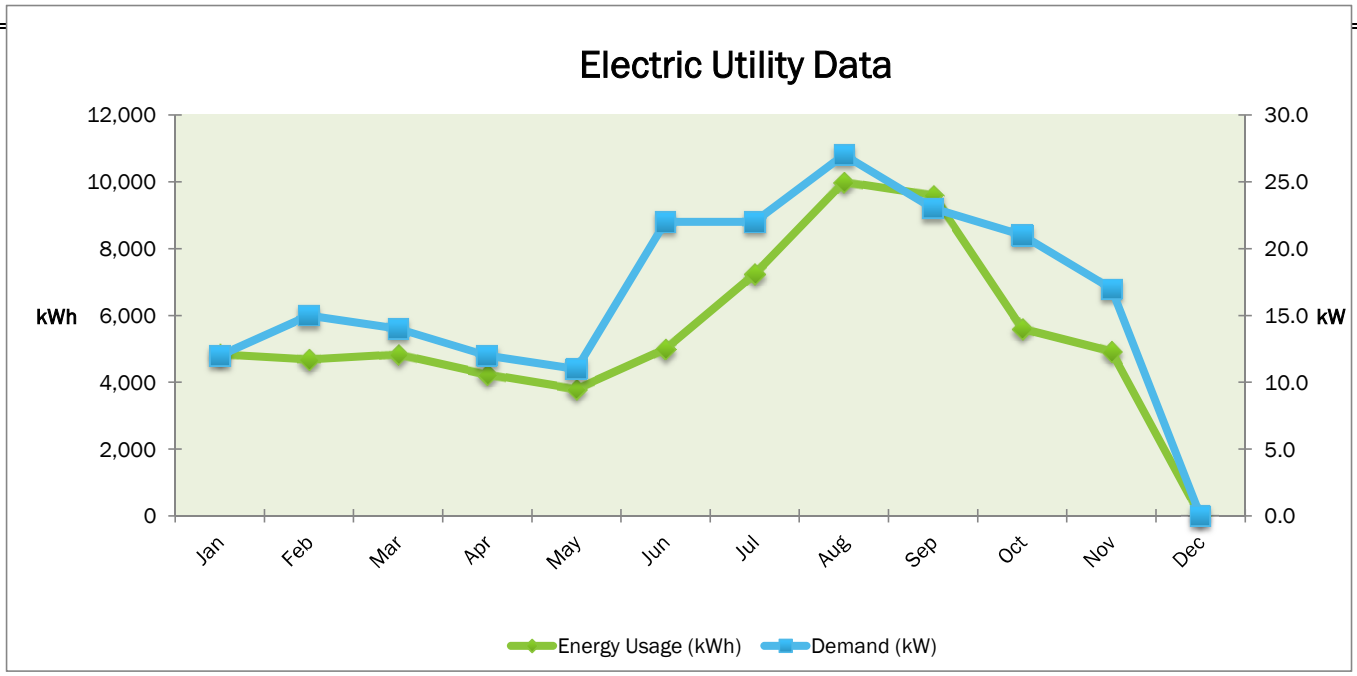
ANNUAL ELECTRIC UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Period	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Supply & Delivery Cost	Total Cost	Billing Days	Load Factor
2013	Jan	12.0	$96	4,840	$390	$486	31	0.54
2013	Feb	15.0	$120	4,680	$475	$595	28	0.46
2013	Mar	14.0	$112	4,840	$326	$438	31	0.46
2013	Apr	12.0	$96	4,240	$370	$466	30	0.49
2013	May	11.0	$88	3,800	$321	$409	31	0.46
2013	Jun	22.0	$176	5,000	$472	$648	30	0.32
2013	Jul	22.0	$176	7,240	$620	$796	31	0.44
2013	Aug	27.0	$216	10,000	$994	$1,210	30	0.51
2013	Sep	23.0	$184	9,600	$785	$969	31	0.56
2013	Oct	21.0	$168	5,600	$512	$680	31	0.36
2013	Nov	17.0	$136	4,920	$404	$540	30	0.40
2013	Dec	0.0	$0	0	$0	$0	31	#DIV/0!
	Avg./Totals:	**16**	**$1,568**	**64,760**	**$5,669**	**$7,237**	**365**	**#DIV/0!**

Table Formulas:

Hours per Month (h) = G x 24
Total Cost (F) = B + D + E
Load Factor (H) = C / (A x (h x 24))

Summary	
Energy Intensity (kWh/sq.ft.):	21.16
Cost Intensity ($/sq.ft.):	$2.37
Blended Cost (inc.demand) / kWh:	$0.112
Avg. Cost / kW:	***$8.00***
Avg. Cost / kWh:	***$0.09***



Building Name: Adult Day Care
Address: 353 Pleasant Avenue
Hamburg, NY 14075
Facility Area: 4,500 sq.ft.

Utility Company: NYSEG
Acct. No.: 1001-1114-393
Date: 10/7/2014

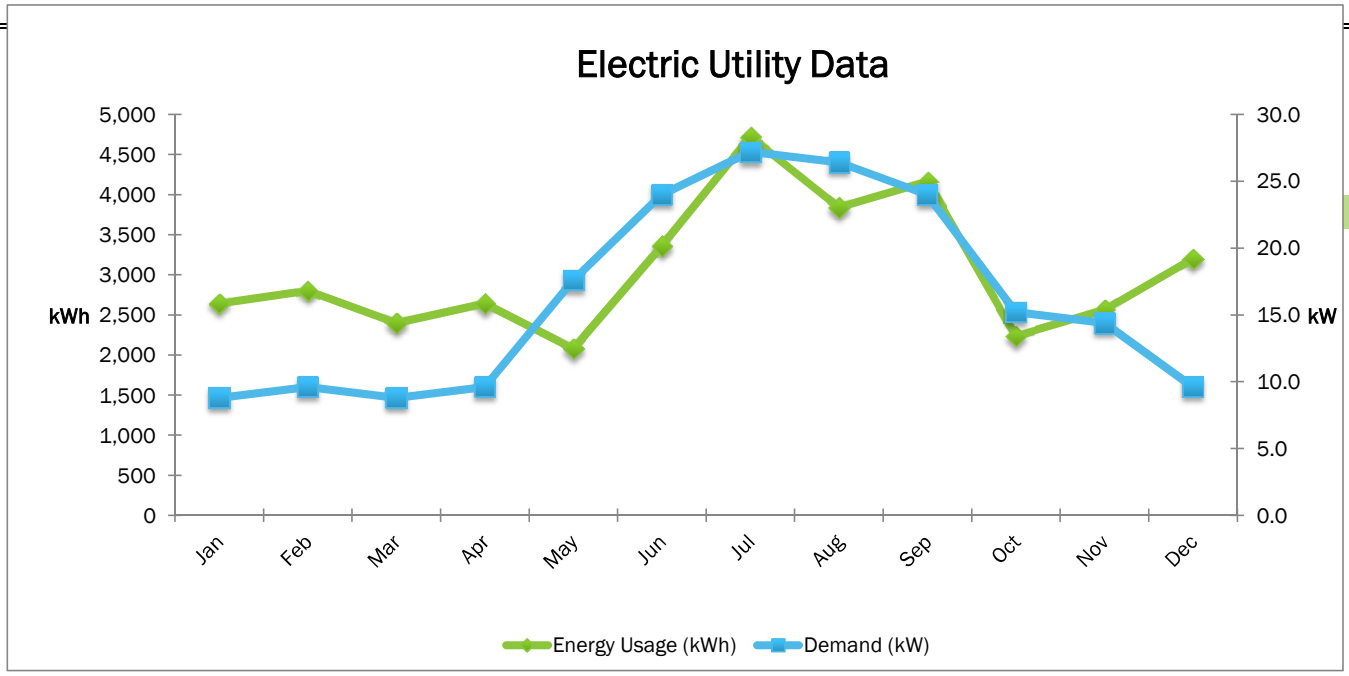
ANNUAL ELECTRIC UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Period	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Supply & Delivery Cost	Total Cost	Billing Days	Load Factor
2013	Jan	8.8	$70	2,640	$189	$260	31	0.40
2013	Feb	9.6	$77	2,800	$269	$346	28	0.43
2013	Mar	8.8	$70	2,400	$174	$244	31	0.37
2013	Apr	9.6	$77	2,640	$208	$284	30	0.38
2013	May	17.6	$141	2,080	$169	$310	31	0.16
2013	Jun	24.0	$192	3,360	$118	$310	30	0.19
2013	Jul	27.2	$218	4,720	$445	$663	31	0.23
2013	Aug	26.4	$211	3,840	$332	$543	30	0.20
2013	Sep	24.0	$192	4,160	$372	$564	31	0.23
2013	Oct	15.2	$122	2,240	$214	$336	31	0.20
2013	Nov	14.4	$115	2,560	$54	$169	30	0.25
2013	Dec	9.6	$77	3,200	$56	$133	31	0.45
	Avg./Totals:	**16**	**$1,562**	**36,640**	**$2,599**	**$4,161**	**365**	**0.29**

