Local Government Energy Audit:
Energy Audit Report

Wells & Pump Stations

Jackson Township Municipal Utilities Authority

May 25, 2018

Final Report by:
TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC Energy Services (TRC) and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility 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 certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Wells & Pump Stations for Jackson Township Municipal Utilities Authority.

The goal of an 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 (TRC), as part of a comprehensive effort to assist New Jersey municipal utility authorities in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

Jackson Township Municipal Utilities Authority has numerous standalone fresh water wells and sewage pumping stations distributed across their service territory. This report focuses on three wells (1, 6, and 11) and two pump stations (Dublin Road and Cooks Bridge) in particular.

Location	Area (sf)	Constructed (yr)
Well 1	216	1961
Well 6	420	1974
Well 11	398	1986
Dublin Road Pump Station	855	2007
Cooks Bridge Pump Station	108	2006
Total	1,997	

The Wells & Pump Stations mostly consists of small buildings containing the pumping systems. There is typically minimal lighting at these facilities. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated five measures which represent an opportunity for the Wells & Pump Stations to reduce annual energy costs by roughly $28,451 and annual greenhouse gas emissions by 245,491 lbs CO_2e. The measures would pay for themselves in 1.55 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce Wells & Pump Stations's annual energy use by 50.1%.

Figure 1 – Previous 12 Month Utility Costs

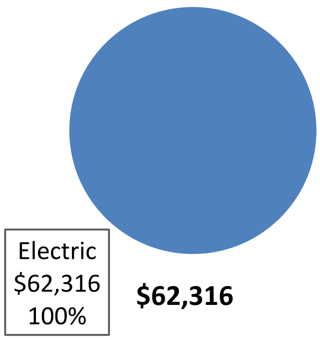
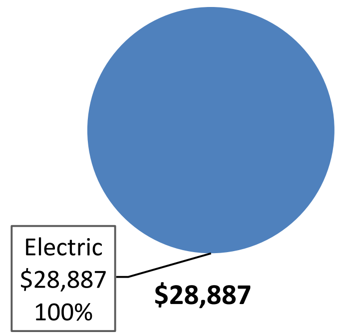


Figure 2 – Potential Post-Implementation Costs



A detailed description of the Wells & Pump Stations' existing energy use can be found in Section 3.

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.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas 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			**15,179**	**2.9**	**0.0**	**$1,771.45**	**$17,045.46**	**$1,050.00**	**$15,995.46**	**9.03**	**15,285**
ECM 1	Install LED Fixtures	Yes	11,003	1.8	0.0	$1,284.11	$7,939.70	$700.00	$7,239.70	5.64	11,080
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	84	0.0	0.0	$9.81	$323.67	$0.00	$323.67	32.98	85
ECM 3	Retrofit Fixtures with LED Lamps	Yes	4,092	1.1	0.0	$477.52	$8,782.10	$350.00	$8,432.10	17.66	4,120
Motor Upgrades			**1,892**	**0.2**	**0.0**	**$220.80**	**$4,206.90**	**$0.00**	**$4,206.90**	**19.05**	**1,905**
ECM 4	Premium Efficiency Motors	Yes	1,892	0.2	0.0	$220.80	$4,206.90	$0.00	$4,206.90	19.05	1,905
Variable Frequency Drive (VFD) Measures			**226,715**	**31.5**	**0.0**	**$26,458.79**	**$30,506.70**	**$6,600.00**	**$23,906.70**	**0.90**	**228,300**
ECM 5	Install VFDs on Well Pumps, Run Slower and Longer	Yes	226,715	31.5	0.0	$26,458.79	$30,506.70	$6,600.00	$23,906.70	0.90	228,300
TOTALS			**243,786**	**34.7**	**0.0**	**$28,451.05**	**$51,759.06**	**$7,650.00**	**$44,109.06**	**1.55**	**245,491**

* - 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 measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Energy Efficient Practices

TRC also identified two low cost (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 the Wells & Pump Stations include:

- Perform Proper Lighting Maintenance
- Ensure Lighting Controls Are Operating Properly

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site sources for the Wells & Pump Stations. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, the equipment changes outlined for each ECM need to be selected and installed through project implementation. One of the first considerations is if there is capital available for project implementation. Another consideration is whether to pursue individual ECMs, a group of ECMs, or a comprehensive approach wherein all ECMs are pursued, potentially in conjunction with other facility projects or improvements.

Rebates, incentives, and financing are available from the NJBPU, NJCEP, as well as some of the state's investor-owned utilities, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any project, please review the appropriate incentive program guidelines before proceeding. This is important because in most cases you will need to submit an application for the incentives before purchasing materials and beginning installation.

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

- SmartStart

For facilities with capital available for implementation of selected individual measures or phasing 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 design the ECM(s), select the equipment and apply for the incentive(s). Program pre-approval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

For facilities without capital available 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 external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. 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. Refer to Section 7 for additional information on this program.

Additional descriptions of all relevant incentive programs are located in Section 8 or: [www.njcleanenergy.com/ci.](www.njcleanenergy.com/ci)

To ensure projects are implemented such that maximum savings and incentives are achieved, bids and specifications should be reviewed by your procurement personnel and/or consultant(s) to ensure that selected equipment coincides with LGEA recommendations, as well as applicable incentive program guidelines and requirements.

2 Facility Information and Existing Conditions

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Dave Harpell	Executive Director	dharpell@jacksonmua.com	7329282222 x 240
Carolann Weisel	Purchasing Department	cweisel@jacksonmua.com	7329282222 x 214
TRC Energy Services			
Tom Page	Auditor	tpage@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On August 18, 2016, TRC performed an energy audit at the Wells & Pump Stations located in Jackson, New Jersey. TRC's team met with Drew Ricciardi to review the facility operations and focus the investigation on specific energy-using systems.

