NORTH BERGEN HOUSING AUTHORITY
TERRACE APARTMENTS
ENERGY ASSESSMENT

for

NEW JERSEY
BUREAU OF PUBLIC UTILITIES

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1.0 INTRODUCTION & BACKGROUND

The North Bergen Housing Authority's (NBHA) Terrace Apartments (Terrace), built in 1971, is a 155,100 square foot senior housing facility located at 6800 Columbia Ave. in North Bergen, New Jersey. The facility is a "Y" shaped building with north, southwest, and southeast wings. The complex consists of senior living apartments, laundry room, Manager's Office, mailroom, Community Room, and kitchen. The complex has eleven floors with 252 apartments. Approximately 28 apartments, equaling slightly over 10%, were surveyed as part of the energy audit.

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

This report covers the energy audit for the North Bergen Housing Authority's Terrace Apartments.

2.0 EXECUTIVE SUMMARY

This report details the results of the North Bergen Housing Authority Terrace Apartments building, a 155,100 square foot senior living facility in North Bergen, New Jersey consisting of 252 apartments and common areas. The following areas were evaluated for energy conservation measures:

- Lighting upgrades
- Light bulb exchange
- Water conservation
- Temperature limiting thermostats
- Air conditioner changeout
- Night setback
- Exhaust fan control modifications
- Appliance upgrades

Various potential Energy Conservation Measures (ECMs) were identified for the above categories. Measures which are recommended for implementation have a payback of 10 years or less. This threshold is considered a viable return on investment. Potential annual savings of $77,200 for the recommended ECMs may be realized with a payback of 1.9 years.

The ECMs identified in this report will allow for the building to reduce its energy usage and if pursued has the opportunity to qualify for the New Jersey Smart Start Buildings Program. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

ECM – 1c Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
158,000	10.3	175,800	0	20,900	0.3	28,000	7.6	6.2

*Incentive is based on the New Jersey Smart Start Prescriptive Lighting Measures.

ECM – 2 Light Bulb Exchange

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
5,800	58.5	29,300	0	10,100	7.7	NA	0.6	NA

*No incentives available.

ECM -3c Install Faucet Aerators

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
12,100	745	6,700	7.3	NA	1.8	NA

*No incentives available.

ECM -3d Install Low Flow Showerheads

Budgetary Cost	Annual Utility Savings			Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total	ROI			
$	Kgal	$		$	Years	Years
17,300	843	7,600	5.6	NA	2.3	NA

*No incentives available.

ECM - 4 Temperature Limiting Thermostats

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
37,500	0	67,438	0	8,800	2.5	NA	4.3	NA

*No incentives available.

ECM – 6 Night Setback

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
2,300	0	11,000	0	1,400	8.6	NA	1.5	NA

*No incentives available.

ECM-7a Install On/Off Controls for Apartment Exhaust Fans

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
32,300	0.0	146,700	0	19,100	7.9	0	1.7	NA

*No incentives available.

ECM-7b Install On/Off Controls for Common Area Exhaust Fans

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
16,000	0	19,500	0	2,600	1.4	NA	5.4	NA

*No incentives available.

3.0 EXISTING CONDITIONS

3.1 Building – General

The NBHA's Terrace Apartments is an eleven story, 155,100 square foot senior housing facility. A large Community Room is on the first floor of the north wing. The center area of the first floor houses the Manager's Office, mailroom, restrooms, and several maintenance offices. The building exterior is concrete and metal fascia built on a concrete foundation. All apartments above the first floor have a continuous balcony that runs the length of the respective building wing. The roof is a flat built up structure with drains. Two stairwells lead to the roof, one at each end of the southwest and southeast wings. In the center of the building is a large penthouse with the gas fired emergency generator on the first level, and the elevator room on the second floor. A chimney exhausts the PVI domestic hot water heaters. The basement houses the electrical/mechanical, storage, laundry, and compactor rooms.

Heat to Terrace is provided by electric baseboard; cooling by window air conditioners. A natural gas fired 60 kW Cummins emergency generator for the entire complex is automatically tested an hour per week. It is used for emergency power only.

Bathrooms and kitchens in apartments, and elevators and hallways in the common areas are ventilated by 47 exhaust fans located on the roof of the north, southwest, and southeast wings. Makeup air is not provided to the building. The laundry room, located in the basement, contains ten (10) washing machines and ten (10) 146,000 BTUH gas-fired dryers.

The building is occupied at all times, with the exception of the Manager's Office, which are operational approximately eight to ten hours per day, five days a week. Multi-use spaces such as the Community Room can be occupied into the evening hours.

An inventory of energy consuming equipment is provided in Appendix S.

3.2 Utility Usage

The building uses electricity and natural gas. Water for potable uses is delivered by a public municipal water system, and sewer water is discharged to a municipal wastewater treatment system.

Electricity and natural gas is supplied and delivered by PSE&G. Electricity is delivered via meter #778013923, and natural gas is delivered via meter #3163748. From May 2008 through April 2009, the building had an annual electric consumption of 2,911,200 kWh, with a demand peak of approximately 848.0 kW (occurring in January 2009), and an annual electric cost of $377,100. This results in a blended electric unit cost of $0.1295 per kWh. Natural gas consumption (for hot water heating and emergency generator) during the same period was 35,800 therms, for an annual cost of $43,500. This results in a natural gas unit cost of $1.216 per therm.

A summary of monthly electricity and natural gas usages and charges for the past year are provided in Appendix A.

Electricity and natural gas commodity supply and delivery are presently purchased from PSE&G. The delivery component for electricity and natural gas will always be the responsibility of the utility that connects the facility to the power grid or gas distribution network; however, electrical and natural gas commodity supply can be purchased from a third party. Traditionally, the electrical and natural gas commodity supply entity will require one to three years of past energy bills to submit a contract. Contract

terms can vary by supplier; therefore, all aspects of contract terms should be carefully considered before making a selection. A list of approved electrical and natural gas energy commodity suppliers is provided in Appendix A.

After a review of PSE&G tariffs, based on existing usage has been concluded that the building is in the correct utility rate structure for both natural gas and electricity. Electricity is billed under the Large Power and Lighting Tariff and natural gas is billed under the Large Volume Service.

3.3 HVAC Systems

3.3.1 Heating System

Electric baseboard provides apartment heating. Each apartment has a thermostat for controlling space temperature.

3.3.2 Domestic Hot Water Heating System

Domestic hot water heating is supplied through three PVI Power VT gas fired condensing water heaters, located in the basement. Each system is designed for 1 MMBH capacity. Two systems usually carry the load with the third unit serving as backup. The system contains a mixing valve and small recirculation pump. The old domestic water heating pumps are abandoned in place.

3.3.3 Direct Expansion Air Conditioning Units

The Community Room is cooled by four Luxaire evaporator/fan units. The evaporator/fan sections are mounted in the ceiling while the associated condenser units are outside on the west side of the area.

The Manager's Office on the first floor has a Mitsubishi split AC unit. The condenser is mounted on the south side of the building. The room is heated with electric baseboard radiation. The laundry room has two split air conditioning units. The two linear evaporators are mounted on the wall and the condensers are on the north side of the building.

A total of 258 window air conditioning units, between 5,000 and 10,000 BTUH in capacity, were counted. The majority had an EER below 10.

3.3.4 Exhaust Fans

Terrace has 46 roof exhaust fans for the apartment bathrooms and kitchen hoods, and common hallways. The Community Room kitchen has a wall mounted exhaust fan near the range.

3.4 Lighting/Electrical

Most of the lighting was considered efficient in the early 1970s, when the building was constructed. By today's standards, the lighting fixtures and controls are inefficient and can be upgraded. A majority of the lighting is provided by inefficient T-12 fixtures with magnetic ballasts. Some T-8 bulbs were noted in T-12 fixtures with magnetic ballasts. In almost all cases, these were found burned out. The lighting in the laundry area has been upgraded to T-8 lamps with electronic ballasts.

Most of the observed apartments had enclosed T-8 ceiling mounted fixtures, T-12 under-cabinet lighting, and 60 watt to 75 watt incandescent bulbs in tenants' lamps. Some apartments also had screw-in compact fluorescent lamps (CFL) in ceiling fixtures and lamps. The majority of original incandescent lighting

fixtures have been replaced with efficient CFLs. No occupancy sensors were observed in the apartments. Most of the exit signs presently do not utilize high efficiency LED technology.

Outdoor lighting consists of high pressure sodium (HPS) and mercury vapor (MV) fixtures utilizing timers which allow for the fixtures to de-energize at a specific time to shut off fixtures during daylight hours. Outdoor lighting fixtures that are connected to timers turn on and off at a certain time each day. All observed outdoor lighting fixtures were off during the site visit.

3.5 Control Systems

There is no centralized building management system (BMS) in the facility. All heating in the apartments is controlled with wall mounted thermostat.

The Manager's Office has a linear AC unit with a remote. Heating in the offices is provided by electric baseboard radiation, and controlled by a wall mounted thermostat. The domestic hot water system is managed by controls on the PVI heaters.

Heating of the makeup air behind the Speed Queen dryers is performed by two Reznor gas fired unit heaters with wall mounted thermostats.

4.0 ENERGY CONSERVATION MEASURES

The TREAT (Targeted Retrofit Energy Analysis Tool) modeling software was selected to perform the majority of the building energy analyses for this project. TREAT, designed and funded by the New York State Energy Research and Development Authority with software protocols specific to public housing projects, integrates fuel bill analysis, weather data, and building modeling information into a database environment. TREAT allows energy efficiency programs to track actual savings relative to predicted savings, and is designed to support Total Quality Management techniques.

TREAT integrates room-by-room heat loss analysis for public housing structures with an hourly energy model developed by the United States Department of Energy National Renewable Energy Lab. Combined, these tools provide enhanced whole building energy saving packages. It is also approved by USDOE for use in Weatherization Assistance Programs.

4.1 ECM-1 Lighting Upgrades

4.1.1 ECM-1a Lighting Replacements

A comprehensive fixture survey was conducted of common areas and approximately 10% of the apartments. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established. The existing base case lighting energy consumption was calculated and compared to the proposed lighting replacements.

The following lighting upgrades were also considered where appropriate:

- Retrofit existing hallway and lobby T-12 fixtures (2' x 2' U-Tube) to 17 watt 2' lamps with reflector kits
- Replace apartment level hallway T-12 fixtures with T-8 fixtures
- Retrofit existing T-12 34-watt 2, 3 & 4 fixtures with T-8 28-watt lamps and electronic ballasts
- Replace incandescent exit signs with LED technology
- Retrofit outdoor incandescent wall mounted fixtures with outdoor rated efficient compact fluorescent fixtures

The above measures will allow the facility to stock only T-8 fixtures in the future. Presently, the facility has a mixture of T-12 and T-8 lamps with multiple ballast combinations. In the future, the facility should only purchase low wattage super T-8s and ballasts, such as the low wattage 4 ft 28 watt units. These lamps may be directly installed into any existing 34 watt fixture when lamps fail.

Lighting has an expected lifetime of 20 years, according to IEEE, and the estimated annual energy savings was 58,700 kWh for a total energy savings of 1,174,000 kWh ($156,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix B and summarized as follows:

ECM – 1a Lighting Replacements

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
65,800	10.3	58,700	0	7,800	1.4	12,400	8.5	6.9

*Incentive is based on the New Jersey Smart Start Prescriptive Lighting Measures.

This measure is not recommended in lieu of ECM-1c.

NBHA is considering replacing all T-12 fixtures located in the hallways with new T-8 fixtures. Each floor has 15 fixtures with 1 x 48" T-12 lamps with Mag-STD ballast, and would be replaced with 1 x 48" T-8 lamps with electronic ballast. A cost of $175 per fixture was assumed for these replacements.

4.1.2 ECM-1b Install Lighting Occupancy Sensors

In many common areas of Terrace, occupancy varies based on usage and time of day. A lighting survey was conducted of all fixtures to determine the average time lights are presently on in each space. It is proposed that occupancy sensors be installed in selected rooms to turn off the lights when the area is unoccupied. Ceiling or wall mounted lighting sensors were considered for the Community Room, laundry, offices, as well as for any apartment kitchens and bathrooms. Occupancy sensors were not considered in mechanical areas and stairways due to safety concerns. Other areas were not considered due to the proposed location of the occupancy sensor. If a sensor does not have a clear view of the occupant's room or hallway, it may darken even with people in the space, creating an unsafe condition.

Occupancy sensors have an expected lifetime of 10 years, according to IEEE, and the estimated annual energy savings was 122,200 kWh for a total energy savings of 1,222,000 kWh ($137,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

ECM – 1b Install Occupancy Sensors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
92,200	0.0	122,200	0	13,700	0.5	15,500	6.7	5.6

*Incentive is based on the New Jersey Smart Start Prescriptive Lighting Measures.

This measure is not recommended in lieu of ECM-1c.

4.1.3 ECM-1c Lighting Replacements with Occupancy Sensors

This measure is a combination of ECMs 1a and 1b to allow for maximum energy and demand reduction. Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. Presently, the facility has numerous fixtures that contain T-8, T-12 lamps with magnetic and electronic ballasts. To increase reliability and ease of maintenance, all fixtures with the older

technology should be upgraded so that NBHA has common T-8 lamps with electronic ballasts throughout the facility. In combination with the above measures the facility should consider stocking low wattage 28 watt T-8s 4-foot lamps to replace the existing 34 watt lamps when they fail. These lamps can be installed in the existing efficient T-8 electronic ballasted fixtures and will increase the energy efficiency of the system.

This type of the system has an expected lifetime of 10 years and the estimated annual energy savings was 175,800 kWh for a total energy savings of 1,758,000 kWh ($209,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix D and summarized below:

ECM – 1c Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
158,000	10.3	175,800	0	20,900	0.3	28,000	7.6	6.2

*Incentive is based on the New Jersey Smart Start Prescriptive Lighting Measures.

This measure is recommended.

4.2 ECM-2 Light Bulb Exchange

Approximately 28 apartments, about 10% of the apartments, were surveyed as part of this energy audit. Based on the survey, it is estimated that approximately 1,150 incandescent light bulbs are presently used in various tenant-owned lamps and plug-in lighting fixtures. Potential energy savings if NBHA initiated a bulb exchange program to replace tenant-owned incandescent bulbs with higher efficient CFL bulbs was evaluated. This measure is expected to have less than a one year payback, assuming an estimated cost of $5 per bulb replaced.

This type of equipment has an expected lifetime of about five years and the estimated annual energy savings was 29,300 kWh for a total energy savings of 146,500 kWh ($50,500) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized below:

ECM – 2 Light Bulb Exchange

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
5,800	58.5	29,300	0	10,100	7.7	NA	0.6	NA

*No incentives available.

This measure is recommended.

4.3 ECM-3 Water Conservation

4.3.1 ECM-3a Replace Urinals and Flush Valves with Low Flow Types

There are two urinals in Terrace, which could be replaced with low flow flush valves. This measure is not recommended based on payback. However, if a urinal is required to be replaced in the future, it is recommended that it be replaced with a low flow fixture.

The implementation cost and savings related to this ECM are presented in Appendix F and summarized below:

ECM -3a Replace Urinals and Flush Valves with Low Flow Types

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
1,300	11	100	NA	NA	12.8	NA

*No incentives available.

This measure is not recommended.

4.3b ECM-3b Replace Toilets and Flush Valves with Low Flow Types

There are 258 toilets in the Terrace complex; over the years approximately half have been replaced with low flow fixtures. This measure would replace the remaining toilets with new low flow fixtures.

The implementation cost and savings related to this ECM are presented in Appendix G and summarized below:

ECM -3b Replace Toilets and Flush Valves with Low Flow Types

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
58,600	537	4,800	NA	NA	12.2	NA

*No incentives available.

This measure is not recommended.

4.3c ECM-3c Install Faucet Aerators

The apartment kitchen and bathroom sink faucets are original equipment. The older faucets use about two gallons per minute for normal use. It is recommended that faucet aerators be used to reduce water flow from sinks. The aerators would screw into the discharge of the existing kitchen and bathroom sink faucets. This measure would install new aerators on the 510 bathroom and kitchen sinks in Terrace.

Aerators have an expected lifetime of about 15 years and the estimated annual water and sewer savings were 745 Kgal for a total savings of 11,175 Kgal ($100,500) over the life of the project.
The implementation cost and savings related to this ECM are presented in Appendix H and summarized below:

ECM -3c Install Faucet Aerators

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
12,100	745	6,700	7.3	NA	1.8	NA

*No incentives available.

This measure is recommended.

4.3d ECM-3d Install Low Flow Showerheads

There are 252 showers in the apartments in the Lawler complex. The showers have the standard showerhead that is nominally rated at 2.5 gallons per minute. LEED information indicates that an average shower takes approximately five minutes. This measure would install new 1.6 GPM showerheads to replace the existing 2.5 GPM showerheads.

This type of equipment has an expected lifetime of about 15 years and the estimated annual water and sewer savings were 843 Kgal for a total savings of 12,645 Kgal ($114,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix I and summarized below:

ECM -3d Install Low Flow Showerheads

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
17,300	843	7,600	5.6	NA	2.3	NA

*No incentives available.

This measure is recommended.

4.4 ECM-4 Temperature Limiting Thermostats

All apartments are heated with electric baseboard, and the apartments have manual thermostats for controlling space temperature.

This measure would replace the existing with new temperature limiting thermostats to allow the tenant to set and control to a particular space temperature. This would not allow the occupant to raise the temperature above a set maximum temperature limit, which for the purposes of this study is assumed at 72°F. If approved by NBHA, the maintenance staff would be able to raise the temperature limit for occupants that require a higher temperature.

This type of equipment has an expected lifetime of about 15 years and the estimated annual energy savings was 67,438 kWh for a total energy savings of 1,011,570 kWh ($132,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix J and summarized below:

ECM - 4 Temperature Limiting Thermostats

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
37,500	0	67,400	0	8,800	2.5	NA	4.3	NA

*No incentives available.

This measure is recommended.

4.5 ECM- 5 Air Conditioner Changeout

Terrace Apartments has 258 apartment window air conditioners, ranging in capacity between 5,000 BTUH and 10,000 BTUH. All units are owned by the tenants who pay a monthly fee for operational cost. Due to age and condition, the operational EER is estimated at 8 to 9. The rated EER on newer units is typically 10 to 12. Some of the newer air conditioning units were observed to be higher efficiency units.

The available cooling capacity of the existing units is around 1,935,000 BTUH. The TREAT Model indicated that approximately 450,000 BTUH, or 23%, is used continuously for cooling. This measure proposes that new tenants in any North Bergen Housing Authority building be required to use Energy Star rated air conditioners with an EER above 10. Most EPA Energy Star rated window air conditioners fall into this category. Energy Star rated air conditioners use at least 10% less energy than conventional models as published by the U.S. Environmental Protection Agency and U.S. Department of Energy.

There is no implementation cost to this ECM. The savings related to this ECM are presented in Appendix K. The savings for an eventual changeout over time are reflected below:

ECM – 5 Air Conditioner Changeout

Budgetary Cost	Annual Utility Savings					Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total	ROI			
$	kW	kWh	Therms	$		$	Years	Years
NA	0	26,200	0	3,400	NA	NA	NA	NA

*No incentives available.

This measure is not recommended as a complete changeout of all room window air conditioners since the units are owned by the tenants. However, it would be a good practice to require future air conditioning units to have an Energy Star rating before allowing installation.

4.6 ECM- 6 Night Setback

The Community Room is heated using perimeter electric baseboard, and cooled using four Luxaire, 5 ton ceiling mounted evaporator/fan units. Presently, these units control to a specified temperature setpoint, and operate to maintain the setpoint. The condensers for these units are located on the west side of the building. The heating and cooling are controlled from separate thermostats.

The Manager's Office is heated using electric baseboard and cooled using a split Mitsubishi A/C unit with a wall mounted evaporator and a condenser located on the south side of the office. The heating and cooling are controlled from separate thermostats.

This measure would install programmable thermostats for night setback of the heating and cooling space temperatures. As part of this measure, all air cooled condensers should be cleaned to reduce the operating head pressure of the compressors, improving system efficiency.

The equipment has an expected lifetime of 15 years, according to ASHRAE, and the estimated annual energy savings is 11,000 kWh for a total energy savings of 165,000 kWh ($21,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix L and summarized below:

ECM – 6 Night Setback

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
2,300	0	11,000	0	1,400	8.6	NA	1.5	NA

*No incentives available.

This measure is recommended.

4.7 ECM-7 Exhaust Fan Controls

4.7.1 ECM-7a Install On/Off Controls for Apartment Exhaust Fans

As previously noted, Terrace has three wings, consisting of the north, southwest, and southeast spurs. There are Greenheck belt drive centrifugal roof fans for the toilets, corridor, and kitchen exhausts, with various CFM capacities.

The north spur has 22 fans, southwest 11 fans, and southeast 13; totaling 46 fans.

The exhaust airflow is approximately 50,000 CFM. The exhaust fans ventilate the common areas (hallways); apartment stove exhaust, and bathroom exhaust. The fans run 24 hours per day the entire year.

The apartment exhaust constitutes approximately 25,000 CFM for the complex.

This measure would install a stand alone controller and relay panel to turn the common area and apartment fans off for eight hours a day. This measure would reduce the combined motor horsepower of the fans, and heating and cooling of the makeup air.

Per New Jersey building code, for intermittent operation 100 cfm of exhaust is required in kitchens and 50 cfm in bathrooms. For continuous operation, 25 cfm is required in kitchens and 20 cfm in bathrooms.

A modification of this ECM that may have equal savings is to re-balance the system to meet the current code requirements. A review of past documentation reveals exhaust rates higher than code currently requires.

The equipment has an expected lifetime of 15 years, according to ASHRAE, and the estimated annual energy savings is 146,700 kWh for a total energy savings of 2,200,500 kWh ($286,500) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix M and summarized below:

ECM-7a Install On/Off Controls for Apartment Exhaust Fans

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
32,300	0.0	146,700	0	19,100	7.9	NA	1.7	NA

*No incentives available.

This measure is recommended.

4.7.2 ECM-7b Install On/Off Controls for Common Area Exhaust Fans

The common area exhausts for the general areas constitute 25,000 CFM.

This measure would install a stand alone controller and relay panel for turning off the common area exhaust fans for eight hours per day. This measure would result in saving energy due to decrease in combined fan motor horsepower and heating and cooling of makeup air.

A modification of this ECM that may have equal savings is to re-balance the system to meet the current code requirements. A review of past documentation reveals exhaust rates higher than code currently requires.

The equipment has an expected lifetime of 15 years, according to ASHRAE, and the estimated annual energy savings is 19,500 kWh for a total energy savings of 292,500 kWh ($39,000) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix N and summarized as follows:

ECM-7b Install On/Off Ccontrols for Common Area Exhaust Fans

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
16,000	0	19,500	0	2,600	1.4	NA	5.4	NA

*No incentives available.

This measure is recommended.

4.8 ECM-8 Energy Star Appliances

All apartments in Terrace contain a standard refrigerator, ranging from 15.5 cubic feet to 17 cubic feet.