Table Formulas:

Hours per Month (h) = G x 24
Total Cost (F) = B + D + E
Load Factor (H) = C / (A x (h x 24))

Summary	
Energy Intensity (kWh/sq.ft.):	8.14
Cost Intensity ($/sq.ft.):	$0.92
Blended Cost (inc.demand) / kWh:	$0.114
Avg. Cost / kW:	***$8.00***
Avg. Cost / kWh:	***$0.07***



Building Name: Town of Hamburg Total
Address: Hamburg, NY 14075

Utility Company: National Fuel
Date: 10/7/2014

wendel

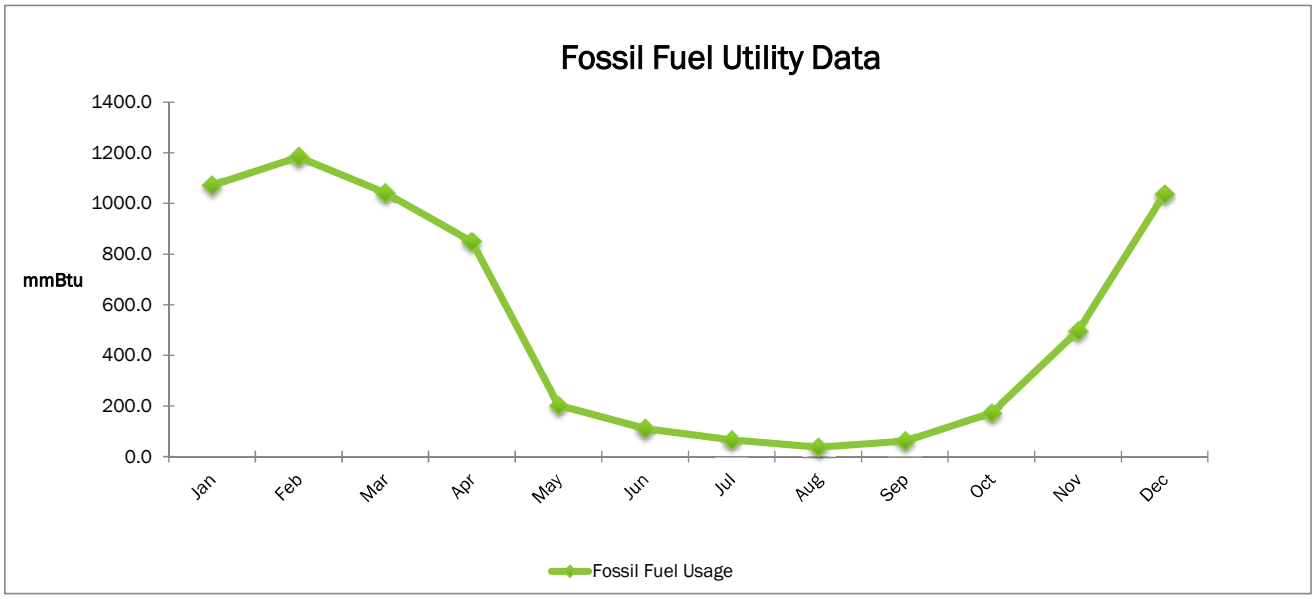
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	10720.0	0.0	0.0	$8,069	$8,069	1072.0	31
2013	Feb	11835.0	0.0	0.0	$8,452	$8,452	1183.5	28
2013	Mar	10425.0	0.0	0.0	$7,507	$7,507	1042.5	31
2013	Apr	8496.0	0.0	0.0	$7,066	$7,066	849.6	30
2013	May	2024.0	0.0	0.0	$2,055	$2,055	202.4	31
2013	Jun	1107.0	0.0	0.0	$1,192	$1,192	110.7	30
2013	Jul	667.0	0.0	0.0	$751	$751	66.7	31
2013	Aug	374.0	0.0	0.0	$450	$450	37.4	30
2013	Sep	609.0	0.0	0.0	$638	$638	60.9	31
2013	Oct	1722.0	0.0	0.0	$1,660	$1,660	172.2	31
2013	Nov	4960.0	0.0	0.0	$4,314	$4,314	496.0	30
2013	Dec	10372.0	0.0	0.0	$8,508	$8,508	1037.2	31
	Avg./Totals:	**63,311**	**0**	**0**	**$50,661**	**$50,661**	**6,331**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	-
Cost Intensity ($/sq.ft.):	-
Avg. Cost / Therm:	*$0.80*
Avg. Cost / mmBtu:	*$8.00*
Avg. Cost / Gallon:	*N/A*



Building Name: Ice Rink 1
Address: 2980 Lakeview Road
Lake View, NY 14085
Facility Area: 55550 sq.ft.

