ENERGY AUDIT – FINAL REPORT

LAVALLETTE
NEWARK AVE. WATER TREATMENT PLANT
NEWARK & BAY AVENUES
LAVALLETTE, NJ 08735
ATTN: MR. CHRISTOPHER F. PARLOW
Borough Administrator / Municipal Clerk

CEG PROJECT NO. 9P08128

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I. EXECUTIVE SUMMARY

This report presents the findings of an energy audit conducted for:

Newark Avenue Water Treatment Plant
Newark Avenue
Lavallette, NJ 08735

Municipal Contact Person: Mr. Christopher F. Parlow
Borough Administrator / Municipal Clerk

This audit was performed in connection with the New Jersey Clean Energy Local Government Energy Audit Program. These energy audits are conducted to promote the office of Clean Energy's mission, which is to use innovation and technology to solve energy and environmental problems in a way that improves the State's economy. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

Electricity	$ 33,600
Natural Gas	$ 935
Total	$ 34,535

Note: From a review of the utility data, along with the fact that the building is unoccupied most of the time, we determined that there are no viable Energy Conservation Measures for this facility other than a roof mounted PV Solar Panel system.

The potential annual energy cost savings are shown below in Table 1. Be aware that the measures are not additive because of the interrelation of several of the measures. The cost of each measure for this level of auditing is ± 20% until detailed engineering, specifications, and hard proposals are obtained.

Table 1
Energy Conservation Measures (ECM's)

ECM NO.	DESCRIPTION	COST	ANNUAL SAVINGS	SIMPLE PAYBACK (YEARS)	SIMPLE RETURN ON INVESTMENT
1	15 KW PV Solar Panel System	$136,620	$12,342	11.07	8.2 %

The estimated demand and energy savings are shown below in Table 2. The information in this table corresponds to the ECM's in Table 1.

Table 2
Estimated Energy Savings

ECM NO.	DESCRIPTION	ANNUAL UTILITY REDUCTION		
		ELECT DEMAND (KW)	ELECT CONSUMPTION (KWH)	NAT GAS (THERMS)
1	15 KW PV Solar Panel System	15	23,689	-

II. INTRODUCTION

Newark Avenue Water Treatment

This comprehensive energy audit covers the Newark Avenue Water Treatment facility that includes three (3) small buildings;

A) The Main Filter building, built in 1999 consists of a water filter equipment room, an office area, Storage room, Clorine room and a Future Lime Storage Room.

B) Water Well house #5 – West Building, consists of: Water Well #5 equipment, a 250 kw emergency generator and includes a storage room

C) Water Well house #3 – East Building, consists of Water Well #3 equipment and a Storage room.

The first task was to collect and review one year's worth of utility energy data for electricity and natural gas. This information was used to analyze operational characteristics, calculate energy benchmarks for comparison to industry averages, estimate savings potential, and establish a baseline to monitor the effectiveness of implemented measures. A computer spreadsheet was used to enter, sum, and calculate benchmarks and to graph utility information (see Appendix A).

The Energy Use Index (EUI) is expressed in British Thermal Units/square foot/year (BTU/ft^2/yr) and can be used to compare energy consumption to similar building types or to track consumption from year to year in the same building. The EUI is calculated by converting annual consumption of all fuels to BTU's then dividing by the area (gross square footage) of the building. EUI is a good indicator of the relative potential for energy savings. A comparatively low EUI indicates less potential for large energy savings. Blueprints (where available) were obtained from the municipality and were utilized to calculate/verify the gross area of the facility.

After gathering the utility data and calculating the EUI, the next step in the audit process is obtaining Architectural and Engineering drawings (where available). By reviewing the Architectural and Engineering drawings, questions regarding the building envelope, lighting systems/controls, HVAC equipment and controls are noted. These questions are then compared to the energy usage profiles developed during the utility data gathering step. Furthermore, through the review of the architectural and engineering drawings a building profile can be defined that documents building age, type, usage, major energy consuming equipment or systems, etc. After this information is gathered the next step in the process is the site visit.

The site visit was spent inspecting the actual systems and answering specific questions from the preliminary review. The building manager provided occupancy schedules, O & M practices, the building energy management program, and other information that has an impact on energy consumption.

The post-site work includes evaluation of the information gathered during the site visit, researching possible conservation opportunities, organizing the audit into a comprehensive

report, and making recommendations on mechanical, lighting and building envelope improvements.

III. METHOD OF ANALYSIS

CEG completed the preliminary audit tasks noted in Section II preparing for the site survey. The site survey is a critical input in deciphering where energy opportunities exist within a facility. The auditor walks the entire site to inventory the building envelope (roof, windows, etc.), the heating, ventilation, and air conditioning equipment (HVAC), the lighting equipment, other facility-specific equipment, and to gain an understanding of how each facility is used.

The collected data is then processed using energy engineering calculations to calculate the anticipated energy usage for the proposed energy conservation measures (ECM's). The actual energy usage is entered directly from the utility bills provided by the Owner. The anticipated energy usage is compared to the actual usage to determine energy savings for the proposed ECM's.

It is pertinent to note, that the savings noted in this report are not duplicative. The savings for each recommendation may actually be higher if the individual recommendations were installed instead of the entire project. For example, the lighting module calculates the change in wattage and multiplies it by the new operating hours instead of the existing operating hours (if there was a change in the hours at all). The lighting controls module calculates the change in hours and multiplies it by the new system wattage instead of the existing wattage. Therefore, if you chose to install the recommended lighting system but not the lighting controls, the savings achieved with the new lighting system would actually be higher because there would have been no reduction in the hours of use.

The same principal follows for heating, cooling, and temperature recommendations – even with fuel switching. If there are recommendations to change the temperature settings to reduce fuel use, then the savings for the heating/cooling equipment recommendations are reduced, as well.

Our thermal module calculates the savings for temperature reductions utilizing automated engineering calculations within Microsoft Excel™ spreadsheets. The savings are calculated in "output" values – meaning energy, not fuel savings. To show fuel savings we multiply the energy values times the fuel conversion factor (these factors are different for electricity, natural gas, fuel oil, etc.) and also take into account the heating/cooling equipment efficiency. The temperature recommendation savings are lower when the heating/cooling equipment is more efficient or is using a cheaper fuel.

Thermal recommendations (insulation, windows, etc.) are evaluated by taking the difference in the thermal load due to reduced heat transfer. Again, the "thermal load" is the thermal load after the other recommendations have been accounted for.

Lastly, installation costs, refer to Appendix B, are then applied to each recommendation and simple paybacks are calculated. Costs are derived from Means Cost Data, other industry publications, and local contractors and suppliers. The NJ SmartStart Building® program incentives (refer to Appendix C) are calculated for the appropriate ECM's and subtracted from the installed cost prior to calculation of the simple payback. In addition, where applicable, maintenance cost savings are estimated and applied to the net savings. Simple return on

investment is calculated using the standard formula of the difference of gains minus investments, divided by the investments. Included within the gains are the annual energy savings, utility incentives and maintenance savings as a total sum. The calculation is completed assuming the project is 100% direct purchased by the Owner with an energy cost escalation of 2.4% for natural gas and 2.2% for electricity.

IV. HISTORIC ENERGY CONSUMPTION/COST

A. Energy Usage / Tariffs

Table 1 and Figure 1 represent the electrical usage for the three (3) surveyed buildings from January-08 to December-08. Lavallette Electric Utility provides electricity to the Newark Avenue water treatment plant. The electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is calculated by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000 Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges. Rates used in this report reflect the most current rate structure available.

