Local Government Energy Audit:
Energy Audit Report


Well Pumps, Water Tanks & Pump Station

Willingboro Municipal Utilities Authority

November 28, 2017

Draft Report by:
TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities associated with recommended upgrades to the facility's systems at this site. Approximate savings are included in this report to make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. It should be noted that detailed design efforts are required in order to implement several of the improvements evaluated as part of this energy analysis.

The energy conservation measures and estimates of energy consumption contained in this report have been reviewed for technical accuracy. However, all estimates contained herein of energy consumption at the site are not guaranteed, because energy consumption ultimately depends on behavioral factors, the weather, and many other uncontrollable variables. The energy assessor and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy consumption vary from the estimated consumption shown herein.

Estimated installation costs are based on a variety of sources, including our own experience at similar facilities, our own pricing research using local contractors and vendors, and cost estimating handbooks such as those provided by RS Means. The cost estimates represent our best judgment for the proposed action. The Owner is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for a particular installation, and for conditions which cannot be known prior to in-depth investigation and design, the energy assessor does not guarantee installed cost estimates and shall in no event be liable should actual installed costs vary from the estimated costs herein.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates and are based on program information available at the time this report is written. The NJBPU reserves the right to extend, modify, or terminate programs without prior or further notice, including incentive levels and eligibility requirements. The Owner should review available program incentives and requirements prior to selecting and/or installing any recommended measures.

Table of Contents

Table of Figures

1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Well Pumps, Water Tanks, and Pump Station.

The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

This study was conducted by TRC Energy Services, as part of a comprehensive effort to assist Willingboro Municipal Utilities Authority (WMUA) in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

Six wells, one pumping station, and two water tanks were included in this study with at total enclosed area of approximately 3,765 square foot. The facilities vary from sites with no buildings to sites with small buildings.

Building Name	SF
Well 1	1,360
Well 5A	740
Well 6	1,200
Well 9	N/A
Well 10	N/A
Well 11	N/A
Windsor Park Pump Station	465
Holyoke Water Tank	N/A
Edge Lane Water Tank	N/A
Total:	**3,765**

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC Energy Services recommends five (5) ECMs which together represent an opportunity to reduce annual energy costs by roughly $68,577 and annual greenhouse gas emissions by 458,405 lbs CO_2e. We estimate that the measures would likely pay for themselves in in energy savings in roughly 1.3 years. The existing and potential utility costs is shown in Figure 1 . These projects represent an opportunity to reduce combined annual energy use at these sites by 23.4%.

Figure 1 – Previous 12 Month Utility Costs

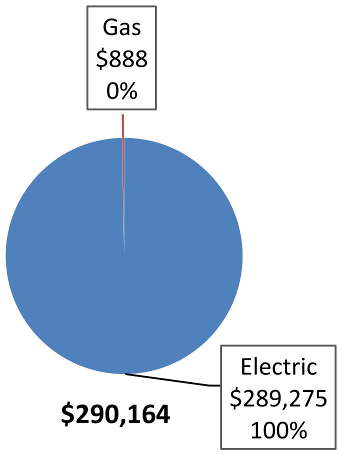
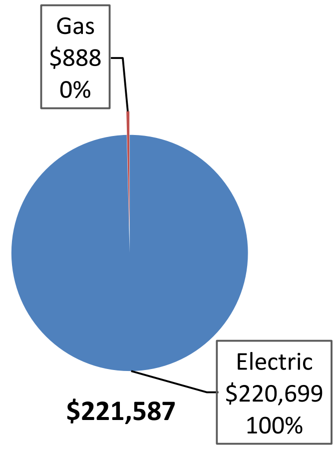


Figure 2 – Potential Post-Implementation Costs



A detailed description of site's existing energy use can be found in Section 3, "Site Energy Use and Costs".

The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of the categories can be found below and descriptions of the individual opportunities can be found in Section 4, "Energy Conservation Measures".

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**31,406**	**4.7**	**0.0**	**$4,731.13**	**$5,870.00**	**$1,670.00**	**$4,200.00**	**0.89**	**31,626**
ECM 1	Install LED Fixtures	Yes	8,820	1.4	0.0	$1,328.66	$4,500.00	$1,500.00	$3,000.00	2.26	8,881
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,388	0.5	0.0	$209.14	$850.00	$170.00	$680.00	3.25	1,398
ECM 3	Retrofit Fixtures with LED Lamps	Yes	21,198	2.8	0.0	$3,193.34	$520.00	$0.00	$520.00	0.16	21,346
Variable Frequency Drive (VFD) Measures			**422,069**	**145.2**	**0.0**	**$63,582.22**	**$85,382.80**	**$0.00**	**$85,382.80**	**1.34**	**425,020**
ECM 4	Install VFDs on Well Pumps	Yes	422,069	145.2	0.0	$63,582.22	$85,382.80	$0.00	$85,382.80	1.34	425,020
HVAC System Improvements			**1,747**	**0.0**	**0.0**	**$263.17**	**$715.62**	**$225.00**	**$490.62**	**1.86**	**1,759**
ECM 5	Install Occupancy-Controlled Thermostats	Yes	1,747	0.0	0.0	$263.17	$715.62	$225.00	$490.62	1.86	1,759
TOTALS			**455,222**	**149.8**	**0.0**	**$68,576.52**	**$91,968.42**	**$1,895.00**	**$90,073.42**	**1.31**	**458,405**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measure save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Variable Frequency Drives measures generally involve controlling the speed of a motor to achieve a flow or temperature rather than using a valve, damper, or no means at all. These measures save energy by slowing a motor which is an extremely efficient method of control.

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand when conditions allow. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperatures. These measures save energy by reducing the demand on the systems and the amount of time systems operate.

Energy Efficient Practices

TRC Energy Services also identified 4 low (or no) cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at sites include:

- Reduce Air Leakage
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Perform Routine Motor Maintenance

For details on these Energy Efficient Practices, please refer to Section 5.

On-Site Generation Measures

TRC Energy Services evaluated the potential for installing on-site generation at the Well Pumps, Water Tanks, and Pump Station sites. Based on the configuration of the sites, the available area, and their load profiles, there is low potential for installing any PV or combined heat and power self-generation measures.

For details on our evaluation and solar PV -generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart (SS)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SS incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SS program. More details on this program and others are available in Section 8.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.2 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a program (non-NJCEP) designed to reduce consumer electric load when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability locally. By enabling grid operators to call upon Curtailment Service Providers and energy consumers to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants will receive payments whether or not their facility is called upon to curtail their load. Please see Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci

2 Facility Information and Existing Conditions

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Andrew Weber	Executive Director	Andrew@wmua.info	609-877-2900 x 15
James J. Mackie, PE	Director of Operations & Maintenance	jmackie@wmua.info	609-877-2900 x105
TRC Energy Services			
Moussa Traore	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

Six wells, one pumping station, and two water tanks were included in this study with at total enclosed area of 3,765 square feet. The facilities vary from sites with no buildings to sites with small buildings.

Building Name	SF
Well 1	1,360
Well 5A	740
Well 6	1,200
Well 9	N/A
Well 10	N/A
Well 11	N/A
Windsor Park Pump Station	465
Holyoke Water Tank	N/A
Edge Lane Water Tank	N/A
Total:	**3,765**

2.3 Building Occupancy

The typical schedules for the various sites are presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Well 6	Weekday	56 hours per week
Well 6	Weekend	
Well 1, Well 5A, Windsor Park Pump Station	Weekday	normally unoccupied
Well 1, Well 5A, Windsor Park Pump Station	Weekend	
Well 9, Well 10, Well 11, Tanks	Weekday	no building
Well 9, Well 10, Well 11, Tanks	Weekend	

2.4 On-site Generation

None of the facilities have any on-site electric generation capacity for normal use.

2.5 Facility Descriptions

Well 1

Well 1 is located on Sylvan Lane. The building is constructed of CMU block with a brick veneer and was built in 1960. The building houses the well pump, chemical feed systems and electrical controls. Total building area is approximately 1,360 square feet. This building is normally unoccupied but does have a 75,000 Btu/hr natural gas fired heater that is manually controlled at the thermostat.