Jackson Township Municipal Utilities Authority has numerous standalone fresh water wells and sewage pumping stations distributed across their service territory. This report focuses on three wells (1, 6, and 11) and two pump stations (Dublin Road and Cooks Bridge).

Location	Area (sf)	Constructed (yr)
Well 1	216	1961
Well 6	420	1974
Well 11	398	1986
Dublin Road Pump Station	855	2007
Cooks Bridge Pump Station	108	2006
Total	1,997	

The Wells & Pump Stations mostly consist of small buildings containing the pumping systems. There was typically minimal lighting found at these facilities, but it is fairly inefficient compared to today's standards. Also, the site is interested in installing variable frequency drives (VFDs) on the well pumps to trim flow.

2.3 Building Occupancy

The well buildings and pump stations are unoccupied except during times of regular maintenance. The equipment, however, is enabled continuously and operates as needed based on demand.

2.4 On-Site Generation

The Wells & Pump Stations do not have any on-site electric generation capacity.

2.5 Wells

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of your equipment.

Well #1

Well #1 is located within a small, single-story concrete block building.

Lighting is provided predominately by 32-Watt linear fluorescent T8 lamps with electronic ballasts. Most of the building uses 2-lamp, 2-foot wide by 4-foot long troffers with diffusers. Lighting control throughout the building is provided by a manual switch.

The building has minimal exterior lighting, which primarily consists of a high-pressure sodium pole mounted fixture that is believed to be controlled with a photocell. It's ventilated with an exhaust fan. No heating or cooling was identified.

The pumping system is comprised of three 40 hp constant speed vertical turbine well pumps. One of the pumps is the designated lead, while both of the remaining pumps operate in lag. The utility demand of the facility indicates that only a single pump is required to operate during periods of peak flow. The remaining well pumps are used for emergencies only. One pump runs about 30% of year.

Well #6

Well #6 is located within a small single story concrete block building with a brick veneer.

Lighting for the pump room is provided by 32-Watt linear fluorescent T8 lamps. The building uses 2-lamp, 2-foot wide by 4-foot long troffers with diffusers. Lighting for the chlorine room is provided by a wall-mounted compact fluorescent fixture. Lighting control throughout the building is provided by manual switches.

The building has minimal exterior lighting, which primarily consists of incandescent wall mounted fixtures that are believed to be controlled with a photocell. It's ventilated with an exhaust fan. No heating or cooling was identified.

The pumping system is comprised of a single 30 hp constant speed vertical turbine well pump. The utility demand of the facility indicates that the single pump operates approximately 87% of the year.

Well #11

Well #11 is located within a small single story concrete block building with a brick veneer.

Lighting for the pump room is provided by 32-Watt linear fluorescent T8 lamps. The building uses 2-lamp, 2-foot wide by 4-foot long troffers with diffusers. Lighting for the chlorine room is provided by a wall mounted incandescent fixture. Lighting control throughout the building is provided by manual switches.

The building has minimal exterior lighting, which primarily consists of High-Pressure Sodium and incandescent wall mounted fixtures that are believed to be controlled with a photocell. It is ventilated with an exhaust fan. No heating or cooling was identified.

The pumping system is comprised of a single 40 hp constant speed vertical turbine well pump located adjacent to the building. The utility demand of the facility indicates that the single pump operates approximately 85% of the year.

2.6 Sanitary Sewer Pump Stations

Cooks Bridge Pump Station

The Cooks Bridge Pump Station is located within a small single story concrete block building.

Lighting is provided by 75-Watt linear fluorescent T12 lamps. The building uses 2-lamp, 2-foot wide by 8-foot long troffers with diffusers. Lighting control throughout the building is provided by manual switches. The building has minimal exterior lighting, which primarily consists metal halide wall-mounted fixtures that are believed to be controlled with a photocell.

The building is ventilated with two exhaust fans. No heating or cooling was identified.

The pumping system is comprised of two 50 hp submersible sewerage pumps that are controlled with VFDs. One of the pumps is the designated lead, while the remaining pumps operate in lag. The utility demand of the facility indicates that both pumps are required to operate during periods of peak flow, though only a single pump is needed most of the time. Based on utility data we estimate at least one pump is required approximately 25% of the year. Discharge from the pumps is directed to the Ocean County Utilities Authority, where it undergoes a treatment process prior to discharge.

Dublin Road Pump Station

The Dublin Road Pump Station is located within a small single story concrete block building with a sublevel for the sanitation pumps.

Lighting for the building is provided by 32-Watt linear fluorescent T8 lamps. The building uses 2-lamp, 2-foot wide by 4-foot long troffers with diffusers. Lighting control throughout the building is provided by manual switches.

The building has minimal exterior lighting, which primarily consists metal halide wall-mounted fixtures that are believed to be controlled with a photocell. It is ventilated with three supply blowers and one exhaust fan. A small electrical resistance unit heater provides heat on demand.

The pumping system is comprised of three suction lift pumps that are controlled with VFDs. One of the 40 hp pumps is the designated lead, while another 40 hp pump is operated in lag. The third pump at 100 hp is a high capacity pump that is only operated in the event of an emergency. The utility demand of the facility indicates that both 40 hp pumps are required to operate during periods of peak flow, though only a single 40 hp pump is needed most of the time. Utility data indicates that the high capacity pump is rarely operated. Discharge from the pumps is directed to the Ocean County Utilities Authority, where it undergoes a treatment process prior to discharge.

2.7 Water-Using Systems

There are no restrooms at any of these facilities.

3 SITE ENERGY USE AND COSTS

Utility data for electricity was analyzed to identify opportunities for savings. The electricity usage is based on fresh water demand and sanitary sewer water flow in the catchment area. There are a number of factors that cause the energy use of these facilities to vary from other facilities identified as: freshwater and wastewater pumping. Specific local climate conditions and variations in effluent flow are key contributors to variations.