This measure recommends replacement of exiting refrigerators with new Energy Star units. Energy Star labeled refrigerators are required by the U.S. Department of Energy to use 20% less energy than non-labeled models.

This measure is not recommended based on the long payback. As existing refrigerators fail, they should be replaced with Energy Star rated units.

The equipment has an expected lifetime of 15 years, according to ASHRAE, and the estimated annual energy savings is 101,000 kWh for a total energy savings of 1,515,000 kWh ($196,500) over the life of the project.

The implementation cost and savings related to this ECM are presented in Appendix O and summarized below:

ECM – 8 Energy Star Appliances

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
176,500	0	101,000	0	13,100	0.1	NA	13.4	NA

*No incentives available.

This measure is not recommended.

4.9 North Bergen Housing Authority Building Incentives

The North Bergen Housing Authority energy conservation project will be eligible for incentives from the New Jersey Office of Clean Energy.

Terrace is not qualified for New Jersey Pay for Performance incentives. The recommended ECMs consist of 13% of the existing building billing kWh. The Pay for Performance threshold is savings of over 15% for a facility.

Terrace is, however, eligible for prescriptive measure incentives for lighting upgrades, which are paid after installation, and energy savings verification is not required. The lighting energy reduction incentives

were calculated utilizing the New Jersey SmartStart Building Prescriptive lighting measures and incentive program. This program provides incentives dependent upon the existing fixture type and proposed lighting retrofit measure.

5.0 ALTERNATIVE ENERGY EVALUATION

5.1 Geothermal

Geothermal heat pumps transfer heat between the constant temperature of the earth and the building to maintain the building's interior space conditions. Below the surface of the earth throughout New Jersey the temperature remains in the low 50°F range throughout the year. This stable temperature provides a source for heat in the winter and a means to reject excess heat in the summer. With geothermal heat pump systems, water is circulated between the building and the "ground-loop" piping buried in the ground. In the summer, the water picks up heat from the building and moves it to the ground. In the winter the fluid picks up heat from the ground and moves it to the building. Heat pumps make the collection and transfer of this heat to and from the building possible.

At present, there is no central chiller system or heat pump system in Terrace Apartments from which to reject heat since the heating system is electric baseboard. The NBHA property is in a city environment and consists mainly of buildings and parking area. Due to the limited green space on the east and west side of the building and a limited parking area, installation of a buried "ground loop" may not be possible.

Geothermal is not recommended due to the lack of opportunity to take advantage of any generated geothermal heat transfer and the lack of green space to install a buried ground loop system.

5.2 Solar

5.2.1 Photovoltaic (PV) Rooftop Solar Power Generation

The roof of Terrace Apartments was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for the purpose of power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC Current is converted to alternating current (AC) with the use of an electrical device called an inverter. The roof would be the most feasible location for any installation since it is has a south face with no obstructions and has minimum rooftop obstructions such as rooftop units and exhaust fans. The roofs of the southeast and southwest wings of the building have ample area between the south edge of the roof and the exhaust fans in the center of the roof, to install solar panels.

To calculate the (PV) power generation, CHA utilized the PVWATTS solar power generation model. The New Jersey clean power estimator that is provided by the New Jersey Clean Energy Program is presently going through updates; therefore, it was recommended using the PVWAT solar grid analyzer version 1. The closest city available in the model is Newark, New Jersey. A fixed tilt array type was utilized to calculate energy production. The PVWATTS solar power generation model may be found in Appendix P.

The incentives given by the State of New Jersey for nonresidential solar PV applications is $1.00 /watt up to 50 kW of installed (PV) array. Federal tax credits are also available for renewable energy projects up to 30% of installation cost. The NBHA does not pay Federal taxes, and, therefore, would not be able to utilize the Federal tax credit incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000

kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The cost of the ACP penalty for 2009 is $689; this is the amount that must be paid per SERC by the high emission producers. The expected dollar amount that will be paid to the PV producer for 2009 is expected to be $600/SREC credit. Payments that will be received from the PV producer will change from year to year dependent upon supply and demand. R R Renewable Energy Consultants is a third party SREC broker that has been approved by the New Jersey Clean Energy Program. As stated above there is no definitive way to calculate an exact price that will be received by the PV producer per SREC over the next 15 years. R R Renewable Energy Consultants estimated an average of $487/ SERC per year and this number was utilized in the cash flow for this report.

Terrace Apartments has a maximum kW demand of 848 kW and a minimum kW of 248 kW. The monthly average over the year observed was 560.7 kW. Terrace's existing load including the electric heat should justify the use of a large PV solar array. A 50 kW system was selected for the calculations based on available roof area. The system costs for PV installations were derived from the most recent NYSERDA (New York State Energy Research and Development Authority) estimates of total cost of system installation. It should be noted that the cost of installation is now $10.00 per watt or $10,000 per kW of installed system. This has increased in the past few years due to the great national demand for PV power generator systems. Other cost considerations will also need to be considered. PV panels have a multiple decade life span yet the inverter device that converts DC electricity to AC has a planned life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

This measure is not recommended at this time due to the long payback period, however could be a potentially viable renewable measure for NBHA to consider in the future if electricity rates continue to increase above $0.15/kWh and if PV installation costs decline below $10 per watt.

The equipment has an expected lifetime of 15 years, according to ASHRAE, and the estimated annual energy savings was 59,150 kWh for a total energy savings of 887,250 kWh ($115,500) over the life of the project. The implementation cost and savings related to this ECM are presented in Appendix P and summarized below:

ECM-9 Photovoltaic (PV) 50 kW Rooftop Solar Power Generation

Budgetary Cost	Annual Utility Savings			ROI	New Jersey Renewable Energy Incentive*	New Jersey Renewable SREC**	Payback (without incentive)	Payback (with incentives)
	Electricity		Total					
$	kW	kWh	$		$	$	Years	Years
500,000	0	59,150	$7,700	(0.85)	$50,000	$28,786	>30	12.3

*Incentive based on New Jersey Renewable Energy Program for non-residential applications of $1.00 per Watt of installed capacity
** Estimated Solar Renewable Energy Certificate Program (SREC) for 15 years at $487/1000 kWh

This measure is not recommended.

5.2.2 Solar Thermal Domestic Hot Water Plant

Active solar thermal systems use solar collectors to collect the sun's energy to heat water, another fluid, or air. The heart of a solar collector is an absorber that converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later use. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in both residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Solar radiation is absorbed by the collector, and the heat collected is commonly used to heat or preheat water or air. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted around the site's latitude, so as to maximize the amount of radiation collected on a yearly basis.

There are several options for using active solar thermal systems for space heating; most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system for Terrace Apartments would be to transfer the heat from the panels to thermal storage tanks in the basement and transfer solar-produced thermal energy for domestic hot water production.

Currently, there are no incentives available for installation of thermal solar systems. There is a Federal tax credit of 30% of installation cost for the thermal applications.

This is not recommended due to the proximity of the proposed solar collectors to the location of the existing domestic hot water system, which would be over 13 floors with no easy route for the piping. The existing PVI condensing hot water heaters are already over 90% efficient. The area on the roof that would be used for the solar collectors is the same area that would be used for photovoltaic panels, which have more direct potential payback.

5.3 Wind

Wind energy is a form of solar energy created by the uneven heating of the earth's surface by the sun. Most small wind turbines use a horizontal axis propeller, or rotor, to capture the kinetic energy of the wind and convert it into rotary motion to drive a generator which usually is designed specifically for the wind turbine. The rotor consists of two or three blades, usually made from wood or fiberglass. These materials give the turbine the required strength and flexibility, and have the added advantage of not interfering with television signals. The structural backbone of the wind turbine is called the mainframe, and it includes the "slip-rings" that connect the wind turbine, which rotates as it points into changing wind directions, and the fixed tower wiring. The tail aligns the rotor into the wind.

To avoid turbulence and capture greater wind energy, turbines are mounted on towers. As a rule of thumb, turbines should be mounted at least 30 feet above any structures or natural features within 300 feet of the installation. Smaller turbines can go on shorter towers. For example, a 250-watt turbine may be mounted on a 30-50 foot tower, while a 10 kW turbine will usually need a tower of 80-120 feet. Towers are available in a variety of designs, including tubular or latticed, guyed or self-supporting. Wind turbine manufacturers also offer towers, and can verify that the tower meets required building and safety specifications as well as being compatible with the turbine.

The New Jersey Clean Energy Program for small wind installations has assigned numerous pre-approved wind turbines for installation in the State of New Jersey. Incentives for wind turbine installations are based on kilowatt hours saved in the first year. Systems size under 16,000 kWh per year of production will receive a $3.20 per kWh incentive. Systems producing over 16,000 kWh will receive $51,200 for the first 16,000 kWh of production with an additional $0.50 per kWh up to a maximum cap of 750,000 kWh per year. These incentives can make a project like this very cost effective. Federal tax credits are also available for renewable energy projects up to 30% of installation cost for systems less than 100 kW.

The most important part of any small wind generation project is the mean annual wind speed at the height of which the turbine will be installed. Due to the height of Terrace (11 stories), a vertical wind turbine could be located on the roof of the building and attached to the existing elevator/emergency generator penthouse in the center of the roof. A structural review of the roof and the elevator/emergency generator penthouse would have to be performed to evaluate the effect of wind loads on the existing structure. A previous evaluation was performed for NBHA for this type of turbine; however, the potential savings were not attractive and the study was not progressed. A wind resource map downloaded from the AWS Truewind Corporation indicated that that mean annual wind speed at 30 meters in the North Bergen area is greater than 10.1 miles per hour of annual wind speed. Most small wind turbines become financially viable over 10 miles per hour of mean annual wind speed; therefore, the ASW Truewind model indicated that installation of a wind turbine may be applicable at this location. The NBHA site may have the minimum average wind speed required to install a land based wind turbine but due to the city environment there is no open area that would allow the use of a ground based system.

An aerial satellite depiction of the location and a wind resource map may be found in Appendix P.

This is not recommended due to the complexity of the installation and the liabilities of operation, a roof top vertical wind turbine may have ice buildup that may become a safety hazard to the buildings in the surrounding area. Land is not available to consider a land based system.

5.4 Combined Heat and Power Generation (CHP)

Combined heat and power also known as "cogeneration" is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven generators, micro-turbines, steam turbines, and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. Terrace Apartments has the need for electrical generation but not a feasible option to use the thermal byproduct of the cogeneration. The heating system is electric baseboard; therefore, the heat generated cannot be utilized as viably as with a hot water heating system. Thermal usage during the summer months would require a different cooling system incorporating an absorption chiller and cooling tower to convert hot water to chilled water. Since building cooling is provided by window air conditioners and split systems, it would not be practical to install this type of cooling system with the existing HVAC equipment; therefore, thermal energy produced by the CHP plant in the warmer months will be wasted.

This is not recommended since there is not a practical use for the thermal production in the summer and winter months.

5.5 Biomass Power Generation

Biomass power generation is a process in which waste organic materials are used to produce electricity or thermal energy that otherwise would be sent to the landfill or expelled to the atmosphere. To participate in NJCEP's Customer On-Site Renewable Energy program, participants must install an on-site sustainable

biomass or fuel cell energy generation system. Incentives for bio-power installations are available to support up to 1MW-dc of rated capacity.

Class I organic residues are eligible for funding through the NJCEP CORE program. Class I wastes include:

- Wood wastes not adulterated with chemicals, glues or adhesives
- Agricultural residues (corn stover, rice hulls or nut shells, manures, poultry litter, horse manure, etc) and/or methane gases from landfills
- Food wastes
- Municipal tree trimming and grass clipping wastes
- Paper and cardboard wastes
- Non-adulterated construction wood wastes, pallets
- NJDEP evaluates biomass resources not identified in the RPS

Examples of eligible facilities for a CORE incentive include:

- Digestion of sewage sludge
- Landfill gas facilities
- Combustion of wood wastes to steam turbine
- Gasification of wood wastes to reciprocating engine
- Gasification or pyrolysis of bio-solid wastes to generation equipment

* From NJOCE Website

This is not recommended due to the building not having a waste stream or an external source that can be utilized for the production of electricity or thermal energy. The proximity of such a system in the surrounding neighborhood of North Bergen would create issues with environmental airborne discharge limits.

5.6 Demand Response Curtailment

Presently, the North Bergen Housing Authority has electricity delivered and supplied by PSE&G.

Utility curtailment is an agreement with the regional transmission organization and an approved Curtailment Service Providers (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator, therefore reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and PSE&G offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on their emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run their emergency generators with notice to test the system. A minimum of 100 kW of curtailable load is required to enter the program. Discussions with the EnerNoc Corporation, an approved CSP, indicate that existing emergency generators will not pass the emissions requirements to enter the program.

Presently, Terrace Apartments has back up generation and an average kW demand during the observed period of 560.7 kW/month. Terrace Apartments has a 60 kW Cummins emergency generator that runs on natural gas. The majority of electricity usage is controlled by the tenants and will not be able to be curtailed by NBHA; therefore, there is no ability to reduce electrical load.

This is not recommended because the emergency generator cannot meet air emissions standards in the State of New Jersey and the building load cannot be curtailed for Demand Response Curtailment. In addition, the size of the generator system is below the minimum 100kW threshold.

6.0 EPA PORTFOLIO MANAGER

The United State Energy Protection Agency (EPA) is a federal agency in charge of regulating environment waste and policy in the United States. The EPA has released a building energy program called the EPA Portfolio Manager for public use. This program is designed to allow property owners and managers to share, compare and improve upon their facility's energy consumption. Inputting such parameters at electricity, heating fuel, building characteristics and location into the website-based program generates a naturalized energy rating score out of 100. Once an account is registered, monthly utility data can be entered to track the savings progress and retrieve an updated energy rating score on a monthly basis.

Due to the facility having more than 10% of the total floor space allocated to "other" per the EPA Portfolio Manger benchmarking tool, Terrace Apartments is unable to obtain an Energy Rating. The "other" allocation is indicative of the Portfolio Manager not having a floor characteristic for a senior housing facility. An alternative method that can be utilized is to compare the facility to similar buildings is the Source Energy Intensity designation, which measures energy per square foot per year. Terrace Apartments Current Source Energy Intensity is 223.5 kBTU/ft^2/year.

A full EPA Energy Star Portfolio Manager Report is located in Appendix Q.

7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the North Bergen Housing Authority's (NBHA) Terrace Apartments in North Bergen, New Jersey identified potential ECMs for lighting replacements/light bulb exchange, faucet aerators, low flow showerheads, thermostat upgrades, night setback, and exhaust fan upgrades. Potential annual savings of $77,200 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM – 1c Lighting Replacements with Occupancy Sensors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
158,000	10.3	175,800	0	20,900	0.3	28,000	7.6	6.2

*Incentive is based on the New Jersey Smart Start Prescriptive Lighting Measures.

ECM – 2 Light Bulb Exchange

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		#2 Oil	Total				
$	kW	kWh	gallons	$		$	Years	Years
5,800	58.5	29,300	0	10,100	7.7	NA	0.6	NA

*No incentives available.

ECM -3c Install Faucet Aerators

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
12,100	745	6,700	7.3	NA	1.8	NA

*No incentives available.

ECM -3d Install Low Flow Showerheads

Budgetary Cost	Annual Utility Savings		ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water / Sewer	Total				
$	Kgal	$		$	Years	Years
17,300	843	7,600	5.6	NA	2.3	NA

*No incentives available.

ECM - 4 Temperature Limiting Thermostats

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
37,500	0	67,438	0	8,800	2.5	NA	4.3	NA

*No incentives available.

ECM – 6 Night Setback

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
2,300	0	11,000	0	1,400	8.6	NA	1.5	NA

*No incentives available.

ECM-7a Install On/Off Controls for Apartment Exhaust Fans

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
32,300	0.0	146,700	0	19,100	7.9	NA	1.7	NA

*No incentives available.

ECM-7b Install On/Off Controls for Common Area Exhaust Fans

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Nat. Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
16,000	0	19,500	0	2,600	1.4	NA	5.4	NA

*No incentives available.

APPENDIX A

Utility Usage Analysis

New Jersey BPU Energy Audit Program
CHA #20241
North Bergen Housing Authority
Terrace Apartments

Account Number: 2100602519
PSE&G - Electric Service

Meter #: 778013923

			Charges			Unit Costs		
Date	Consumption (kWh)	Demand (kW)	Total ($)	Demand ($)	Consumption ($)	Blended Rate ($/kWh)	Consumption ($/kWh)	Demand ($/kW)
5/5/2008	164,800	376.0	$18,547.30	$1,817.30	$16,730.00	0.1125	0.1015	4.83
7/3/2008	248,000	320.0	$38,391.34	$9,297.81	$29,093.53	0.1548	0.1173	29.06
8/4/2008	152,800	272.0	$24,293.66	$4,564.38	$19,729.28	0.1590	0.1291	16.78
9/3/2008	121,600	248.0	$20,828.09	$4,302.81	$16,525.28	0.1713	0.1359	17.35
10/2/2008	111,200	264.0	$16,651.18	$2,452.18	$14,199.00	0.1497	0.1277	9.29
10/31/2008	194,400	528.0	$24,333.46	$3,314.27	$21,019.19	0.1252	0.1081	6.28
12/3/2008	277,600	680.0	$33,045.88	$3,804.53	$29,241.35	0.1190	0.1053	5.59
12/30/2008	323,200	792.0	$37,698.90	$4,165.78	$33,533.12	0.1166	0.1038	5.26
1/27/2009	410,400	**848.0**	$48,551.71	$4,385.81	$44,165.90	0.1183	0.1076	5.17
2/23/2009	337,600	800.0	$42,718.65	$4,232.45	$38,486.20	0.1265	0.1140	5.29
3/30/2009	364,000	800.0	$44,972.03	$4,232.45	$40,739.58	0.1235	0.1119	5.29
4/29/2009	205,600	800.0	$27,073.05	$4,232.45	$22,840.60	0.1317	0.1111	5.29
Most Recent Yr	2,911,200	848.0	$377,105.25	$50,802.22	$326,303.03	0.1295	0.1121	9.62

New Jersey BPU Energy Audit Program
CHA #20241
North Bergen Housing Authority
Terrace Apartments

Account Number: 2100602519
PSE&G - Natural Gas Service

Meter #: 3163748

Date	Therms	Cost	($/Therm)
5/5/2008	2,920	$4,106.61	1.406
7/3/2008	4,168	$6,761.42	1.622
8/4/2008	1,727	$3,001.75	1.738
9/3/2008	1,882	$2,520.08	1.339
10/2/2008	2,245	$2,800.55	1.248
11/3/2008	2,739	$3,563.56	1.301
12/3/2008	3,154	$3,812.00	1.209
12/30/2008	3,030	$3,841.14	1.268
1/27/2009	3,529	$4,200.22	1.190
2/23/2009	3,387	$3,532.24	1.043
3/30/2009	4,024	$3,192.08	0.793
4/29/2009	2,989	$2,182.53	0.730

Most Recent Yr	35,794	$43,514.18	1.216

New Jersey BPU Energy Audit Program
CHA #20241
North Bergen Housing Authority
Terrace Apartments

Account Number: 10000997822906
United Water - Domestic Water Service

Date	Gallons	Cost	($/Gal)
8/13/2008	742,764	$3,112.29	0.00419
9/13/2008	734,536	$3,075.91	0.00419
10/11/2008	727,804	$3,050.74	0.00419
11/10/2008	869,924	$3,587.93	0.00412
12/8/2008	756,228	$3,157.06	0.00417
1/12/2009	964,920	$3,937.37	0.00408
2/11/2009	769,692	$3,207.41	0.00417
3/13/2009	729,300	$3,061.93	0.00420
4/16/2009	847,474	$3,760.09	0.00444
5/12/2009	658,240	$3,293.21	0.00500
6/11/2009	778,668	$3,822.69	0.00491
7/17/2009	982,124	$4,717.21	0.00480

Most Recent Yr	9,561,674	$41,783.84	0.004

United Water - Sewage Service

Date	Gallons	Cost	($/Gal)
9/30/2008	2,185,656	$11,452.84	0.00524
12/31/2008	2,324,784	$12,181.87	0.00524
3/31/2009	2,353,956	$12,946.71	0.00550
6/30/2009	2,463,912	$13,551.46	0.00550

Most Recent Yr	9,328,308	$50,132.88	0.005

ELECTRIC MARKETERS LIST

The following is a listing of marketers/suppliers/brokers that have been licensed by the NJ Board of Public Utilities to sell electricity to residential, small commercial and industrial customers served by the Public Service Electric and Gas Company distribution system. **This listing is provided for informational purposes only and PSE&G makes no representations or warranties as to the competencies of the entities listed herein or to the completeness of this listing.**

American Powernet Management
867 Berkshire Blvd, Suite 101
Wyomissing, PA 19610
www.americanpowernet.com

BOC Energy Services
575 Mountain Avenue
Murray Hill, NJ 07974
www.boc-gases.com

Commerce Energy Inc.
535 Route 38, Suite 138
Cherry Hill, NJ 08002
(888) 817-8572 or
(858) 910-8099
www.commerceenergy.com

ConEdison Solutions
701 Westchester Avenue
Suite 201 West
White Plains, NY 10604
(800) 316-8011
www.ConEdSolutions.com

Constellation NewEnergy, Inc.
1199 Route 22 East
Mountainside, NJ 07092
908 228-5100
www.newenergy.com

Credit Suisse (USA), Inc.
700 College Road East
Princeton, NJ 08450
www.creditsuisse.com

Direct Energy Services, LLC
One Gateway Center, Suite 2600
Newark, NJ 07102
(973) 799-8568
www.directenergy.com

FirstEnergy Solutions
395 Ghent Road Suite 407
Akron, OH 44333
(800) 977-0500
www.fes.com

Gerdau Ameristeel Energy Co.
North Crossman Road
Sayreville, NJ 08872

Gexa Energy LLC New Jersey
20 Greenway Plaza, Suite 600
Houston, TX 77046
(866) 304-GEXA
Beth.miller@gexaenergy.com

Glacial Energy of New Jersey
2602 McKinney Avenue, Suite 220
Dallas, TX 75204
www.glacialenergy.com

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095
www.hess.com

Integrys Energy Services, Inc
99 Wood Avenue, Suite 802
Iselin, NJ 08830
www.integrysenergy.com

Liberty Power Delaware, LLC
1901 W Cypress Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

Liberty Power Holdings, LLC
1901 W Cypress Creek Road, Suite 600
Fort Lauderdale, FL 33309
(866) Power-99
(866) 769-3799
www.libertypowercorp.com

Pepco Energy Services, Inc.
d/b/a Power Choice
23 S. Kinderkamack Rd Ste D
Montvale, NJ 07645
(800) 363-7499
www.pepco-services.com

PPL EnergyPlus, LLC
Energy Marketing Center
Two North Ninth Street
Allentown, PA 18101
1-866-505-8825
http://www.pplenergyplus.com/

Sempra Energy Solutions
The Mac-Cali Building
581 Main Street, 8th Floor
Woodbridge, NJ 07095
(877) 273-6772
www.SempraSolutions.com