Interior lighting is provided by fixtures with compact fluorescent lamps and manual switches. Exterior lighting consists metal halide fixtures with photocell controls.

Well 1 has one 1,400 gpm pump driven by a 150 HP motor.

Well 5A

Well 5A is located on Baldwin Lane. The plant building was constructed of CMU block with a brick veneer in 1997. The building houses electrical control equipment and lime feed equipment. The building area is approximately 740 square feet and it is normally unoccupied. The building is conditioned by manually controlled electric heaters and also has a small air conditioner.

All of the interior lighting is provided by fluorescent fixtures. Exterior lighting consists of high-pressure sodium and mercury vapor fixtures.

Well 5A has one 1,000 gpm pump driven by a 125 HP motor which has not operated since April 2012. A radium removal project is in progress and scheduled to be completed mid-2017.

Well 6

Well 6 is located on Medallion Lane. The building is constructed of CMU block with brick veneer and was built in 1975. The building houses the well pump, pressure filtration piping and controls, high service pump, chemical feed systems and a standby generator. The total building area is approximately 1,200 square feet. There is one operator at the building for approximately 56 hours per week. The building is conditioned by electric heaters with thermostat control and a small air conditioner.

Interior lighting consists of two lamp, 4-foot fluorescent fixtures with manual switches. The exterior light fixtures use LED lamps.

Well 6 has a 100 HP well pump, 150 high service pump, and a 25 HP aerator transfer pump. The well pump has a design flow rate of 1,500 gpm. In 2015 electrical upgrades were implemented at this facility including a new natural gas fired emergency generator, motor control center, and motor and VFD for the high service pump.

Wells 9, 10 & 11

These wells are located on Middlebury Lane, Barnwell Drive, and Pageant Lane. None of the wells have a building. Well 9 was built in 1979, Well 10 was built in 1986, and Well 11 was built in 1988. Each of the well sites only have a single well pump. Wells 9 and 10 have 100 HP motors and Well 11 has a 200 HP motor with a VFD. All three of the pumps have a design flow rate of 1,500 gpm. Each of the well sites has a natural gas fired emergency generator. The wells supply water to the Meribrook water treatment plant.

Windsor Park Pumps Station

The Windsor Park Pump Station is located on Club House. The building was constructed in 1958 of CMU block with brick veneer. The building houses two 40 HP sewage pumps with controls that are used to pump wastewater to the Water Pollution Control plant. Total building area is approximately 465 square feet. The building is normally not occupied but does have a 10 kW electric heater.

Interior lighting is provided by a mix of fluorescent and high pressure sodium vapor fixtures with manual controls. Exterior lighting is provided by a high pressure sodium vapor fixture.

Water Tanks

The Holyoke Water Tank is located on Holyoke Lane and the Edge Lane Water Tank is located on Edge Lane. Both are elevated tanks used to store potable water. The Holyoke tank was constructed in 1959 and the Edge Lane tank was constructed in 1968. The only energy using equipment at the tank sites are incandescent exterior lights.

Please refer to Appendix A: Equipment Inventory & Recommendation for an inventory of equipment at all of the sites.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. There are a number of factors that could cause the energy use of these sites to vary from the energy use for other similar facilities. The primary factors are the system capacity relative to end use requirements, system efficiency, and system operation.

3.1 Total Cost of Energy

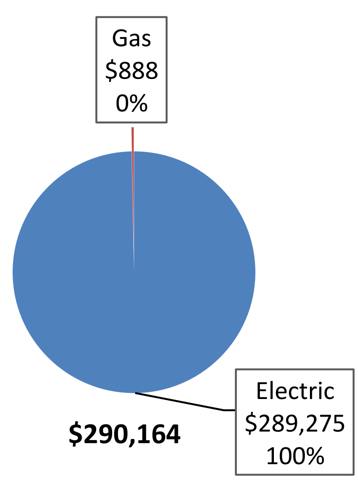
The following energy consumption and cost data summarizes the usage for all of the sites. This is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information. Specific information for each site is also provided in Section 3.3.

Figure 6 - Utility Summary

Utility Summary for Well Pumps, Water Tanks, Pump Station		
Fuel	**Usage**	**Cost**
Electricity	1,920,256 kWh	$289,275
Natural Gas	938 Therms	$888
Total		**$290,164**

The current utility cost for this site is $290,164 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Total Electricity Usage (All Sites)

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.151/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 8 - Graph of 12 Months Electric Usage & Demand

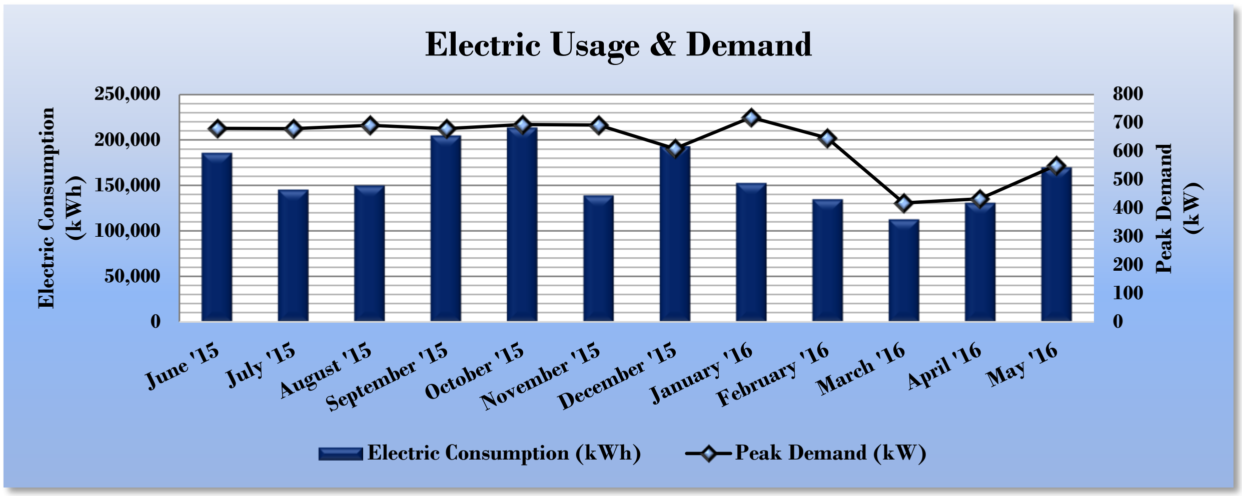


Figure 9 - Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/23/15	32	185,756	681	$546	$33,155
7/23/15	30	145,269	680	$455	$27,937
8/21/15	29	149,866	692	$327	$28,138
9/22/15	32	204,549	680	$551	$34,774
10/21/15	29	213,436	695	$387	$29,021
11/19/15	29	138,771	693	$356	$20,126
12/22/15	33	192,959	610	$516	$24,944
1/23/16	32	152,376	719	$420	$20,072
2/23/16	31	134,740	647	$388	$18,404
3/23/16	29	112,557	419	$209	$15,247
4/22/16	30	130,752	433	$280	$17,095
5/23/16	31	169,747	551	$441	$21,946
Totals	**367**	**1,930,778**	**719.4**	**$4,877**	**$290,860**
Annual	**365**	**1,920,256**	**719.4**	**$4,850**	**$289,275**