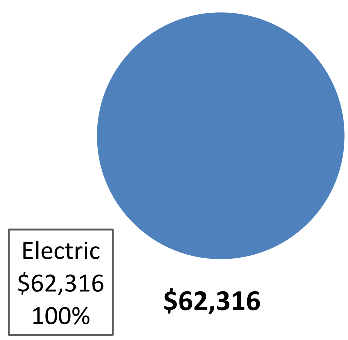
3.1 Total Cost of Energy

The following energy consumption and cost data summarizes the usage from the well and pumping stations. This is based on the last 12 month period of utility usage data that was provided for the electric utility. There is no gas usage at the facilities in this report. The annual consumption and cost were developed from this information. The current utility cost for all of the sites in this report is $62,316 as shown in Figure 5 and Figure 6 below.

Figure 5 - Utility Summary

Utility Summary for Wells and Pump Stations		
Fuel	**Usage**	**Cost**
Electricity	486,757 kWh	$62,316
Total		**$62,316**

Figure 6 - Energy Cost Breakdown



3.2 Well and Pump Station Total Electricity Usage

Electricity is provided by JCP&L. The average electric cost (combined for commodity, transmission, and distribution) for the past 12 months is $0.117/kWh, which is the blended rate used throughout the analyses in this report. The total monthly electricity consumption and peak demand for the Wells & Pump Stations (aggregate of all 5 sites included in this report) are represented graphically in the chart immediately below.

Figure 7 –Total Electric Usage & Demand

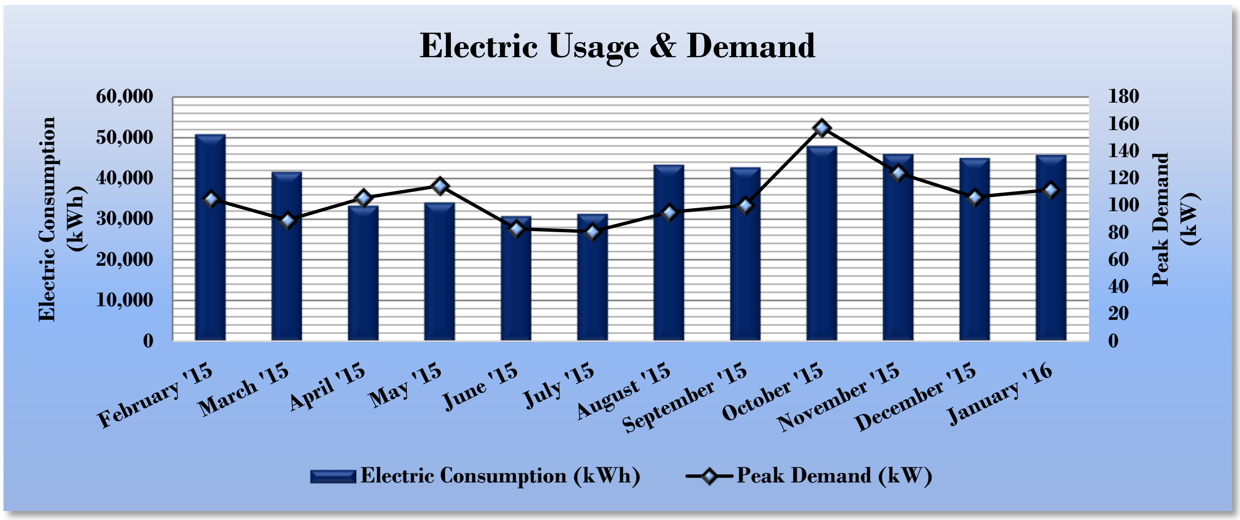


Figure 8 – Total Electric Usage & Demand

Electric Billing Data for Wells and Pump Stations					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
3/3/15	33	50,743	105	491	6,122
4/1/15	29	41,579	89	490	5,178
5/1/15	30	33,252	106	428	4,612
6/1/15	31	34,039	115	533	4,434
7/1/15	30	30,763	83	355	4,026
7/31/15	30	31,262	81	357	4,093
9/1/15	32	43,303	95	388	5,474
10/1/15	30	42,659	100	328	5,322
11/2/15	32	47,883	158	641	6,212
12/3/15	31	45,922	124	523	5,882
1/4/16	32	44,972	106	527	5,782
2/2/16	29	45,715	112	508	5,864
Totals	**369**	**492,092**	**157.5**	**$5,570**	**$62,999**
Annual	**365**	**486,757**	**157.5**	**$5,509**	**$62,316**