Table 2 and Figure 2 show the natural gas energy usage for the three (3) surveyed buildings from January-08 to December-08. The entire complex is served natural gas via one main gas meter, supplied by South Jersey Gas. Below is the average unit cost for the utilities at the Newark Avenue Treatment Plant

Description	Average
Electricity	17.1¢/kWh
Natural Gas	$2.109/Therm

Table 1
Electricity Billing Data

Water Treatment Plant - Well House 3 & 5

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Total Consumption	Units	Minimum Charge	Rate $/Kwh	Total $
Lavallette Electric Utility	January	1/25/2008	2/24/2008	2604	Electric	33	12,360	kwh	$ 14.75	$ 0.158	$ 1,967.63
Lavallette Electric Utility	February	2/25/2008	3/24/2008	2604	Electric	30	13,320	kwh	$ 14.75	$ 0.158	$ 2,119.31
Lavallette Electric Utility	March	3/25/2008	4/23/2008	2604	Electric	32	14,280	kwh	$ 14.75	$ 0.158	$ 2,270.99
Lavallette Electric Utility	April	4/24/2008	5/25/2008	2604	Electric	29	11,760	kwh	$ 14.75	$ 0.158	$ 1,872.83
Lavallette Electric Utility	May	5/26/2008	6/25/2008	2604	Electric	29	17,040	kwh	$ 14.75	$ 0.158	$ 2,707.07
Lavallette Electric Utility	June	6/26/2008	7/25/2008	2604	Electric	32	7,440	kwh	$ 14.75	$ 0.185	$ 1,391.15
Lavallette Electric Utility	July	7/26/2008	8/26/2008	2604	Electric	30	34,080	kwh	$ 14.75	$ 0.185	$ 6,319.55
Lavallette Electric Utility	August	8/27/2008	9/23/2008	2604	Electric	29	24,360	kwh	$ 14.75	$ 0.185	$ 4,521.35
Lavallette Electric Utility	September	9/24/2008	10/22/2008	2604	Electric	32	20,400	kwh	$ 14.75	$ 0.185	$ 3,788.75
Lavallette Electric Utility	October	10/23/2008	12/9/2008	2604	Electric	31	10,680	kwh	$ 14.75	$ 0.158	$ 1,702.19
Lavallette Electric Utility	November	12/9/2008	1/12/2009	2604	Electric	28	17,520	kwh	$ 14.75	$ 0.158	$ 2,782.91
Lavallette Electric Utility	December	1/12/2009	1/13/2009	2604	Electric	32	13,560	kwh	$ 14.75	$ 0.158	$ 2,157.23
						Total:	196800	kwh		**Total:**	$ 33,600.96
										Avg. Cost per kwh:	$ 0.171

Figure 1
Electricity Usage Profile

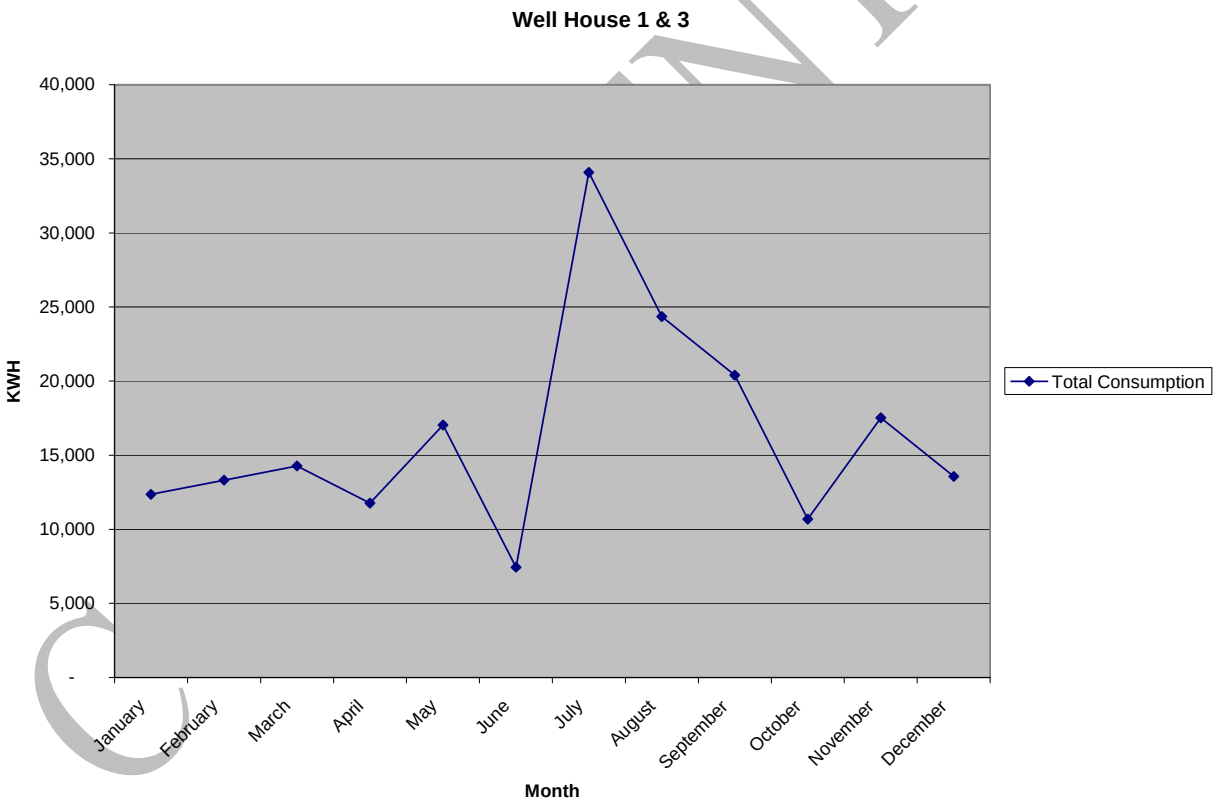
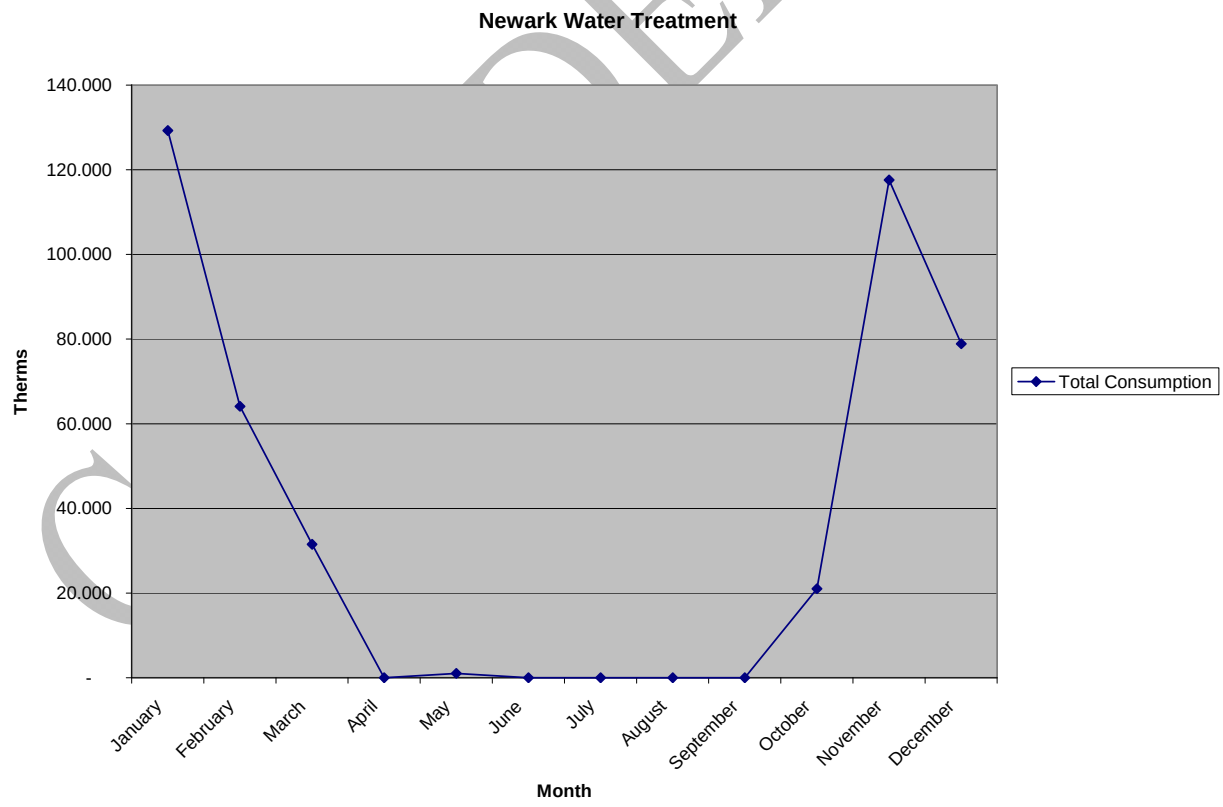