Date: 10/7/2014
Utility Company: National Fuel
Acct. No.: 3128280-06

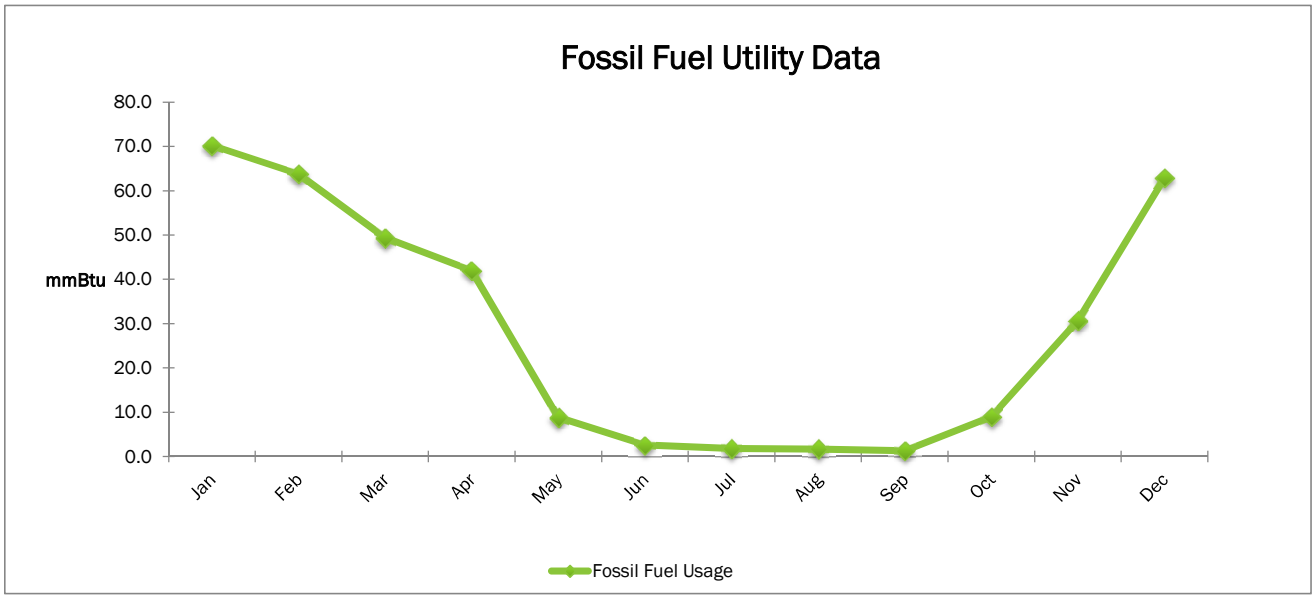
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	702.0	0.0	0.0	$548	$548	70.2	31
2013	Feb	638.0	0.0	0.0	$480	$480	63.8	28
2013	Mar	494.0	0.0	0.0	$386	$386	49.4	31
2013	Apr	420.0	0.0	0.0	$385	$385	42.0	30
2013	May	88.0	0.0	0.0	$106	$106	8.8	31
2013	Jun	26.0	0.0	0.0	$42	$42	2.6	30
2013	Jul	18.0	0.0	0.0	$34	$34	1.8	31
2013	Aug	17.0	0.0	0.0	$31	$31	1.7	30
2013	Sep	13.0	0.0	0.0	$28	$28	1.3	31
2013	Oct	90.0	0.0	0.0	$99	$99	9.0	31
2013	Nov	307.0	0.0	0.0	$281	$281	30.7	30
2013	Dec	628.0	0.0	0.0	$543	$543	62.8	31
	Avg./Totals:	**3,441**	**0**	**0**	**$2,961**	**$2,961**	**344**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.006194419
Cost Intensity ($/sq.ft.):	$0.05
Avg. Cost / Therm:	***$0.86***
Avg. Cost / mmBtu:	***$8.61***
Avg. Cost / Gallon:	***N/A***



Building Name: Ice Rink 2
Address: 2980 Lakeview Road
Lake View, NY 14085
Facility Area: 55550 sq.ft.

Date: 10/7/2014
Utility Company: National Fuel
Acct. No.: 3128279-02

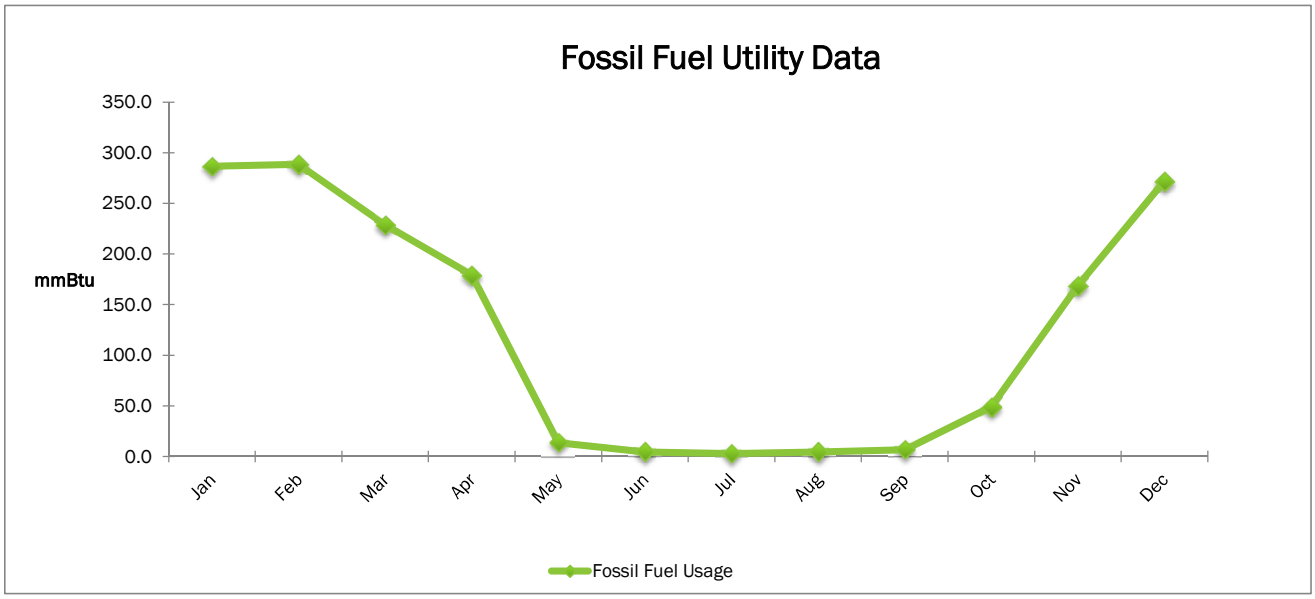
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	2868.0	0.0	0.0	$2,098	$2,098	286.8	31
2013	Feb	2887.0	0.0	0.0	$2,013	$2,013	288.7	28
2013	Mar	2287.0	0.0	0.0	$1,626	$1,626	228.7	31
2013	Apr	1792.0	0.0	0.0	$1,517	$1,517	179.2	30
2013	May	137.0	0.0	0.0	$156	$156	13.7	31
2013	Jun	45.0	0.0	0.0	$60	$60	4.5	30
2013	Jul	30.0	0.0	0.0	$45	$45	3.0	31
2013	Aug	46.0	0.0	0.0	$57	$57	4.6	30
2013	Sep	67.0	0.0	0.0	$74	$74	6.7	31
2013	Oct	490.0	0.0	0.0	$466	$466	49.0	31
2013	Nov	1688.0	0.0	0.0	$1,406	$1,406	168.8	30
2013	Dec	2718.0	0.0	0.0	$2,184	$2,184	271.8	31
	Avg./Totals:	**15,055**	**0**	**0**	**$11,702**	**$11,702**	**1,506**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.02710171
Cost Intensity ($/sq.ft.):	$0.21
Avg. Cost / Therm:	***$0.78***
Avg. Cost / mmBtu:	***$7.77***
Avg. Cost / Gallon:	***N/A***



Building Name: Town Hall
Address: 6100 South Park Avenue
Hamburg, NY 14075
Facility Area: 35,763 sq.ft.