South Jersey Energy Company
1 South Jersey Plaza, Route 54
Folsom, NJ 08037
(800) 756-3749
www.sjindustries.com

Strategic Energy, LLC
6 East Main Street, Suite 6E
Ramsey, NJ 07446
(888) 925-9115
www.sel.com

Suez Energy Resources NA
333 Thornall Street FL6
Edison, NJ 08818
866.999.8374(toll free)
www.suezenergyresources.com

UGI Energy Services, Inc.
d/b/a POWERMARK
1 Meridian Blvd. Suite 2C01
Wyomissing, PA 19610
(800) 427-8545
www.ugienergyservices.com

Jan 14, 2009

GAS MARKETERS LIST

The following is a listing of marketers/suppliers/brokers that have been licensed by the NJ Board of Public Utilities to sell natural gas to residential, small commercial and industrial customers served by the Public Service Electric and Gas Company distribution system. **This listing is provided for informational purposes only and PSE&G makes no representations or warranties as to the competencies of the entities listed herein or to the completeness of this listing.**

Gateway Energy Services
44 Whispering Pines Lane
Lakewood, NJ 08701
(800) 805-8586
www.gesc.com

Great Eastern Energy
3044 Coney Island Ave. PH
Brooklyn, NY 11235
888-651-4121
www.greateasterngas.com

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095
(800) 437-7872
www.hess.com

Hudson Energy Services, LLC
545 Route 17 South
Ridgewood, NJ 07450
(201) 251-2400
www.hudsonenergyservices.com

Intelligent Energy
7001 SW 24th Avenue
Gainesville, FL 32607
Sales: 1 877 I've Got Gas
(1 877 483-4684)
Customer Service:
1 800 927-9794
www.intelligentenergy.org

Systrum Energy
877-SYSTRUM
(877-797-8786)
www.systrumenergy.com

Macquarie Cook Energy, LLC
10100 Santa Monica Blvd, 18th Fl
Los Angeles, CA 90067

Metro Energy Group, LLC
14 Washington Place
Hackensack, NJ 07601
www.metroenergy.com

Metromedia Energy, Inc.
6 Industrial Way
Eatontown, NJ 07724
(800) 828-9427
www.metromediaenergy.com

Mitchell- Supreme Fuel
(NATGASCO)
532 Freeman Street
Orange, NJ 07050
(800) 840-4GAS
www.mitchellsupreme.com

MxEnergy Inc.
P.O. Box 177
Annapolis Junction, MD 20701
800-375-1277
www.mxenergy.com

Pepco Energy Services, Inc.
23 S Kinderkamack Rd, Suite D
Montvale, NJ 07645
(800) 363-7499
www.pepco-services.com

Plymouth Rock Energy, LLC
165 Remsen Street
Brooklyn, NJ 11201
866-539-6450
www.plymouthrockenergy.com

PPL EnergyPlus, LLC
Energy Marketing Center
Two North Ninth Street
Allentown, PA 18101
1-866-505-8825
www.pplenergyplus.com/natural+gas/

RPL Holdings, Inc
601 Carlson Pkwy
Minnetonka, MN 55305

South Jersey Energy Company
One South Jersey Plaza, Rte 54
Folsom, NJ 08037
(800) 756-3749
www.sjindustries.com/sje.htm

Sprague Energy Corp.
Two International Drive, Ste 200
Portsmouth, NH 03801
800-225-1560
www.spragueenergy.com

Stuyvesant Energy LLC
642 Southern Boulevard
Bronx, NY 10455
(718) 665-5700
www.stuyfuel.com

Tiger Natural Gas, Inc.
1422 E. 71st Street, Suite J.
Tulsa, OK 74136
1-888-875-6122
www.tigernaturalgas.com

UGI Energy Services, Inc.
d/b/a GASMARK
704 E. Main Street, Suite I
Moorestown, NJ 08057
856-273-9995
www.ugienergyservices.com

Woodruff Energy
73 Water Street
P.O. Box 777
Bridgeton, NJ 08302
(856) 455-1111
www.woodruffenergy.com

DESIGN HEATING AND COOLING LOADS FOR BASE BUILDING

8/25/2009
Project Name: NBHA Terrace Apts

For: NBHA

By:

Date:

Primary Heating System:

Space Name	Load, Btu/Hr	Feet of Electric Baseboard
Boiler Room Base	81134	96
Comm Rm Kitchen & Store	113524	134
Base Common Area	342247	402
1st -10th Apts	2227058	2611
Base Floor Apts	45270	54
1st-10th Common Areas	0	0

Required Heating Equipment Output Capacity: 3090153 Btu/hr
Available Heating Equipment Output Capacity: 900000 Btu/hr
Baseboard Capacity: 250 Watt/Ft
Heating Equipment Efficiency: 100 %
Calculated Distribution Efficiency: 100 %
Heating Safety Factor: 1.10
HEATING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED HEATING LOAD.

Cooling System:

Space Name	Load, Btu/Hr	Distribution CFM
Boiler Room Base	0	0
Comm Rm Kitchen & Store	87933	3199
Base Common Area	0	0
1st -10th Apts	2246584	81721
Base Floor Apts	22680	825
1st-10th Common Areas	0	0

Required Cooling Equipment Output Capacity: 2607298 Btu/hr

Available Cooling Equipment Output Capacity: 450000 Btu/hr

Total flow: 86220 CFM

Cooling Equipment Efficiency: 9 SEER

Calculated Distribution Efficiency: 99%

Temperature Drop: 28 F

Cooling Safety Factor: 1.10

Distribution Safety Factor: 1.10

COOLING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED COOLING LOAD.

Notes:

1. The room heating/cooling loads do not include the equipment and distribution safety factor and distribution losses
2. The room distribution includes distribution safety factor.
3. The load on the room is the peak load for this room in a year.
4. Available equipment output capacity includes equipment efficiency.
5. Required equipment output capacity includes diversity, distribution losses and equipment safety factor.
6. Overall distribution CFM/GPM for heating/cooling includes equipment safety factor, distribution losses and diversity.

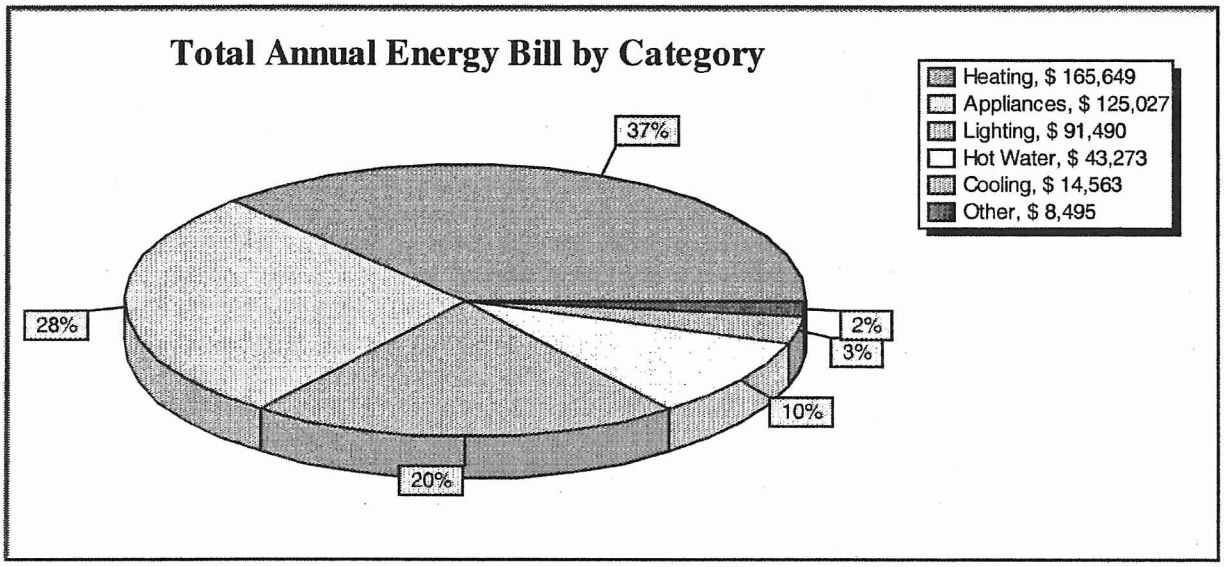
MODEL ENERGY REPORT FOR BASE BUILDING

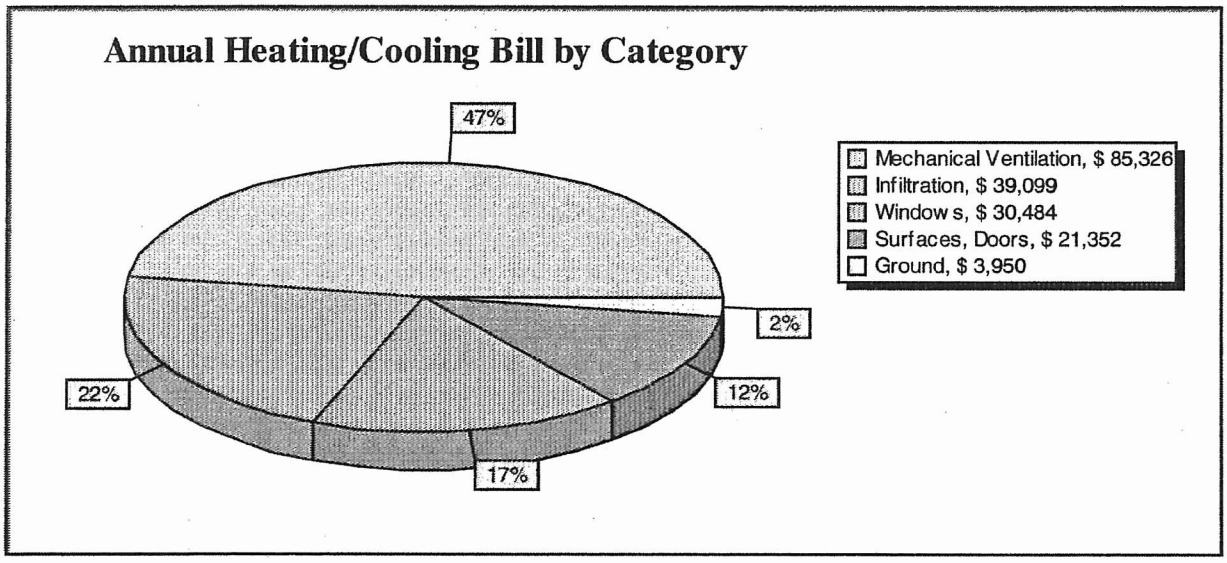
NBHA Terrace Apts

For: NBHA

By:

Date: 8/25/2009





Note: Due to rounding, the sum of percentages may not be equal to 100.

Base Load Report

Customer Information

Customer Name: NBHA

Address: Terrace 6800 Columbia Avenue
North Bergen, NJ 07047

Billing Period: 5/2008 - 4/2009

Auditor Information

Technician Name:

Company:

Phone Number:

Date: 8/25/2009

Model to Actual Comparison of Base Usage Per Year

Model Name: Base Building

Billing Period Name: BillingPeriod1

	Electricity		Natural gas			
	kWh	$	Therm	$		
Model	1,722,283	223,897	36,384	44,388		
Billing	1,656,451	222,004	36,017	44,681		
% Difference	-4	-1	-1	1		

Note: Actual billing data is adjusted to reflect a full year's usage.

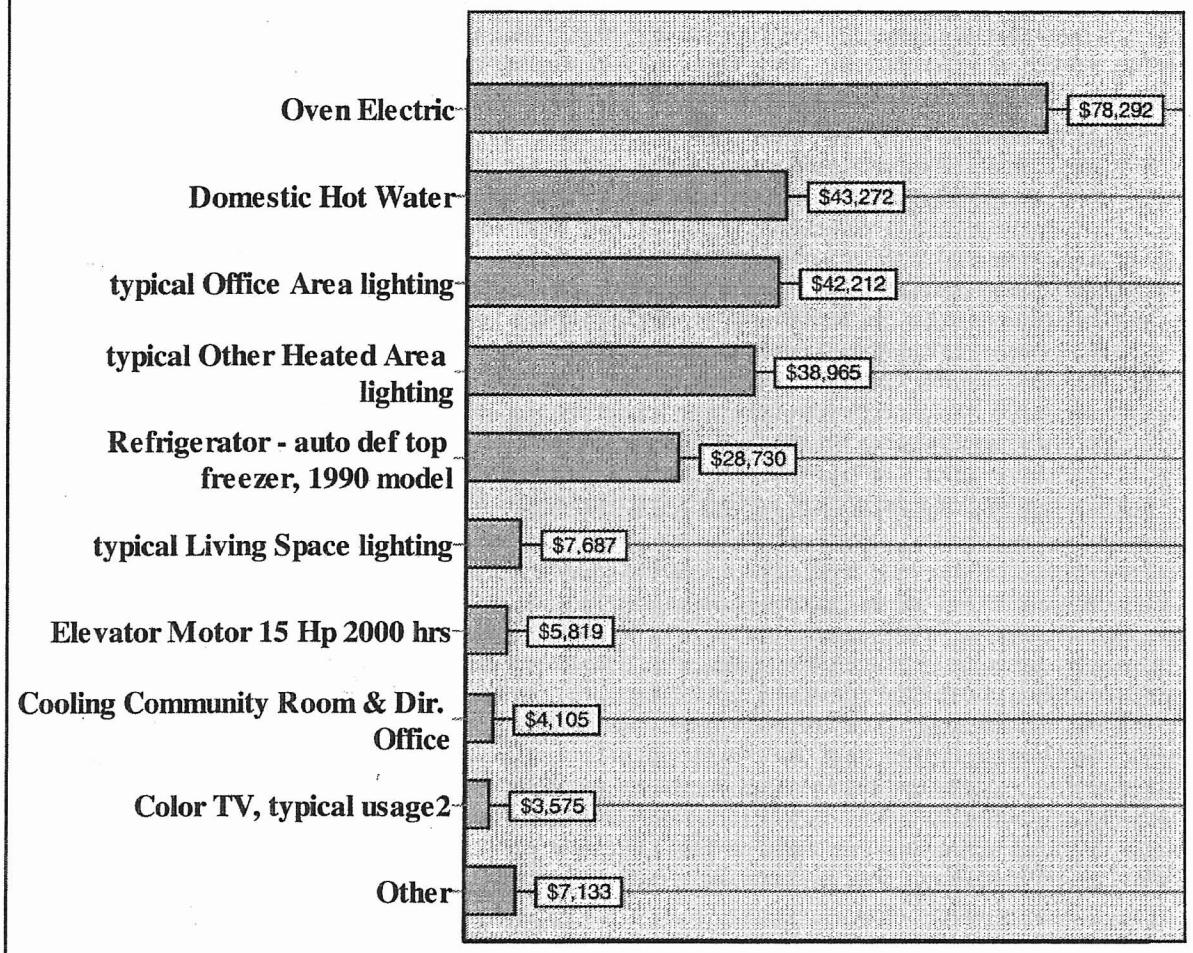
Annual Use of Domestic Hot Water, Appliances, and Lighting

Model Name: Base Building

	Electricity $0.13 per kWh		Natural gas $1.22 per Therm				Total
	kWh	$	therms	$			$
1. Oven Electric	602,250	78,292	0	0			78,292
2. Domestic Hot Water	0	0	35,469	43,272			43,272
3. typical Office Area lighting	324,704	42,212	0	0			42,212
4. typical Other Heated Area lighting	299,732	38,965	0	0			38,965
5. Refrigerator - auto def top freezer, 1990	221,000	28,730	0	0			28,730
6. typical Living Space lighting	59,130	7,687	0	0			7,687
7. Elevator Motor 15 Hp 2000 hrs	44,760	5,819	0	0			5,819
8. Cooling Community Room & Dir. Office	31,574	4,105	0	0			4,105
9. Color TV, typical usage2	27,500	3,575	0	0			3,575
10. Other	46,284	6,017	915	1,116			7,133
TOTAL	1,656,934	215,402	36,384	44,388			259,790

Base Load Energy Users, $/year

Model Name: Base Building



NORMALIZED MODEL TO BILLING COMPARISON

Project name: NBHA Terrace Apts
For : NBHA
By :
Date: 8/25/2009

Billing Period Name: BillingPeriod1
Model Package Name: Base Building

Natural gas

	Model		Billing Data	
	Consumption Therm	Cost $	Consumption Therm	Cost $
January	3090.18	3782	3059.00	3744
February	2791.13	3417	2762.97	3383
March	3090.18	3782	3059.00	3744
April	2990.49	3660	2960.32	3624
May	3090.18	3782	3059.00	3744
June	2990.49	3660	2960.32	3624
July	3090.18	3782	3059.00	3744
August	3090.18	3782	3059.00	3744
September	2990.49	3660	2960.32	3624
October	3090.18	3782	3059.00	3744
November	2990.49	3660	2960.32	3624
December	3090.18	3782	3059.00	3744
Total	36384.32	44533	36017.24	44085
Daily Base Load	99.68	122	98.68	120

Electricity

	Model		Billing Data	
	Consumption kWh	Cost $	Consumption kWh	Cost $
January	342524.64	44538	437627.20	56902

February	309377.09	40229	357461.64	46480
March	342524.64	44538	322133.06	41887
April	321750.74	41838	235823.78	30667
May	146276.10	19026	140684.89	18299
June	178086.32	23161	157803.77	20524
July	184022.53	23933	170795.86	22213
August	184022.53	23933	166046.50	21596
September	158798.80	20654	136146.66	17709
October	267148.07	34739	188135.97	24468
November	331475.46	43102	268353.14	34896
December	342524.64	44538	363913.88	47319
Total	3108531.57	404229	2944926.37	382960
Daily Base Load	4718.58	613	4538.22	590

Notes:

1. The report compares model energy consumption with the consumption calculated using the billing analysis slope and reference temperature. The usage is for normalized thirty year average weather conditions.
2. Monthly fuel cost includes heating, cooling and base load usage and monthly flat meter fee entered on Fuels/Rates screen.

INVESTMENT GUIDELINES FOR HEATING

Project name: NBHA Terrace Apts

For : NBHA

By :

Date: 8/25/2009

Billing Period Name: BillingPeriod1

		Heating
Your building heating energy usage	Btu/SqFt-HDD	5.11
Target heating energy usage	Btu/SqFt-HDD	7.00
Your cost of energy	$/MMBtu	39.28
	$/kWh	0.13
Target cost of energy	$/MMBtu	39.28
	$/kWh	0.13
Annual Degree Days base 65	HDD	5,050
Heated Area	SqFt	163,240
Savings from reducing to the target comsumption	Btu/HDD	-309,120
	$/Year	-61,318
Savings term (target payback)	Years	10.0
Cost effective investment	$	0

Notes:
1. Your building heating energy usage is calculated by multiplying the building slope by the ratio of heating degree days for the actual reference temperature to heating degree days base 65F. The building gets credit for the reference temperature below 65F.
2. Target heating energy usage and Savings term are entered on Analysis Periods screen.
3. Your cost of energy is equal to the calculated average heating fuel cost. In the buildings with dual heating fuels the consumption-weighted average of main and back up heating fuel cost is calculated.
4. Target cost of energy allows evaluating feasibility of changing heating fuel, for example switching from electric to gas heating. This feature will be available in the subsequent versions of Treat. Currently target cost is always the same as the actual cost.
5. Savings from reducing to target consumption is the annual savings realized after the current energy usage and energy cost are reduce to target energy usage and target energy cost.
6. Cost effective investment is the product of the Savings from reducing to target consumption and the Savings term. It shows how much may be invested in the home improvements in order for the improvements to pay for itself completely during the specified savings term.

HEATING ENERGY SCORECARD

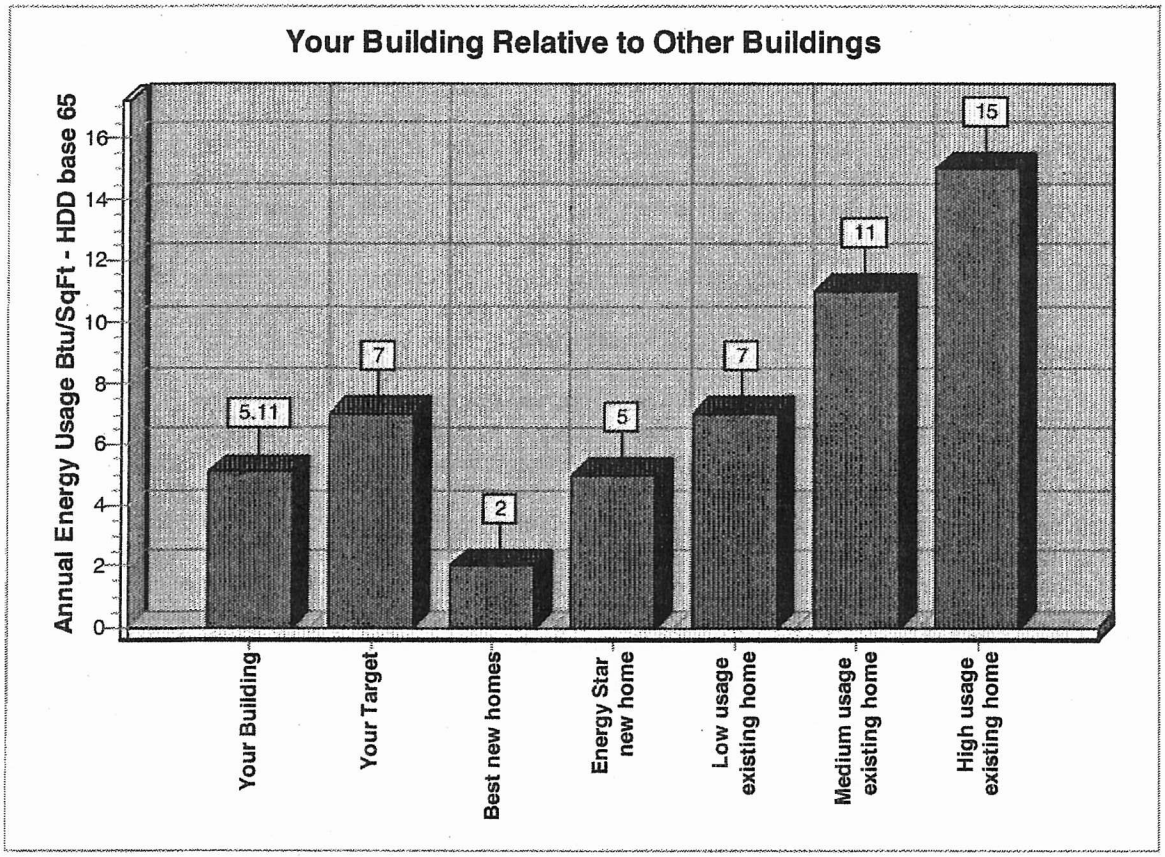
Project name: NBHA Terrace Apts

For : NBHA

By :