Table 2
Natural Gas Billing Data

Water Treatment Plant

Provider	Month	Start Date	End Date	Account	Utility Type	Billing Days	Consumption	Units	Total $
NJ Natural Gas	January	1/10/2008	2/11/2008	22-0006-7371-42	Gas	32	129.273	therms	$ 201.48
NJ Natural Gas	February	2/11/2008	3/11/2008	22-0006-7371-42	Gas	28	64.111	therms	$ 115.15
NJ Natural Gas	March	3/11/2008	4/8/2008	22-0006-7371-42	Gas	28	31.530	therms	$ 69.83
NJ Natural Gas	April	4/8/2008	5/9/2008	22-0006-7371-42	Gas	31	-	therms	$ 14.87
NJ Natural Gas	May	5/9/2008	6/10/2008	22-0006-7371-42	Gas	32	1.049	therms	$ 41.24
NJ Natural Gas	June	6/10/2008	7/10/2008	22-0006-7371-42	Gas	30	-	therms	$ 19.65
NJ Natural Gas	July	7/10/2008	8/9/2008	22-0006-7371-42	Gas	30	-	therms	$ 19.65
NJ Natural Gas	August	8/9/2008	9/8/2008	22-0006-7371-42	Gas	30	-	therms	$ 19.65
NJ Natural Gas	September	9/8/2008	10/8/2008	22-0006-7371-42	Gas	30	-	therms	$ 20.72
NJ Natural Gas	October	10/8/2008	11/6/2008	22-0006-7371-42	Gas	29	21.040	therms	$ 58.89
NJ Natural Gas	November	11/6/2008	12/8/2008	22-0006-7371-42	Gas	32	117.600	therms	$ 206.02
NJ Natural Gas	December	12/8/2008	1/9/2009	22-0006-7371-42	Gas	32	78.900	therms	$ 148.13
						12 Month Total:	443.503	therms	$ 935.28
						Average Cost per therm:	$ 2.109		

Figure 2
Natural Gas Usage Profile



B. Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's energy utilization per square foot of building. This calculation is completed by converting all utility usage (gas, electric, oil) consumed by a building over a specified time period, typically one year, to British Thermal Units (BTU) and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance among buildings of similar type. The EUI for this facility is calculated as follows:

$$\text{Building EUI} = \frac{\text{(Electric Usage in kBtu/h + Gas Usage in kBtu/h)}}{\text{Building Square Footage}}$$

Electric = ((196,800 kWh) * (1000 W/kW) * (3.414 Btu/h / 1 W))/ (1000 Btu / 1 kBtu)
= 671,875 kBtu

Gas = ((444 therms) * (100,000 Btu/h / 1 Therm)) / (1000 Btu / 1 kBtu) = 44,350 kBtu

$$\text{Building EUI} = \frac{\text{(671,875 kBTU + 44,350 kBtu)}}{\text{4236 SF}} = \frac{\text{716,225 kBtu}}{\text{4236 SF}} = 169.1 \text{ kBtu/SF}$$

Newark Ave. Water Treatment Plant EUI = 169 kBtu/SF

C. EPA Energy Benchmarking System

The United States Environmental Protection Agency (EPA) in an effort to promote energy management has created a system for benchmarking energy use amongst various end users. The benchmarking tool utilized for this analysis is entitled Portfolio Manager. The Portfolio Manager tool allows you to track and assess energy consumption via the template forms located on the ENERGY STAR website (www.energystar.gov). The importance of benchmarking for local government municipalities is becoming more important as utility costs continue to increase and more emphasis is being placed throughout multiple arenas on carbon reduction, greenhouse gas emissions and other environmental impacts.

Based on information gathered from the ENERGY STAR website, Government agencies spend more than $10 billion a year on energy to provide public services and meet constituent needs. Furthermore, energy use in commercial buildings and industrial facilities is responsible for more than 50 percent of U.S. carbon dioxide emissions. Therefore, it is vital that local government municipalities assess their energy usage, benchmark this usage utilizing Portfolio Manager, set priorities and goals to lessen their energy usage and move forward with these priorites and goals. Saving energy will in-turn save the environment.

In accordance with the Local Government Energy Audit Program, CEG has created an Energy Star account for the municipality in order to allow access to monitor their yearly energy usage as it compares to facilities of similar type. The login page for the account can be accessed at the following web address; the username and password are also listed below:

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.login

User Name:	lavalletteboro
Password:	lgeaceg09007

Utilizing the utility bills and other information gathered during the energy audit process, CEG entered the respective data into Portfolio Manager and the following is a summary of the results:

Table 5
ENERGY STAR Performance Rating

FACILITY DESCRIPTION	ENERGY PERFORMANCE RATING	NATIONAL AVERAGE
Newark Water Treatment	N/A	N/A

Specific building types are detailed on the ENERGY STAR website. Non-typical buildings are covered by an "Other" category. The Newark Avenue Water Treatment Plant falls under this "Other" category. The "Other" category is used if your building type or a section of the building is not represented by one of the specific categories. An Energy Performance Rating cannot be calculated if more then 10% of a building is classified as "Other." The majority of this facility would be classified as "Other" and therefore cannot be given an Energy Performance Rating. Despite this, the Portfolio Manager calculates the building EUI. The EUI is an important tool that can be used to track the energy efficiency if the building. Baselines for improvement can be set that the municipality can strive to meet. CEG recommends that the Borough of Lavallette keep their Portfolio Manager account up to date to monitor the performance of the building.

The EUI calculated in the previous section is a good indicator of the energy performance of the Newark Avenue Water Treatment Plant in the absence of the Energy Star Portfolio Manager Program. The Water Treatment Plant has an EUI of 169. The lower the EUI the less energy the facilty uses per square foot. A low EUI indicates a more efficient building. There maybe opportunity for improvement making the facility more energy efficient and saving more on the utility costs.

V. FACILITY DESCRIPTION

Water Treatment Plant – Filter Building

At 2,940 sq.ft. the Water Treatment Plant Building is the largest of the three buildings on this site. The building houses water filter equipment, an office area, Storage room, Clorine room and a Future Lime Storage Room. The Future Lime Storage room has a separate outside entrance and is constructed with explosion proof electrical devices. (the space is currently utilized for general storage) The building is generally unoccupied except for periodic maintenance visits. The building is fairly new, constructed in 1999, thus building envelope, roof , doors and windows are in good condition.

Heating & Ventilation

The main filter room is heated by four (4) gas-fired Reznor horizontal unit heaters, each with a capacity of 25,000 Btuh input. A manually operated rooftop exhaust fan and corresponding wall intake louver provides summer ventilation, 1100 cfm capacity. The exhaust fan is equipped with a gravity operated backdraft damper, the intake louver has a motorized damper.

The Office is heated by a gas-fired Reznor horizontal unit heater, with an a capacity of 25,000 Btuh input. 500 watt, 18" long, electric baseboard heaters are provided in the Toilet room and Storage rooms.

The Clorine room is heated by a gas-fired Reznor horizontal unit heater, with a capacity of 25,000 Btuh input. A small wall ventilation fan, 265 cfm, is manually operated with a wall switch.

The Storage room is heated by a Markel explosion-proof unit heater, 5 kw capacity.