Date: 10/7/2014
Utility Company: National Fuel
Acct. No.: 3350720-01

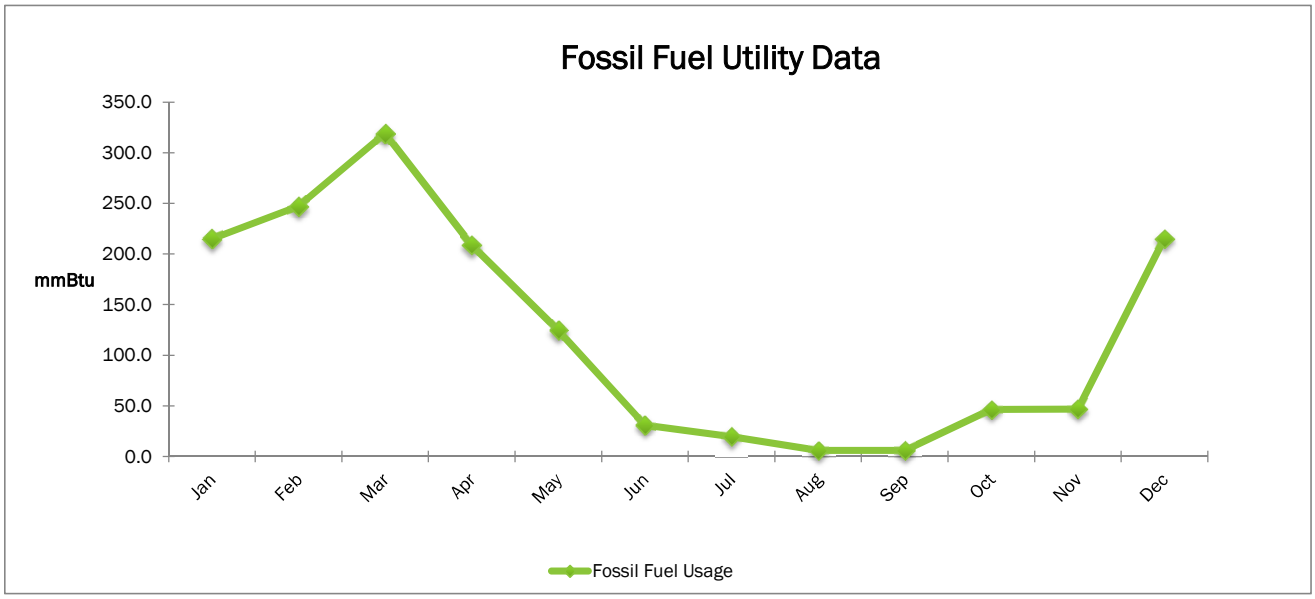
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	2149.0	0.0	0.0	$1,662	$1,662	214.9	31
2013	Feb	2471.0	0.0	0.0	$1,770	$1,770	247.1	28
2013	Mar	3191.0	0.0	0.0	$2,226	$2,226	319.1	31
2013	Apr	2087.0	0.0	0.0	$1,524	$1,524	208.7	30
2013	May	1247.0	0.0	0.0	$1,170	$1,170	124.7	31
2013	Jun	311.0	0.0	0.0	$320	$320	31.1	30
2013	Jul	197.0	0.0	0.0	$207	$207	19.7	31
2013	Aug	59.0	0.0	0.0	$71	$71	5.9	30
2013	Sep	60.0	0.0	0.0	$69	$69	6.0	31
2013	Oct	464.0	0.0	0.0	$407	$407	46.4	31
2013	Nov	469.0	0.0	0.0	$441	$441	46.9	30
2013	Dec	2152.0	0.0	0.0	$1,743	$1,743	215.2	31
	Avg./Totals:	**14,857**	**0**	**0**	**$11,609**	**$11,609**	**1,486**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.041542935
Cost Intensity ($/sq.ft.):	$0.32
Avg. Cost / Therm:	***$0.78***
Avg. Cost / mmBtu:	***$7.81***
Avg. Cost / Gallon:	***N/A***



Building Name: Buildings and Grounds
Address: 2720 Lakeview RD
Hamburg NY, 14075
Facility Area: 20,000 sq.ft.

Date: 10/7/2014
Utility Company: National Fuel
Acct. No.: 4550209-09

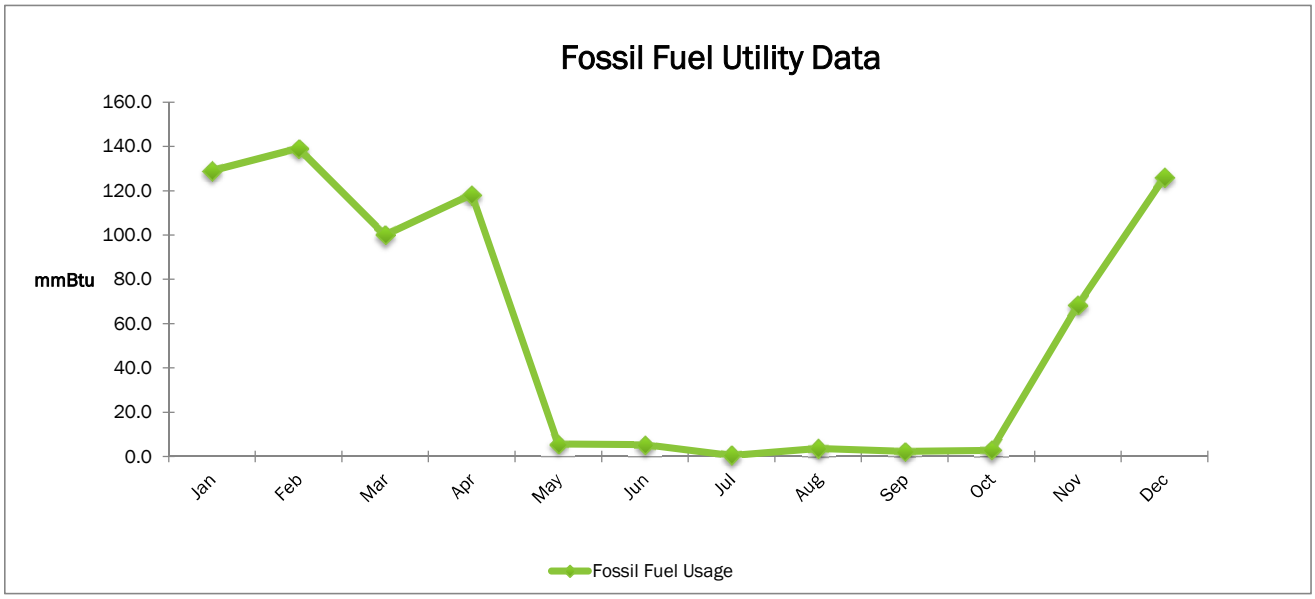
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	1290.0	0.0	0.0	968.5	$969	129.0	31
2013	Feb	1391.0	0.0	0.0	993.4	$993	139.1	28
2013	Mar	1000.0	0.0	0.0	$736	$736	100.0	31
2013	Apr	1183.0	0.0	0.0	$1,020	$1,020	118.3	30
2013	May	56.0	0.0	0.0	$73	$73	5.6	31
2013	Jun	53.0	0.0	0.0	$68	$68	5.3	30
2013	Jul	5.0	0.0	0.0	$22	$22	0.5	31
2013	Aug	36.0	0.0	0.0	$49	$49	3.6	30
2013	Sep	23.0	0.0	0.0	$36	$36	2.3	31
2013	Oct	28.0	0.0	0.0	$42	$42	2.8	31
2013	Nov	684.0	0.0	0.0	$597	$597	68.4	30
2013	Dec	1260.0	0.0	0.0	$1,036	$1,036	126.0	31
	Avg./Totals:	**7,009**	**0**	**0**	**$5,641**	**$5,641**	**701**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.035045
Cost Intensity ($/sq.ft.):	$0.28
Avg. Cost / Therm:	***$0.80***
Avg. Cost / mmBtu:	***$8.05***
Avg. Cost / Gallon:	***N/A***



Building Name: Highway Department Office
Address: 2720 Lakeview RD
Hamburg NY, 14075
Facility Area: 7,656 sq.ft.