Date: 8/25/2009

Billing Period Name: BillingPeriod1



Heating Slope: 6.24

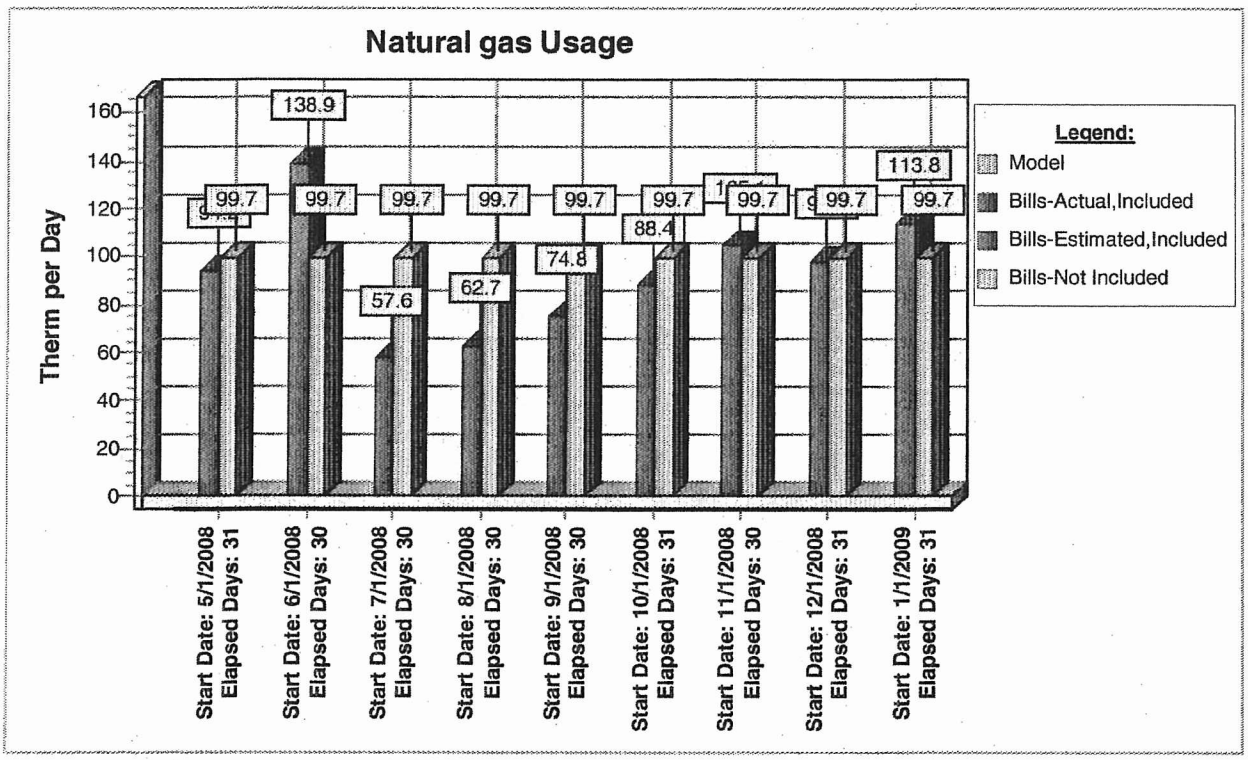
Reference temperature: 61

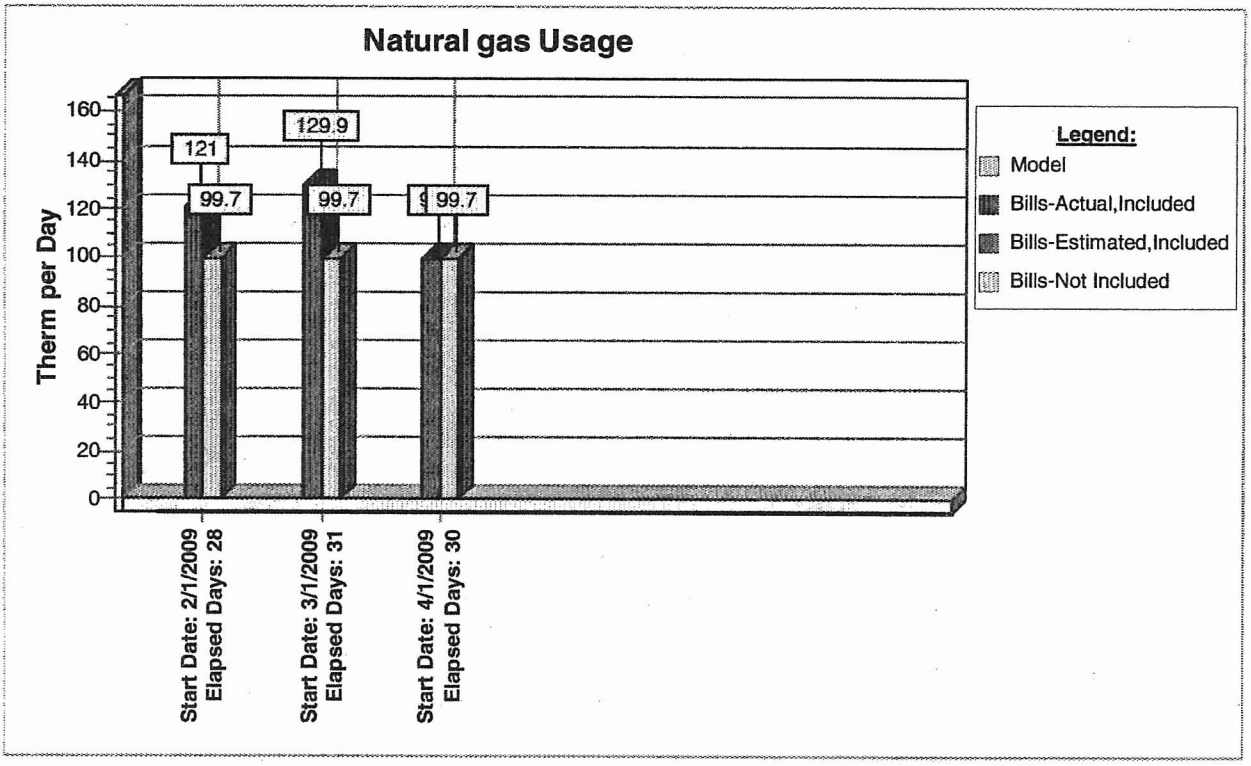
Note: Annual energy usage of your building shown on the chart is calculated by multiplying the building slope by the ratio of heating degree days for the actual reference temperature to heating degree days base 65F. The building gets credit for low reference temperature.

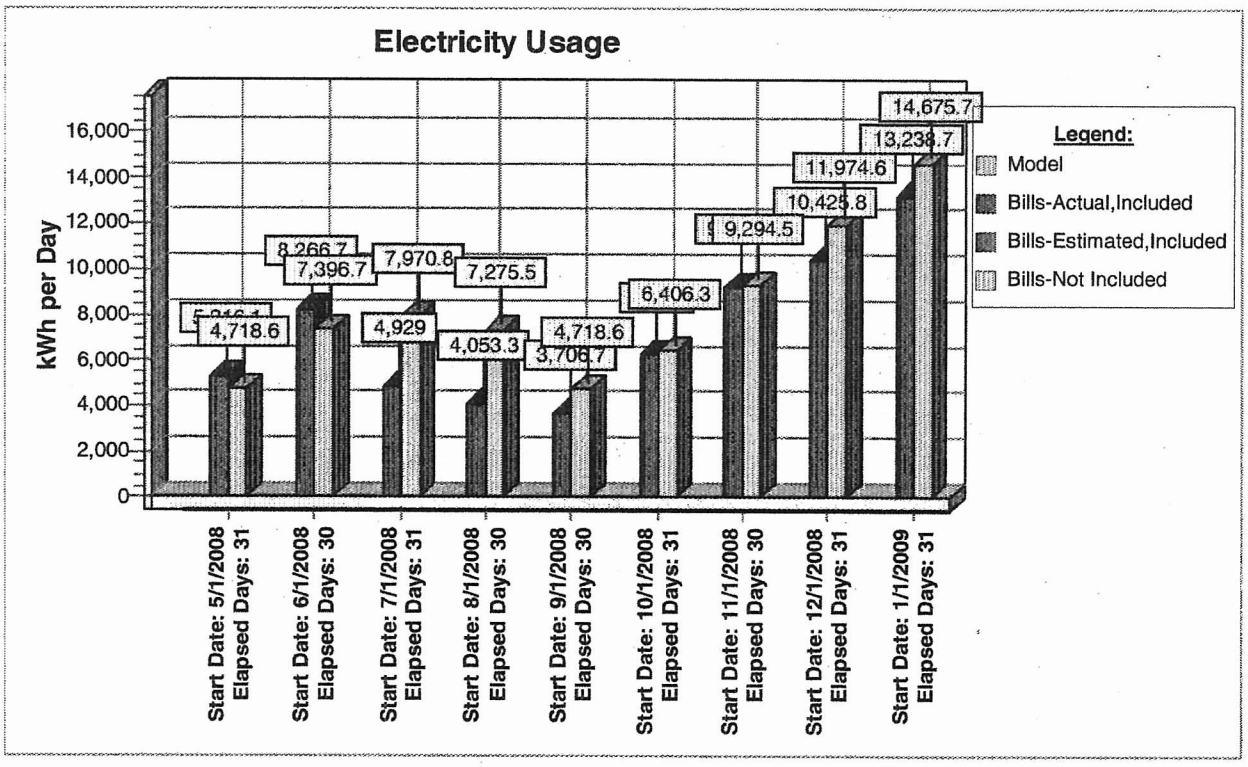
ACTUAL BILLING TO MODEL COMPARISON REPORT

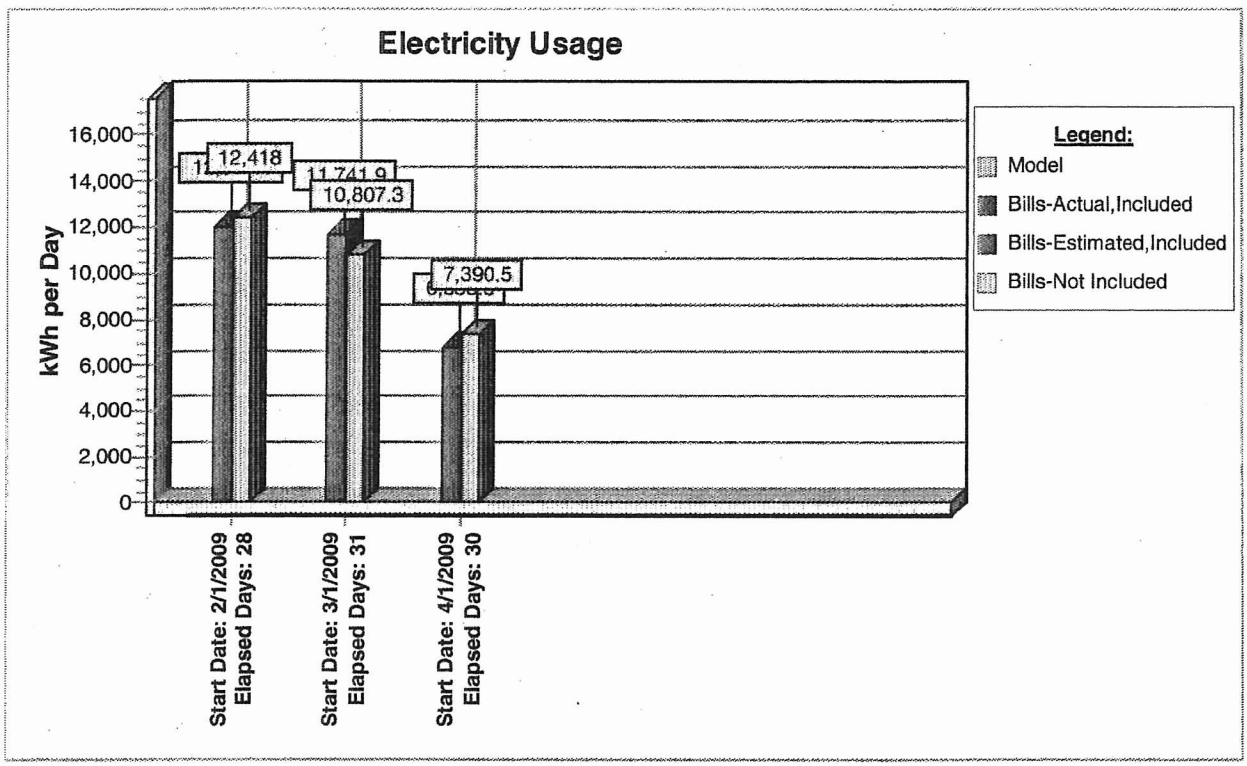
Project name: NBHA Terrace Apts
For : NBHA
By :
Date: 8/25/2009

Billing Period Name: BillingPeriod1
Model Package Name: Base Building




Natural gas Usage
Therm per Day
160
140
120
100
80
60
40
20
0
121
129.9
99.7
99.7
99.7
Start Date: 2/1/2009
Elapsed Days: 28
Start Date: 3/1/2009
Elapsed Days: 31
Start Date: 4/1/2009
Elapsed Days: 30
Legend:
Model
Bills-Actual,Included
Bills-Estimated,Included
Bills-Not Included


Electricity Usage
kWh per Day
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
4,718.6
8,266.7
7,396.7
7,970.8
4,929
7,275.5
4,053.3
4,718.6
3,706.7
6,406.3
9,294.5
10,425.8
11,974.6
13,238.7
14,675.7
Start Date: 5/1/2008
Elapsed Days: 31
Start Date: 6/1/2008
Elapsed Days: 30
Start Date: 7/1/2008
Elapsed Days: 31
Start Date: 8/1/2008
Elapsed Days: 30
Start Date: 9/1/2008
Elapsed Days: 30
Start Date: 10/1/2008
Elapsed Days: 31
Start Date: 11/1/2008
Elapsed Days: 30
Start Date: 12/1/2008
Elapsed Days: 31
Start Date: 1/1/2009
Elapsed Days: 31
Legend:
Model
Bills-Actual,Included
Bills-Estimated,Included
Bills-Not Included



Notes:

1. Only bills that are completely within the analysis period are included in the report.
2. Bills for the "Whole building" metered space are included in the report.
3. If there are multiple metered spaces for the fuel, then only the usage for the dates for which utility bills are available for ALL metered spaces is included in the report. The start date and elapsed days of all such bills must be exactly the same. The restriction allows TREAT to calculate the total building energy consumption for the time period.
4. The billing bar is color-coded as Not Included if utility bill for at least one individually metered space for the time period was entered as not to be included in the Billing Analysis (Include the Bill in Analyais field was set to No on the Utility Bills screen for this bill).
5. The billing bar is color-coded as Estimated if there is at least one estimated utility bill for at least one individually metered space for the time period (Bill Type field is set to Estimated on the Utility Bills screen for this bill) and all the bills for the time period are included in the billing analysis.
6. The billing bar is color-coded as Actual if utility bill for all individually metered spaces for the time period are actual.
7. Model data is only shown if the billing period is compared to the model with valid calculation results.
8. Model heating and cooling usage is calculated using model heating/cooling slope and reference temperature and weather data available in Daily Weather Data library for the period covered by utility bill.

APPENDIX B

ECM-1a Lighting Replacements

Energy Audit of North Bergen Housing Authority

CHA Project No. 20241 Terrace Apartments **Cost of Electricity:** **$0.112 $/kWh**

ECM-1a Lighting Replacements **$9.62 $/kW**

			EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS					
	Field Code	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
		Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
First Floor	4	Lobby/Halls	18	2B 34 R F 2 (u) (MAG)	FU2EE	72	1.3	Breaker	8760	11,353	18	2T 17 R F 2 (ELE)	F22ILL	33	0.6	Breaker	8,760	5,203	6,150	$ 770.34	$ 1,822.50	$180	2.4	2.1
	18	Manager Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2,600	582	-	$ -	$ -	$0		
	4	Mail Room	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	2912	839	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	2,912	384	454	$ 68.93	$ 405.00	$40	5.9	5.3
	18	Laundry	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	SW	4368	6,849	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	SW	4,368	6,849	-	$ -	$ -	$0		
	2	Garage	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2912	932	4	W 28 W F 2	F42SSILL	48	0.2	SW	2,912	559	373	$ 56.56	$ 425.00	$40	7.5	6.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	Breaker	4,368	3,355	1,677	$ 232.35	$ 1,050.00	$160	4.5	3.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	Breaker	4,368	3,355	1,677	$ 232.35	$ 1,050.00	$160	4.5	3.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	Breaker	4,368	3,355	1,677	$ 232.35	$ 1,050.00	$160	4.5	3.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	Breaker	4,368	3,355	1,677	$ 232.35	$ 1,050.00	$160	4.5	3.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	Breaker	4,368	3,355	1,677	$ 232.35	$ 1,050.00	$160	4.5	3.8
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	1,258	2	T 28 R F 4	F44SSILL	96	0.2	SW	4,368	839	419	$ 58.09	$ 262.50	$40	4.5	3.8
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	1,258	2	T 28 R F 4	F44SSILL	96	0.2	SW	4,368	839	419	$ 58.09	$ 262.50	$40	4.5	3.8
	6	Community Room	1	T 34 R F 4 (MAG)	F44EE	144	0.1	SW	4368	629	1	T 28 R F 4	F44SSILL	96	0.1	SW	4,368	419	210	$ 29.04	$ 131.25	$20	4.5	3.8
	61	Men's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	239	1	T 28 R F 3	F43SSILL	72	0.1	SW	2,080	150	89	$ 14.99	$ 128.25	$20	8.6	7.2
	61	Women's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	239	1	T 28 R F 3	F43SSILL	72	0.1	SW	2,080	150	89	$ 14.99	$ 128.25	$20	8.6	7.2
	61	Kitchen	4	T 34 R F 3 (MAG)	F43EE	115	0.5	SW	2912	1,340	4	T 28 R F 3	F43SSILL	72	0.3	SW	2,912	839	501	$ 76.00	$ 513.00	$80	6.7	5.7
	61	Transportation Rm	2	T 34 R F 3 (MAG)	F43EE	115	0.2	SW	2000	460	2	T 28 R F 3	F43SSILL	72	0.1	SW	2,000	288	172	$ 29.21	$ 256.50	$40	8.8	7.4
	117	Trash Compactor	3	CF 23	CFS23/1	23	0.1	SW	2000	138	3	CF 23	CFS23/1	23	0.1	SW	2,000	138	-	$ -	$ -	$0		
	2	Mech/Elect Room	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2000	640	4	W 28 W F 2	F42SSILL	48	0.2	SW	2,000	384	256	$ 43.48	$ 425.00	$40	9.8	8.9
	117	Mech/Elect Room	8	CF 23	CFS23/1	23	0.2	SW	2000	368	8	CF 23	CFS23/1	23	0.2	SW	2,000	368	-	$ -	$ -	$0		
	17	Elevator 1	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	736	3	2' 17 W F 1	F21ILL	20	0.1	Breaker	8,760	526	210	$ 26.34	$ 303.75	$30	11.5	10.4
	17	Elevator 2	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	736	3	2' 17 W F 1	F21ILL	20	0.1	Breaker	8,760	526	210	$ 26.34	$ 303.75	$30	11.5	10.4
2nd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
3rd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
4th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
5th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
6th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
7th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
8th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
9th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
10th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
11th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	Breaker	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	Breaker	8,760	683	447	$ 55.96	$ 303.75	$30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8,760	920	-	$ -	$ -	$0		
Apartments	217	W32CF4-E SW (T8, Occ)	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	SW	2912	85,904	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	SW	2,912	85,904	-	$ -	$ -	$0		
	126	2CF23 Wall Mt 1 SW EA (Occ)	500	DC 23 C CF 2	CFQ22/2	48	24.0	SW	2912	69,888	500	DC 23 C CF 2	CFQ22/2	48	24.0	SW	2,912	69,888	-	$ -	$ -	$0		
	222	W20CF1-Mag SW (T12)	250	W 20 CF1 (MAG)	F21SS	28	7.0	SW	2912	20,384	250	W 17 C F 1 (ELE)	F21LL	16	4.0	SW	2,912	11,648	8,736	$ 1,325.63	$ 16,875.00	$6,250	12.7	8.0
Exterior	225	Outside Wallpacks	20	70 High Pressure Sodium	HPS70/1	95	1.9	Timer	4368	8,299	20	70 High Pressure Sodium	HPS70/1	95	1.9	Timer	4,368	8,299	-	$ -	$ -	$0		
	236	Outside Doors	6	MV 250	mv250/1	290	1.7	Timer	4368	7,600	6	MV 250	mv250/1	290	1.7	Timer	4,368	7,600	-	$ -	$ -	$0		
	237	Pole	6	WP 400 Po HPS	hps400/1	465	2.8	Timer	4368	12,187	6	WP 400 Po HPS	hps400/1	465	2.8	Timer	4,368	12,187	-	$ -	$ -	$0		
	189	Exit Signs	70	X 7.0 W 1	ECF7/1	10	0.7	Breaker	8760	6,132	70	X 1.5C LED	ELED1.5/1	1.5	0.1	Breaker	8,760	920	5,212	$ 652.92	$ 8,977.50	$700	13.7	12.7
		Total	**1,428**				**88.3**			**341,150**	**1,428**			**3,432**	**78**			**282,456**	**58,693**	**$7,771**	**$65,757**	**$12,420**		
																		Demand Savings		**10.3**	**$1,192**			
																		kWh Savings		**58,693**	**$6,579**			
																		Total savings			**$7,771**		**8.5**	**6.9**

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
ECM #1 - Fixture and Control Replacement Cost Lighting Analysis