3.3 Site Electricity Usage

Well 1

Figure 10 – Well #1: Graph of 12 Months Electric Usage & Demand

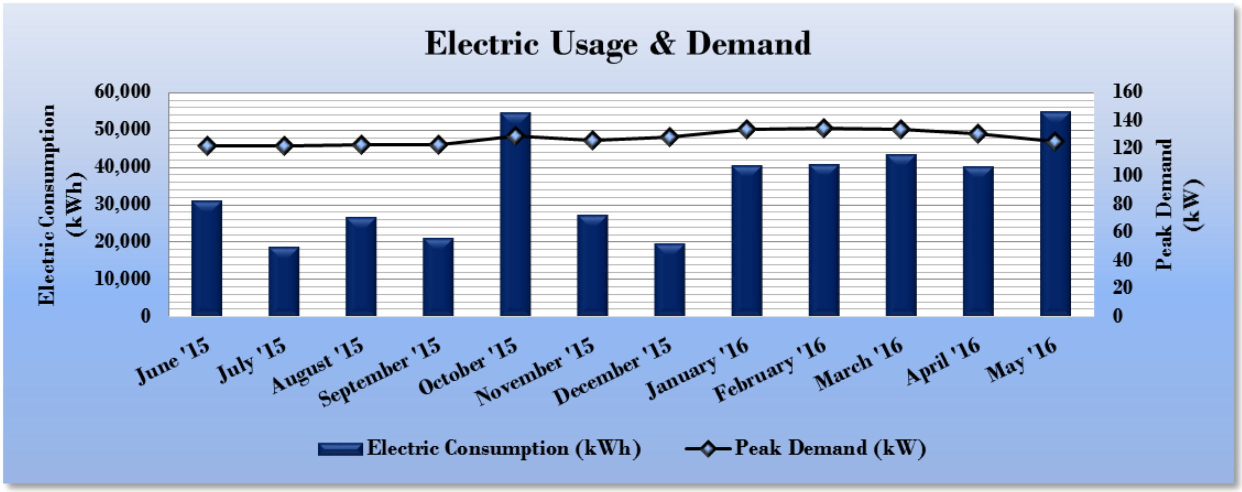


Figure 11 – Well #1: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	31,081	122.2	$5,548
7/23/15	30	18,933	122.2	$3,966
8/21/15	29	26,628	122.6	$4,901
9/22/15	32	21,161	122.7	$4,188
10/21/15	29	54,905	129.1	$7,056
11/19/15	29	27,307	125.8	$3,774
12/22/15	33	19,699	128.3	$2,805
1/23/16	32	40,555	134.2	$5,027
2/23/16	31	40,955	135.0	$4,988
3/23/16	29	43,677	133.6	$5,254
4/22/16	30	40,468	131.1	$4,902
5/23/16	31	55,192	125.6	$6,451
Totals	**367**	**420,561**	**135.0**	**$58,858**
Annual	**365**	**418,269**	**135.0**	**$58,537**

Well 5A

Figure 12 – Well #5A: Graph of 12 Months Electric Usage & Demand

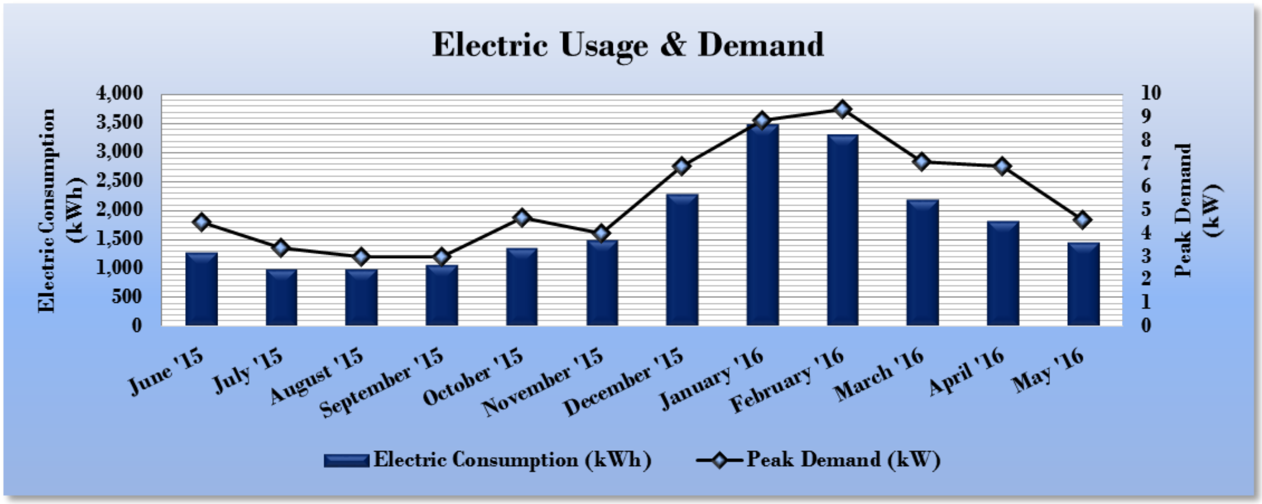


Figure 13 – Well #5A: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	1,272	4.5	$579
7/23/15	30	987	3.4	$517
8/21/15	29	984	3.0	$520
9/22/15	32	1,052	3.0	$528
10/21/15	29	1,342	4.7	$543
11/19/15	29	1,492	4.0	$557
12/22/15	33	2,283	6.9	$647
1/23/16	32	3,466	8.9	$771
2/23/16	31	3,293	9.4	$747
3/23/16	29	2,182	7.1	$623
4/22/16	30	1,812	6.9	$584
5/23/16	31	1,438	4.6	$537
Totals	**367**	**21,603**	**9.4**	**$7,154**
Annual	**365**	**21,485**	**9.4**	**$7,115**

Well 6

Figure 14 – Well #6: Graph of 12 Months Electric Usage & Demand

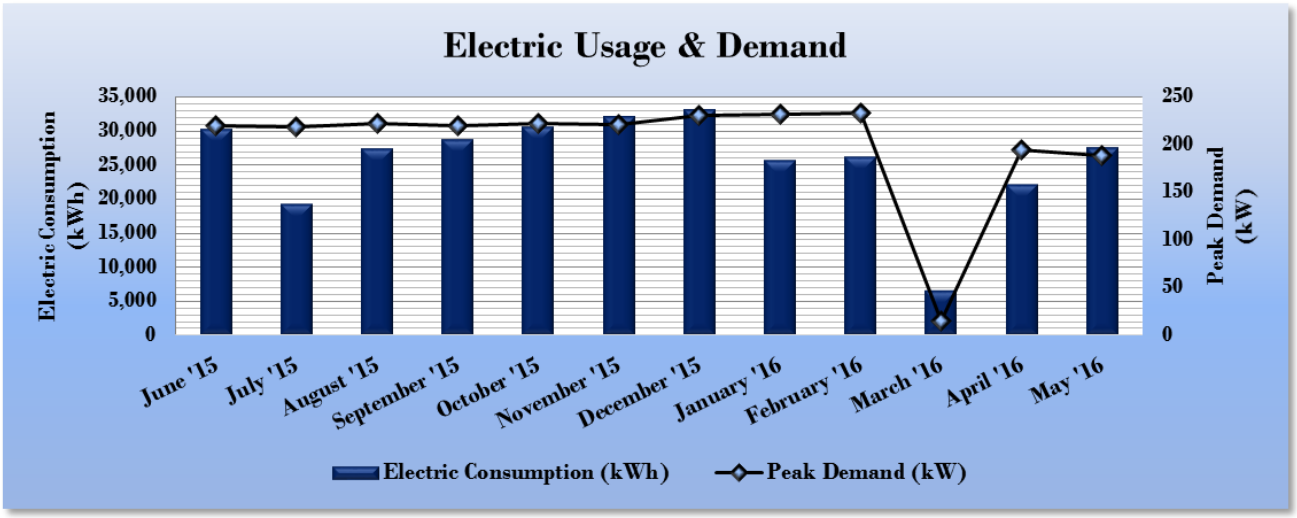


Figure 15 – Well #6: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/15/15	32	30,234	219.6	$6,650
7/15/15	30	19,185	218.5	$5,320
8/13/15	29	27,298	222.1	$6,287
9/14/15	32	28,708	219.7	$6,367
10/13/15	29	30,501	223.0	$4,686
11/11/15	29	32,047	221.8	$4,840
12/14/15	33	33,082	231.3	$4,886
1/14/16	31	25,709	232.4	$3,947
2/12/16	29	26,119	233.0	$3,953
3/15/16	32	6,547	15.3	$1,103
4/14/16	30	22,028	194.7	$3,357
5/13/16	29	27,536	189.2	$3,905
Totals	**365**	**308,994**	**233.0**	**$55,301**
Annual	**365**	**308,994**	**233.0**	**$55,301**