Date: 10/7/2014
Utility Company: NYSEG
Acct. No.: 3128278-04

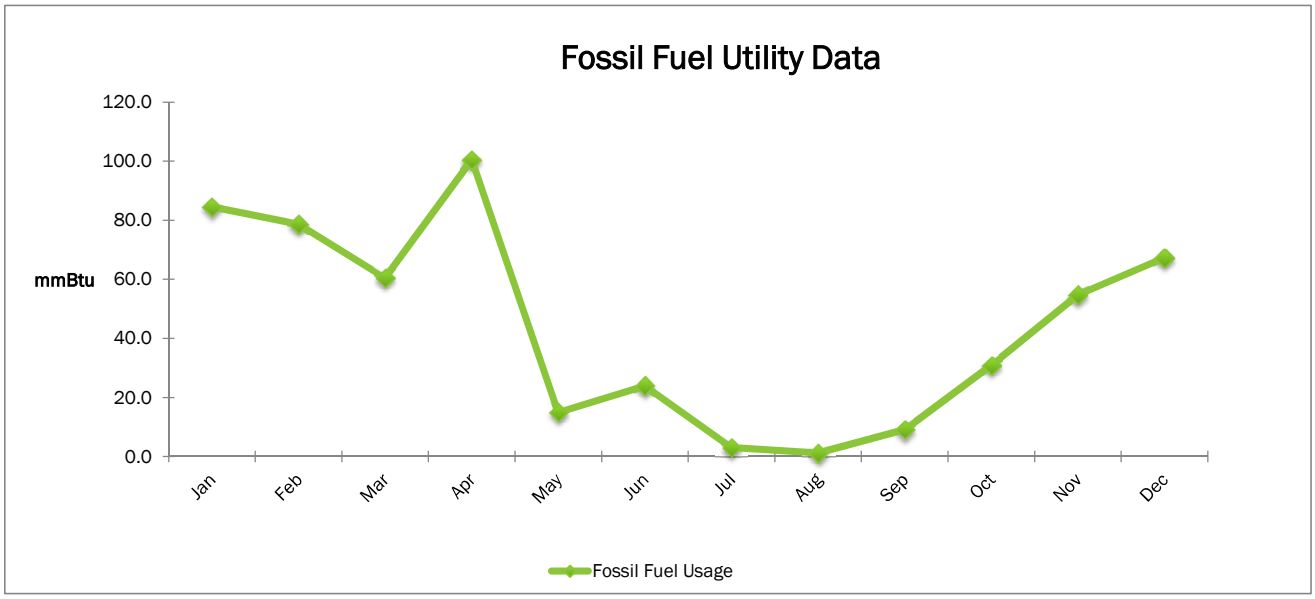
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	845.0	0.0	0.0	$650	$650	84.5	31
2013	Feb	787.0	0.0	0.0	$585	$585	78.7	28
2013	Mar	605.0	0.0	0.0	$461	$461	60.5	31
2013	Apr	1005.0	0.0	0.0	$874	$874	100.5	30
2013	May	149.0	0.0	0.0	$168	$168	14.9	31
2013	Jun	239.0	0.0	0.0	$248	$248	23.9	30
2013	Jul	30.0	0.0	0.0	$45	$45	3.0	31
2013	Aug	12.0	0.0	0.0	$28	$28	1.2	30
2013	Sep	91.0	0.0	0.0	$94	$94	9.1	31
2013	Oct	309.0	0.0	0.0	$300	$300	30.9	31
2013	Nov	547.0	0.0	0.0	$487	$487	54.7	30
2013	Dec	673.0	0.0	0.0	$574	$574	67.3	31
	Avg./Totals:	**5,292**	**0**	**0**	**$4,511**	**$4,511**	**529**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.069122257
Cost Intensity ($/sq.ft.):	$0.59
Avg. Cost / Therm:	***$0.85***
Avg. Cost / mmBtu:	***$8.52***
Avg. Cost / Gallon:	***N/A***



Building Name: Town Park Fitness Center
Address: 4420 Lake Shore Road
Hamburg, NY 14075
Facility Area: 3,060 sq.ft.

Date: 10/7/2014
Utility Company: National Fuel
Acct. No.: 3424250-03

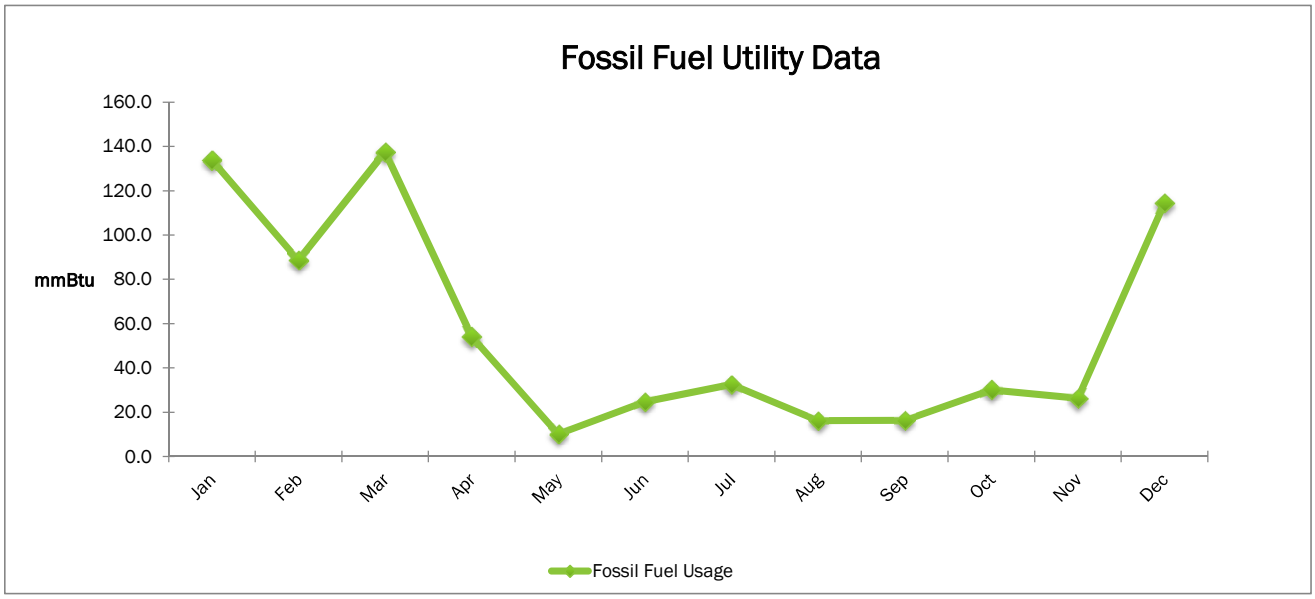
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	1338.0	0.0	0.0	$979	$979	133.8	31
2013	Feb	886.0	0.0	0.0	$654	$654	88.6	28
2013	Mar	1375.0	0.0	0.0	$998	$998	137.5	31
2013	Apr	540.0	0.0	0.0	$508	$508	54.0	30
2013	May	102.0	0.0	0.0	$120	$120	10.2	31
2013	Jun	247.0	0.0	0.0	$256	$256	24.7	30
2013	Jul	325.0	0.0	0.0	$322	$322	32.5	31
2013	Aug	162.0	0.0	0.0	$159	$159	16.2	30
2013	Sep	164.0	0.0	0.0	$156	$156	16.4	31
2013	Oct	301.0	0.0	0.0	$293	$293	30.1	31
2013	Nov	263.0	0.0	0.0	$242	$242	26.3	30
2013	Dec	1143.0	0.0	0.0	$951	$951	114.3	31
	Avg./Totals:	6,846	0	0	$5,639	$5,639	685	365

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.22372549
Cost Intensity ($/sq.ft.):	$1.84
Avg. Cost / Therm:	*$0.82*
Avg. Cost / mmBtu:	*$8.24*
Avg. Cost / Gallon:	*N/A*



Building Name: Adult Day Care
Address: 353 Pleasant Avenue
Hamburg, NY 14075
Facility Area: 4,500 sq.ft.