Domestic Hot Water

Domestic hot water for the private toilet room and countertop sink is an 20 gallon electric hot water heater, located under the office counter.

Lighting System

The office, storage room and treatment rooms are lit with 4-foot fixtures containing T8 lamps and electronic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The toilet room is lit by an incandescent fixture. Standard switching is utilized and there are no other types of lighting controls present.

Exit signs throughout the building contain incandescent lamps and consume an estimated 40 watts of electricity per sign.

The exterior lighting is mounted on the building and includes an assortment of wall packs and incandescent fixtures.

Water Well House #5 – West Building

The 528 sq.ft. East Building houses Water Well #5 equipment, a 250 kw emergency generator and includes a storage room with a separate entrance. The building is generally unoccupied except for periodic maintenance visits. The facility is fairly new, building envelope, roof , doors and windows are in good condition.

Heating & Ventilation

The Well & Generator Room is heated by a single 3 kw Chomalox electric heater with integral thermostat.. A wall exhaust fan and corresponding intake louver provide ventilation and combustion/cooling air for the emergency generator.. The fan damper and intake damper were manually held open to provide summer ventilation of the space.

Lighting System

The well rooms are lit by a combination of 8-foot fixtures containing T12 lamps and magnetic ballasts, and incandescent fixtures. Standard switching is utilized and there are no other types of lighting controls present.

The exterior lighting is mounted on the building and includes an assortment of wall packs and incandescent fixtures.

Water Well House #3 – East Building

The 768 sq.ft. East Building houses Water Well #3 equipment and includes a storage room with a separate entrance. The building is generally unoccupied except for periodic maintenance visits. The facility is fairly new, building envelope, roof , doors and windows are in good condition.

Heating & Ventilation

The Well Room is heated by approximately 40 linear feet of electric baseboard heat which is contiuous along the outside walls of the space. A Honeywell thermostat controls the heaters. A 24” diameter wall exhaust fan and corresponding intake louver provide ventilation. The fan and intake damper are manually switched on/off to provide ventilation when needed.

The Storage Room is heated by a small electric heater with integral thermostat.

Lighting System

The well rooms are lit by 3-foot fixtures containing T12 lamps and magnetic ballasts. Standard switching is utilized and there are no other types of lighting controls present.

The exterior lighting is mounted on the building and includes an assortment of wall packs and incandescent fixtures.

VI. MAJOR EQUIPMENT LIST

Following the completion of the field survey a detailed equipment list was created. The equipment within this list is considered major energy consuming equipment whose replacement could yield substantial savings. In addition, the list shows the major equipment in the facility and all pertinent information utilized in energy savings calculations. An approximate age was assigned to the equipment if a manufacturers date was not shown on the equipment's nameplate. The ASHRAE service life for the equipment along with the remaining useful life is also shown in the Appendix.

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, lack of nameplates, etc.

Refer to Appendix D for the Major Equipment List for this facility.

VII. ENERGY CONSERVATION MEASURES (ECM)

Our analysis of the utility data and building use did not reveal any viable Energy Conservation Measures (ECM's) for this facility other than a roof mounted PV Solar Panel system. The facility is only occupied for approximately 4 hours per month for periodic inspections and maintenance.

Since the facility is rarely occupied, the lights are switched off most of the time. Any system switched to off is already yielding the maximum in energy conservation. It is recommended that the existing incandescent lamps be replaced with compact fluorescent lamps at the end of their useful life and that the existing T12 lamps be replaced with T8 lamps and ballasts when periodic maintenance is performed.

A review of the utility bills reveals no summer or winter spike in energy use that could be attributed to heating or cooling cost. The building does not have any mechanical cooling. The summer electric use increases are due to the water well pumps operation due to seasonal increase in town population. The presence of many gas-fired unit heaters and baseboard electric heat would normally indicate gas use to match. However, the annual gas bill is only $935. It is apparent that the heat dissipated by the water pump motors, filter equipment and electrical gear is supporting the heating load. Also, temperatures are not maintained for human comfort, only for freeze and condensation prevention.

VIII. RENEWABLE/DISTRIBUTED ENERGY MEASURES (ECM #1)

Globally, renewable energy has become a priority affecting international and domestic energy policy. The State of New Jersey has taken a proactive approach, and has recently adopted in its Energy Master Plan a goal of 30% renewable energy by 2020. To help reach this goal New Jersey created the Office of Clean Energy under the direction of the Board of Public Utilities and instituted a Renewable Energy Incentive Program to provide additional funding to private and public entities for installing qualified renewable technologies. A renewable energy source can greatly reduce a building's operating expenses while producing clean environmentally friendly energy. CEG has assessed the feasibility of installing renewable energy technologies for Borough of Lavallette's Newark Avenue Water Treatment Plant, and concluded that there is potential for solar energy generation.

Solar energy produces clean energy and reduces a building's carbon footprint. This is accomplished via photovoltaic panels which will be mounted on all south and southwestern facades of the building. Flat roof, as well as sloped areas can be utilized; flat areas will have the panels turned to an optimum solar absorbing angle. (A structural survey of the roof would be necessary before the installation of PV panels is considered). The state of NJ has instituted a program in which one Solar Renewable Energy Certificate (SREC) is given to the Owner for every 1000 kWh of generation. SREC's can be sold anytime on the market at their current market value. The value of the credit varies upon the current need of the power companies. The average value per credit is around $350, this value was used in our financial calculations. This equates to $0.35 per kWh generated.

CEG has reviewed the existing roof area of the building being audited for the purposes of determining a potential for a roof mounted photovoltaic system. A roof area of 980 S.F. can be utilized for a PV system on the Main Filter building roof. A depiction of the area utilized is shown in Appendix F following the financial calculations. Using this square footage it was determined that a system size of 15.18 kilowatts could be installed to match the maximum peak monthly demand. The required square footage for a system of this size is 970 S.F. and has an estimated kilowatt hour production of 23,689 KWh annually, reducing the overall electric consumption by approximately 12%. A detailed financial analysis can be found in Appendix F. This analysis illustrates the payback of the system over a 25 year period. The eventual degradation of the solar panels and the price of accumulated SREC's are factored into the payback.

CEG has reviewed financing options for the owner. Two options were studied and they are as follows: Self-financed and direct purchase without finance. Self-finance was calculated with 95% of the total project cost financed at a 7% interest rate over 25 years. Direct purchase involves the local government paying for 100% of the total project cost upfront. Both of these calculations include a utility inflation rate as well as the degradation of the solar panels over time. Based on our calculations the following are the payback periods for the respective method of payment:

PAYMENT TYPE	SIMPLE PAYBACK	INTERNAL RATE OF RETURN
Self-Finance	11.07 Years	14.3 %
Direct Purchase	11.07 Years	8.2 %

The above information is concluded as ECM #1 showing installation costs, energy savings and other pertinent summarized information in Section I of this report.

Wind energy production is an option available through the Renewable Energy Incentive Program. Small wind turbines can be utilized to produce clean energy on a per building basis. Cash incentives are available per kWh of electric usage. CEG has reviewed the applicability of wind energy for Borough of Lavallette and has determined it is not a viable option. Low average wind speeds for the area are not adequate for wind turbine generation. Typical wind turbines start producing energy at 8 mph wind speeds. The nearest wind station to Lavallette is Toms River. Average 5.4 mph wind speeds making this application impractical.

IX. ENERGY PURCHASING AND PROCUREMENT STRATEGY

Load Profile:

Load Profile analysis was performed to determine the seasonal energy usage of the facility. Irregularities in the load profile will indicate potential problems within the facility. Consequently based on the profile a recommendation will be made to remedy the irregularity in energy usage. For this report, the facility's energy consumption data was gathered in table format and plotted in graph form to create the load profile. Refer to Section IV, Figures 1 and 2 included within this report to reference the respective electricity and natural gas usage load profile for January 2008 through December 2008.