COST TABLE

Notes	Field Code	Standard Code	NYSERDA Code	Watts per fixture	Retrofit	Standard Code	NYSERDA Code	Watts per fixture	Lamps/Fix	Ball/Fix	Fixture Replacement			Ballast Replacement			Lamp Replacement			O.P.& D	NJ Incentive	Retrofit Cost (inc. O&P)
											Material	Labor	Disposal	Material	Labor	Disposal	Material	Labor	Disposal			
	2	T 34 W F 2 (MAG) RL/RB	F42ES	80	RL/RB	W 28 W F 2	F42SSILL	48	2	1				$20.00	$45.00	INC	$10.00	$10.00	INC	$21.25	**$10.00**	**$106.25**
(1)	**3**	W 34 W F 1 (MAG)	F41EE	43	Replace	W 28 W F 1	F41SSILL	26	1	1	$90.00	$45.00	$5.00							$35.00	**$25.00**	**$175.00**
(2)	**4**	2B 34 R F 2 (u) (MAG)	FU2EE	72	Replace	2T 17 R F 2 (ELE)	F22ILL	33	2	1				$20.00	$45.00	INC	$5.00	$5.00	INC	$26.25	**$10.00**	**$101.25**
	6	T 34 R F 4 (MAG)	F44EE	144	RL/RB	T 28 R F 4	F44SSILL	96	4	1				$20.00	$45.00	INC	$20.00	$20.00	INC	$26.25	**$20.00**	**$131.25**
	17	2' 20 W F 1 (MAG)	F21SS	28	RL/RB	2' 17 W F 1	F21ILL	20	1					$20.00	$45.00	INC	$5.00	$5.00	INC	$26.25	**$10.00**	**$101.25**
	18	T 32 R F 4 (ELE)	F44ILL	112	NONE																	
	28	CR 40 C F 1 (MAG)	FC16/1	35	NONE																	
	57	S 34 C F 1 (MAG)	F41EE	43	RL/RB	S 28 C F 1	F41SSILL	26	1	1				$20.00	$45.00	INC	$5.00	$5.00	INC	$26.25	**$10.00**	**$101.25**
	61	T 34 R F 3 (MAG)	F43EE	115	RL/RB	T 28 R F 3	F43SSILL	72	3	10				$20.00	$45.00	INC	$15.00	$15.00	INC	$33.25	**$20.00**	**$128.25**
	117	CF 23	CFS23/1	23	NONE																	
	126	DC 23 C CF 2	CFQ22/2	48	NONE																	
	189	X 7.0 W 1	ECF7/1	10	Replace	X 1.5C LED	ELED1.5/1	1.5	1		$50.00	$45.00	INC							$33.25	**$10.00**	**$128.25**
	217	W 32 C F 4 (ELE)	F44ILL/2	118	NONE																	
	222	W 20 CF1 (MAG)	F21SS	28	Replace	W 17 C F 1 (ELE)	F21LL	16	1	1	$40.00	$10.00	INC							$17.50	**$25.00**	**$67.50**
	225	70 High Pressure Sodium	HPS70/1	95	NONE																	
	236	MV 250	mv250/1	290	NONE																	
	237	WP 400 Po HPS	hps400/1	465	NONE																	
	OCC	OCCUPANCY SENSOR SWITCH									$50	$45	INC							$23.75	**$20.00**	**$118.75**
	C-OCC	OCC SENSOR W/ 20 FT. WIRE TO CEILING									$100	$50	INC							$52.50	**$35.00**	**$202.50**

Rebuild Notes:
(1) Replace with client requested fixtures
(2) 2' x 2' U-Tube to 17 w 2' lamps with Reflector Kit Vendor Code RK(2F17t)

New Jersey Smart Start Prescriptive Lighting type	Watt/Fix	Lamps	$/Unit	
New Hard Wired Compact Fluorescents	N/A	1	$25	
New Hard Wired Compact Fluorescents	N/A	2	$30	
For retrofit of T-12 fixtures to T-5 or T-8 with electronic ballasts				
Retrofit T-12 to T-5,T-8 with Electronic Ballasts	N/A	1&2	$10	
Retrofit T-12 to T-5,T-8 with Electronic Ballasts	N/A	3 & 4	$20	
For replacement of fixtures with new T-5 or T-8 fixtures				
HID, T-12, Incandescent to T-8, T-5 with Electronic Ballasts	>1000	N/A	$284	
HID, T-12, Incandescent to T-8, T-5 with Electronic Ballasts	400-999	N/A	$100	
HID, T-12, Incandescent to T-8, T-5 with Electronic Ballasts	250--399	N/A	$50	
HID Only to T-8, T-5 with Electronic Ballasts	175-249	N/A	$43	
HID Only to T-8, T-5 with Electronic Ballasts	100-174	N/A	$30	
HID Only to T-8, T-5 with Electronic Ballasts	75-99		$16	
T-12 Only to T-8, T-5 with Electronic Ballasts (1&2 lamp)	<250	1&2	$25	
T-12 Only to T-8, T-5 with Electronic Ballasts (3&4 lamp)	<250	3 & 4	$30	
For retrofit of T-8 fixtures by permanent delamping & new reflectors	N/A	N/A	$20	
New construction and complete renovation	N/A	N/A	Perf based only	
LED Exit Signs (new fixtures only): For existing facilities with load <= 75 kW	N/A	N/A	$20	
LED Exit Signs (new fixtures only): For existing facilities with load >= 75 kW	N/A	N/A	$10	
Pulse Start Metal Halide (for fixtures >= 150 watts) - includes parking lot lighting	N/A	N/A	$25	
Parking lot low bay - LED	N/A	N/A	$43	
T-12 to T-8 fixtures by permanent delamping & new reflectors	N/A	N/A	$30	
Controls				
OSW- Occupancy Sensor Wall Mounted (existing facilities only)	N/A	N/A	$20	
OSR- Occupancy Sensor Remote Mounted (existing facilities only)	N/A	N/A	$35	
DLD-Fluorescent Daylight Dimming	N/A	N/A	$25	Per Fixture Controlled
OHLF-Occupancy controlled High-Low with Step Ballast	N/A	N/A	$25	Per Fixture Controlled
OSRH- Occupancy Sensor Remote Mounted	N/A	N/A	$35	
OHLH-Occupancy controlled High-Low with Step Ballast	N/A	N/A	$75	Per Fixture Controlled
DDH-Daylight Dimming	N/A	N/A	$75	Per Fixture Controlled

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
ECM #1 - Fixture and Control Replacement Cost Lighting Analysis

Hours of Operation

Energy Audit of North Bergen Housing Autho	Hours/Day	Hours/Year	Proposed	Utilized
Hallways	24	8760	8760	Y
Offices	10	2600	1200	Y
Community Room	12	4368	2000	Y
Outdoor Lighting	12	4368	4368	Y
Stairway	24	8760	8760	Y
Laundry	12	4368	1500	Y
Storage Areas		1000	250	Y
Boiler Room		2000	2000	Y
Bath Room	8	2080	1000	Y
General Common	8	2912	2912	Y
Cafeteria/Kitchen/Service	8	2912	1200	Y
Apartments (HA lights)	8	2912	2184	Y
Apartment (tenants' lamps)		500	500	Y

APPENDIX C

ECM-1b Install Occupancy Sensors

Energy Audit of North Bergen Housing Authority

CHA Project No. 20241 Terrace Apartments

ECM-1b Install Occupancy Sensors

Cost of Electricity: $0.112 $/kWh

$9.62 $/kW

			EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS					
		Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
	Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
First Floor	4	Lobby/Halls	18	2B 34 R F 2 (u) (MAG)	FU2EE	72	1.3	Breaker	8760	11,353.0	18	2B 34 R F 2 (u) (MAG)	FU2EE	72	1.3	None	8760	11,353.0	0.0	$0.00	$0.00	$0.00		
	18	Manager Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582.4	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	OCC	1200	268.8	313.6	$35.15	$118.75	$20.00	3.4	2.8
	4	Mail Room	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	2912	838.7	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.3	None	2912	838.7	0.0	$0.00	$0.00	$0.00		
	18	Laundry	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	SW	4368	6,849.0	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	C-OCC	1500	2,352.0	4,497.0	$504.05	$405.00	$70.00	0.8	0.7
	2	Garage	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2912	931.8	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	None	2912	931.8	0.0	$0.00	$0.00	$0.00		
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,031.9	8	T 34 R F 4 (MAG)	F44EE	144	1.2	C-OCC	2000	2,304.0	2,727.9	$305.76	$405.00	$70.00	1.3	1.1
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,031.9	8	T 34 R F 4 (MAG)	F44EE	144	1.2	C-OCC	2000	2,304.0	2,727.9	$305.76	$405.00	$70.00	1.3	1.1
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,031.9	8	T 34 R F 4 (MAG)	F44EE	144	1.2	C-OCC	2000	2,304.0	2,727.9	$305.76	$405.00	$70.00	1.3	1.1
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,031.9	8	T 34 R F 4 (MAG)	F44EE	144	1.2	C-OCC	2000	2,304.0	2,727.9	$305.76	$405.00	$70.00	1.3	1.1
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,031.9	8	T 34 R F 4 (MAG)	F44EE	144	1.2	C-OCC	2000	2,304.0	2,727.9	$305.76	$405.00	$70.00	1.3	1.1
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	1,258.0	2	T 34 R F 4 (MAG)	F44EE	144	0.3	None	4368	1,258.0	0.0	$0.00	$0.00	$0.00		
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	1,258.0	2	T 34 R F 4 (MAG)	F44EE	144	0.3	None	4368	1,258.0	0.0	$0.00	$0.00	$0.00		
	6	Community Room	1	T 34 R F 4 (MAG)	F44EE	144	0.1	SW	4368	629.0	1	T 34 R F 4 (MAG)	F44EE	144	0.1	None	4368	629.0	0.0	$0.00	$0.00	$0.00		
	61	Men's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	239.2	1	T 34 R F 3 (MAG)	F43EE	115	0.1	OCC	1000	115.0	124.2	$13.92	$237.50	$40.00	17.1	14.2
	61	Women's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	239.2	1	T 34 R F 3 (MAG)	F43EE	115	0.1	OCC	1000	115.0	124.2	$13.92	$118.75	$20.00	8.5	7.1
	61	Kitchen	4	T 34 R F 3 (MAG)	F43EE	115	0.5	SW	2912	1,339.5	4	T 34 R F 3 (MAG)	F43EE	115	0.5	OCC	1200	552.0	787.5	$88.27	$118.75	$20.00	1.3	1.1
	61	Transportation Rm	2	T 34 R F 3 (MAG)	F43EE	115	0.2	SW	2000	460.0	2	T 34 R F 3 (MAG)	F43EE	115	0.2	OCC	250	57.5	402.5	$45.11	$118.75	$20.00	2.6	2.2
	117	Trash Compactor	3	CF 23	CFS23/1	23	0.1	SW	2000	138.0	3	CF 23	CFS23/1	23	0.1	None	2000	138.0	0.0	$0.00	$0.00	$0.00		
	2	Mech/Elect Room	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2000	640.0	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	None	2000	640.0	0.0	$0.00	$0.00	$0.00		
	117	Mech/Elect Room	8	CF 23	CFS23/1	23	0.2	SW	2000	368.0	8	CF 23	CFS23/1	23	0.2	None	2000	368.0	0.0	$0.00	$0.00	$0.00		
	17	Elevator 1	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	735.8	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	None	8760	735.8	0.0	$0.00	$0.00	$0.00		
	17	Elevator 2	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	735.8	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	None	8760	735.8	0.0	$0.00	$0.00	$0.00		
2nd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
3rd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
4th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
5th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
6th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
7th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
8th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
9th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
10th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
11th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650.2	15	W 34 W F 1 (MAG)	F41EE	43	0.6	None	8760	5,650.2	0.0	$0.00	$0.00	$0.00		
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130.0	3	S 34 C F 1 (MAG)	F41EE	43	0.1	None	8760	1,130.0	0.0	$0.00	$0.00	$0.00		
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	919.8	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8760	919.8	0.0	$0.00	$0.00	$0.00		
Apartments	217	W32CF4-E SW (T8, Occ)	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	SW	2912	85,904.0	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	OCC	2184	64,428.0	21,476.0	$2,407.15	$118.75	$20.00	0.0	0.0
	126	2CF23 Wall Mt 1 SW EA (Occ)	500	DC 23 C CF 2	CFQ22/2	48	24.0	SW	2912	69,888.0	500	DC 23 C CF 2	CFQ22/2	48	24.0	OCC	2184	52,416.0	17,472.0	$1,958.36	$118.75	$20.00	0.1	0.1
	222	W20CF1-Mag SW (T12)	250	W 20 CF1 (MAG)	F21SS	28	7.0	SW	2912	20,384.0	250	W 20 CF1 (MAG)	F21SS	28	7.0	None	2912	20,384.0	0.0	$0.00	$0.00	$0.00		
Exterior	225	Outside Wallpacks	20	70 High Pressure Sodium	HPS70/1	95	1.9	Timer	4368	8,299.2	20	70 High Pressure Sodium	HPS70/1	95	1.9	None	4368	8,299.2	0.0	$0.00	$0.00	$0.00		
	236	Outside Doors	6	MV 250	mv250/1	290	1.7	Timer	4368	7,600.3	6	MV 250	mv250/1	290	1.7	None	4368	7,600.3	0.0	$0.00	$0.00	$0.00		
	237	Pole	6	WP 400 Po HPS	hps400/1	465	2.8	Timer	4368	12,186.7	6	WP 400 Po HPS	hps400/1	465	2.8	None	4368	12,186.7	0.0	$0.00	$0.00	$0.00		
	189	Exit Signs	70	X 7.0 W 1	ECF7/1	10	0.7	Breaker	8760	6,132.0	70	X 7.0 W 1	ECF7/1	10	0.7	None	8760	6,132.0	0.0	$0.00	$0.00	$0.00		
		Total	**1,428**				**88.3**			**341,150**	**1,428**				**88**			**282,313**	**58,837**	**6,595**	**$3,380**	**580**		
																		Demand Savings		**0.0**	**$0**			
																		kWh Savings		**58,837**	**$6,595**			
																		Total Savings			**$6,595**		**0.5**	**0.4**

APPENDIX D

ECM-1c Install Lighting Replacements and Occupancy Sensors

Energy Audit of North Bergen Housing Authority

CHA Project No. 20241 Terrace Apartments

ECM-1c Lighting Replacements with Occupancy Sensors

Cost of Electricity: $0.112 $/kWh

$9.62 $/kW

			EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS					
		Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
	Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
First Floor	4	Lobby/Halls	18	2B 34 R F 2 (u) (MAG)	FU2EE	72	1.3	Breaker	8760	11,353	18	2T 17 R F 2 (ELE)	F22ILL	33	0.6	None	8,760	5,203	6,150	$ 770.34	$ 1,822.50	$ 180	2.4	2.1
	18	Manager Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	582	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	OCC	1,200	269	314	$ 35.15	$ 118.75	$ 20	3.4	2.8
	4	Mail Room	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	2912	839	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	None	2,912	384	454	$ 68.93	$ 405.00	$ 40	5.9	5.3
	18	Laundry	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	SW	4368	6,849	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	C-OCC	1,500	2,352	4,497	$ 504.05	$ 405.00	$ 70	0.8	0.7
	2	Garage	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2912	932	4	W 28 W F 2	F42SSILL	48	0.2	None	2,912	559	373	$ 56.56	$ 425.00	$ 40	7.5	6.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	C-OCC	2,000	1,536	3,496	$ 436.19	$ 1,455.00	$ 230	3.3	2.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	C-OCC	2,000	1,536	3,496	$ 436.19	$ 1,455.00	$ 230	3.3	2.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	C-OCC	2,000	1,536	3,496	$ 436.19	$ 1,455.00	$ 230	3.3	2.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	C-OCC	2,000	1,536	3,496	$ 436.19	$ 1,455.00	$ 230	3.3	2.8
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	5,032	8	T 28 R F 4	F44SSILL	96	0.8	C-OCC	2,000	1,536	3,496	$ 436.19	$ 1,455.00	$ 230	3.3	2.8
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	1,258	2	T 28 R F 4	F44SSILL	96	0.2	None	4,368	839	419	$ 58.09	$ 262.50	$ 40	4.5	3.8
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	1,258	2	T 28 R F 4	F44SSILL	96	0.2	None	4,368	839	419	$ 58.09	$ 262.50	$ 40	4.5	3.8
	6	Community Room	1	T 34 R F 4 (MAG)	F44EE	144	0.1	SW	4368	629	1	T 28 R F 4	F44SSILL	96	0.1	None	4,368	419	210	$ 29.04	$ 131.25	$ 20	4.5	3.8
	61	Men's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	239	1	T 28 R F 3	F43SSILL	72	0.1	OCC	1,000	72	167	$ 23.71	$ 365.75	$ 60	15.4	12.9
	61	Women's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	239	1	T 28 R F 3	F43SSILL	72	0.1	OCC	1,000	72	167	$ 23.71	$ 247.00	$ 40	10.4	8.7
	61	Kitchen	4	T 34 R F 3 (MAG)	F43EE	115	0.5	SW	2912	1,340	4	T 28 R F 3	F43SSILL	72	0.3	OCC	1,200	346	994	$ 131.27	$ 631.75	$ 100	4.8	4.1
	61	Transportation Rm	2	T 34 R F 3 (MAG)	F43EE	115	0.2	SW	2000	460	2	T 28 R F 3	F43SSILL	72	0.1	OCC	250	36	424	$ 57.46	$ 375.25	$ 60	6.5	5.5
	117	Trash Compactor	3	CF 23	CFS23/1	23	0.1	SW	2000	138	3	CF 23	CFS23/1	23	0.1	None	2,000	138	-	$ -	$ -	$ -		
	2	Mech/Elect Room	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2000	640	4	W 28 W F 2	F42SSILL	48	0.2	None	2,000	384	256	$ 43.48	$ 425.00	$ 40	9.8	8.9
	117	Mech/Elect Room	8	CF 23	CFS23/1	23	0.2	SW	2000	368	8	CF 23	CFS23/1	23	0.2	None	2,000	368	-	$ -	$ -	$ -		
	17	Elevator 1	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	736	3	2' 17 W F 1	F21ILL	20	0.1	None	8,760	526	210	$ 26.34	$ 303.75	$ 30	11.5	10.4
	17	Elevator 2	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	736	3	2' 17 W F 1	F21ILL	20	0.1	None	8,760	526	210	$ 26.34	$ 303.75	$ 30	11.5	10.4
2nd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
3rd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
4th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
5th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
6th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
7th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
8th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
9th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
10th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
11th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	5,650	15	W 28 W F 1	F41SSILL	26	0.4	None	8,760	3,416	2,234	$ 279.82	$ 2,625.00	$ 375	9.4	8.0
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	1,130	3	S 28 C F 1	F41SSILL	26	0.1	None	8,760	683	447	$ 55.96	$ 303.75	$ 30	5.4	4.9
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	920	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	None	8,760	920	-	$ -	$ -	$ -		
Apartments	217	W32CF4-E SW (T8, Occ)	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	SW	2912	85,904	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	OCC	1,000	29,500	56,404	$ 6,322.07	$ 29,687.50	$ 5,000	4.7	3.9
	126	2CF23 Wall Mt 1 SW EA (Occ)	500	DC 23 C CF 2	CFQ22/2	48	24.0	SW	2912	69,888	500	DC 23 C CF 2	CFQ22/2	48	24.0	OCC	1,000	24,000	45,888	$ 5,143.38	$ 59,375.00	$ 10,000	11.5	9.6
	222	W20CF1-Mag SW (T12)	250	W 20 CF1 (MAG)	F21SS	28	7.0	SW	2912	20,384	250	W 17 C F 1 (ELE)	F21LL	16	4.0	None	2,912	11,648	8,736	$ 1,325.63	$ 16,875.00	$ 6,250	12.7	8.0
Exterior	225	Outside Wallpacks	20	70 High Pressure Sodium	HPS70/1	95	1.9	Timer	4368	8,299	20	70 High Pressure Sodium	HPS70/1	95	1.9	None	4,368	8,299	-	$ -	$ -	$ -		
	236	Outside Doors	6	MV 250	mv250/1	290	1.7	Timer	4368	7,600	6	MV 250	mv250/1	290	1.7	None	4,368	7,600	-	$ -	$ -	$ -		
	237	Pole	6	WP 400 Po HPS	hps400/1	465	2.8	Timer	4368	12,187	6	WP 400 Po HPS	hps400/1	465	2.8	None	4,368	12,187	-	$ -	$ -	$ -		
	189	Exit Signs	70	X 7.0 W 1	ECF7/1	10	0.7	Breaker	8760	6,132	70	X 1.5C LED	ELED1.5/1	1.5	0.1	None	8,760	920	5,212	$ 652.92	$ 8,977.50	$ 700	13.7	12.7
		Total	1,428				88.3			341,150	1,428				77.9			165,360		20,895	157,962	27,960		
																		Demand Savings		10.3	$1,192			
																		kWh Savings		175,790	$19,703			
																		Total Savings			$20,895		7.6	6.2

APPENDIX E

ECM-2 Light Bulb Exchange

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
ECM-2 Bulb Replacements (Apartment Lamps)

Cost of Electricity: $0.112 $/kWh
$9.62 $/kW

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS					
	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual $ Saved	Retrofit Cost	NJ Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	*Lighting Fixture Code* Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	*Lighting Fixture Code* Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
71	I 60 (tenants' lamps)	400	I 60	I60/1	60	24.0	SW	500	12,000	400	CF 13	CFQ13/1	17	6.8	SW	500	3,400	8,600	$ 963.93	$ 2,000.00	$0	2.1	2.1
93	I 75 (tenants' lamps)	750	I 75	I75/1	75	56.3	SW	500	28,125	750	CF 18	CFQ18/1-L	20	15.0	SW	500	7,500	20,625	$ 2,311.76	$ 3,750.00	$0	1.6	1.6
	Total	**1,150**				**80.3**			**40,125**	**1,150**			**37**	**22**			**10,900**	**29,225**	**$3,276**	**$5,750**	**$0**		
																		Demand Savings	**58.5**	**$6,750**			
																		kWh Savings	**29,225**	**$3,276**			
																		Total savings		**$10,026**		**0.6**	**0.6**

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
ECM-2 Bulb Replacements (Apartment Lamps)

COST TABLE

Notes	Field Code	Standard Code	NYSERDA Code	Watts per fixture	Retrofit	Standard Code	NYSERDA Code	Watts per fixture	Lamps/Fix	Ball/Fix	Fixture Replacement			Ballast Replacement			Lamp Replacement			O.P.& D	NJ Incentive	Retrofit Cost (inc. O&P)
											Material	Labor	Disposal	Material	Labor	Disposal	Material	Labor	Disposal			
	71	I 60	I60/1	60	Replace	CF 13	CFQ13/1	17	1								$4.00	INC	INC	$1.00	**$0.00**	**$5.00**
	93	I 75	I75/1	75	Replace	CF 18	CFQ18/1-L	20	1								$4.00	INC	INC	$1.00	**$0.00**	**$5.00**

Rebuild Notes:
(1) Replace with client requested fixtures
(2) 2' x 2' U-Tube to 17 w 2' lamps with Reflector Kit Vendor Code RK(2F17t)

New Jersey Smart Start Prescriptive Lighting type	Watt/Fix	Lamps	$/Unit	
New Hard Wired Compact Fluorescents	N/A	1	$25	
New Hard Wired Compact Fluorescents	N/A	2	$30	
For retrofit of T-12 fixtures to T-5 or T-8 with electronic ballasts				
Retrofit T-12 to T-5,T-8 with Electronic Ballasts	N/A	1&2	$10	
Retrofit T-12 to T-5,T-8 with Electronic Ballasts	N/A	3 & 4	$20	
For replacement of fixtures with new T-5 or T-8 fixtures				
HID, T-12, Incandescent to T-8, T-5 with Electronic Ballasts	>1000	N/A	$284	
HID, T-12, Incandescent to T-8, T-5 with Electronic Ballasts	400-999	N/A	$100	
HID, T-12, Incandescent to T-8, T-5 with Electronic Ballasts	250--399	N/A	$50	
HID Only to T-8, T-5 with Electronic Ballasts	175-249	N/A	$43	
HID Only to T-8, T-5 with Electronic Ballasts	100-174	N/A	$30	
HID Only to T-8, T-5 with Electronic Ballasts	75-99		$16	
T-12 Only to T-8, T-5 with Electronic Ballasts (1&2 lamp)	<250	1&2	$25	
T-12 Only to T-8, T-5 with Electronic Ballasts (3&4 lamp)	<250	3 & 4	$30	
For retrofit of T-8 fixtures by permanent delamping & new reflectors	N/A	N/A	$20	
New construction and complete renovation	N/A	N/A	Perf based only	
LED Exit Signs (new fixtures only): For existing facilities with load <= 75 kW	N/A	N/A	$20	
LED Exit Signs (new fixtures only): For existing facilities with load >= 75 kW	N/A	N/A	$10	
Pulse Start Metal Halide (for fixtures >= 150 watts) - includes parking lot lighting	N/A	N/A	$25	
Parking lot low bay - LED	N/A	N/A	$43	
T-12 to T-8 fixtures by permanent delamping & new reflectors	N/A	N/A	$30	
Controls				
OSW- Occupancy Sensor Wall Mounted (existing facilities only)	N/A	N/A	$20	
OSR- Occupancy Sensor Remote Mounted (existing facilities only)	N/A	N/A	$35	
DLD-Fluorescent Daylight Dimming	N/A	N/A	$25	Per Fixture Controlled
OHLF-Occupancy controlled High-Low with Step Ballast	N/A	N/A	$25	Per Fixture Controlled
OSRH- Occupancy Sensor Remote Mounted	N/A	N/A	$35	
OHLH-Occupancy controlled High-Low with Step Ballast	N/A	N/A	$75	Per Fixture Controlled
DDH-Daylight Dimming	N/A	N/A	$75	Per Fixture Controlled

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
ECM-2 Bulb Replacements (Apartment Lamps)

Hours of Operation

Energy Audit of North Bergen Housing Authc	Hours/Day	Hours/Year	Proposed	Utilized
Apartment (tenants' lamps)		500	500	Y

APPENDIX F

ECM-3a Replace Urinals and Flush Valves with Low Flow Units

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM-3a Replace urinals and flush valves with low flow

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.00	$ / kGal
Urinals in Building	2	
Average Flushes / Urinal (per Day)	30	
Average Gallons / Flush	3.0	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	2	
Proposed Gallons / Flush	1.0	Gal
Proposed Material Cost	$360	
Proposed Installation Cost	$269	
Total cost of new urinals & valves	$1,258	

SAVINGS		
Current Urinal Water Use	66	kGal / year
Proposed Urinal Water Use	55	kGal / year
Water Savings	11	kGal / year
Cost Savings	$99	/ year
Simple Payback	12.8	year

APPENDIX G

ECM-3b Replace Toilets with Low Flow Units

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM-3b Replace toilets with low flow units.