Date: 10/7/2014
Utility Company: National Fuel
Acct. No.: 3424250-03

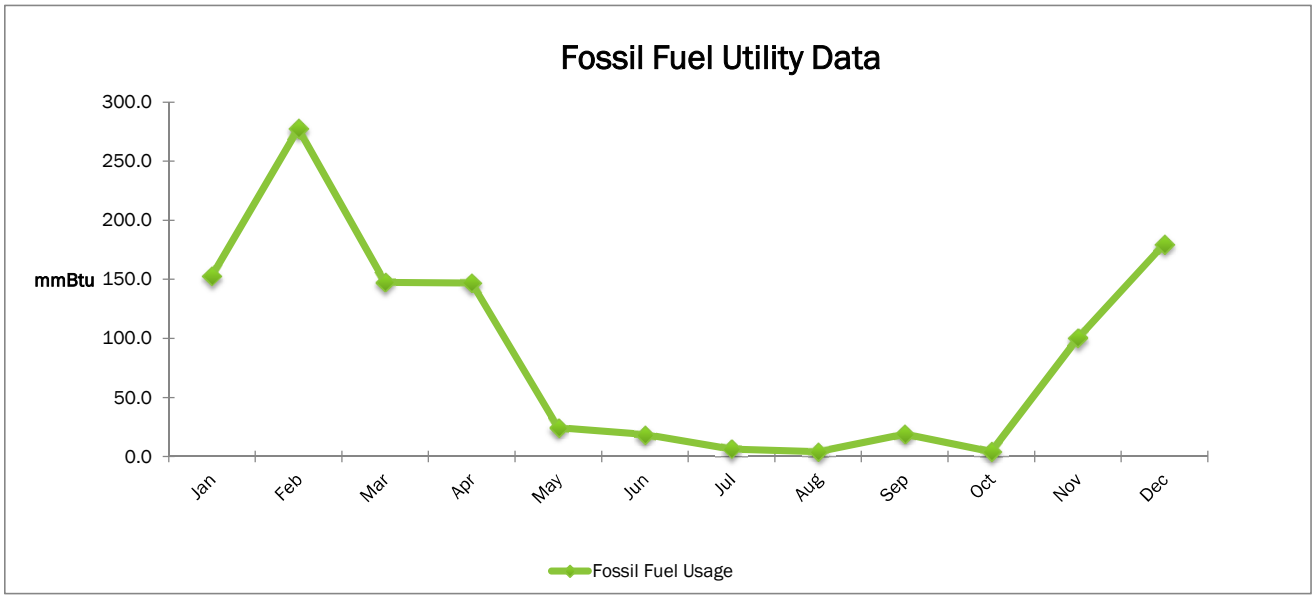
ANNUAL FUEL UTILITY DATA

		A	B	C	E	F	G	H
Billing Year	Billing Month	Natural Gas Usage (Therms)	Fuel Oil #2 Usage (Gal)	Propane Usage (Gal)	Usage Supply & Delivery Cost	Total Cost	mmBtu Equivalent	Billing Days
2013	Jan	1528.0	0.0	0.0	$1,164	$1,164	152.8	31
2013	Feb	2775.0	0.0	0.0	$1,956	$1,956	277.5	28
2013	Mar	1473.0	0.0	0.0	$1,074	$1,074	147.3	31
2013	Apr	1469.0	0.0	0.0	$1,238	$1,238	146.9	30
2013	May	245.0	0.0	0.0	$262	$262	24.5	31
2013	Jun	186.0	0.0	0.0	$199	$199	18.6	30
2013	Jul	62.0	0.0	0.0	$76	$76	6.2	31
2013	Aug	42.0	0.0	0.0	$55	$55	4.2	30
2013	Sep	191.0	0.0	0.0	$181	$181	19.1	31
2013	Oct	40.0	0.0	0.0	$54	$54	4.0	31
2013	Nov	1002.0	0.0	0.0	$861	$861	100.2	30
2013	Dec	1798.0	0.0	0.0	$1,477	$1,477	179.8	31
	Avg./Totals:	**10,811**	**0**	**0**	**$8,598**	**$8,598**	**1,081**	**365**

Table Formulas:

mmBtu Equivalent (G) = Natural Gas Therms (A) / 10
mmBtu Equivalent (G) = Fuel Oil #2 Gallons (B) x 0.14
mmBtu Equivalent (G) = Propane Gallons (C) x 0.096
Total Cost (F) = D + E

Summary	
Energy Intensity (mmBtu/sq.ft.):	0.240244444
Cost Intensity ($/sq.ft.):	$1.91
Avg. Cost / Therm:	***$0.80***
Avg. Cost / mmBtu:	***$7.95***
Avg. Cost / Gallon:	***N/A***



Appendix B

Trend Data

Table: ECM-1 Logged Hours

Town of Hamburg Lighting Logger Data								
Logger	**Logger Type**	**Building**	**Floor**	**Location**	**Hours Installed**	**Hours On**	**% On**	**Annual Hours On**
10225591	Light On/Off	Town Hall	1	Engineers Office	287.87	128.36	0.45	3906.09
10225595	Light On/Off	Town Hall	1	Engineers Hall	288.00	73.66	0.26	2240.49
10225587	Light On/Off	Ice Rink	1	Scoreboard	288.00	281.00	0.98	8547.08
10225588	Light On/Off	B&G Garage	1	By Time Clock	287.00	85.00	0.30	2594.43
10225591	Light On/Off	Senior Garage	1	Right side of Garage	287.50	1.70	0.01	51.80

DATA LOGGER LOCATIONS

Office Space Test

Motor On/OFF Loggers:

	Logger Type	Logger #	Bldg Installed In	Location Installed	Date Installed	Time Installed	Removal Date	Removal Time
1	Light ON/OFF	10225591	Town Hall	Town Engineer Office	3/14/2014	8:20		
2	Light ON/OFF	10225595	Town Hall	Town Engineer Hallway	3/14/2014	8:20		
3	Light ON/OFF	10225587	Ice Rink	Under Scoreboard	3/14/2014	8:36		
4	Light ON/OFF	10225589	B&G Garage	Middle of BLDG exhaust fan above time clock	3/14/2014	8:44		
5	Light ON/OFF	10225588	Senior Garage	2nd Wallbeam from right	3/14/2014	8:52		
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

NOTES:

Plot Title: Hammy MV

#	Date Time, GMT-04:00	Light (LGR S/N: 10225591, SEN S/N	ON
22	3/14/2014 8:14	1	0:00:10
23	3/14/2014 8:14	0	
24	3/14/2014 9:00	1	8:05:35
25	3/14/2014 17:05	0	
26	3/14/2014 17:08	1	0:00:57
27	3/14/2014 17:08	0	
28	3/14/2014 17:09	1	0:03:08
29	3/14/2014 17:12	0	
30	3/14/2014 17:13	1	0:04:33
31	3/14/2014 17:17	0	
32	3/14/2014 17:17	1	0:07:11
33	3/14/2014 17:25	0	
34	3/15/2014 16:50	1	0:12:09
35	3/15/2014 17:02	0	
36	3/15/2014 17:02	1	0:00:18
37	3/15/2014 17:03	0	
38	3/15/2014 17:03	1	0:00:03
39	3/15/2014 17:03	0	
40	3/15/2014 17:03	1	0:00:34
41	3/15/2014 17:04	0	
42	3/15/2014 17:04	1	0:00:36
43	3/15/2014 17:04	0	
44	3/15/2014 17:05	1	0:00:18
45	3/15/2014 17:05	0	
46	3/15/2014 17:06	1	0:04:35
47	3/15/2014 17:11	0	
48	3/15/2014 17:15	1	0:00:27
49	3/15/2014 17:15	0	
50	3/15/2014 17:15	1	0:00:14
51	3/15/2014 17:15	0	
52	3/15/2014 17:23	1	0:03:33
53	3/15/2014 17:26	0	
54	3/15/2014 17:29	1	0:00:10
55	3/15/2014 17:29	0	
56	3/15/2014 17:29	1	0:00:07
57	3/15/2014 17:29	0	
58	3/15/2014 17:56	1	0:01:38
59	3/15/2014 17:57	0	
60	3/15/2014 17:58	1	0:08:33
61	3/15/2014 18:06	0	
62	3/15/2014 18:06	1	0:08:03
63	3/15/2014 18:14	0	
64	3/16/2014 15:28	1	2:45:14
65	3/16/2014 18:13	0	
66	3/17/2014 9:03	1	2:06:52