Electricity:

Section IV, Figure 1 demonstrates a typical cooling profile, (April –October), complimenting the heating load (November – March). It is evident that there is a significant reduction in consumption from October to December 2008 and a substantial increase from May to September 2008. The summertime load is typical, with some expected increased consumption in the June-September period. Base-load shaping is important because a flat consumption profiles will yield more competitive pricing. This facility is heated by electric base-board heaters and an electric unit heater. Air conditioning is supplied by a number of window units.

Natural Gas:

Section IV, Figure 2 demonstrates a typical heating load (November –March), and a very complimentary cooling load (April –October). Consequently there is a clear separation between summer and winter loads consistent with energy commodity prices traded on the New York Mercantile Exchange. Heating loads carry a much higher average cost because of the higher demand for natural gas during the winter for heating. This facility utilizes a duct furnace.

Tariff Analysis:

Electricity:

This facility receives electrical service from the Lavallette Electric Utility on a General Service tariff rate. General Service is for electric service for customers other than Residential and/or Residential Total Electric. Lavallette has installed new rates for the period October 1 through May 31, 2009 of $.14050/kWh, (this represents a 12% decrease in rates) and June 1 through September 30, 2009 of $.16750 / kWh (this represents a 10% decrease in rates). The General Service customers also pay a Customer Charge of $14.75 per month.

Natural Gas:

The Borough receives natural gas Delivery Service through New Jersey Natural Gas Company on a GSS (General Service Small) or GSL (General Service Large) tariff rate schedule. The Water Treatment Plant utilizes the GSL rate schedule, and it is available to any Customer in the

entire territory served by the Company who use is greater than or equal to 5,000 therm's annually and uses gas for all purposes other than residential and interruptible service. Where the customer uses the Cooling, Air Conditioning and Pool Heating Service (CAC) under Special Provision 1 applicable to customers purchasing gas supply under Rider "A", the Company will, upon application of the Customer, meter the space heating and the "CAC" separately.
This service is considered a "firm" service. Where the customer may either purchase gas from Company's Rider "A", for Basic Gas Supply Service (BGSS) or from a Marketer or Broker.

The basic charges under this tariff are for: Customer Charge, Demand Charge, Delivery Charge and if the customer elects, the BGSS Supply Charge.

The customer can elect to have the Commodity Charge serviced through the utility or by a Third Party Supplier (TPS). It is pertinent to note, should the TPS not deliver, and the customer will receive replacement service from the utility which carries an extremely high penalty cost of service.

Imbalances can occur when Third Party Suppliers are used to supply natural gas, full-delivery is not made, and when a new supplier is contracted or the customer returns to the utility. It is important when utilizing a Third Party Supplier, that an experienced regional supplier is used. Otherwise, under delivery can occur, jeopardizing economics and scheduling.

The information provided by Lavallette represents that they are currently utilizing the service of a Third Party Supplier PEPCO Energy Services. CEG believes there is room within in the "upcharge" for improvement (please see comments below).

Recommendations:

CEG recommends a global approach that will be consistent with all facilities within the Borough. CEG's primary observation is seen in the electricity costs. The Total Weighted Average price per kWh (kilowatt) for all buildings is $.167704 / kWh, (kWh, kilowatt hour is the common unit of electric measure). Energy commodities are among the most volatile of all commodities, however at this point and time, energy is extremely competitive. The Township could see significant savings if it were to take advantage of these current market prices quickly, before energy increases. Based on last year's historical consumption (January – December 2008) and current electric rates, the Borough could improve end-user energy costs by approximately 25%. (Note: Savings were calculated using Lavallette's Total Annual Consumption of 791,483 kWh's and a variance of approximately $.0427/kWh, utilizing a fixed one-year commodity contract). CEG recommends aggregating the entire electric load to gain the most optimal energy costs. CEG also recommends advisement for alternative sourcing and supply of energy on a "managed approach" basis. CEG realizes that Lavallette is a Municipal Electric Company, but also realizes that energy costs are at historic lows, and that there is an opportunity here if/that the Borough should investigate.

CEG's realizes that The Borough utilizes the services of a Third Party Supplier for Natural Gas. The contract with PEPCO Energy Services will terminate in January 31, 2010. CEG recommends renegotiation of the agreement before winter, when prices intrinsically escalate.

When The Borough renegotiates this agreement CEG suggests careful consideration of the basis, "upcharge". CEG believes that this charge could see improvement of 30%. CEG recommends energy advisory services to create a strategy for energy procurement.

CEG also recommends that the Borough of Lavallette schedule a meeting with their current utility providers to review their utility charges and current tariff structures for electricity and natural gas. This meeting would provide insight regarding alternative procurement options that are currently available. Through its meeting with the Local Distribution Company (LDC), the Township will learn more about the competitive supply process and can acquire a list of approved Third Party Suppliers from the New Jersey Board of Public Utilities website at www.nj.gov/bpu. (if competition is allowed). They should also consider using a billing-auditing service to further analyze the utility invoices, manage the data and use the data to manage ongoing demand-side management projects. Furthermore, CEG recommends special attention to credit mechanisms, imbalances, balancing charges and commodity charges when meeting with their utility representative. In addition, The Borough should consider alternative billing options. Some utilities allow for consolidated billing options when utilizing the service of a Third Party Supplier.

Finally, if the Borough of Lavallette frequently changes its supplier for energy (natural gas), it needs to closely monitor balancing, particularly when the contract is close to termination.

X. INSTALLATION FUNDING OPTIONS

CEG has reviewed various funding options for the Owner to utilize in subsidizing the costs for installing the energy conservation measures noted within this report. Below are a few alternative funding methods:

i. *Energy Savings Improvement Program (ESIP)* – Public Law 2009, Chapter 4 authorizes government entities to make energy related improvements to their facilities and par for the costs using the value of energy savings that result from the improvements. The "Energy Savings Improvement Program (ESIP)" law provides a flexible approach that can allow all government agencies in New Jersey to improve and reduce energy usage with minimal expenditure of new financial resources.

ii. *Municipal Bonds* – Municipal bonds are a bond issued by a city or other local government, or their agencies. Potential issuers of municipal bonds include cities, counties, redevelopment agencies, school districts, publicly owned airports and seaports, and any other governmental entity (or group of governments) below the state level. Municipal bonds may be general obligations of the issuer or secured by specified revenues. Interest income received by holders of municipal bonds is often exempt from the federal income tax and from the income tax of the state in which they are issued, although municipal bonds issued for certain purposes may not be tax exempt.

iii. *Power Purchase Agreement* – Public Law 2008, Chapter 3 authorizes contractor of up to fifteen (15) years for contracts commonly known as "power purchase agreements." These are programs where the contracting unit (Owner) procures a contract for, in most cases, a third party to install, maintain, and own a renewable energy system. These renewable energy systems are typically solar panels, windmills or other systems that create renewable energy. In exchange for the third party's work of installing, maintaining and owning the renewable energy system, the contracting unit (Owner) agrees to purchase the power generated by the renewable energy system from the third party at agreed upon energy rates.

CEG recommends the Owner review the use of the above-listed funding options in addition to utilizing their standard method of financing for facilities upgrades in order to fund the proposed energy conservation measures.

XI. ADDITIONAL RECOMMENDATIONS

The following recommendations include no cost/low cost measures, Operation & Maintenance (O&M) items, and water conservation measures with attractive paybacks. These measures are not eligible for the Smart Start Buildings incentives from the office of Clean Energy but save energy none the less.

A. Chemically clean the condenser and evaporator coils periodically to optimize efficiency. Poorly maintained heat transfer surfaces can reduce efficiency 5-10%.

B. Maintain all weather stripping on windows and doors.

C. Use cog-belts instead of v-belts on all belt-driven fans, etc. These can reduce electrical consumption of the motor by 2-5%.

D. Reduce lighting in specified areas where the foot candle levels are above 70 in private offices and above 30 in corridor, lobbies, etc.