3.3 Wells

Well #1

Figure 9 - Electric Usage & Demand Well #1

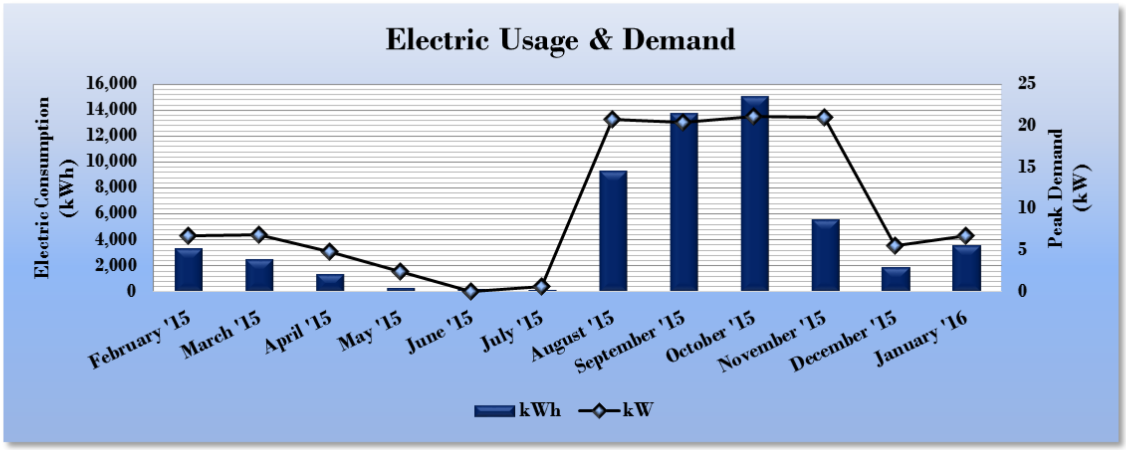


Figure 10 –Electric Usage & Demand Well #1

Electric Billing Data for Wells and Pump Stations						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/3/15	33	3,403	7	$40	$455	No
4/1/15	29	2,546	7	$39	$367	No
5/1/15	30	1,396	5	$34	$236	No
6/1/15	31	310	2	$34	$92	No
7/1/15	30	256	0	$0	$43	No
7/31/15	30	139	1	$34	$76	No
9/1/15	32	9,362	21	$65	$1,150	No
10/1/15	30	13,770	20	$58	$1,619	No
11/2/15	32	15,106	21	$62	$1,771	No
12/3/15	31	5,588	21	$62	$736	No
1/4/16	32	1,904	6	$30	$303	No
2/2/16	29	3,606	7	$30	$491	No
Totals	**369**	**57,386**	**21.1**	**$489**	**$7,339**	0
Annual	**365**	**56,764**	**21.1**	**$484**	**$7,259**	

Well #6

Figure 11 –Electric Usage & Demand Well #6

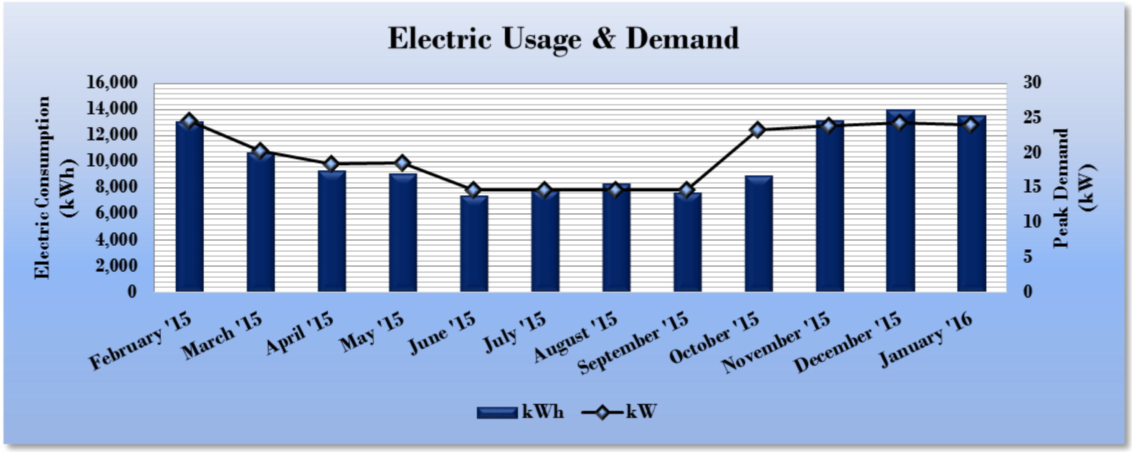


Figure 12 –Electric Usage & Demand Well #6

Electric Billing Data for Wells and Pump Stations						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/3/15	32	13,096	25	$95	$1,513	No
4/1/15	28	10,702	20	$66	$1,238	No
5/1/15	30	9,365	19	$48	$1,088	No
6/1/15	30	9,137	19	$52	$1,071	No
7/1/15	29	7,421	15	$40	$910	No
7/31/15	29	7,804	15	$40	$951	No
9/1/15	31	8,381	15	$40	$1,013	No
10/1/15	29	7,693	15	$40	$936	No
11/2/15	31	8,968	23	$75	$1,111	No
12/3/15	30	13,204	24	$78	$1,575	No
1/4/16	31	14,016	24	$80	$1,665	No
2/2/16	29	13,556	24	$79	$1,630	Yes
Totals	**359**	**123,343**	**24.7**	**$734**	**$14,701**	1
Annual	**365**	**125,404**	**24.7**	**$746**	**$14,947**	