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.00	$ / kGal
Toilets in Building	129	
Average Flushes / Toilet (per Day)	6	
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	129	
Proposed Gallons / Flush	1.6	Gal
Proposed Material Cost of new Flush Valves	$315	
Proposed Installation cost of new Flush Valves	$139	
Total cost of new toilets & valves	$58,534	

SAVINGS		
Current Toilet Water Use	989	kGal / year
Proposed Toilet Water Use	452	kGal / year
Water Savings	537	kGal / year
Cost Savings	$4,831	/ year
Simple Payback	12.1	year

Note:
Terrace Apartments has 258 toilets. This assumes that half of the toilets have been replaced with low flow toilets.

APPENDIX H

Not used

APPENDIX I

ECM-3c Replace Shower Heads with Low Flow Units

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM-3c Replace Showerheads

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$9.00	$ / kGal
Showers in Building	252	
Average Uses / shower (per day)	1	
Time in shower	5	Minutes
Old Flow / Showerhead	2.50	GPM
Average Gallons / Use	13	Gal/Day

PROPOSED CONDITIONS		
Proposed showers to modify	252	
Proposed Flow / Showerhead	1.6	Gal
Proposed Average Gallons / Use	8.0	Gal/Day
Proposed Material Cost of new showerheads	$15	
Proposed Installation cost of new showerheads	$19	
Total cost of new showerheads	$8,505	

SAVINGS		
Current Shower Water Use	1,150	kGal / year
Proposed Shower Water Use	736	kGal / year
Water Savings	414	kGal / year
Cost Savings	$3,725	/ year
Simple Payback	2.3	year

APPENDIX J

ECM-4 Temperature Limiting Thermostats for Electric Baseboard

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM-4 Temperature Limiting Thermostats

Install new temperature limiting thermostats for the electric fin tube radiation.

Multipliers *	
Material:	1.00
**Labor:	1.44
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Install temperature limiting thermostat.	252	ea.	$ 50	$ 47		$ 12,600	$ 17,055	$ -	$ 29,655	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$	29,655	Subtotal
$	2,966	10% Contingency
$	4,893	Contractor 15% O&P
$	-	0% Engineering
$	**37,514**	**Total**

* Mutipliers per RS Means Mechanical Cost Data for Newark, New Jersey

**Multiplier for Electrical / Controls Technician Labor specific to the Newark, New Jersey area.

RECOMMENDED IMPROVEMENTS

Customer: NBHA

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home.

Annual Cost Savings by Improvement in Recommended Packages

Improvement Description	Non-energy benefits	Improve-ment Cost	Thermostates Apartments	NA	NA
Thermostat Common & Apartments: Install 1 programmable heating/cooling thermostat. Install 2 non-programmable Heating only thermostats. Install 1 non-programmable heating/cooling thermostat.	Improve comfort, improve convenience.	$ 0	$ 8,767/yr		
Total Annual Energy Cost Savings			$ 8,767 /yr		
Total Installed Cost			$ 0		
Monthly Loan Payment at 8.00%, 30-year Term			$ 0		
Estimated Monthly Cash Flow After Energy Savings			$ 730.58		
Simple Annual Payback, Years			NA		
Savings to Investment Ratio			NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

YOUR SUMMARY

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home. You should use it as a guide for deciding what work you want to have done. Remember, your Home Performance Contractor is ready to complete these projects promptly, and the work is guaranteed.

Selected Packages

Measure Description	Non-energy benefits	Package1	Package2	Package3
Thermostat Common & Apartments: Install 1 programmable heating/cooling thermostat. Install 2 non-programmable Heating only thermostats. Install 1 non-programmable heating/cooling thermostat.	Improve comfort, improve convenience.	$ 0		
Total Installed Cost		$ 0		
Annual Energy Cost Savings		$ 8,767		
Annual KWh Savings, KWh		67,438		
Total Energy Savings, MMBtu		230.1		
Simple annual payback, years		NA		
Savings to Investment Ratio		NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

DESIGN HEATING AND COOLING LOADS FOR THERMOSTATES APARTMENTS

8/25/2009
Project Name: NBHA Terrace Apts

For: NBHA

By:

Date:

Primary Heating System:

Space Name	Load, Btu/Hr	Feet of Electric Baseboard
Boiler Room Base	81134	96
Comm Rm Kitchen & Store	113524	134
Base Common Area	314991	370
1st -10th Apts	2076860	2435
Base Floor Apts	42650	50
1st-10th Common Areas	0	0

Required Heating Equipment Output Capacity: 2892071 Btu/hr
Available Heating Equipment Output Capacity: 900000 Btu/hr
Baseboard Capacity: 250 Watt/Ft
Heating Equipment Efficiency: 100 %
Calculated Distribution Efficiency: 100 %
Heating Safety Factor: 1.10
HEATING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED HEATING LOAD.

Cooling System:

Space Name	Load, Btu/Hr	Distribution CFM
Boiler Room Base	0	0
Comm Rm Kitchen & Store	87933	3199
Base Common Area	0	0
1st -10th Apts	2246584	81721
Base Floor Apts	22680	825
1st-10th Common Areas	0	0

Required Cooling Equipment Output Capacity: 2607254 Btu/hr

Available Cooling Equipment Output Capacity: 450000 Btu/hr

Total flow: 86219 CFM

Cooling Equipment Efficiency: 9 SEER

Calculated Distribution Efficiency: 99%

Temperature Drop: 28 F

Cooling Safety Factor: 1.10

Distribution Safety Factor: 1.10

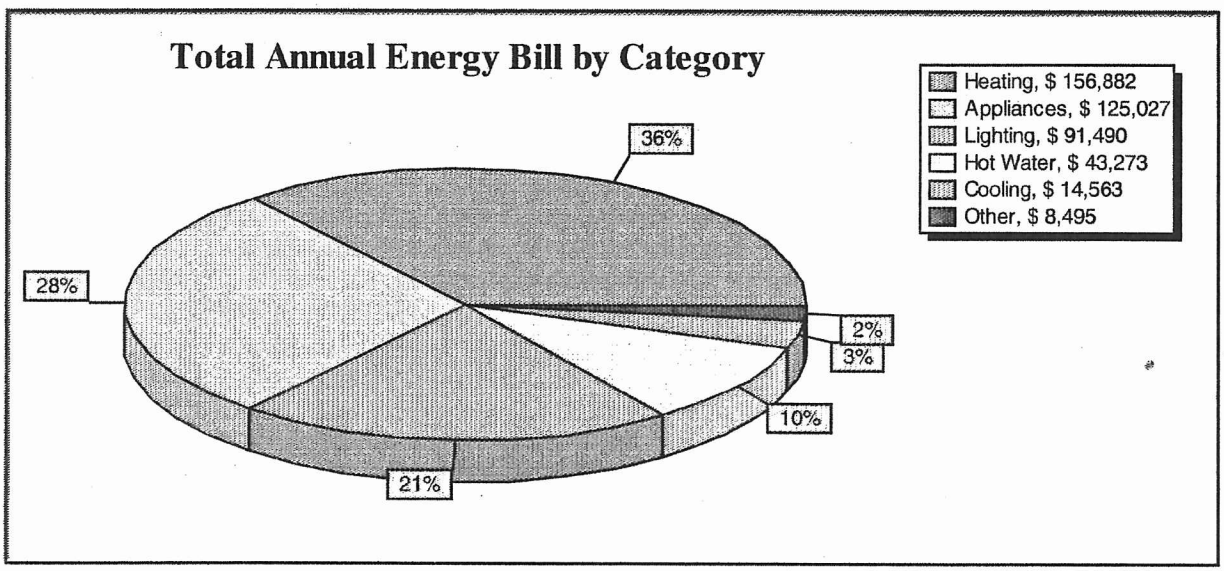
COOLING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED COOLING LOAD.

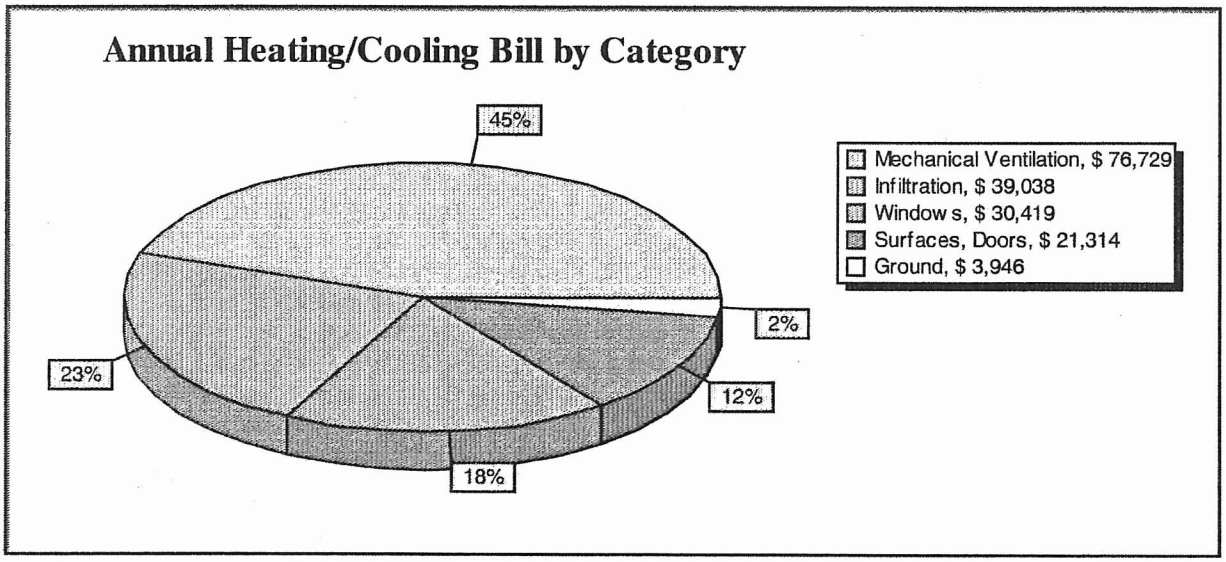
Notes:

1. The room heating/cooling loads do not include the equipment and distribution safety factor and distribution losses
2. The room distribution includes distribution safety factor.
3. The load on the room is the peak load for this room in a year.
4. Available equipment output capacity includes equipment efficiency.
5. Required equipment output capacity includes diversity, distribution losses and equipment safety factor.
6. Overall distribution CFM/GPM for heating/cooling includes equipment safety factor, distribution losses and diversity.

MODEL ENERGY REPORT FOR THERMOSTATES APARTMENTS

NBHA Terrace Apts
For: NBHA
By:
Date: 8/25/2009





Note: Due to rounding, the sum of percentages may not be equal to 100.

Base Load Report

Customer Information

Customer Name: NBHA

Address: Terrace 6800 Columbia Avenue
North Bergen, NJ 07047

Billing Period: None

Auditor Information

Technician Name:

Company:

Phone Number:

Date: 8/25/2009

Model to Actual Comparison of Base Usage Per Year

Model Name: Thermostates Apartments

Billing Period Name: None

	Electricity		Natural gas			
	kWh	$	Therm	$		
Model	1,722,283	223,897	36,384	44,388		
Billing						
% Difference						

Note: No billing data is available because the model was not compared to a billing period

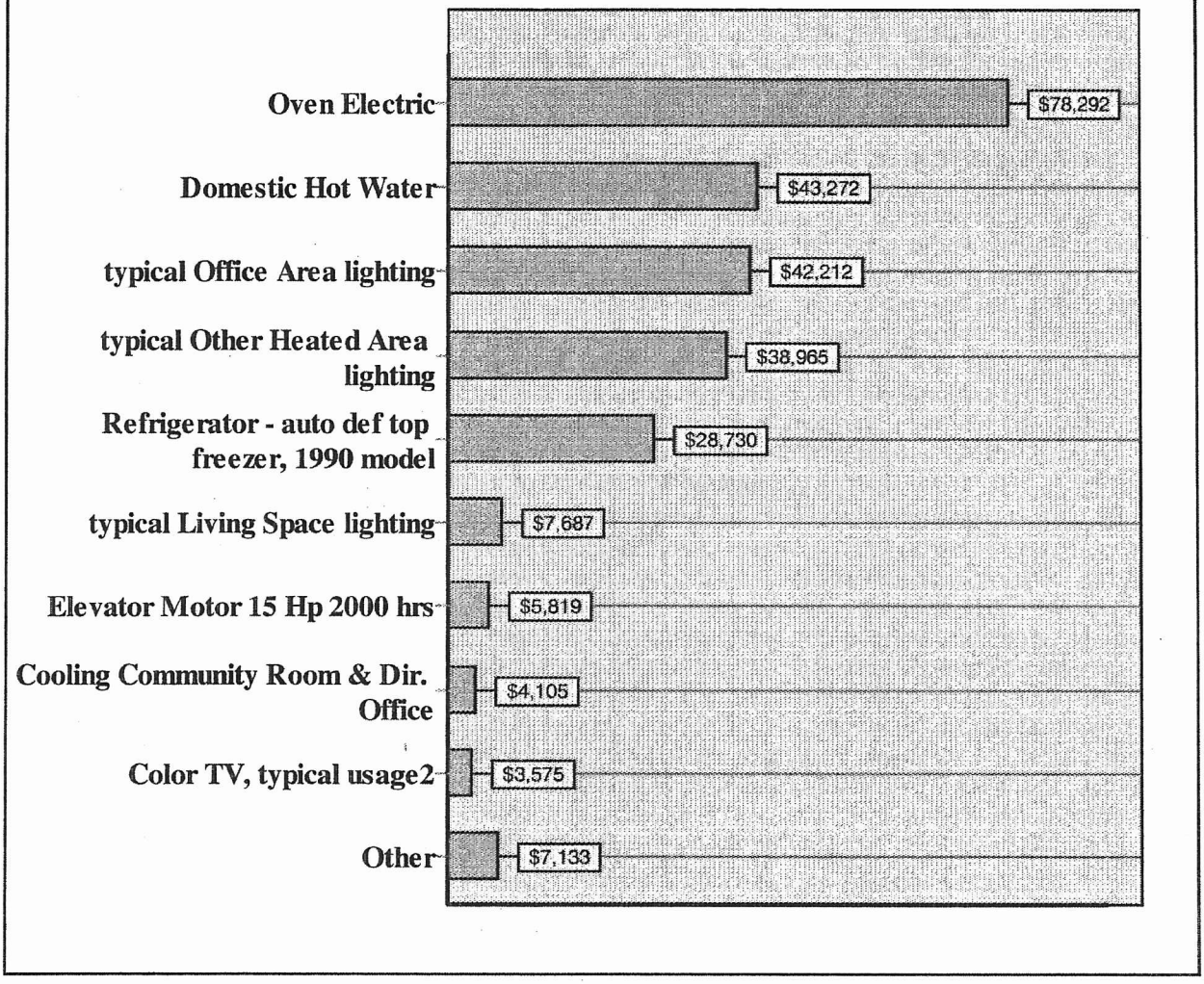
Annual Use of Domestic Hot Water, Appliances, and Lighting

Model Name: Thermostates Apartments

	Electricity $0.13 per kWh		Natural gas $1.22 per Therm				Total
	kWh	$	therms	$			$
1. Oven Electric	602,250	78,292	0	0			78,292
2. Domestic Hot Water	0	0	35,469	43,272			43,272
3. typical Office Area lighting	324,704	42,212	0	0			42,212
4. typical Other Heated Area lighting	299,732	38,965	0	0			38,965
5. Refrigerator - auto def top freezer, 1990	221,000	28,730	0	0			28,730
6. typical Living Space lighting	59,130	7,687	0	0			7,687
7. Elevator Motor 15 Hp 2000 hrs	44,760	5,819	0	0			5,819
8. Cooling Community Room & Dir. Office	31,574	4,105	0	0			4,105
9. Color TV, typical usage2	27,500	3,575	0	0			3,575
10. Other	46,284	6,017	915	1,116			7,133
TOTAL	1,656,934	215,402	36,384	44,388			259,790

Base Load Energy Users, $/year

Model Name: Thermostates Apartments



DETAILED PACKAGE DESCRIPTION AND WORKSCOPE FOR
Thermostates Apartments

NBHA Terrace Apts

For: NBHA

By:

Date:8/25/2009

Improvement Information:

1. Thermostat Common & Apartments

Programmable Thermostat Installation

Install 1 programmable heating/cooling thermostat.
Install 2 non-programmable Heating only thermostats.
Install 1 non-programmable heating/cooling thermostat.

Non-Energy Benefits: Improve comfort, improve convenience.

Work Scope:

Comply with General Conditions. Submit product information and obtain Owner approval prior to ordering. Thermostat shall have a minimum of two setback periods per day and allow for 7-day programming. Remove existing thermostat and leave with Owner if requested, otherwise dispose off-site in compliance with state and local solid waste regulations, including compliance with hazardous waste regulations for thermostats which contain mercury. Patch and paint surface where existing thermostat was removed, to match existing. Terminate unused existing thermostat wires safely and hidden from view. For removed line-voltage thermostats, disconnect wiring at load and breaker panel, safely terminate wiring, and label disconnected wiring and breakers as "ABANDONED". Install new thermostat 60" above finished floor in location approved by Owner. Level the new thermostat, and ensure that it is securely fastened and installed according to the manufacturer's instructions. Adjust anticipator according to heating system instructions. Test thermostat by cycling it automatically through setup and setback periods. Program the thermostat (temperature and time periods) according to the Owner's instructions. Provide a written report of settings. Provide training to Owner in use of thermostat, including at a minimum: How to change thermostat temperature, how to change program periods, how to temporarily override programmed periods, how to change auto/fan setting (if applicable) and what this does, how to adjust anticipator, and other system-specific features.

APPENDIX K

ECM-5 Air Conditioner Changeout with High EER Units

TCAR ACP

RECOMMENDED IMPROVEMENTS

Customer: NBHA

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home.

Annual Cost Savings by Improvement in Recommended Packages

Improvement Description	Non-energy benefits	Improve-ment Cost	Cooling AC Units to 12 EER	NA	NA
Cooling System A/C Units to 12 EER 1: Install 12 SEER 450,000 Btu/hr cooling system. Reuse existing distribution system.	Increase value of building.	$ 0	$ 3,401/yr		
Total Annual Energy Cost Savings			$ 3,401 /yr		
Total Installed Cost			$ 0		
Monthly Loan Payment at 8.00%, 30-year Term			$ 0		
Estimated Monthly Cash Flow After Energy Savings			$ 283.44		
Simple Annual Payback, Years			NA		
Savings to Investment Ratio			NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

YOUR SUMMARY

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home. You should use it as a guide for deciding what work you want to have done. Remember, your Home Performance Contractor is ready to complete these projects promptly, and the work is guaranteed.

Selected Packages

Measure Description	Non-energy benefits	Package1	Package2	Package3
Cooling System A/C Units to 12 EER 1: Install 12 SEER 450,000 Btu/h cooling system. Reuse existing distribution system.	Increase value of building.	$ 0		
Total Installed Cost		$ 0		
Annual Energy Cost Savings		$ 3,401		
Annual KWh Savings, KWh		26,164		
Total Energy Savings, MMBtu		89.3		
Simple annual payback, years		NA		
Savings to Investment Ratio		NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

DESIGN HEATING AND COOLING LOADS FOR COOLING AC UNITS TO 12 EER

8/25/2009
Project Name: NBHA Terrace Apts

For: NBHA

By:

Date:

Primary Heating System:

Space Name	Load, Btu/Hr	Feet of Electric Baseboard
Boiler Room Base	81134	96
Comm Rm Kitchen & Store	113524	134
Base Common Area	342247	402
1st -10th Apts	2227058	2611
Base Floor Apts	45270	54
1st-10th Common Areas	0	0

Required Heating Equipment Output Capacity: 3090153 Btu/hr
Available Heating Equipment Output Capacity: 900000 Btu/hr
Baseboard Capacity: 250 Watt/Ft
Heating Equipment Efficiency: 100 %
Calculated Distribution Efficiency: 100 %
Heating Safety Factor: 1.10
HEATING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED HEATING LOAD.