Well 9

Figure 16 – Well #9: Graph of 12 Months Electric Usage & Demand

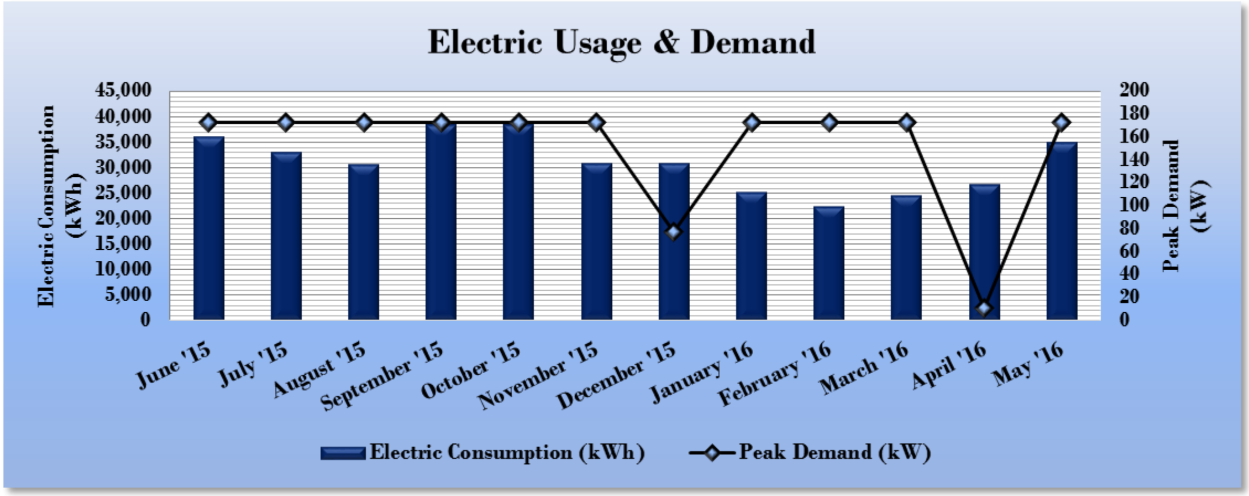


Figure 17 – Well #9: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	35,946	173.2	$6,813
7/23/15	30	32,922	173.2	$6,412
8/21/15	29	30,600	173.0	$6,023
9/22/15	32	38,358	173.2	$6,978
10/21/15	29	38,394	173.0	$5,300
11/19/15	29	30,906	173.2	$4,405
12/22/15	33	30,780	77.8	$3,825
1/23/16	32	25,110	173.0	$3,509
2/23/16	31	22,428	173.0	$3,167
3/23/16	29	24,588	172.8	$3,388
4/22/16	30	26,784	11.0	$2,912
5/23/16	31	34,830	173.0	$4,485
Totals	**367**	**371,646**	**173.2**	**$57,216**
Annual	**365**	**369,621**	**173.2**	**$56,905**

Well 10

Figure 18 – Well #10: Graph of 12 Months Electric Usage & Demand

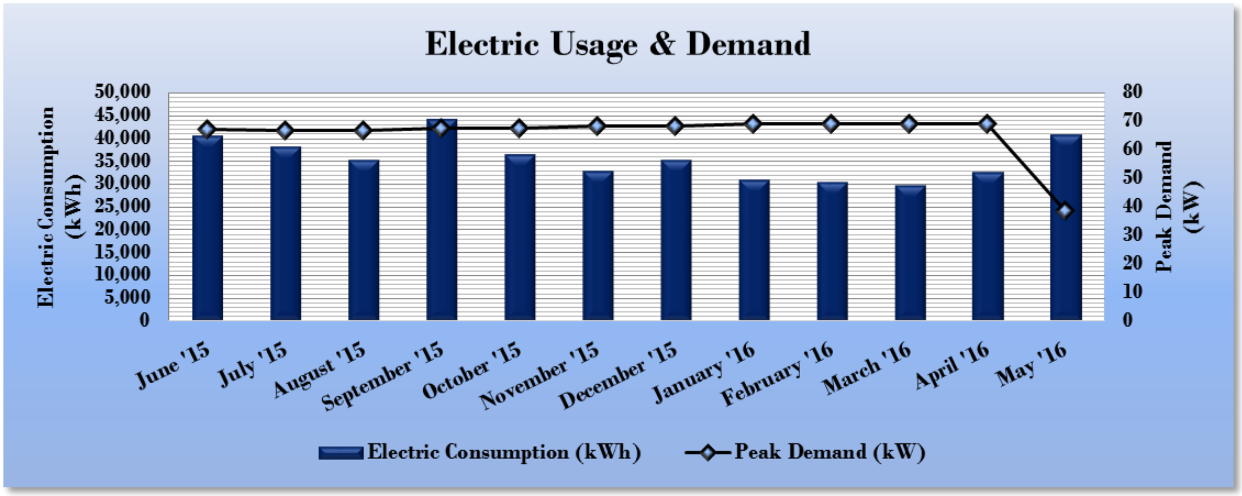


Figure 19 – Well #10: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	40,613	67.4	$6,107
7/23/15	30	38,030	66.9	$5,755
8/21/15	29	35,171	66.9	$5,286
9/22/15	32	44,188	67.6	$6,397
10/21/15	29	36,386	67.7	$4,603
11/19/15	29	32,874	68.4	$4,180
12/22/15	33	35,297	68.4	$4,295
1/23/16	32	30,971	69.3	$3,698
2/23/16	31	30,417	69.4	$3,573
3/23/16	29	29,535	69.2	$3,461
4/22/16	30	32,660	69.3	$3,796
5/23/16	31	40,802	38.6	$4,663
Totals	**367**	**426,944**	**69.4**	**$55,814**
Annual	**365**	**424,617**	**69.4**	**$55,509**

Well 11

Figure 20 – Well #11: Graph of 12 Months Electric Usage & Demand

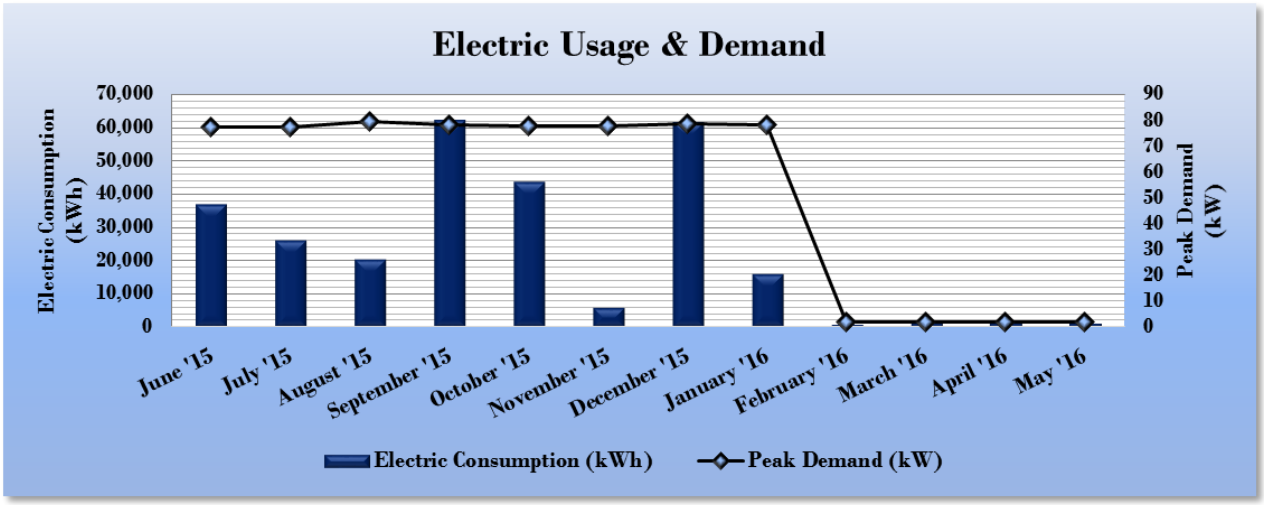


Figure 21 – Well #11: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	36,702	77.5	$5,725
7/23/15	30	26,009	77.5	$4,331
8/21/15	29	20,182	79.7	$3,547
9/22/15	32	62,088	78.2	$8,778
10/21/15	29	43,518	78.1	$5,492
11/19/15	29	5,631	77.8	$1,008
12/22/15	33	61,600	78.7	$7,315
1/23/16	32	15,774	78.4	$1,898
2/23/16	31	490	2.0	$739
3/23/16	29	831	2.0	$885
4/22/16	30	879	2.0	$903
5/23/16	31	1,109	2.0	$940
Totals	**367**	**274,813**	**79.7**	**$41,559**
Annual	**365**	**273,315**	**79.7**	**$41,333**