Well # 11

Figure 13 –Electric Usage & Demand Well #11

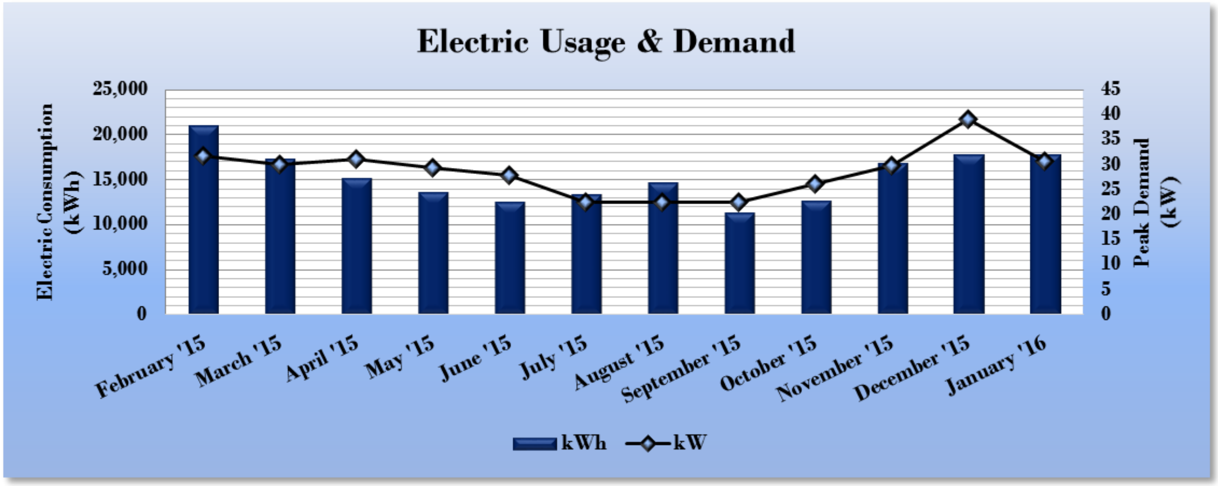


Figure 14 –Electric Usage & Demand Well #11

Electric Billing Data for Wells and Pump Stations						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/3/15	33	21,080	32	$140	$2,384	No
4/1/15	29	17,360	30	$129	$1,991	No
5/1/15	30	15,160	31	$119	$1,768	No
6/1/15	31	13,680	29	$117	$1,614	No
7/1/15	30	12,600	28	$108	$1,543	No
7/31/15	30	13,440	23	$76	$1,602	No
9/1/15	32	14,720	23	$76	$1,741	No
10/1/15	30	11,320	23	$70	$1,363	No
11/2/15	32	12,720	26	$91	$1,538	No
12/3/15	31	16,840	30	$111	$2,007	No
1/4/16	32	17,800	39	$163	$2,163	No
2/2/16	29	17,800	31	$116	$2,118	No
Totals	**369**	**184,520**	**39**	**$1,315**	**$21,833**	0
Annual	**365**	**182,520**	**39**	**$1,301**	**$21,596**	

3.4 Pump Stations

Cooks Bridge Pump Station

Figure 15 –Electric Usage & Demand Cooks Bridge Pump Station

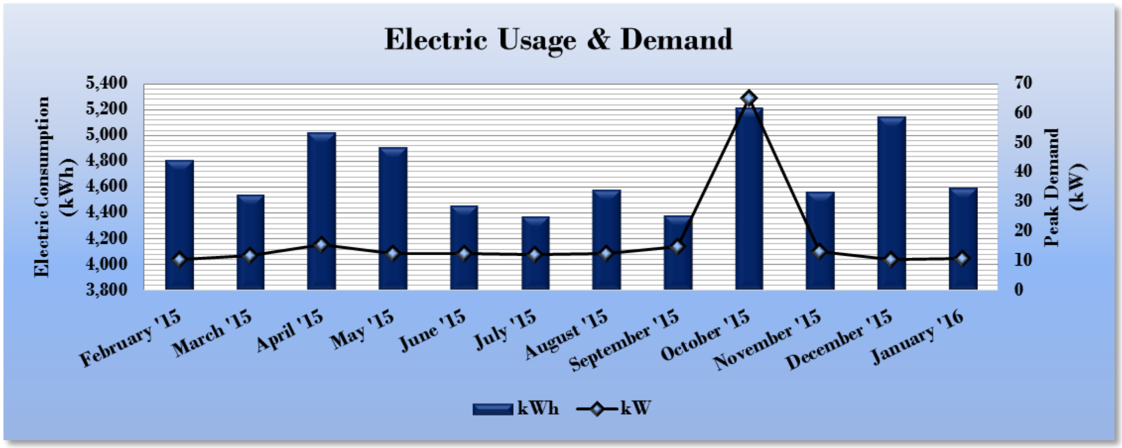


Figure 16 –Electric Usage & Demand Cooks Bridge Pump Station

Electric Billing Data for Wells and Pump Stations						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/2/15	32	4,813	10	$127	$689	No
3/31/15	29	4,545	12	$127	$662	No
4/30/15	30	5,029	16	$105	$689	No
6/1/15	31	4,913	12	$105	$681	No
7/1/15	30	4,458	13	$105	$651	No
7/31/15	30	4,376	12	$105	$642	No
9/1/15	32	4,579	12	$105	$664	No
10/1/15	30	4,384	15	$57	$590	No
11/2/15	32	5,218	65	$310	$936	No
12/3/15	31	4,563	13	$151	$705	No
1/4/16	32	5,150	11	$151	$769	No
2/2/16	29	4,600	11	$151	$710	No
Totals	**368**	**56,628**	**65.3**	**$1,599**	**$8,387**	0
Annual	**365**	**56,166**	**65.3**	**$1,585**	**$8,319**	