E. Provide more frequent air filter changes to decrease overall fan horsepower requirements and maintain better IAQ.

F. Recalibrate existing sensors serving the office spaces

G. Install a Vending Miser system to turn off the vending machines in the lunch room when not in use.

H. Clean all light fixtures to maximize light output.

I. Confirm that outside air economizers on the rooftop units that serve the Office Areas are functioning properly to take advantage of free cooling.

APPENDIX

Electric Cost Summary

Water Treatment plant -
Newark Ave.
Lavallett Electric Utility
Acct.No: 1798

Appendix A

Month	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Total
Last Meter Read Date	1/25/2008	2/25/2008	3/25/2008	4/24/2008	5/26/2008	6/26/2008	7/26/2008	8/27/2008	9/24/2007	10/23/2008	12/9/2008	1/12/2009	1/25/2008
Current Meter Read Date	2/25/2008	3/25/2008	4/24/2008	5/26/2008	6/26/2008	7/26/2008	8/27/2008	9/24/2007	10/23/2008	12/9/2008	1/12/2009	1/25/2008	1/25/2008
Billing Days	33	30	32	29	29	32	30	29	32	31	28	32	367
KWH	12,360	13,320	14,280	11,760	17,040	7,440	34,080	24,360	20,400	10,680	17,520	13,560	196,800
KW	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Monthly Load Factor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minium Charge	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$177
Delivery $/kwh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Electric Supply, $	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supply $/kwh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Cost, $	$1,968	$2,119	$2,271	$1,873	$2,707	$1,391	$6,320	$4,521	$3,789	$1,702	$2,783	$2,157	$33,601
$/KWH	$0.1592	$0.1591	$0.1590	$0.1593	$0.1589	$0.1870	$0.1854	$0.1856	$0.1857	$0.1594	$0.1588	$0.1591	$0.1707

Natural Gas Cost Summary

Newark Ave.
New Jersey Natural Gas
Acct. No.19-4792-3860-25

Month	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Total
Billing Days	32	28	28	31	32	30	30	30	30	29	32	32	364
Last Meter Read Date	1/10/2008	2/11/2008	3/11/2008	4/8/2008	5/9/2008	6/10/2008	7/10/2008	8/9/2008	9/8/2008	10/8/2008	11/6/2008	12/8/2008	1/10/2008
Current Meter Read Date	2/11/2008	3/11/2008	4/8/2008	5/9/2008	6/10/2008	7/10/2008	8/9/2008	9/8/2008	10/8/2008	11/6/2008	12/8/2008	1/9/2009	1/9/2009
Gas Used per 100 cu ft	124	61	30	0	1	0	0	0	0	20	113	75	424
BTU Factor	1.05	1.05	1.05	1.05	1.04	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Therms (Burner Tip)	129	64	32	0	1	0	0	0	0	21	118	79	444
Total Distribution Cost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cost per Therm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Commodity Cost	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cost per Therm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Cost	$201	$115	$70	$15	$41	$20	$20	$20	$21	$59	$206	$148	$935
Cost per Therm	$1.56	$1.80	$2.21	#DIV/0!	$39.31	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	$2.80	$1.75	$1.88	$2.109

Borough of Lavallette - Newark Avenue Water Treatment Plant

CONSTRUCTION COST AND REBATES					
ECM #1 - PV SOLAR	Qty	Unit Cost $	Material $	Labor $	Total $
PV Solar	66	$2,070	$136,620	included	$136,620
Total					**$136,620**

Concord Engineering Group, Inc.

520 BURNT MILL ROAD
VOORHEES, NEW JERSEY 08043
PHONE: (856) 427-0200
FAX: (856) 427-6508

SmartStart Building Incentives

The NJ SmartStart Buildings Program offers financial incentives on a wide variety of building system equipment. The incentives were developed to help offset the initial cost of energy-efficient equipment. The following tables show the current available incentives as of January, 2009:

Electric Chillers

Water-Cooled Chillers	$12 - $170 per ton
Air-Cooled Chillers	$8 - $52 per ton

Gas Cooling

Gas Absorption Chillers	$185 - $400 per ton
Gas Engine-Driven Chillers	Calculated through custom measure path)

Desiccant Systems

	$1.00 per cfm – gas or electric

Electric Unitary HVAC

Unitary AC and Split Systems	$73 - $93 per ton
Air-to-Air Heat Pumps	$73 - $92 per ton
Water-Source Heat Pumps	$81 per ton
Packaged Terminal AC & HP	$65 per ton
Central DX AC Systems	$40- $72 per ton
Dual Enthalpy Economizer Controls	$250

Ground Source Heat Pumps

Closed Loop & Open Loop	$370 per ton

Gas Heating

Gas Fired Boilers < 300 MBH	$300 per unit
Gas Fired Boilers ≥ 300 - 1500 MBH	$1.75 per MBH
Gas Fired Boilers ≥1500 - ≤ 4000 MBH	$1.00 per MBH
Gas Fired Boilers > 4000 MBH	(Calculated through Custom Measure Path)
Gas Furnaces	$300 - $400 per unit

Variable Frequency Drives

Variable Air Volume	$65 - $155 per hp
Chilled-Water Pumps	$60 per hp
Compressors	$5,250 to $12,500 per drive

Natural Gas Water Heating

Gas Water Heaters ≤ 50 gallons	$50 per unit
Gas-Fired Water Heaters >50 gallons	$1.00 - $2.00 per MBH
Gas-Fired Booster Water Heaters	$17 - $35 per MBH

Premium Motors

Three-Phase Motors	$45 - $700 per motor

Prescriptive Lighting

T-5 and T-8 Lamps w/Electronic Ballast in Existing Facilities	$10 - $30 per fixture, (depending on quantity)
Hard-Wired Compact Fluorescent	$25 - $30 per fixture
Metal Halide w/Pulse Start	$25 per fixture
LED Exit Signs	$10 - $20 per fixture
T-5 and T-8 High Bay Fixtures	$16 - $284 per fixture

Lighting Controls – Occupancy Sensors

Wall Mounted	$20 per control
Remote Mounted	$35 per control
Daylight Dimmers	$25 per fixture
Occupancy Controlled hi-low Fluorescent Controls	$25 per fixture controlled

Lighting Controls – HID or Fluorescent Hi-Bay Controls

Occupancy hi-low	$75 per fixture controlled
Daylight Dimming	$75 per fixture controlled

Other Equipment Incentives

Performance Lighting	$1.00 per watt per SF below program incentive threshold, currently 5% more energy efficient than ASHRAE 90.1-2004 for New Construction and Complete Renovation
Custom Electric and Gas Equipment Incentives	not prescriptive

Borough of Lavallette - Newark Ave. Water Treatment Plant

Newark Ave. Water Treatment Plant - Main Filter Building

QUANITY	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	REMAINING USEFUL LIFE	NOTES
4	REZNOR	F-25	GAS-FIRED HORIZONTAL UNIT HEATER	25,000 BTUH INPUT	80%	MAIN FILTER ROOM	10 YEARS	WITH WALL MOUNTED THERMOSTAT
1	REZNOR	F-25	GAS-FIRED HORIZONTAL UNIT HEATER	25,000 BTUH INPUT	80%	OFFICE	10 YEARS	WITH WALL MOUNTED THERMOSTAT
1	REZNOR	F-25	GAS-FIRED HORIZONTAL UNIT HEATER	25,000 BTUH INPUT	80%	CLORINE ROOM	5 YEARS	CORRIOSION DAMAGE FROM CLORINE; WITH WALL MOUNTED THERMOSTAT
2	MARKEL	HQC	ELECTRIC BASEBOARD	500 WATTS	100%	TOILET ROOM; STORAGE ROOM	10 YEARS	WITH INTEGRAL THERMOSTATS
1	MARKEL	HLA	ELECTRIC UNIT HEATER	5 KW	100%	FUTURE LIME STORAGE ROOM	10 YEARS	EXPLOSION PROOF CONSTRUCTION, WITH WALL MOUNTED THERMOSTAT
1	STATE	PATRIOT	ELECTRIC DOMESTIC HWH	20 GALLON	100%	OFFICE	10 YEARS	