Windsor Park Pump Station

Figure 22 – Windsor Park Pump Station: Graph of 12 Months Electric Usage & Demand

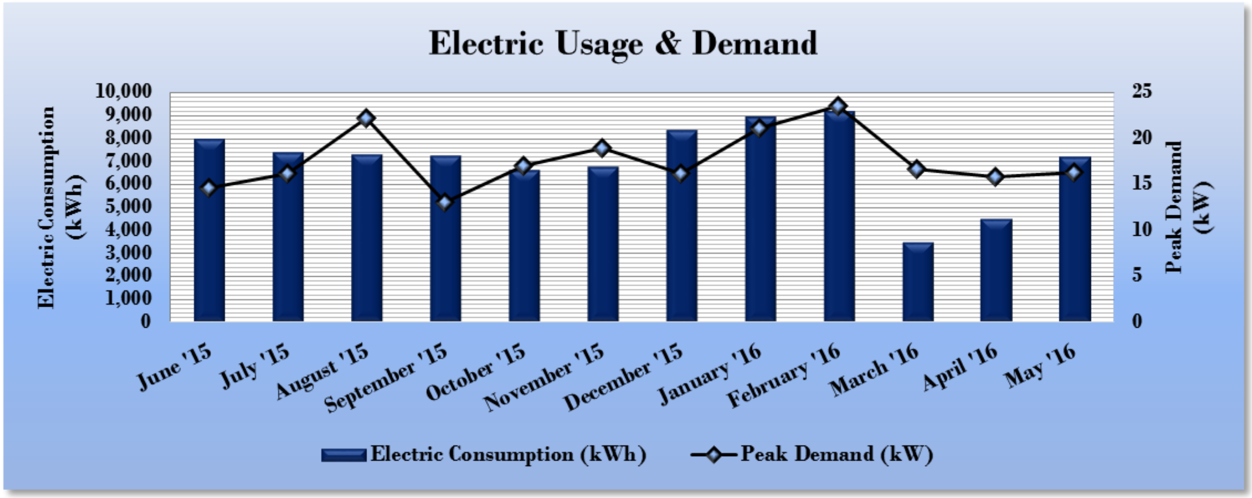


Figure 23 – Windsor Park Pump Station: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/23/15	32	7,970	14.6	$546	$1,530
7/23/15	30	7,373	16.2	$455	$1,448
8/21/15	29	7,293	22.3	$327	$1,406
9/22/15	32	7,212	13.1	$551	$1,365
10/21/15	29	6,626	17.1	$387	$1,194
11/19/15	29	6,768	19.0	$356	$1,215
12/22/15	33	8,352	16.2	$516	$1,018
1/23/16	32	8,907	21.2	$420	$1,072
2/23/16	31	9,154	23.6	$388	$1,089
3/23/16	29	3,487	16.7	$209	$404
4/22/16	30	4,459	15.9	$280	$518
5/23/16	31	7,196	16.3	$441	$844
Totals	**367**	**84,797**	**23.6**	**$4,877**	**$13,103**
Annual	**365**	**84,334**	**23.6**	**$4,850**	**$13,032**

Holyoke Water Tank

Figure 24 – Holyoke Water Tank: Graph of 12 Months Electric Usage & Demand

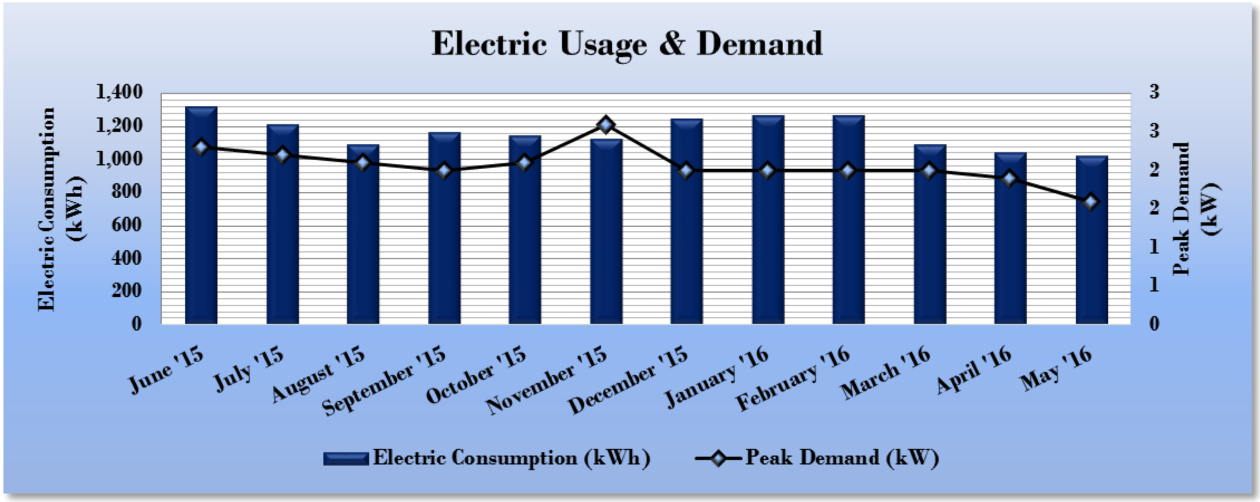


Figure 25 – Holyoke Water Tank: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	1,314	2.3	$203
7/23/15	30	1,206	2.2	$188
8/21/15	29	1,086	2.1	$168
9/22/15	32	1,158	2.0	$175
10/21/15	29	1,140	2.1	$148
11/19/15	29	1,122	2.6	$148
12/22/15	33	1,242	2.0	$153
1/23/16	32	1,260	2.0	$151
2/23/16	31	1,260	2.0	$148
3/23/16	29	1,086	2.0	$129
4/22/16	30	1,038	1.9	$123
5/23/16	31	1,020	1.6	$120
Totals	**367**	**13,932**	**2.6**	**$1,854**
Annual	**365**	**13,856**	**2.6**	**$1,844**