67	3/17/2014 11:09	0	
68	3/17/2014 11:11	1	6:58:15
69	3/17/2014 18:09	0	
70	3/18/2014 8:59	1	9:13:41
71	3/18/2014 18:13	0	
72	3/18/2014 19:12	1	0:01:55
73	3/18/2014 19:14	0	
74	3/19/2014 9:02	1	7:58:57
75	3/19/2014 17:01	0	
76	3/19/2014 18:43	1	0:16:01
77	3/19/2014 18:59	0	
78	3/19/2014 19:19	1	0:22:59
79	3/19/2014 19:42	0	
80	3/20/2014 9:01	1	7:58:01
81	3/20/2014 16:59	0	
82	3/20/2014 19:13	1	0:30:05
83	3/20/2014 19:43	0	
84	3/20/2014 20:17	1	0:01:23
85	3/20/2014 20:18	0	
86	3/21/2014 8:59	1	9:10:14
87	3/21/2014 18:09	0	
88	3/23/2014 17:10	1	0:00:13
89	3/23/2014 17:11	0	
90	3/24/2014 9:00	1	8:00:49
91	3/24/2014 17:01	0	
92	3/24/2014 17:03	1	0:02:03
93	3/24/2014 17:05	0	
94	3/24/2014 17:06	1	0:02:20
95	3/24/2014 17:08	0	
96	3/24/2014 17:08	1	0:03:41
97	3/24/2014 17:12	0	
98	3/24/2014 17:12	1	0:00:44
99	3/24/2014 17:13	0	
100	3/24/2014 20:01	1	0:22:41
101	3/24/2014 20:23	0	
102	3/25/2014 9:00	1	7:58:34
103	3/25/2014 16:59	0	
104	3/25/2014 18:59	1	0:42:36
105	3/25/2014 19:41	0	
106	3/26/2014 8:12	1	0:00:04
107	3/26/2014 8:12	0	
	287:58:26		73:40:14

Plot Title: Hamburg MV

#	Date Time, GMT-04:00	Light (LGR S/N: 10225595, SEN S/N	ON
33	3/14/2014 8:16	1	12:37:33
34	3/14/2014 20:54	0	
35	3/14/2014 20:54	1	0:00:01
36	3/14/2014 20:54	0	
37	3/16/2014 10:43	1	1:38:22
38	3/16/2014 12:21	0	
39	3/17/2014 8:15	1	11:49:45
40	3/17/2014 20:05	0	
41	3/17/2014 20:54	1	0:00:01
42	3/17/2014 20:54	0	
43	3/18/2014 6:58	1	0:00:01
44	3/18/2014 6:58	0	
45	3/18/2014 8:29	1	11:24:50
46	3/18/2014 19:54	0	
47	3/18/2014 20:55	1	0:00:01
48	3/18/2014 20:55	0	
49	3/18/2014 22:53	1	22:00:34
50	3/19/2014 20:54	0	
51	3/20/2014 8:28	1	11:41:56
52	3/20/2014 20:10	0	
53	3/20/2014 20:53	1	0:00:01
54	3/20/2014 20:53	0	
55	3/21/2014 7:56	1	12:17:57
56	3/21/2014 20:14	0	
57	3/23/2014 12:01	1	32:43:27
58	3/24/2014 20:45	0	
59	3/25/2014 8:45	1	12:07:12
60	3/25/2014 20:52	0	
61	3/26/2014 8:08	1	0:01:09
62	3/26/2014 8:09	0	
	287:52:42		128:22:50

Plot Title: Hammy MV

#	Date Time, GMT-04:00	Light (LGR S/N: 10225588, SEN S/N	ON
15	3/14/2014 8:51	1	0:04:17
16	3/14/2014 8:56	0	
17	3/14/2014 12:03	1	0:00:18
18	3/14/2014 12:04	0	
19	3/14/2014 14:30	1	0:00:45
20	3/14/2014 14:31	0	
21	3/14/2014 14:47	1	0:00:39
22	3/14/2014 14:48	0	
23	3/14/2014 16:14	1	0:00:31
24	3/14/2014 16:15	0	
25	3/14/2014 17:18	1	0:00:56
26	3/14/2014 17:19	0	
27	3/17/2014 8:18	1	0:00:12
28	3/17/2014 8:19	0	
29	3/17/2014 8:22	1	0:01:57
30	3/17/2014 8:23	0	
31	3/17/2014 8:32	1	0:01:20
32	3/17/2014 8:33	0	
33	3/17/2014 8:35	1	0:00:13
34	3/17/2014 8:35	0	
35	3/17/2014 8:39	1	0:02:34
36	3/17/2014 8:41	0	
37	3/17/2014 9:03	1	0:01:56
38	3/17/2014 9:05	0	
39	3/17/2014 9:08	1	0:00:23
40	3/17/2014 9:09	0	
41	3/17/2014 10:27	1	0:00:12
42	3/17/2014 10:27	0	
43	3/17/2014 12:09	1	0:00:44
44	3/17/2014 12:09	0	
45	3/17/2014 12:20	1	0:00:24
46	3/17/2014 12:21	0	
47	3/17/2014 15:06	1	0:01:19
48	3/17/2014 15:07	0	
49	3/17/2014 15:30	1	0:01:47
50	3/17/2014 15:31	0	
51	3/17/2014 16:21	1	0:00:40
52	3/17/2014 16:22	0	
53	3/17/2014 17:19	1	0:02:07
54	3/17/2014 17:21	0	
55	3/18/2014 7:54	1	0:01:28
56	3/18/2014 7:56	0	
57	3/18/2014 8:01	1	0:01:15
58	3/18/2014 8:02	0	
59	3/18/2014 8:24	1	0:00:31

60	3/18/2014 8:24	0	
61	3/18/2014 10:11	1	0:00:09
62	3/18/2014 10:11	0	
63	3/18/2014 11:57	1	0:00:28
64	3/18/2014 11:57	0	
65	3/18/2014 13:03	1	0:02:43
66	3/18/2014 13:06	0	
67	3/18/2014 14:19	1	0:00:13
68	3/18/2014 14:19	0	
69	3/18/2014 14:36	1	0:00:19
70	3/18/2014 14:36	0	
71	3/18/2014 14:54	1	0:03:16
72	3/18/2014 14:58	0	
73	3/18/2014 15:21	1	0:00:17
74	3/18/2014 15:22	0	
75	3/18/2014 16:30	1	0:01:15
76	3/18/2014 16:31	0	
77	3/18/2014 17:25	1	0:00:31
78	3/18/2014 17:26	0	
79	3/19/2014 8:22	1	0:01:36
80	3/19/2014 8:24	0	
81	3/19/2014 10:34	1	0:00:08
82	3/19/2014 10:34	0	
83	3/19/2014 12:12	1	0:00:37
84	3/19/2014 12:13	0	
85	3/19/2014 14:14	1	0:00:40
86	3/19/2014 14:14	0	
87	3/19/2014 16:27	1	0:00:26
88	3/19/2014 16:27	0	
89	3/20/2014 17:19	1	0:00:22
90	3/20/2014 17:19	0	
91	3/21/2014 8:29	1	0:08:31
92	3/21/2014 8:37	0	
93	3/21/2014 10:41	1	0:00:14
94	3/21/2014 10:41	0	
95	3/21/2014 11:48	1	0:00:37
96	3/21/2014 11:49	0	
97	3/21/2014 15:19	1	0:00:28
98	3/21/2014 15:20	0	
99	3/21/2014 15:43	1	0:00:28
100	3/21/2014 15:44	0	
101	3/21/2014 16:11	1	0:00:27
102	3/21/2014 16:11	0	
103	3/21/2014 17:13	1	0:00:34
104	3/21/2014 17:14	0	
105	3/24/2014 8:03	1	0:00:36
106	3/24/2014 8:03	0	