Dublin Road Pump Station

Figure 17 –Electric Usage & Demand Dublin Road Pump Station

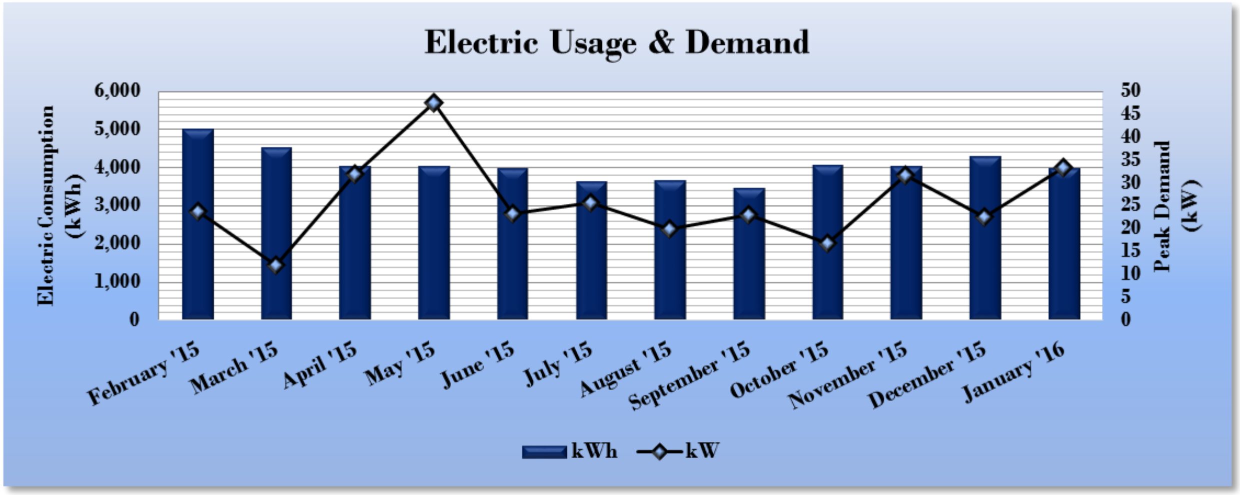


Figure 18 –Electric Usage & Demand Dublin Road Pump Station

Electric Billing Data for Wells and Pump Stations						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/3/15	33	5,040	24	$89	$674	No
4/1/15	29	4,545	12	$127	$662	No
4/30/15	30	4,040	32	$123	$603	No
6/1/15	31	4,040	48	$226	$710	No
7/1/15	30	4,000	23	$103	$598	No
7/31/15	30	3,640	26	$103	$559	No
9/1/15	32	3,680	20	$103	$564	No
10/1/15	30	3,480	23	$103	$538	No
11/2/15	32	4,080	17	$103	$604	No
12/3/15	31	4,040	32	$121	$618	No
1/4/16	32	4,320	23	$103	$630	No
2/2/16	29	4,000	33	$131	$625	No
Totals	**369**	**48,905**	**47.6**	**$1,433**	**$7,386**	0
Annual	**365**	**48,375**	**47.6**	**$1,418**	**$7,306**	

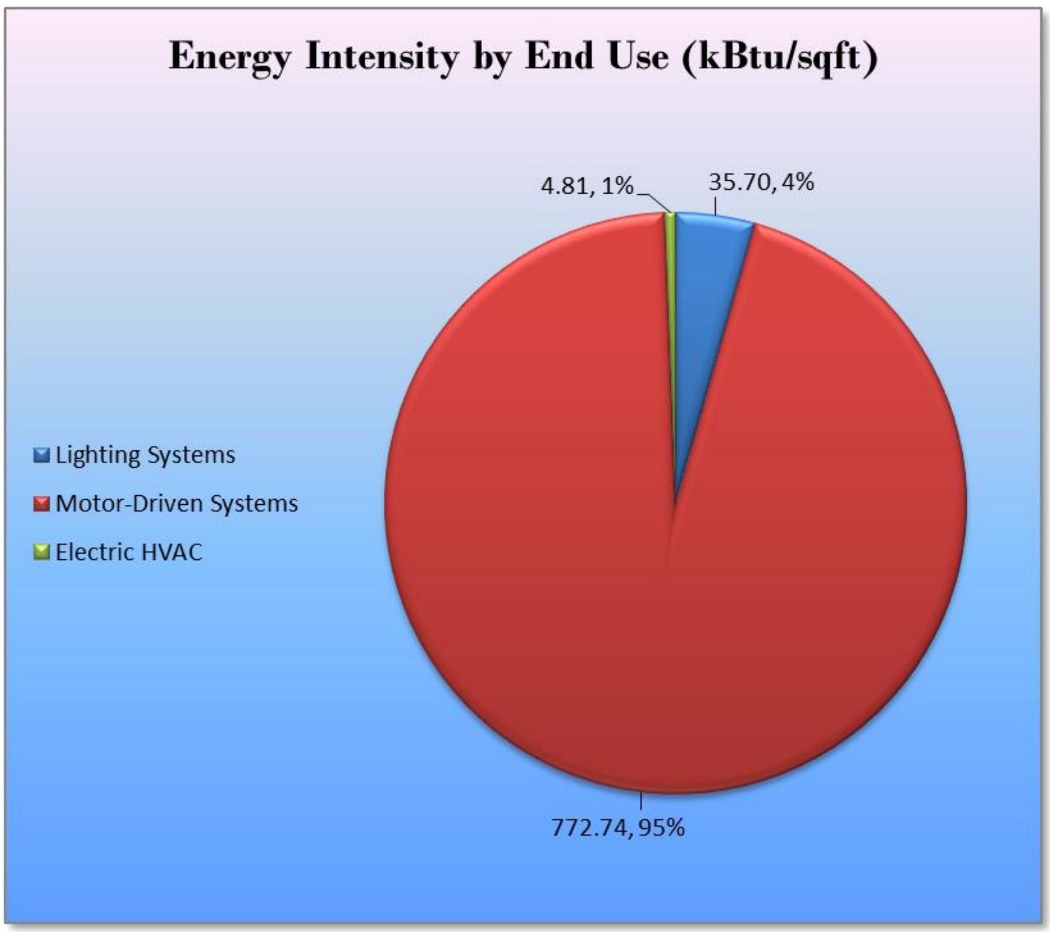
3.5 Benchmarking

The electricity usage for each well and pump station is based on freshwater demand and wastewater flow in the catchment area. There are a number of factors that cause the energy use of these facilities to vary from other facilities identified as: freshwater and wastewater pumping. Specific local climate conditions and variations in effluent flow are key contributors to variations. 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 building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 19 - Energy Balance (% and kBtu/sqft)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Wells & Pump Stations regarding financial incentives for which they may qualify to implement the recommended 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 usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described 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 20 – Summary of Recommended ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas 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			**15,179**	**2.9**	**0.0**	**$1,771.45**	**$17,045.46**	**$1,050.00**	**$15,995.46**	**9.03**	**15,285**
ECM 1	Install LED Fixtures	Yes	11,003	1.8	0.0	$1,284.11	$7,939.70	$700.00	$7,239.70	5.64	11,080
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	84	0.0	0.0	$9.81	$323.67	$0.00	$323.67	32.98	85
ECM 3	Retrofit Fixtures with LED Lamps	Yes	4,092	1.1	0.0	$477.52	$8,782.10	$350.00	$8,432.10	17.66	4,120
Motor Upgrades			**1,892**	**0.2**	**0.0**	**$220.80**	**$4,206.90**	**$0.00**	**$4,206.90**	**19.05**	**1,905**
ECM 4	Premium Efficiency Motors	Yes	1,892	0.2	0.0	$220.80	$4,206.90	$0.00	$4,206.90	19.05	1,905
Variable Frequency Drive (VFD) Measures			**226,715**	**31.5**	**0.0**	**$26,458.79**	**$30,506.70**	**$6,600.00**	**$23,906.70**	**0.90**	**228,300**
ECM 5	Install VFDs on Well Pumps, Run Slower and Longer	Yes	226,715	31.5	0.0	$26,458.79	$30,506.70	$6,600.00	$23,906.70	0.90	228,300
TOTALS			**243,786**	**34.7**	**0.0**	**$28,451.05**	**$51,759.06**	**$7,650.00**	**$44,109.06**	**1.55**	**245,491**