Newark Ave. Water Treatment Plant - West Building, Water Well House #5

QUANITY	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	REMAINING USEFUL LIFE	NOTES
1	CHROMOLOX	UNKNOWN	ELECTRIC UNIT HEATER	3 KW	100%	WELL HOUSE #5	5 YEARS	WITH INTEGRAL THERMOSTAT

Newark Ave. Water Treatment Plant - East Building, Water Well House #3

QUANITY	MAKE	MODEL	TYPE	CAPACITY	EFFICIENCY	SERVES	REMAINING USEFUL LIFE	NOTES
40 Ll.f.	CHROMOLOX	UNKNOWN	ELECTRIC BASEBOARD HEAT	APPROX. 10 KW	100%	WELL HOUSE #5	5 YEARS	WITH WALL THERMOSTAT

INVESTMENT GRADE LIGHTING AUDIT

CONCORD ENERGY SERVICES

BS09-007
Borough of Lavallette - Water Treatment Plant
Newark Avenue
Lavallette, NJ

Date:

	Existing Fixtures						Proposed Fixtures									Fixtures Retrofitted			Unit Installation Cost							
Existing Lighting Fixture Type	**Room Name**	**Lighting Fixture Description**	**Lamps per Fixture**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Existing/Replace**	**Description**	**Lamps per Fixture**	**Watts**	**Qty of Fixtures**	**Total Watts**	**Wattage Reduction**	**Average Burn Hours**	**Ave $/kwh**	**Energy Savings, kWh**	**Energy Savings, $**	**Qty**	**Material Each**	**Labor Each**	**Total Each**	**Total Materials**	**Total Labor**	**Total All**	**Rebate Estimate**	**Simple Payback**
	Water Treatment Building																									
A	Office	2L-T8-32w- 4' Linear	2	55	6	330	Existing to Remain	Existing to Remain	2	55	6	330	0	260	$0.17	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
D	Toilet Room	1L-A Lamp-100w	1	100	1	100	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	82	260	$0.17	21	$3.62	1	$ 5.86	$ 28.00	$33.86	$5.86	$28.00	$33.86	$0.00	9.3
C	Storage Room	2L-T8-32w- 4' Linear	2	55	2	110	Existing to Remain	Existing to Remain	2	55	2	110	0	260	$0.17	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
B	Filter Room	4L-T8-8' Linear	4	108	15	1620	Existing to Remain	Existing to Remain	4	108	15	1620	0	260	$0.17	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
C		2L-T8-32w- 4' Linear	2	55	3	165	Existing to Remain	Existing to Remain	2	55	3	165	0	260	$0.17	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
A	Chlorine Room	2L-T8-32w- 4' Linear	2	55	3	165	Existing to Remain	Existing to Remain	2	55	3	165	0	260	$0.17	0	$0.00	0	$ -	$ -	$0.00	$0.00	$0.00	$0.00	$0.00	
	Water Treatment Building Summary				**30**	**2490**					**30**	**2408**	**82**			**21**	**$3.62**	**1**				**$6**	**$28**	**$34**	**$0**	**9.3**
	Water Well Building (East)																									
F	Well Room	2L-T12-3' Linear	2	80	3	240	Relamp, Reballast	Sylvania Lamps FO25/835/XP/ECO Sylvania Ballast QHE 2X32T8/UNV ISN-SC	2	43	3	129	111	260	$0.17	29	$4.91	3	$ 32.95	$ 60.00	$92.95	$98.85	$180.00	$278.85	$30.00	50.7
	Water Well Building (East) Summary				**3**	**240**					**3**	**129**	**111**			**29**	**$4.91**	**3**				**$99**	**$180**	**$279**	**$30**	**50.7**
	Water Well Building (West)																									
E	Well Room	2L-T12-8' Linear	2	160	3	480	Relamp, Reballast	Sylvania Lamps FO96/835/XP/SS/ECO Sylvania Ballast QHE 2X59T8/UNV ISL-SC	2	89	3	267	213	260	$0.17	55	$9.41	3	122.8	60	$182.80	$368.40	$180.00	$548.40	$30.00	55.1
D		1L-A Lamp-100w	1	100	1	100	Relamp	Sylvania CF19EL/MINI/830	1	18	1	18	82	260	$0.17	21	$3.62	1	5.86	28	$33.86	$5.86	$28.00	$33.86	$0.00	9.3
	Water Well Building (West) Summary				**4**	**580**					**4**	**285**	**295**			**77**	**$13.04**	**4**				**$374**	**$208**	**$582**	**$30**	**42.4**

Project Name: Borough of Lavallette - Newark Ave. Water treatment Plant
Location: Lavallette, NJ
Description: Photovoltaic System 95% Financing - 20 year

Simple Payback Analysis

	Photovoltaic System 95% Financing - 20 year
Total Construction Cost	$136,620
Annual kWh Production	23,689
Annual Energy Cost Reduction	$4,051
Annual SREC Revenue	$8,291
First Cost Premium	**$136,620**
Simple Payback:	**11.07** Years

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	95%
Financing Term (mths):	240	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.171**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	7.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Interest Expense	Loan Principal	Net Cash Flow	Cumulative Cash Flow
0	$6,831	0	0	0	$0	0	0	(6,831)	0
1	$0	23,689	$4,051	$0	$8,291	$8,987	$3,088	$267	($6,564)
2	$0	23,571	$4,172	$0	$8,250	$8,764	$3,311	$347	($6,217)
3	$0	23,453	$4,298	$0	$8,208	$8,525	$3,550	$431	($5,786)
4	$0	23,336	$4,426	$0	$8,167	$8,268	$3,807	$519	($5,267)
5	$0	23,219	$4,559	$239	$8,127	$7,993	$4,082	$372	($4,895)
6	$0	23,103	$4,696	$238	$8,086	$7,698	$4,377	$469	($4,426)
7	$0	22,987	$4,837	$237	$8,046	$7,382	$4,694	$571	($3,856)
8	$0	22,872	$4,982	$236	$8,005	$7,042	$5,033	$677	($3,179)
9	$0	22,758	$5,131	$234	$7,965	$6,678	$5,397	$787	($2,392)
10	$0	22,644	$5,285	$233	$7,925	$6,288	$5,787	$903	($1,489)
11	$0	22,531	$5,444	$232	$7,886	$5,870	$6,205	$1,023	($467)
12	$0	22,418	$5,607	$231	$7,846	$5,421	$6,654	$1,148	$681
13	$0	22,306	$5,776	$230	$7,807	$4,940	$7,135	$1,278	$1,959
14	$0	22,195	$5,949	$229	$7,768	$4,425	$7,650	$1,413	$3,372
15	$0	22,084	$6,127	$227	$7,729	$3,872	$8,203	$1,554	$4,926
16	$0	21,973	$6,311	$226	$7,691	$3,279	$8,796	$1,700	$6,627
17	$0	21,863	$6,500	$225	$7,652	$2,643	$9,432	$1,852	$8,479
18	$0	21,754	$6,695	$224	$7,614	$1,961	$10,114	$2,010	$10,489
19	$0	21,645	$6,896	$223	$7,576	$1,230	$10,845	$2,174	$12,664
20	$0	21,537	$7,103	$222	$7,538	$446	$11,629	$2,344	$15,008
21	$0	21,429	$7,316	$221	$7,500	$378	$10,691	$3,527	$18,535
22	$0	21,322	$7,536	$220	$7,463	$259	$8,798	$5,723	$24,258
23	$0	21,216	$7,762	$219	$7,425	$0	$0	$14,969	$39,226
24	$0	21,110	$7,995	$217	$7,388	$0	$0	$15,166	$54,392
25	$0	21,004	$8,235	$216	$7,351	$0	$0	$15,370	$69,761
	Totals:	451,938	$108,847	$3,686	$158,178	$111,712	$129,789	$149,278	$225,840
				Net Present Value (NPV)				**$11,734**	
				Internal Rate of Return (IRR)				**14.3%**	