107	3/24/2014 8:14	1	0:05:43
108	3/24/2014 8:20	0	
109	3/24/2014 8:28	1	0:03:07
110	3/24/2014 8:32	0	
111	3/24/2014 10:30	1	0:00:13
112	3/24/2014 10:30	0	
113	3/24/2014 10:42	1	0:00:10
114	3/24/2014 10:42	0	
115	3/24/2014 12:02	1	0:05:31
116	3/24/2014 12:07	0	
117	3/24/2014 12:46	1	0:00:18
118	3/24/2014 12:47	0	
119	3/24/2014 13:26	1	0:00:28
120	3/24/2014 13:27	0	
121	3/24/2014 16:19	1	0:01:11
122	3/24/2014 16:21	0	
123	3/24/2014 17:05	1	0:01:19
124	3/24/2014 17:06	0	
125	3/25/2014 7:53	1	0:00:47
126	3/25/2014 7:54	0	
127	3/25/2014 7:55	1	0:04:33
128	3/25/2014 7:59	0	
129	3/25/2014 8:20	1	0:03:49
130	3/25/2014 8:24	0	
131	3/25/2014 10:33	1	0:00:11
132	3/25/2014 10:33	0	
133	3/25/2014 12:24	1	0:00:48
134	3/25/2014 12:25	0	
135	3/25/2014 13:13	1	0:08:19
136	3/25/2014 13:21	0	
137	3/25/2014 13:53	1	0:00:26
138	3/25/2014 13:54	0	
139	3/25/2014 14:50	1	0:00:16
140	3/25/2014 14:51	0	
141	3/25/2014 15:05	1	0:00:40
142	3/25/2014 15:05	0	
143	3/25/2014 16:11	1	0:00:38
144	3/25/2014 16:11	0	
145	3/25/2014 17:21	1	0:00:36
146	3/25/2014 17:21	0	
147	3/26/2014 7:43	1	0:00:33
148	3/26/2014 7:43	0	
149	3/26/2014 7:50	1	0:05:55
150	3/26/2014 7:56	0	
151	3/26/2014 8:15	1	0:05:46
152	3/26/2014 8:21	0	
	287:29:49		1:42:40

Plot Title: Hammy MV

#	Date Time, GMT-0	Light (LGR S/N: 10225587, SEN S/N	On
17	3/14/2014 8:35	1	0:00:04
18	3/14/2014 8:35	0	
19	3/14/2014 8:35	1	0:00:02
20	3/14/2014 8:35	0	
21	3/14/2014 8:35	1	0:00:01
22	3/14/2014 8:35	0	
23	3/14/2014 8:35	1	0:00:02
24	3/14/2014 8:35	0	
25	3/14/2014 8:35	1	0:00:01
26	3/14/2014 8:35	0	
27	3/14/2014 8:35	1	0:00:03
28	3/14/2014 8:35	0	
29	3/14/2014 8:35	1	19:43:28
30	3/17/2014 4:19	0	
31	3/17/2014 7:33	1	20:15:31
32	3/18/2014 3:49	0	
33	3/18/2014 7:04	1	23:41:40
34	3/26/2014 6:45	0	
35	3/26/2014 7:02	1	1:21:48
36	3/26/2014 8:23	0	
	287:48:52		281:02:40

Plot Title: Hammy MV

#	Date Time, GMT-04:00	Light (LGR S/N: 10225589, SEN S/N:	Light On
17	3/14/2014 8:43	1	5:39:07
18	3/14/2014 14:22	0	
19	3/16/2014 8:36	1	8:35:58
20	3/16/2014 17:12	0	
21	3/17/2014 5:42	1	1:30:33
22	3/17/2014 7:13	0	
23	3/17/2014 7:13	1	0:00:15
24	3/17/2014 7:13	0	
25	3/17/2014 7:13	1	0:00:03
26	3/17/2014 7:13	0	
27	3/17/2014 7:13	1	11:51:07
28	3/17/2014 19:04	0	
29	3/18/2014 5:45	1	9:55:25
30	3/18/2014 15:40	0	
31	3/18/2014 18:18	1	0:00:27
32	3/18/2014 18:18	0	
33	3/19/2014 5:36	1	9:17:08
34	3/19/2014 14:53	0	
35	3/20/2014 5:44	1	9:09:17
36	3/20/2014 14:53	0	
37	3/21/2014 5:47	1	9:05:48
38	3/21/2014 14:53	0	
39	3/23/2014 11:22	1	0:17:57
40	3/23/2014 11:40	0	
41	3/23/2014 13:45	1	0:00:06
42	3/23/2014 13:45	0	
43	3/23/2014 13:47	1	0:00:43
44	3/23/2014 13:47	0	
45	3/23/2014 13:50	1	0:00:34
46	3/23/2014 13:51	0	
47	3/23/2014 14:00	1	0:00:22
48	3/23/2014 14:01	0	
49	3/23/2014 14:43	1	0:00:18
50	3/23/2014 14:43	0	
51	3/23/2014 14:45	1	0:00:13
52	3/23/2014 14:45	0	
53	3/24/2014 5:54	1	8:37:08
54	3/24/2014 14:31	0	
55	3/24/2014 14:57	1	0:00:16
56	3/24/2014 14:58	0	
57	3/25/2014 5:34	1	9:05:22
58	3/25/2014 14:39	0	
59	3/26/2014 6:40	1	1:53:50
60	3/26/2014 8:34	0	
	287		85:01:57

EMS Trend Summary

	SDC	YEAR 1	Year 1						SDC	
			10/01/2013-1/01/2014	8/01/13-10/01/2013	6/01/13-7/30/2013	4/01/13-6/01/2013	3/01/13-3/31/2013	1/01/13-3/01/2013	11/01/12-1/01/2013	08/01/12-11/01/12
Total Hours:		8821	2231	1487	1432	1488	743	1440	1488	
	AVG Percent Occ	AVG Percent Occ	Percent Occupied	Percent Occupied	Percent Occupied	Percent Occupied	Percent Occupied	Percent Occupied	Percent Occupied	Percent Occupied
Unit A Supervisor	30%	32%	32%	34%	33%	35%	28%	32%	30%	
Unit B Supervisor										
Supervisors Office	30%	32%	31%	34%	33%	35%	28%	31%	30%	
Supervisors Open Office	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Front Conference Room	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Lobby	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Unit A Tax Collector										
Unit B Tax Collector	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Legal Reception	30%	34%	41%	34%	33%	35%	28%	32%	30%	
Legal Office	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Judge A Chamber	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Judge B Chamber	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Engineering Office	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Attorney Office	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Employee Lounge	30%	32%	31%	34%	33%	35%	28%	32%	30%	
Finance & Administration	30%	32%	31%	34%	33%	35%	28%	32%	30%	

140 John James Audubon Parkway, Suite 201
Amherst, New York 14228
P 716.688.0766
F 716.625.6825

www.wendelenergy.com