* - 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

Our recommended upgrades to existing lighting fixtures are summarized in Figure 21 below.

Figure 21 – 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	**15,179**	**2.9**	**0.0**	**$1,771.45**	**$17,045.46**	**$1,050.00**	**$15,995.46**	**9.03**	**15,285**
ECM 1	Install LED Fixtures	11,003	1.8	0.0	$1,284.11	$7,939.70	$700.00	$7,239.70	5.64	11,080
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	84	0.0	0.0	$9.81	$323.67	$0.00	$323.67	32.98	85
ECM 3	Retrofit Fixtures with LED Lamps	4,092	1.1	0.0	$477.52	$8,782.10	$350.00	$8,432.10	17.66	4,120

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	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)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0
Exterior	11,003	1.8	0.0	$1,284.11	$7,939.70	$700.00	$7,239.70	5.64	11,080

Measure Description

This measure evaluates replacing existing fixtures containing fluorescent, HID, and incandescent 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.

Maintenance savings are anticipated since LED sources have burn hours which are generally more than twice that of a fluorescent source and more than 10 times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	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)
Interior	84	0.0	0.0	$9.81	$323.67	$0.00	$323.67	32.98	85
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates 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.

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	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)
Interior	2,044	0.7	0.0	$238.55	$8,190.23	$300.00	$7,890.23	33.08	2,058
Exterior	2,048	0.3	0.0	$238.97	$591.87	$50.00	$541.87	2.27	2,062

Measure Description

This measure evaluates replacing linear fluorescent lamps with LED tube lamps and replacing incandescent and halogen screw-in based lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. Screw-in LED lamps can be used as a direct replacement for most other screw-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source and more than 10 times incandescent sources. LED lamps that use the existing fluorescent fixture ballast will be constrained by the remaining hours of the ballast. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

4.1.2 Motor Upgrades

Our recommended motor upgrades are summarized in Figure 22 below.

Figure 22 – Summary of Motor 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)
Motor Upgrades		**1,892**	**0.2**	**0.0**	**$220.80**	**$4,206.90**	**$0.00**	**$4,206.90**	**19.05**	**1,905**
ECM 4	Premium Efficiency Motors	1,892	0.2	0.0	$220.80	$4,206.90	$0.00	$4,206.90	19.05	1,905

ECM 4: Premium Efficiency Motors

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)
1,892	0.2	0.0	$220.80	$4,206.90	$0.00	$4,206.90	19.05	1,905

Measure Description

This measure evaluates replacing standard efficiency motors with IHP 2014 efficiency motors. The evaluation assumes existing motors will be replaced with the same size motors. It is important that the speed of each new motor match the speed of the motor it replaces as closely as possible. The base case motor efficiencies are obtained from nameplate information. Proposed case premium motor efficiencies are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the annual operating hours.

4.1.3 Variable Frequency Drive Measures

Our recommended variable frequency drive (VFD) measures are summarized in Figure 23 below.

Figure 23 – 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		**226,715**	**31.5**	**0.0**	**$26,458.79**	**$30,506.70**	**$6,600.00**	**$23,906.70**	**0.90**	**228,300**
ECM 5	Install VFDs on Well Pumps, Run Slower and Longer	226,715	31.5	0.0	$26,458.79	$30,506.70	$6,600.00	$23,906.70	0.90	228,300

ECM 5: Install VFDs on Well Pumps, Run Slower and Longer

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)
226,715	31.5	0.0	$26,458.79	$30,506.70	$6,600.00	$23,906.70	0.90	228,300

Measure Description

This measure evaluates installing VFDs on the pumps for Well #1, Well #6, and Well #11 and then modifying their operation strategy in conjunction with the other pumps in the system. The pumps operate as needed to supply fresh water. We recommend operating these large pumps at reduced speeds for a longer period to provide the same volume of water. Any short-term shortfalls in well production capacity can be accommodated using the storage capacity of the system.

Energy savings result from reducing pump motor speed (and power). The magnitude of energy savings is based on the amount of time at reduced loads. The calculations assume the pump speed and flow can generally be reduced 20% and the pumps will operate 20% longer. Additional savings can be achieved if the pumps speed can be further reduced. Wells that already run for most of the year (like well #11), may have lower savings.

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.

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.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) 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 based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a Low potential for installing a PV array.

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 sq ft of flat or south-facing rooftop, or other unshaded space, on which to place the PV panels. In our opinion, **the facilities do appear not meet these minimum criteria for cost-effective PV installation**.

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1

6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. 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 heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Lack of thermal load is the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in NJ specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

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 facility(ies) 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 (http://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 (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR 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 other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 24 for a list of the eligible programs identified for each recommended ECM.

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install
ECM 1	Install LED Fixtures	x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		
ECM 3	Retrofit Fixtures with LED Lamps	x		
ECM 4	Premium Efficiency Motors			
ECM 5	Install VFDs on Well Pumps, Run Slower and Longer		x	

SmartStart 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.