Edge Lane Water Tank

Figure 26 – Edge Lane Water Tank: Graph of 12 Months Electric Usage & Demand

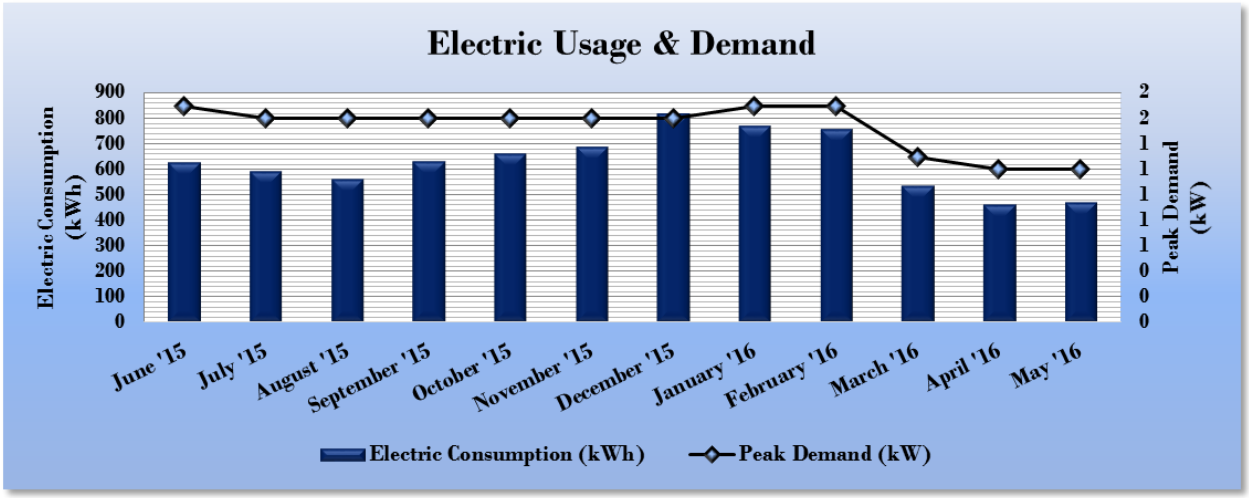


Figure 27 – Edge Lane Water Tank: Table of 12 Months Electric Usage & Demand

Electric Billing Data for Well Pumps, Water Tanks, Pump Station				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/23/15	32	624	1.7	$106
7/23/15	30	588	1.6	$100
8/21/15	29	558	1.6	$95
9/22/15	32	630	1.6	$103
10/21/15	29	660	1.6	$89
11/19/15	29	684	1.6	$92
12/22/15	33	816	1.6	$103
1/23/16	32	768	1.7	$96
2/23/16	31	756	1.7	$93
3/23/16	29	534	1.3	$67
4/22/16	30	462	1.2	$59
5/23/16	31	468	1.2	$59
Totals	**367**	**7,548**	**1.7**	**$1,063**
Annual	**365**	**7,507**	**1.7**	**$1,057**

3.4 Natural Gas Usage

Natural Gas is provided by PSE&G. The average gas cost for the past 12 months is $0.947/therm, which is the blended rate used throughout the analyses in this report. Natural gas data was only provided for Well 1. The monthly gas consumption is represented graphically in the chart below.

Figure 28 - Graph of 12 Months Natural Gas Usage

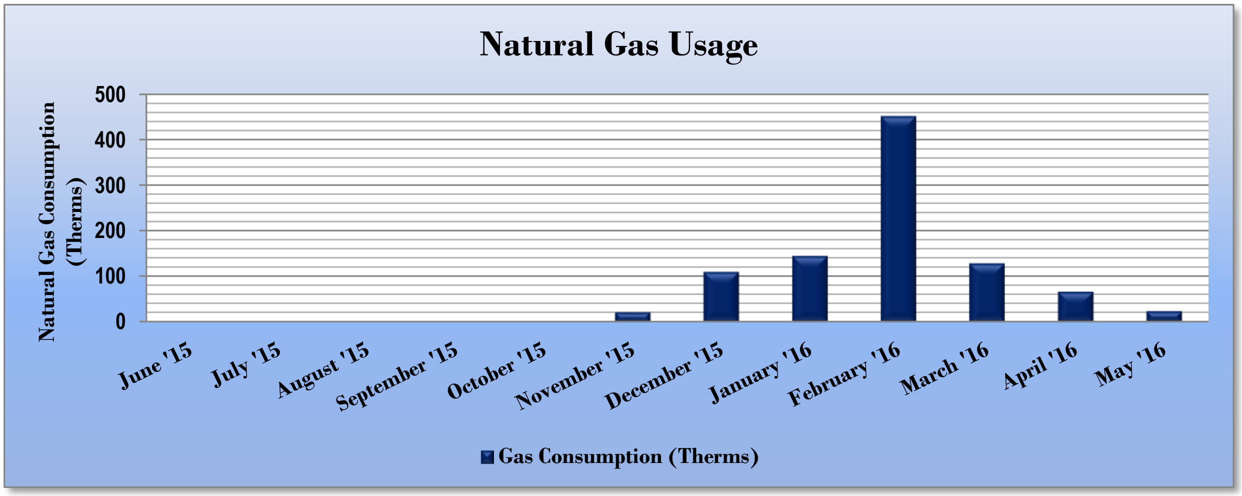


Figure 29 - Table of 12 Months Natural Gas Usage

Gas Billing Data for Well Pumps, Water Tanks, Pump Station			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/23/15	32	0	$11
7/23/15	30	0	$11
8/24/15	32	0	$11
9/21/15	28	0	$11
10/21/15	30	0	$12
11/19/15	29	21	$28
12/22/15	33	109	$101
1/22/16	31	144	$131
2/23/16	32	451	$378
3/23/16	29	128	$111
4/22/16	30	66	$59
5/23/16	31	23	$28
Totals	**367**	**943**	**$893**
Annual	**365**	**938**	**$888**

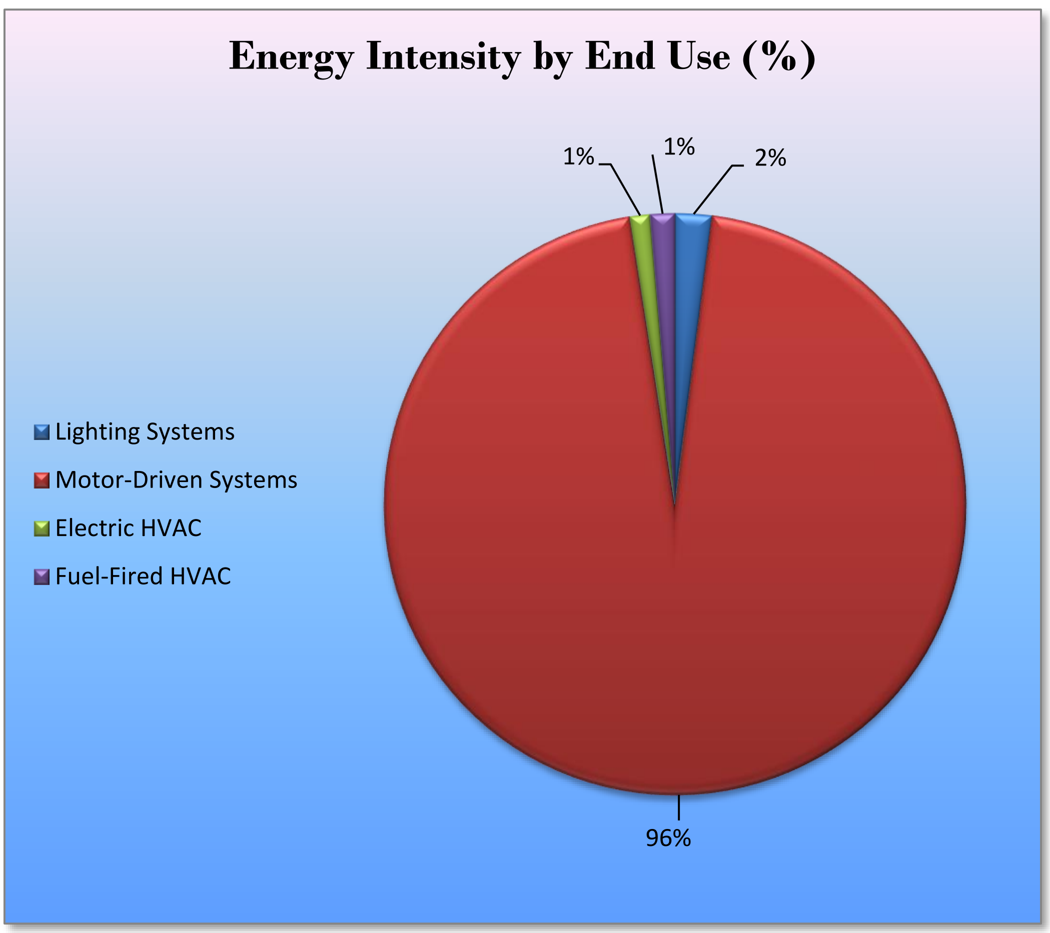
3.5 Benchmarking

Portfolio Manager, an online tool created and managed by the United State Environmental Protection Agency (EPA) through the ENERGY STAR® program does not have benchmarking data for the types of facilities included in this report. The energy use of well pumps and pump stations will vary based on system capacity relative to end use requirements, system efficiency, and system operation. As a result a meaningful benchmark could not be developed as part of this study.