Cooling System:

Space Name	Load, Btu/Hr	Distribution CFM
Boiler Room Base	0	0
Comm Rm Kitchen & Store	87933	3199
Base Common Area	0	0
1st -10th Apts	2246584	81721
Base Floor Apts	22680	825
1st-10th Common Areas	0	0

Required Cooling Equipment Output Capacity: 2607298 Btu/hr

Available Cooling Equipment Output Capacity: 450000 Btu/hr

Total flow: 86220 CFM

Cooling Equipment Efficiency: 12 SEER

Calculated Distribution Efficiency: 99%

Temperature Drop: 28 F

Cooling Safety Factor: 1.10

Distribution Safety Factor: 1.10

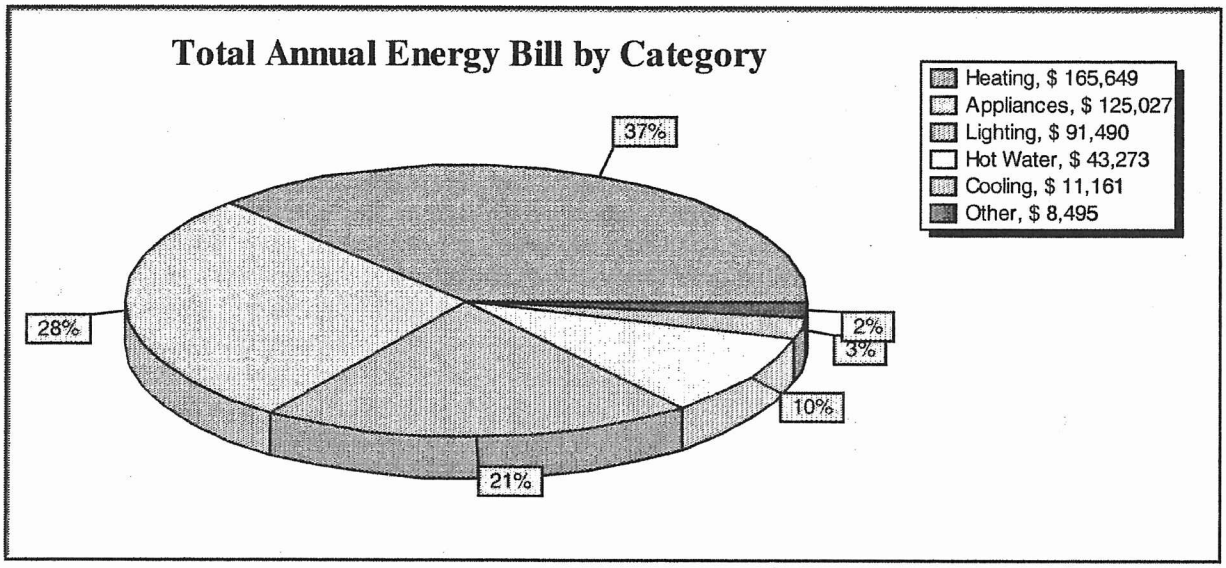
COOLING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED COOLING LOAD.

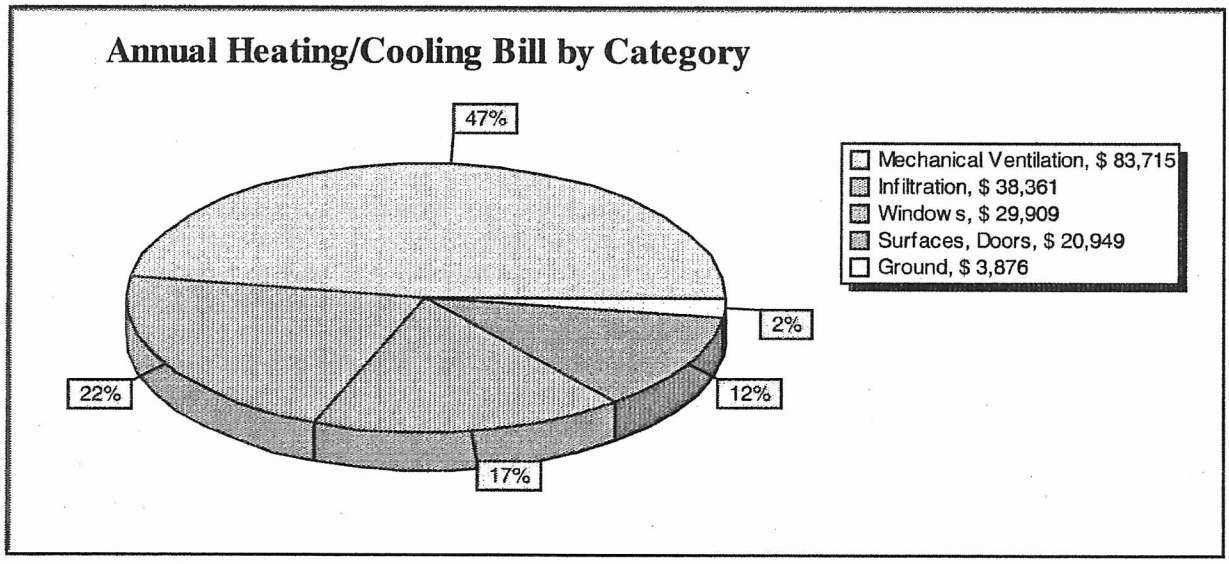
Notes:

1. The room heating/cooling loads do not include the equipment and distribution safety factor and distribution losses
2. The room distribution includes distribution safety factor.
3. The load on the room is the peak load for this room in a year.
4. Available equipment output capacity includes equipment efficiency.
5. Required equipment output capacity includes diversity, distribution losses and equipment safety factor.
6. Overall distribution CFM/GPM for heating/cooling includes equipment safety factor, distribution losses and diversity.

MODEL ENERGY REPORT FOR COOLING AC UNITS TO 12 EER

NBHA Terrace Apts
For: NBHA
By:
Date: 8/25/2009





Note: Due to rounding, the sum of percentages may not be equal to 100.

Base Load Report

Customer Information

Customer Name: NBHA

Address: Terrace 6800 Columbia Avenue
North Bergen, NJ 07047

Billing Period: None

Auditor Information

Technician Name:

Company:

Phone Number:

Date: 8/25/2009

Model to Actual Comparison of Base Usage Per Year

Model Name: Cooling AC Units to 12 EER

Billing Period Name: None

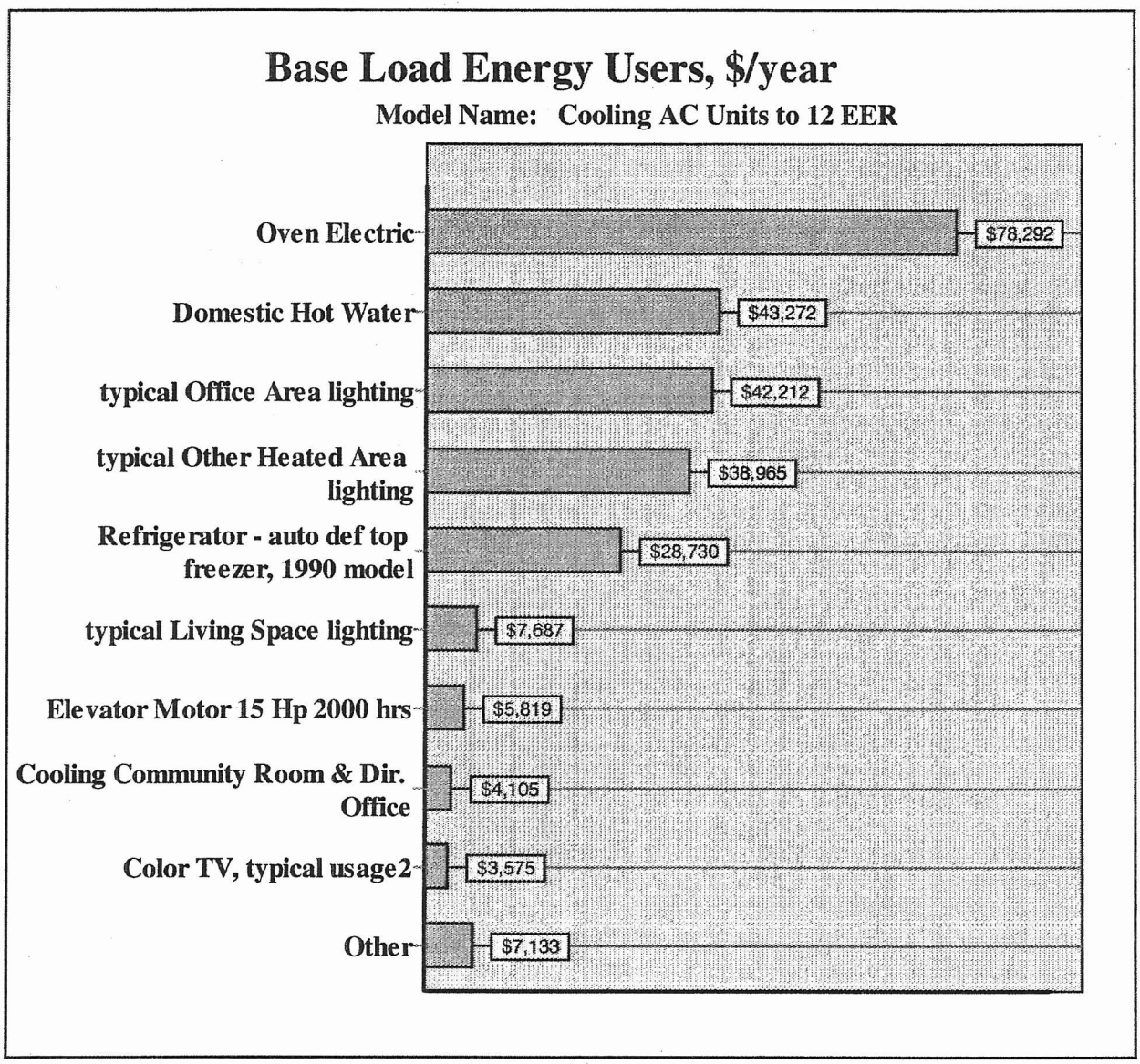
	Electricity		Natural gas			
	kWh	$	Therm	$		
Model	1,722,283	223,897	36,384	44,388		
Billing						
% Difference						

Note: No billing data is available because the model was not compared to a billing period

Annual Use of Domestic Hot Water, Appliances, and Lighting

Model Name: Cooling AC Units to 12 EER

	Electricity $0.13 per kWh		Natural gas $1.22 per Therm				Total
	kWh	$	therms	$			$
1. Oven Electric	602,250	78,292	0	0			78,292
2. Domestic Hot Water	0	0	35,469	43,272			43,272
3. typical Office Area lighting	324,704	42,212	0	0			42,212
4. typical Other Heated Area lighting	299,732	38,965	0	0			38,965
5. Refrigerator - auto def top freezer, 1990	221,000	28,730	0	0			28,730
6. typical Living Space lighting	59,130	7,687	0	0			7,687
7. Elevator Motor 15 Hp 2000 hrs	44,760	5,819	0	0			5,819
8. Cooling Community Room & Dir. Office	31,574	4,105	0	0			4,105
9. Color TV, typical usage2	27,500	3,575	0	0			3,575
10. Other	46,284	6,017	915	1,116			7,133
TOTAL	1,656,934	215,402	36,384	44,388			259,790


Base Load Energy Users, $/year
Model Name: Cooling AC Units to 12 EER
Oven Electric
$78,292
Domestic Hot Water
$43,272
typical Office Area lighting
$42,212
typical Other Heated Area lighting
$38,965
Refrigerator - auto def top freezer, 1990 model
$28,730
typical Living Space lighting
$7,687
Elevator Motor 15 Hp 2000 hrs
$5,819
Cooling Community Room & Dir. Office
$4,105
Color TV, typical usage2
$3,575
Other
$7,133

DETAILED PACKAGE DESCRIPTION AND WORKSCOPE FOR Cooling AC Units to 12 EER

NBHA Terrace Apts

For: NBHA

By:

Date:8/25/2009

Improvement Information:

1. Cooling System A/C Units to 12 EER 1

Cooling System Improvement

Input Capacity, Btu/Hr	450000
SEER	12

Non-Energy Benefits: Increase value of building.

Work Scope:

Comply with general conditions. Submit product information to owner for approval in writing prior to ordering. Remove existing air conditioning system safely and completely. Patch and paint where existing equipment was removed to match existing surfaces. Perform complete load sizing of the building prior to selecting replacement equipment, using standard methods such as ACCA manual J, or ASHRAE. Size new equipment according to this load sizing, and not according to the size of removed equipment. Provide a written copy of load sizing and assumptions for approval by the owner prior to ordering equipment. Size distribution system according to standard methods. Install forced air system securely and level. Securely fasten system to duct work with mechanical fasteners and seal. Install locking balancing dampers. Install a clean air filter. Duct sealing and insulation shall comply with standards described in the separate duct sealing and duct insulation work scopes. After installation is complete, measure and record air temperature change. Ensure that these measurements are within the manufacturer's requirements. Balance distribution system by measuring air supply to all grilles and adjusting manual balancing dampers. Set anticipator at thermostat. Charge per manufacturer's instructions. Measure and adjust superheat, subcooling, saturated suction temperature, saturated condensing temperature, compressor amps, outside air temperature, return air temperature, and supply air temperature. Provide training to the owner in the use of the system and thermostat. Deliver to the owner users manual, including measurement reports, warranties, and approved submittals.

APPENDIX L

ECM-6 Night Setback for Offices and Community Room

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM-6 Night Setback Controls for Community Room and Main Office.

Suggestions

Install new programable thermostats in the Terrace Apartments Community Room and Main Office. for night set back temperatures for heating and cooling.

Clean the air cooled condensers for the Terrace Office and Community Room air conditioning equipment.

Multipliers *	
Material:	1.00
**Labor:	1.44
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Install and program, programmable thermostats for night setback conditions.	5	ea.	$ 207	$ 67		$ 1,035	$ 482	$ -	$ 1,517	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
Clean the remote air cooled condensers for the Office and Community Rm. AC Units.	5	ea.		$ 40	$ 1.00	$ -	$ 288	$ 5	$ 293	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

* Mutipliers per RS Means Mechanical Cost Data for Newark, New Jersey

**Multiplier for Electrical / Controls Technician Labor specific to the Newark, New Jersey area.

$ 1,810	Subtotal
$ 181	10% Contingency
$ 299	15% Contractor O&P
$ -	0% Engineering
$ 2,290	**Total**

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM-6 Night Setbacks

Terrace Office Area and Community Room

Utility Costs $ 0.13
kW/Ton 1.2

Community Room Capacity		
Unit	Ton	kW
#1	5	6
#2	5	6
#3	5	6
#4	5	6
Total	20	24

	Cooling kW	Heating kW
Community Room	24	18
Director Office	2.4	1.8
Total	26.4	19.8
	1,196	3,630
	31,574	**71,874**

NYC Bin Hours above and below balance temp

100,000 Btu/Therm
55 Balance Temp

Inputs

		Current	Proposed
Operating Hours	Hr per Day	24	9
	Day per Wk	7	6
	Wk per Yr	52	52
Annual Operating Hours		8,736	2,808
Occupied Hours	Hr per Day	9	9
	Day per Wk	6	6
	Wk per Yr	52	52
Annual Occupied Hours		2,808	2,808
Occupancy Rate		32%	100%

Fuel Costs

Winter	$ -	/Therm
Summer	$ -	/Therm

Heating Efficiency	100%	
Cooling Efficiency	1.20	kW/ton
Cooling Efficiency	1.20	kW/ton

Proposed Night Setback Optimization

		Unit	Current		Proposed	
			Heating	Cooling	Heating	Cooling
Total Capacity		kWh	71,874	31,574	71,874	31,574
Capacity to be Setback		%	100%	100%	100%	100%
		BTU/hr	71,874	31,574	71,874	31,574
Design Point		F DB	5	95	5	95
Total Load		BTU/hr F	1,437	789	1,437	789
Dead band		F DB	5	0	5	0
Setpoints	Occ.	F DB	72	75	72	75
	Unocc.	F DB	72	75	60	80
Balance Point		F DB	55	55	55	55

Savings

	Heating Therm	Cooling Therm	Cooling Kwh	Heating kWh
Current	1,345	275		
Proposed	432	88		
Energy Savings	912	186	1,863	9,124
Cost Savings	$0	$0	$242	$1,186

Total	**$1,428**

Calculation

Mean Temperature	Binned Hours	Adjusted Hours Current	Adjusted Hours Proposed
°F db	Hrs	Hrs	Hrs
92.5	1	1.0	0.3
87.5	34	33.9	10.9
82.5	77	76.8	24.7
77.5	366	365.0	117.3
72.5	718	716.0	230.2
67.5	802	799.8	257.1
62.5	759	756.9	243.3
57.5	830	827.7	266.1
52.5	754	751.9	241.7
47.5	789	786.8	252.9
42.5	562	560.5	180.1
37.5	629	627.3	201.6
32.5	909	906.5	291.4
27.5	788	785.8	252.6
22.5	322	321.1	103.2
17.5	223	222.4	71.5
12.5	122	121.7	39.1
7.5	50	49.9	16.0
2.5	20	19.9	6.4
-2.5	5	5.0	1.6
-7.5	0	-	-
Total	8,760	8,736	2,808

Current

	Occ. Hours	Status Heating	Status Cooling	Heating Load	Cooling Load	Energy Therm	Energy Therm
	Hrs			BTU/hr	BTU/hr	Therm	Therm
Occupied	0.3	0	1	-	29,601	-	0
	10.9	0	1	-	25,654	-	2
	24.7	0	1	-	21,707	-	4
	117.3	0	1	-	17,761	-	17
	230.2	0	1	-	13,814	-	26
	257.1	0	1	-	9,867	-	21
	243.3	0	1	-	5,920	-	12
	266.1	0	1	-	1,973	-	4
	241.7	0	0	-	-	-	-
	252.9	1	0	10,781	-	27	-
	180.1	1	0	17,969	-	32	-
	201.6	1	0	25,156	-	51	-
	291.4	1	0	32,343	-	94	-
	252.6	1	0	39,531	-	100	-
	103.2	1	0	46,718	-	48	-
	71.5	1	0	53,906	-	39	-
	39.1	1	0	61,093	-	24	-
	16.0	1	0	68,280	-	11	-
	6.4	1	0	75,468	-	5	-
	1.6	1	0	82,655	-	1	-
	-	1	0	89,843	-	-	-
	2,808	12	8	603,742	126,298	432	88

Proposed

	Occ. Hours	Status Heating	Status Cooling	Heating Load	Cooling Load	Energy Therm	Energy Therm
	Hrs			BTU/hr	BTU/hr	Therm	Therm
Occupied	0.3	0	1	-	29,601	-	0
	10.9	0	1	-	25,654	-	2
	24.7	0	1	-	21,707	-	4
	117.3	0	1	-	17,761	-	17
	230.2	0	1	-	13,814	-	26
	257.1	0	1	-	9,867	-	21
	243.3	0	1	-	5,920	-	12
	266.1	0	1	-	1,973	-	4
	241.7	0	0	-	-	-	-
	252.9	1	0	10,781	-	27	-
	180.1	1	0	17,969	-	32	-
	201.6	1	0	25,156	-	51	-
	291.4	1	0	32,343	-	94	-
	252.6	1	0	39,531	-	100	-
	103.2	1	0	46,718	-	48	-
	71.5	1	0	53,906	-	39	-
	39.1	1	0	61,093	-	24	-
	16.0	1	0	68,280	-	11	-
	6.4	1	0	75,468	-	5	-
	1.6	1	0	82,655	-	1	-
	-	1	0	89,843	-	-	-
	2,808	12	8	603,742	126,298	432	88

Mean Temperature	Binned Hours	Adjusted Hours Current	Adjusted Hours Proposed
°F db	Hrs	Hrs	Hrs
92.5	1	1.0	0.3
87.5	34	33.9	10.9
82.5	77	76.8	24.7
77.5	366	365.0	117.3
72.5	718	716.0	230.2
67.5	802	799.8	257.1
62.5	759	756.9	243.3
57.5	830	827.7	266.1
52.5	754	751.9	241.7
47.5	789	786.8	252.9
42.5	562	560.5	180.1
37.5	629	627.3	201.6
32.5	909	906.5	291.4
27.5	788	785.8	252.6
22.5	322	321.1	103.2
17.5	223	222.4	71.5
12.5	122	121.7	39.1
7.5	50	49.9	16.0
2.5	20	19.9	6.4
-2.5	5	5.0	1.6
-7.5	0	-	-
Total	8,760	8,736	2,808

	Unocc. Hours	Status Heating	Status Cooling	Heating Load	Cooling Load	Energy Therm	Energy Therm
	Hrs			BTU/hr	BTU/hr	Therm	Therm
Unoccupied	0.7	0	1	-	29,601	-	0
	23.0	0	1	-	25,654	-	5
	52.1	0	1	-	21,707	-	9
	247.7	0	1	-	17,761	-	37
	485.9	0	1	-	13,814	-	56
	542.7	0	1	-	9,867	-	45
	513.6	0	1	-	5,920	-	25
	561.7	0	1	-	1,973	-	9
	510.2	0	0	-	-	-	-
	533.9	1	0	10,781	-	58	-
	380.3	1	0	17,969	-	68	-
	425.7	1	0	25,156	-	107	-
	615.1	1	0	32,343	-	199	-
	533.2	1	0	39,531	-	211	-
	217.9	1	0	46,718	-	102	-
	150.9	1	0	53,906	-	81	-
	82.6	1	0	61,093	-	50	-
	33.8	1	0	68,280	-	23	-
	13.5	1	0	75,468	-	10	-
	3.4	1	0	82,655	-	3	-
	-	1	0	89,843	-	-	-
	5,928	12	8	603,742	126,298	912	186

	Unocc. Hours	Status Heating	Status Cooling	Heating Load	Cooling Load	Energy Therm	Energy Therm
	Hrs			BTU/hr	BTU/hr	Therm	Therm
Unoccupied	-	0	1	-	29,601	-	-
	-	0	1	-	25,654	-	-
	-	0	1	-	21,707	-	-
	-	0	1	-	17,761	-	-
	-	0	1	-	13,814	-	-
	-	0	1	-	9,867	-	-
	-	0	1	-	5,920	-	-
	-	0	1	-	1,973	-	-
	-	0	0	-	-	-	-
	-	1	0	10,781	-	-	-
	-	1	0	17,969	-	-	-
	-	1	0	25,156	-	-	-
	-	1	0	32,343	-	-	-
	-	1	0	39,531	-	-	-
	-	1	0	46,718	-	-	-
	-	1	0	53,906	-	-	-
	-	1	0	61,093	-	-	-
	-	1	0	68,280	-	-	-
	-	1	0	75,468	-	-	-
	-	1	0	82,655	-	-	-
	-	1	0	89,843	-	-	-
	-	12	8	603,742	126,298	-	-

APPENDIX M

ECM-7a Apartment Exhaust Fans Off 8 Hrs. / Day

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM - 7a Exhaust Fan On/Off Relays - Apartments

Suggestions

Install a small programmable controller and relays to turn roof mounted exhaust fans on and off based on a time schedule.

Multipliers *	
Material:	1.00
**Labor:	1.44
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
32 Point Programable Controller. Cost includes installation, programming and startup.	1	ea.		$ 2,000	$ 4,730	$ -	$ 2,880	$ 4,730	$ 7,610	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
Install On/Off Relays in NEMA cabinet. Install conduit and wire from controller to MCC.	31	ea.			$ 510	$ -	$ -	$ 15,810	$ 15,810	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 23,420	Subtotal
$ 4,684	20% Contingency
$ 4,216	15% Contractor O&P
$ -	0% Engineering
$ 32,320	**Total**

* Mutipliers per RS Means Mechanical Cost Data for Newark, New Jersey

**Multiplier for Electrical / Controls Technician Labor specific to the Newark, New Jersey area.

RECOMMENDED IMPROVEMENTS

Customer: NBHA

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home.