Generally, the incentive values provided throughout the report assume the SmartStart 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 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.

<u>Prescriptive Equipment Incentives Available</u>:

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 SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Although your facility is an existing building, and only the prescriptive incentives have been applied in the calculations, the SmartStart custom measure path is recommended for ECM 5 (Install VFDs on Well Pumps, Run Slower and Longer). 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.

SmartStart 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 SmartStart 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 SmartStart 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 into 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. Detailed program descriptions and application can be found at: [www.njcleanenergy.com/ESIP.](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 (http://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 (http://www.pjm.com/training/training%20material.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 & Recommendations

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 #11 - Well Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,002	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,002	0.05	149	0.0	$17.43	$117.00	$20.00	5.57
Well #11 - Exterior	1	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,320	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	50	4,320	0.11	674	0.0	$78.62	$390.68	$100.00	3.70
Well #11 - Exterior	2	Incandescent: Spot fixtures	Wall Switch	100	4,320	Relamp	No	2	LED Screw-In Lamps: Spot fixtures	Wall Switch	18	4,320	0.13	801	0.0	$93.43	$215.31	$10.00	2.20
Well#11 - Exterior	2	Incandescent: Ceiling mount fixtures	Wall Switch	70	4,320	Relamp	No	2	LED Screw-In Lamps: Ceiling mount fixtures	Wall Switch	11	4,320	0.10	576	0.0	$67.23	$107.51	$20.00	1.30
Well #11 - Chlorine Room	1	Incandescent: Wall hanging fixture	Wall Switch	75	2,002	Relamp	No	1	LED Screw-In Lamps: Wall hanging fixture	Wall Switch	11	2,002	0.05	145	0.0	$16.90	$53.75	$10.00	2.59
Well #6 - Exterior	1	Incandescent: Wall hanging fixture	Wall Switch	75	4,320	Relamp	No	1	LED Screw-In Lamps: Wall hanging fixture	Wall Switch	11	4,320	0.05	312	0.0	$36.46	$53.75	$10.00	1.20
Well#6 - Exterior	2	Incandescent: Spot fixtures	Wall Switch	75	4,320	Relamp	No	2	LED Screw-In Lamps: Spot fixtures	Wall Switch	11	4,320	0.10	625	0.0	$72.92	$215.31	$10.00	2.82
Well#6 - Chlorine Room	1	Compact Fluorescent: Wall mount fixture	Wall Switch	40	2,002	Relamp	No	1	LED Screw-In Lamps: Wall mount fixture	Wall Switch	7	2,002	0.03	75	0.0	$8.71	$53.75	$10.00	5.02
Well#6 - Well room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,002	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,002	0.11	299	0.0	$34.85	$234.00	$40.00	5.57
Well#6, Well#11	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well#1 - Exterior	1	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,320	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	50	4,320	0.11	674	0.0	$78.62	$390.68	$100.00	3.70
Well#1 - Interior	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,002	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,002	0.11	299	0.0	$34.85	$234.00	$40.00	5.57
Dublin PS - Exterior	6	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,320	LED Retrofit	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	40	4,320	0.73	4,393	0.0	$512.74	$2,002.74	$0.00	3.91
Dublin PS - Exterior	2	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,320	LED Retrofit	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	146	4,320	0.51	3,046	0.0	$355.50	$3,905.99	$200.00	10.42
Dublin PS - Ground Floor	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	2,002	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	None	29	2,002	0.32	896	0.0	$104.55	$4,998.48	$120.00	46.66
Dublin PS - Downstairs	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	2,002	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	None	29	2,002	0.16	448	0.0	$52.28	$2,499.24	$60.00	46.66
Cooks PS - Exterior	2	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,320	LED Retrofit	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	46	4,320	0.41	2,431	0.0	$283.71	$833.08	$200.00	2.23
Cooks PS - Exterior	1	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,320	LED Retrofit	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	46	4,320	0.20	1,216	0.0	$141.86	$416.54	$100.00	2.23
Cooks PS - Interior	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	2,002	Relamp & Reballast	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,002	0.03	95	0.0	$11.09	$323.67	$40.00	25.58

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
Dublin PS - Pit	Pump Sewage out of Pit	2	Process Pump	40.0	90.0%	Yes	540	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Dublin PS - Pit	Pump Sewage out of Pit	1	Process Pump	100.0	90.0%	Yes	0	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Dublin PS - Ground Floor	Interior	1	Exhaust Fan	10.0	90.0%	No	3,391	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Dublin PS - Ground Floor	Blower Motors	3	Supply Fan	1.0	88.0%	No	2,745	No	88.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cooks PS - Inside	Pump Sewage out of Pit	2	Process Pump	50.0	90.0%	Yes	1,110	No	90.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cooks PS - Ceiling	Interior	2	Exhaust Fan	0.3	80.0%	No	2,745	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Well #1	Well #1	1	Process Pump	40.0	94.1%	No	2,500	No	94.1%	Yes	2	6.37	45,981	0.0	$5,366.20	$12,668.60	$2,400.00	1.91
Well #6	Well #6	1	Process Pump	30.0	93.6%	No	7,660	No	93.6%	Yes	1	4.81	106,228	0.0	$12,397.40	$8,472.05	$1,800.00	0.54
Well #11	Well #11	1	Process Pump	40.0	93.0%	No	7,473	Yes	94.1%	Yes	1	6.62	139,338	0.0	$16,261.44	$13,572.95	$2,400.00	0.69

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
Dublin PS - Ceiling	Ground Floor	1	Electric Resistance Heat		12.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Appendix B: ENERGY STAR® Statement of Energy Performance

Freshwater wells and wastewater pump stations do not currently quality to receive an ENERGY STAR® score. Therefore a Statement of Energy Performance (SEP) is not available at this time.