3.6 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across systems, an energy balance was performed for the sites. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems and determine their proportional contribution to overall energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 30 - Energy Balance (%)



4 Energy Conservation Measures

Level of Analysis

The goal of this audit report is to identify potential energy projects, help prioritize specific measures for implementation, and set WMUA on the path to receive financial incentives for the appropriate measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is considered sufficient to make "Go/No-Go" decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016. Further analysis or investigation may be required to calculate more accurate savings to support any custom SmartStart, Pay for Performance, or Large Energy Users incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJ prescriptive SmartStart program. Depending on your implementation strategy, the project may be eligible for more lucrative incentives through other programs as identified in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 31 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**31,406**	**4.7**	**0.0**	**$4,731.13**	**$5,870.00**	**$1,670.00**	**$4,200.00**	**0.89**	**31,626**
ECM 1	Install LED Fixtures	8,820	1.4	0.0	$1,328.66	$4,500.00	$1,500.00	$3,000.00	2.26	8,881
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,388	0.5	0.0	$209.14	$850.00	$170.00	$680.00	3.25	1,398
ECM 3	Retrofit Fixtures with LED Lamps	21,198	2.8	0.0	$3,193.34	$520.00	$0.00	$520.00	0.16	21,346
Variable Frequency Drive (VFD) Measures		**422,069**	**145.2**	**0.0**	**$63,582.22**	**$85,382.80**	**$0.00**	**$85,382.80**	**1.34**	**425,020**
ECM 4	Install VFDs on Well Pumps	422,069	145.2	0.0	$63,582.22	$85,382.80	$0.00	$85,382.80	1.34	425,020
HVAC System Improvements		**1,747**	**0.0**	**0.0**	**$263.17**	**$715.62**	**$225.00**	**$490.62**	**1.86**	**1,759**
ECM 5	Install Occupancy-Controlled Thermostats	1,747	0.0	0.0	$263.17	$715.62	$225.00	$490.62	1.86	1,759
TOTALS		**455,222**	**149.8**	**0.0**	**$68,576.52**	**$91,968.42**	**$1,895.00**	**$90,073.42**	**1.31**	**458,405**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

4.1.1 Lighting Upgrades

Recommended lighting upgrades measures are summarized in Figure 32 below.

Figure 32 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**31,406**	**4.7**	**0.0**	**$4,731.13**	**$5,870.00**	**$1,670.00**	**$4,200.00**	**0.89**	**31,626**
ECM 1	Install LED Fixtures	8,820	1.4	0.0	$1,328.66	$4,500.00	$1,500.00	$3,000.00	2.26	8,881
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,388	0.5	0.0	$209.14	$850.00	$170.00	$680.00	3.25	1,398
ECM 3	Retrofit Fixtures with LED Lamps	21,198	2.8	0.0	$3,193.34	$520.00	$0.00	$520.00	0.16	21,346

ECM 1: Install LED Fixtures

Measure Description

We recommend replacing existing exterior fixtures containing HID lamps with new high performance LED light fixtures. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

During planning and design for the installation of new fixtures, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

Please refer to Appendix A: Equipment Inventory & Recommendation for a detailed list of the locations and light fixtures affected by this measure.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Measure Description

We recommend replacing linear fluorescent lamps, ballasts, and reflectors with LED tube lamps, reflectors, and drivers specifically designed for existing linear fluorescent fixtures. The retrofit uses the existing fixture housing but replaces the rest of the components with an efficient source and reflectors designed for LEDs. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During retrofit planning and design, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

Please refer to Appendix A: Equipment Inventory & Recommendation for a detailed list of the locations and light fixtures affected by this measure.

ECM 3: Retrofit Fixtures with LED Lamps

Measure Description

We recommend replacing incandescent screw-in lamps with LED lamps at the water tanks. Screw-in LED lamps can be used as a direct replacement for most other screw-in lamps. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LEDs have burn hours which are more than 10 times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

Please refer to Appendix A: Equipment Inventory & Recommendation for a detailed list of the locations and light fixtures affected by this measure.

4.1.2 Variable Frequency Drive Measures

Recommended variable frequency drive (VFD) measures include the measure noted in Figure 33 below.

Figure 33 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		422,069	145.2	0.0	$63,582.22	$85,382.80	$0.00	$85,382.80	1.34	425,020
ECM 4	Install VFDs on Well Pumps	422,069	145.2	0.0	$63,582.22	$85,382.80	$0.00	$85,382.80	1.34	425,020

ECM 4: Install VFDs on Well Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
422,069	145.2	0.0	$63,582.22	$85,382.80	$0.00	$85,382.80	1.34	425,020

Measure Description

We recommend installing variable frequency drives (VFD) to control the well pumps for Well 1, Well 6, Well 9 and Well 10. The VFDs will modulate pump speed based on tank level. Energy savings result from reducing pump motor speed (and power) during much of the pump operation. The initial savings is based on running the pumps at an average of 80% speed over the year and increasing the pump run time correspondingly to maintain the total water flow.

Please refer to Appendix A: Equipment Inventory & Recommendation for more information about the equipment affected by this measure.

4.1.3 HVAC System Improvements

Recommended HVAC system improvement measures are summarized in Figure 34 below.

Figure 34 - Summary of HVAC System Improvement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		1,747	0.0	0.0	$263.17	$715.62	$225.00	$490.62	1.86	1,759
ECM 5	Install Occupancy-Controlled Thermostats	1,747	0.0	0.0	$263.17	$715.62	$225.00	$490.62	1.86	1,759

ECM 5: Install Occupancy-Controlled Thermostats

Measure Description

We recommend installing occupancy-controlled thermostats in place of existing manually thermostats, which are controlled by occupants to regulate temperature within the facility. An occupancy controlled thermostat is a thermostat paired with a sensor and/or door detector to identify movement and determine if a room is occupied or unoccupied. If occupancy is sensed by the sensor, the thermostat goes into an occupied mode and enables programmed temperature setpoint. After a pre-programmed time frame elapses and no occupancy is sensed, the thermostat switches to unoccupied mode and enables the temperature reset until occupancy is sensed again. By resetting the heating temperature setpoint down and the cooling temperature setpoint up, for times that the conditioned space is not occupied, the operation of the HVAC equipment is reduced while still maintaining reasonable space temperatures during unoccupied periods. This type of thermostat is often used in residence facilities such as hotels and dormitories to conserve energy.

The occupancy controlled thermostat provides savings by reducing heating and cooling energy when a room is unoccupied.

Please refer to Appendix A: Equipment Inventory & Recommendation for more information about the equipment affected by this measure.

5 Energy Efficient Practices

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of low or no-cost efficiency strategies. By employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Reduce Air Leakage

Air leakage, or infiltration, occurs when outside air enters a building uncontrollably through cracks and openings. Properly sealing such cracks and openings can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. This includes caulking or installing weather stripping around leaky doors and windows allowing for better control of indoor air quality through controlled ventilation.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

6 Self-Generation Measures

Self-generation measures include both renewable (e.g., solar, wind) and non-renewable (e.g., microturbines) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening was conducted on the nine (9) sites included in this report. Based on electric demand, size and location of free area and shading elements, we've determined these facilities have a **Low Potential** for installing a PV array.

6.2 Combined Heat and Power

In non-industrial settings, combined heat and power (CHP) is the on-site generation of electricity and recovery of heat which is put to beneficial use. Common prime movers in CHP applications include reciprocating engines, microturbines, fuel cells, and (at large facilities) gas turbines. Electricity is typically interconnected to the sites local distribution system. Heat is recovered from the exhaust stream and the ancillary cooling system and interconnected to the existing hot water (or steam) distribution system.

CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on natural gas availability, thermal load, electrical demand, siting, and interconnection shows that the sites do not meet the minimum requirements for a cost-effective CHP installation.

7 Demand Response

Demand Response (DR) is a program designed to reduce consumer electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. DR service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability locally.

By enabling grid operators to call upon Curtailment Service Providers and energy consumers to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants will receive payments whether or not their facility is called upon to curtail their load.

Typically an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR program often find it to be a valuable source of revenue for their facilities because the payments can significantly offset annual utility costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats so that air conditioning units run less frequently or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR event cycle. DR program participants often have to install smart meters and may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (www.pjm.com/training/trainingmaterial.aspx), along with a variety of other program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

8 Project Funding / Incentives

The NJCEP is able to provide the incentive programs described below, and others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's 1999 Electricity Restructuring Law which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 35 for a list of the eligible programs identified for each recommended ECM.

Figure 35 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Install LED Fixtures	X			
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X			
ECM 3	Retrofit Fixtures with LED Lamps				
ECM 4	Install VFDs on Well Pumps		X		
ECM 5	Install Occupancy-Controlled Thermostats				

SmartStart (SS) is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install (DI) caters to small to mid-size facilities to bundle measures and simplify participation, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities and requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption; applicants can use in-house staff or preferred contractor.

Generally, the incentive values provided throughout the report assume the SS program is utilized because it provides a consistent comparison of available incentives.

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below. You may also check the following website for further information, including most current program availability, requirements, and incentive levels: www.njcleanenergy.com/ci

8.1 SmartStart

Overview

The SmartStart (SS) program offers incentives for installing *prescriptive* and *custom* energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC

Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SS prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the SS custom program provides incentives for new and innovative technologies, or process improvements not defined through one of the prescriptive incentives listed above.

Although your facility is an existing building, and only the prescriptive incentives have been applied in the calculations, the SS custom measure path is recommended for ECM 4 (Install VFDs on Well Pumps). These incentives are calculated utilizing a number of factors, including project cost, energy savings and comparison to existing conditions or a defined standard. To qualify, the proposed measure(s) must be at least 2% more efficient than current energy code or recognized industry standard, and save at least 75,000 kWh or 1,500 therms annually.

SS custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives in the SS program (inclusive of prescriptive and custom) are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SS prescriptive program you will need to submit an application for the specific equipment installed or to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report. Please note that SS custom application requirements are different from the prescriptive applications and will most likely require additional effort to complete.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB

8.2 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract", whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an Energy Services Company or "ESCO";
(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations;
(3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the Energy Savings Plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize the incentive programs to help further reduce costs when compiling the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

8.3 Demand Response Energy Aggregator

The first step toward participation in a Demand Response (DR) program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (www.pjm.com/training/trainingmaterial.aspx), along with a variety of other program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

See Section 7 for additional information.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e. non-utility) energy supplier.

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: **www.state.nj.us/bpu/commercial/shopping.html**.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a Third Party Supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: **www.state.nj.us/bpu/commercial/shopping.html**.

Appendix A: Equipment Inventory & Recommendation

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Well #1	4	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	LED Retrofit	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	90	4,380	0.67	4,059	0.0	$611.39	$1,200.00	$400.00	1.31
Well #1	5	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,380	LED Retrofit	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	90	4,380	0.41	2,475	0.0	$372.80	$1,500.00	$500.00	2.68
Well #1 - Ceiling	11	Compact Fluorescent: 32 W Screw-in	Wall Switch	32	200	None	No	11	Compact Fluorescent: 32 W Screw-in	Wall Switch	32	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #1	2	Compact Fluorescent: 64 W Screw-in	Wall Switch	64	200	None	No	2	Compact Fluorescent: 64 W Screw-in	Wall Switch	64	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #5A	3	High-Pressure Sodium: (1) 150W Lamp	Daylight Dimming	188	4,380	LED Retrofit	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	90	4,380	0.24	1,455	0.0	$219.21	$900.00	$300.00	2.74
Well #5A	2	Mercury Vapor: (1) 100W Lamp	Daylight Dimming	125	4,380	LED Retrofit	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	90	4,380	0.06	346	0.0	$52.19	$600.00	$200.00	7.66
Well #6	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,190	LED Retrofit	No	17	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,190	0.46	1,388	0.0	$209.14	$850.00	$170.00	3.25
Well #6	9	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	50	4,380	None	No	9	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	50	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	200	None	No	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	200	None	No	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	1	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	200	None	No	1	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	200	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	1	High-Pressure Sodium: (1) 150W Lamp	Daylight Dimming	188	4,380	LED Retrofit	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	90	4,380	0.08	485	0.0	$73.07	$300.00	$100.00	2.74
Holyoke WT	8	Incandescent: area lighting	None	300	5,805	LED Retrofit	No	8	LED Screw-In Lamps: screw in	None	38	5,805	1.71	13,749	0.0	$2,071.21	$320.00	$0.00	0.15
Edge Lane WT	5	Incandescent: area lighting	None	300	5,032	LED Retrofit	No	5	LED Screw-In Lamps: screw in	None	38	5,032	1.07	7,449	0.0	$1,122.13	$200.00	$0.00	0.18

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Well #1	Well Pump	1	Water Supply Pump	150.0	95.8%	No	3,800	No	95.8%	Yes	1	23.48	257,440	0.0	$38,781.84	$24,899.35	$0.00	0.64
Well #1	Lime Slury Mixer	1	Other	0.5	80.0%	No	3,800	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #1	Peristaltic Pump	1	Process Pump	1.5	88.5%	No	3,800	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #1	Chemical Feed Pumps	2	Process Pump	0.3	80.0%	No	3,800	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #5A	Well Pump	1	Water Supply Pump	125.0	94.5%	No	0	No	94.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #5A	Aeration Blower	1	Process Fan	7.5	89.5%	No	2,000	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #5A	Lime Slury Mixer	1	Other	0.5	80.0%	No	8,760	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #5A	Calcium Hypochlorite Feeder	1	Other	0.3	80.0%	No	0	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Well Pump	1	Water Supply Pump	100.0	95.4%	No	1,400	No	95.4%	Yes	1	15.72	63,496	0.0	$9,565.30	$20,161.15	$0.00	2.11
Well #6	High Service Pump	1	Water Supply Pump	150.0	95.8%	Yes	1,400	No	95.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Aerator Transfer Pump	1	Process Pump	25.0	92.4%	No	1,400	No	92.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Lime Slury Mixer	2	Other	0.3	80.0%	No	1,400	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Chemical Feed Pumps	3	Process Pump	0.3	80.0%	No	1,400	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #9	Well Pump	1	Water Supply Pump	100.0	95.0%	No	5,230	No	95.0%	Yes	1	15.78	238,202	0.0	$35,883.69	$20,161.15	$0.00	0.56
Well #10	Well Pump	1	Water Supply Pump	100.0	94.5%	No	6,200	No	94.5%	Yes	1	15.87	283,875	0.0	$42,764.06	$20,161.15	$0.00	0.47
Well #11	Well Pump	1	Water Supply Pump	200.0	95.8%	Yes	3,500	No	95.8%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	Sewage Pumps	2	Other	40.0	93.0%	No	4,900	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	Building Exhaust	2	Exhaust Fan	3.0	87.5%	No	200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	Building Supply	2	Makeup Air Fan	3.0	87.5%	No	200	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Recirc	1	Process Pump	3.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Well #5A	Building	2	Electric Resistance Heat		34.13	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #5A	Building	1	Through-The-Wall AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Building	3	Electric Resistance Heat		17.07	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Windsor Park Pump Station	Building	1	Electric Resistance Heat		34.13	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #6	Office	1	Window AC	0.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Well #1	Building	1	Warm Air Unit Heater	60.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00