Project Name: **Borough of Lavallette - Newark Ave. Water treatment Plant**
Location: **Lavallette, NJ**
Description: **Photovoltaic System - Direct Purchase**

Simple Payback Analysis

	Photovoltaic System - Direct Purchase
Total Construction Cost	$136,620
Annual kWh Production	23,689
Annual Energy Cost Reduction	$4,051
Annual SREC Revenue	$8,291
First Cost Premium	**$136,620**
Simple Payback:	**11.07** **Years**

Life Cycle Cost Analysis

Analysis Period (years):	25	Financing %:	0%
Financing Term (mths):	0	Maintenance Escalation Rate:	3.0%
Average Energy Cost ($/kWh)	**$0.171**	Energy Cost Escalation Rate:	3.0%
Financing Rate:	0.00%	SREC Value ($/kWh)	$0.350

Period	Additional Cash Outlay	Energy kWh Production	Energy Cost Savings	Additional Maint Costs	SREC Revenue	Net Cash Flow	Cumulative Cash Flow
0	$136,620	0	0	0	$0	(136,620)	0
1	$0	23,689	$4,051	$0	$8,291	$12,342	($124,278)
2	$0	23,571	$4,172	$0	$8,250	$12,422	($111,856)
3	$0	23,453	$4,298	$0	$8,208	$12,506	($99,350)
4	$0	23,336	$4,426	$0	$8,167	$12,594	($86,756)
5	$0	23,219	$4,559	$239	$8,127	$12,447	($74,309)
6	$0	23,103	$4,696	$238	$8,086	$12,544	($61,765)
7	$0	22,987	$4,837	$237	$8,046	$12,646	($49,120)
8	$0	22,872	$4,982	$236	$8,005	$12,752	($36,368)
9	$0	22,758	$5,131	$234	$7,965	$12,862	($23,506)
10	$0	22,644	$5,285	$233	$7,925	$12,978	($10,528)
11	$0	22,531	$5,444	$232	$7,886	$13,098	$2,570
12	$0	22,418	$5,607	$231	$7,846	$13,223	$15,793
13	$0	22,306	$5,776	$230	$7,807	$13,353	$29,146
14	$0	22,195	$5,949	$229	$7,768	$13,488	$42,634
15	$0	22,084	$6,127	$227	$7,729	$13,629	$56,263
16	$0	21,973	$6,311	$226	$7,691	$13,775	$70,038
17	$0	21,863	$6,500	$225	$7,652	$13,927	$83,966
18	$0	21,754	$6,695	$224	$7,614	$14,085	$98,051
19	$0	21,645	$6,896	$223	$7,576	$14,249	$112,300
20	$0	21,537	$7,103	$222	$7,538	$14,419	$126,720
21	$1	21,429	$7,316	$221	$7,500	$14,596	$141,315
22	$2	21,322	$7,536	$220	$7,463	$14,779	$156,094
23	$3	21,216	$7,762	$219	$7,425	$14,969	$171,063
24	$4	21,110	$7,995	$217	$7,388	$15,166	$186,229
25	$5	21,004	$8,235	$216	$7,351	$15,370	$201,598
	Totals:	451,938	$108,847	$3,686	$158,178	$338,218	$263,340
				Net Present Value (NPV)		**$201,623**	
				Internal Rate of Return (IRR)		**8.2%**	

Building	Usable Roof Area (sq ft)	Panel	Qty	Panel Sq Ft	Panel Total Sq Ft	Total KW	Total Annual kWh	Panel Weight (33 lbs)	W/SQFT
Newark Ave. Water Treat.	980	Sunpower SPR230	66	14.7	970	15.18	23,689	2,178	15.64

Total Roof Area 1400 x .70 = 980 Sq. Ft.

.= Proposed PV Layout

Notes:

1. Estimated kWH based on 4.68 hours full output per day per 365 day year. Actual kWH will vary day to day.

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Water Treatment Plant

Building ID: 1804213
For 12-month Period Ending: December 31, 2008[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: July 30, 2009

Facility
Water Treatment Plant
Newark Ave.
Lavallette, NJ 08735

Facility Owner
N/A

Primary Contact for this Facility
N/A

Year Built: 1999
Gross Floor Area (ft²): 4,236

Energy Performance Rating[2] (1-100) N/A

Site Energy Use Summary[3]

Natural Gas (kBtu)[4]	146,854
Electricity (kBtu)	658,049
Total Energy (kBtu)	804,903

Energy Intensity[5]

Site (kBtu/ft²/yr)	194
Source (kBtu/ft²/yr)	568

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	109

Electric Distribution Utility
Borough of Lavallette

National Average Comparison

National Average Site EUI	104
National Average Source EUI	213
% Difference from National Average Source EUI	167%
Building Type	Other

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Certifying Professional
N/A

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Water Treatment Plant	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Other	Is this an accurate description of the space in question?		☐
Location	Newark Ave., Lavallette, NJ 08735	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Water Treatment Plant (Other)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	4,236 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of PCs	1 (Optional)	Is this the number of personal computers in the space?		☐
Weekly operating hours	168 Hours(Optional)	Is this the total number of hours per week that the space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	2 (Optional)	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Borough of Lavallette

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
11/10/2008	12/09/2008	17,520.00
10/10/2008	11/09/2008	10,680.00
09/10/2008	10/09/2008	20,400.00
08/10/2008	09/09/2008	24,360.00
07/10/2008	08/09/2008	34,080.00
06/10/2008	07/09/2008	7,440.00
05/10/2008	06/09/2008	17,040.00
04/10/2008	05/09/2008	11,760.00
03/10/2008	04/09/2008	14,280.00
02/10/2008	03/09/2008	13,320.00
01/10/2008	02/09/2008	12,360.00
Electric Consumption (kWh (thousand Watt-hours))		**183,240.00**
Electric Consumption (kBtu)		**625,214.88**
Total Electricity Consumption (kBtu)		**625,214.88**
Is this the total Electricity consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas		
Meter: Gas (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
11/10/2008	12/09/2008	117.60
10/10/2008	11/09/2008	21.04
09/10/2008	10/09/2008	0.00
08/10/2008	09/09/2008	0.00
07/10/2008	08/09/2008	0.00
06/10/2008	07/09/2008	0.00
05/10/2008	06/09/2008	1,049.00
04/10/2008	05/09/2008	0.00
03/10/2008	04/09/2008	31.53
02/10/2008	03/09/2008	64.11

01/10/2008	02/09/2008	129.27
Gas Consumption (therms)		**1,412.55**
Gas Consumption (kBtu)		**141,255.00**
Total Natural Gas Consumption (kBtu)		**141,255.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

Certifying Professional

(When applying for the ENERGY STAR, this must be the same PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Water Treatment Plant
Newark Ave.
Lavallette, NJ 08735

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Water Treatment Plant	
Gross Floor Area Excluding Parking: (ft^2)	4,236
Year Built	1999
For 12-month Evaluation Period Ending Date:	December 31, 2008

Facility Space Use Summary

Water Treatment Plant	
Space Type	Other - Other
Gross Floor Area(ft^2)	4,236
Number of PCs[o]	1
Weekly operating hours[o]	168
Workers on Main Shift[o]	2

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 12/31/2008)	**Baseline** (Ending Date 12/31/2008)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft^2)	194	194	0	N/A	104
Source (kBtu/ft^2)	568	568	0	N/A	213
Energy Cost					
$/year	$ 33,866.94	$ 33,866.94	N/A	N/A	$ 18,130.24
$/$ft^2$/year	$ 8.00	$ 8.00	N/A	N/A	$ 4.28
Greenhouse Gas Emissions					
$MtCO_2e$/year	109	109	0	N/A	58
$kgCO_2e/ft^2$/year	26	26	0	N/A	14

More than 50% of your building is defined as Other. This building is currently ineligible for a rating. Please note the National Average column represents the CBECS national average data for Other. This building uses X% less energy per square foot than the CBECS national average for Other.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.