Annual Cost Savings by Improvement in Recommended Packages

Improvement Description	Non-energy benefits	Improve-ment Cost	Fans Off 8hrday Apartments	NA	NA
Fans Off 8 hrs/day Apartments: Replace existing fan with new 25,400 CFM fan.	Improve indoor air quality, increase value of building.	$ 0	$ 19,066/yr		
Total Annual Energy Cost Savings			$ 19,066 /yr		
Total Installed Cost			$ 0		
Monthly Loan Payment at 8.00%, 30-year Term			$ 0		
Estimated Monthly Cash Flow After Energy Savings			$ 1,588.86		
Simple Annual Payback, Years			NA		
Savings to Investment Ratio			NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

YOUR SUMMARY

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home. You should use it as a guide for deciding what work you want to have done. Remember, your Home Performance Contractor is ready to complete these projects promptly, and the work is guaranteed.

Selected Packages

Measure Description	Non-energy benefits	Package1	Package2	Package3
Fans Off 8 hrs/day Apartments: Replace existing fan with new 25,400 CFM fan.	Improve indoor air quality, increase value of building.	$ 0		
Total Installed Cost		$ 0		
Annual Energy Cost Savings		$ 19,066		
Annual KWh Savings, KWh		146,664		
Total Energy Savings, MMBtu		500.4		
Simple annual payback, years		NA		
Savings to Investment Ratio		NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

DESIGN HEATING AND COOLING LOADS FOR FANS OFF 8HRDAY
APARTMENTS

8/25/2009
Project Name: NBHA Terrace Apts

For: NBHA

By:

Date:

Primary Heating System:

Space Name	Load, Btu/Hr	Feet of Electric Baseboard
Boiler Room Base	81134	96
Comm Rm Kitchen & Store	113524	134
Base Common Area	342247	402
1st -10th Apts	1687058	1978
Base Floor Apts	36630	43
1st-10th Common Areas	0	0

Required Heating Equipment Output Capacity: 2486649 Btu/hr
Available Heating Equipment Output Capacity: 900000 Btu/hr
Baseboard Capacity: 250 Watt/Ft
Heating Equipment Efficiency: 100 %
Calculated Distribution Efficiency: 100 %
Heating Safety Factor: 1.10
HEATING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED HEATING LOAD.

Cooling System:

Space Name	Load, Btu/Hr	Distribution CFM
Boiler Room Base	0	0
Comm Rm Kitchen & Store	87933	3199
Base Common Area	0	0
1st -10th Apts	2029783	73835
Base Floor Apts	19212	699
1st-10th Common Areas	0	0

Required Cooling Equipment Output Capacity: 2363391 Btu/hr

Available Cooling Equipment Output Capacity: 450000 Btu/hr

Total flow: 78154 CFM

Cooling Equipment Efficiency: 9 SEER

Calculated Distribution Efficiency: 99%

Temperature Drop: 28 F

Cooling Safety Factor: 1.10

Distribution Safety Factor: 1.10

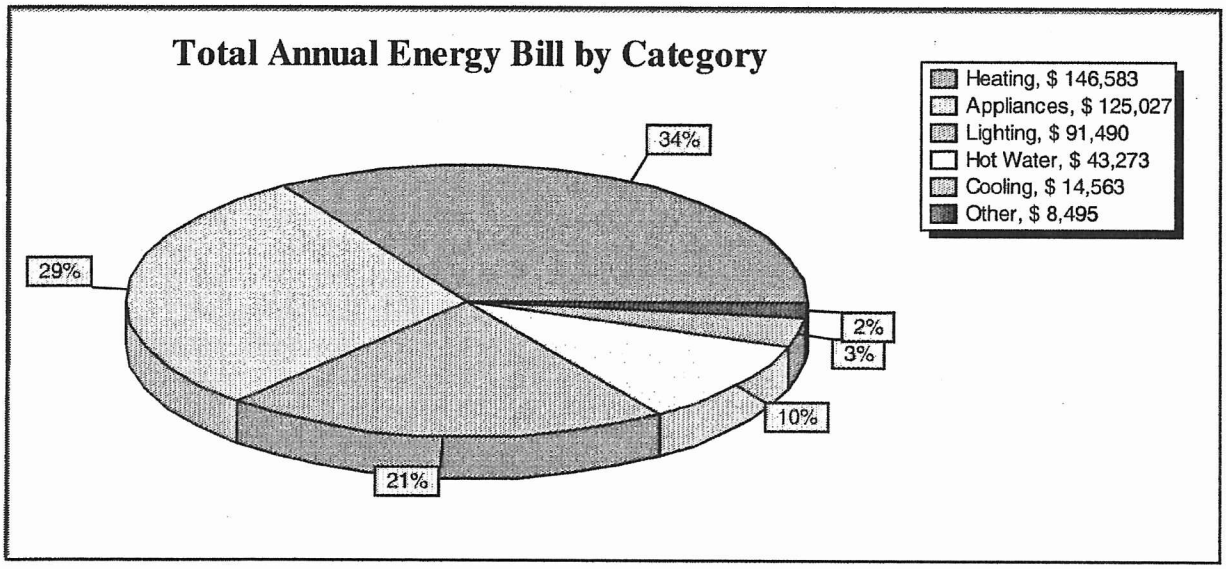
COOLING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED COOLING LOAD.

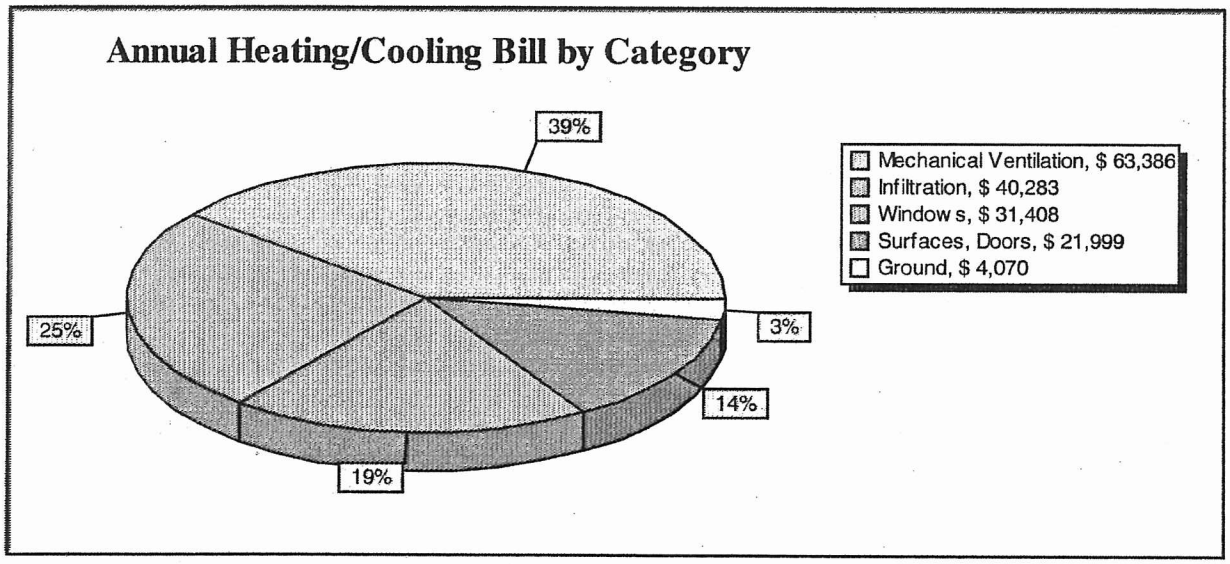
Notes:

1. The room heating/cooling loads do not include the equipment and distribution safety factor and distribution losses
2. The room distribution includes distribution safety factor.
3. The load on the room is the peak load for this room in a year.
4. Available equipment output capacity includes equipment efficiency.
5. Required equipment output capacity includes diversity, distribution losses and equipment safety factor.
6. Overall distribution CFM/GPM for heating/cooling includes equipment safety factor, distribution losses and diversity.

MODEL ENERGY REPORT FOR FANS OFF 8HRDAY APARTMENTS

NBHA Terrace Apts
For: NBHA
By:
Date: 8/25/2009





Note: Due to rounding, the sum of percentages may not be equal to 100.

Base Load Report

Customer Information

Customer Name: NBHA

Address: Terrace 6800 Columbia Avenue
North Bergen, NJ 07047

Billing Period: None

Auditor Information

Technician Name:

Company:

Phone Number:

Date: 8/25/2009

Model to Actual Comparison of Base Usage Per Year

Model Name: Fans Off 8hrday Apartments

Billing Period Name: None

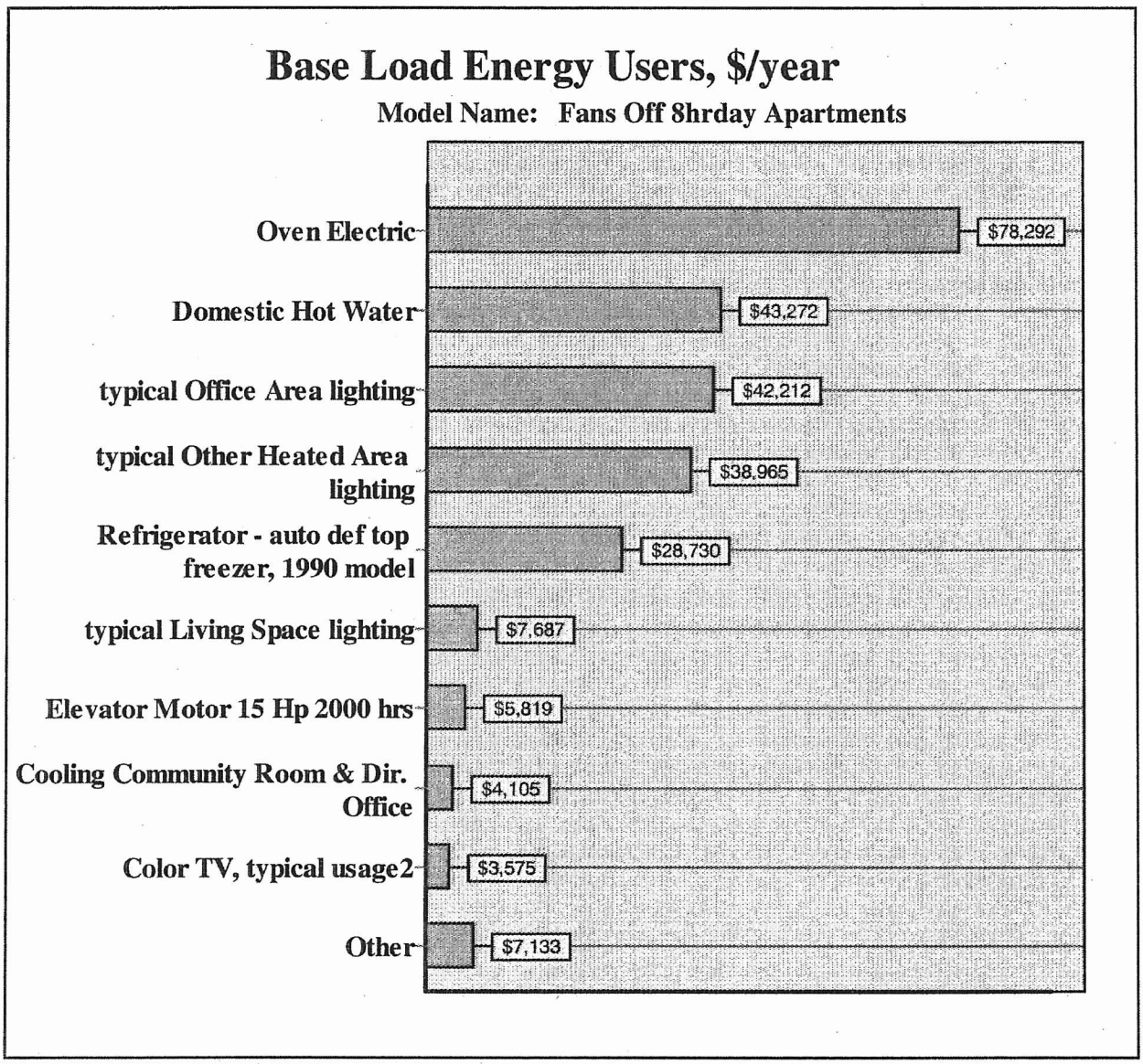
	Electricity		Natural gas			
	kWh	$	Therm	$		
Model	1,722,283	223,897	36,384	44,388		
Billing						
% Difference						

Note: No billing data is available because the model was not compared to a billing period

Annual Use of Domestic Hot Water, Appliances, and Lighting

Model Name: Fans Off 8hrday Apartments

	Electricity $0.13 per kWh		Natural gas $1.22 per Therm				Total
	kWh	$	therms	$			$
1. Oven Electric	602,250	78,292	0	0			78,292
2. Domestic Hot Water	0	0	35,469	43,272			43,272
3. typical Office Area lighting	324,704	42,212	0	0			42,212
4. typical Other Heated Area lighting	299,732	38,965	0	0			38,965
5. Refrigerator - auto def top freezer, 1990	221,000	28,730	0	0			28,730
6. typical Living Space lighting	59,130	7,687	0	0			7,687
7. Elevator Motor 15 Hp 2000 hrs	44,760	5,819	0	0			5,819
8. Cooling Community Room & Dir. Office	31,574	4,105	0	0			4,105
9. Color TV, typical usage2	27,500	3,575	0	0			3,575
10. Other	46,284	6,017	915	1,116			7,133
TOTAL	1,656,934	215,402	36,384	44,388			259,790


Base Load Energy Users, $/year
Model Name: Fans Off 8hrday Apartments
Oven Electric
$78,292
Domestic Hot Water
$43,272
typical Office Area lighting
$42,212
typical Other Heated Area lighting
$38,965
Refrigerator - auto def top freezer, 1990 model
$28,730
typical Living Space lighting
$7,687
Elevator Motor 15 Hp 2000 hrs
$5,819
Cooling Community Room & Dir. Office
$4,105
Color TV, typical usage2
$3,575
Other
$7,133

DETAILED PACKAGE DESCRIPTION AND WORKSCOPE FOR Fans Off 8hrday Apartments

NBHA Terrace Apts

For: NBHA

By:

Date:8/25/2009

Improvement Information:

1. Fans Off 8 hrs/day Apartments

Mechanical Ventilation Improvement

Ventilation Rate, CFM	Heat Recovery Efficiency	Ventilated Spaces	Type of Installation
400	0	Base Floor Apts	Replace existing fan
25000	0	1st -10th Apts	Replace existing fan

Non-Energy Benefits: Improve indoor air quality, increase value of building.

Work Scope:

Comply with general conditions. Submit product information to owner for approval in writing prior to ordering. Patch and paint where existing equipment was removed to match existing surfaces. Perform complete ventilation sizing of the building prior to selecting equipment, using standard methods such as ASHRAE Standard 62. Size new equipment according to this sizing, and not according to the size of removed equipment. Provide a written copy of sizing and assumptions for approval by the owner prior to ordering equipment. Size distribution system according to standard methods. Install system securely and level. Securely fasten system to duct work with mechanical fasteners and seal. Install clean air filters. Duct sealing and insulation shall comply with standards described in the separate duct sealing and duct insulation work scopes. Balance distribution system by measuring air supply to all grilles and adjusting manual balancing dampers. Balancing dampers shall be of the locking type. Install defrost drainage per manufacturer's instructions. Provide air gap for drain pipe per building or local codes. Insulate all ductwork per energy code requirements. Insulation shall be mechanically fastened. Tape is unacceptable as a fastener. Install supply grilles in locations where cold entering air will not present a comfort problem. After installation is complete, measure and record entering and leaving air temperatures. Ensure that these measurements are within the manufacturer's requirements. Provide training to the owner in the use of the system and controls. Deliver to the owner users manual, including measurement reports, warranties, and approved submittals.

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM - 7a Exhaust Fan On/Off Relays - Apartments

Suggestions

Install a small programmable controller and relays to turn roof mounted exhaust fans on and off based on a time schedule.

Multipliers *	
Material:	1.00
Labor:	1.44
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
32 Point Programable Controller	1	ea.			$ 4,730	$ -	$ -	$ 4,730	$ 4,730	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
Install On/Off Relays in NEMA cabinet. Install conduit and wire	31	ea.			$ 510	$ -	$ -	$ 15,810	$ 15,810	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

* Mutipliers per RS Means Mechanical Cost Data for Newark, New Jersey

$ 20,540	Subtotal
$ 4,108	20% Contingency
$ 3,697	15% Contractor O&P
$ -	0% Engineering
$ 28,345	**Total**

APPENDIX N

ECM-7b Common Area Exhaust Fans Off 8 Hrs. / Day

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM - 7b Exhaust Fan On/Off Relays - Common Areas

Suggestions

Install a small programmable controller and relays to turn roof mounted exhaust fans on and off based on a time schedule.

Multipliers *	
Material:	1.00
**Labor:	1.44
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
16 Point Programable Controller. Cost includes installation, programming and startup.	1	ea.		$ 1,000	$ 2,000	$ -	$ 1,440	$ 2,000	$ 3,440	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
Install On/Off Relays in NEMA cabinet. Install conduit and wire from controller to MCC.	16	ea.			$ 510	$ -	$ -	$ 8,160	$ 8,160	Means Mechanical Cost Data - 2009
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 11,600	Subtotal
$ 2,320	20% Contingency
$ 2,088	15% Contractor O&P
$ -	0% Engineering
$ 16,008	**Total**

* Mutipliers per RS Means Mechanical Cost Data for Newark, New Jersey

**Multiplier for Electrical / Controls Technician Labor specific to the Newark, New Jersey area.

RECOMMENDED IMPROVEMENTS

Customer: NBHA

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home.

Annual Cost Savings by Improvement in Recommended Packages

Improvement Description	Non-energy benefits	Improve-ment Cost	Fans Off 8 hrday Common	NA	NA
Fans Off 8hr/day Common Areas: Replace existing fan with new 25,800 CFM fan.	Improve indoor air quality, increase value of building.	$ 0	$ 2,536/yr		
Total Annual Energy Cost Savings			$ 2,536 /yr		
Total Installed Cost			$ 0		
Monthly Loan Payment at 8.00%, 30-year Term			$ 0		
Estimated Monthly Cash Flow After Energy Savings			$ 211.31		
Simple Annual Payback, Years			NA		
Savings to Investment Ratio			NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

YOUR SUMMARY

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home. You should use it as a guide for deciding what work you want to have done. Remember, your Home Performance Contractor is ready to complete these projects promptly, and the work is guaranteed.

 ***Selected Packages*** 

Measure Description	Non-energy benefits	Package1	Package2	Package3
Fans Off 8hr/day Common Areas: Replace existing fan with new 25,800 CFM fan.	Improve indoor air quality, increase value of building.	$ 0		
Total Installed Cost		$ 0		
Annual Energy Cost Savings		$ 2,536		
Annual KWh Savings, KWh		19,506		
Total Energy Savings, MMBtu		66.6		
Simple annual payback, years		NA		
Savings to Investment Ratio		NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

DESIGN HEATING AND COOLING LOADS FOR FANS OFF 8 HRDAY COMMON

8/25/2009
Project Name: NBHA Terrace Apts

For: NBHA

By:

Date:

Primary Heating System:

Space Name	Load, Btu/Hr	Feet of Electric Baseboard
Boiler Room Base	81134	96
Comm Rm Kitchen & Store	113524	134
Base Common Area	234247	275
1st -10th Apts	2227058	2611
Base Floor Apts	45270	54
1st-10th Common Areas	0	0

Required Heating Equipment Output Capacity: 2971353 Btu/hr
Available Heating Equipment Output Capacity: 900000 Btu/hr
Baseboard Capacity: 250 Watt/Ft
Heating Equipment Efficiency: 100 %
Calculated Distribution Efficiency: 100 %
Heating Safety Factor: 1.10
HEATING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED HEATING LOAD.

Cooling System:

Space Name	Load, Btu/Hr	Distribution CFM
Boiler Room Base	0	0
Comm Rm Kitchen & Store	87933	3199
Base Common Area	0	0
1st -10th Apts	2246584	81721
Base Floor Apts	22680	825
1st-10th Common Areas	0	0

Required Cooling Equipment Output Capacity: 2607298 Btu/hr

Available Cooling Equipment Output Capacity: 450000 Btu/hr

Total flow: 86220 CFM

Cooling Equipment Efficiency: 9 SEER

Calculated Distribution Efficiency: 99%

Temperature Drop: 28 F

Cooling Safety Factor: 1.10

Distribution Safety Factor: 1.10

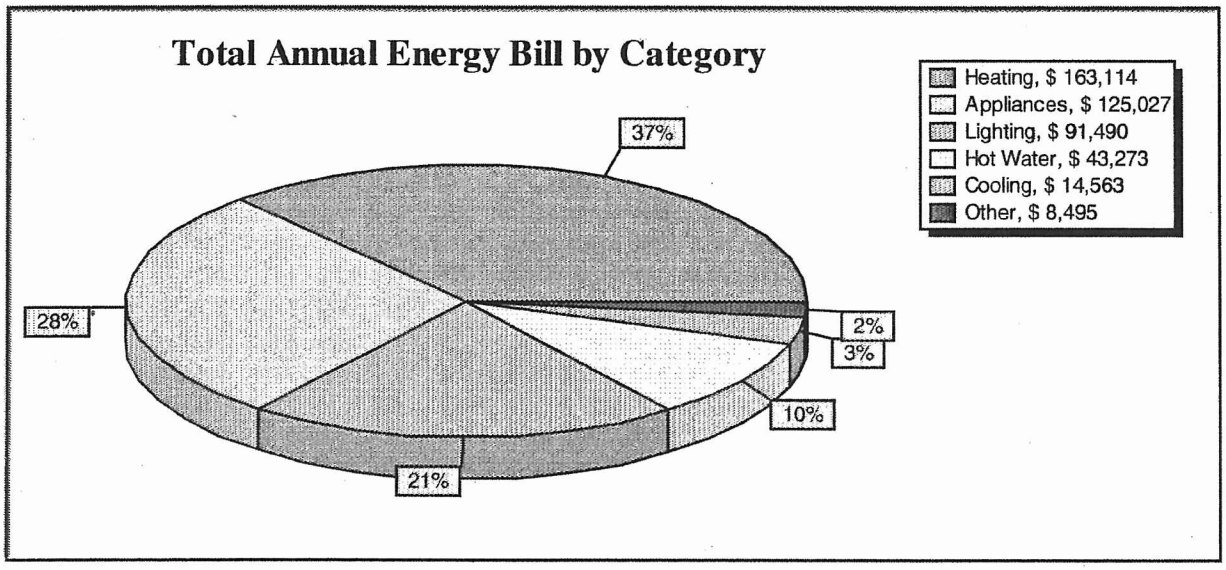
COOLING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED COOLING LOAD.

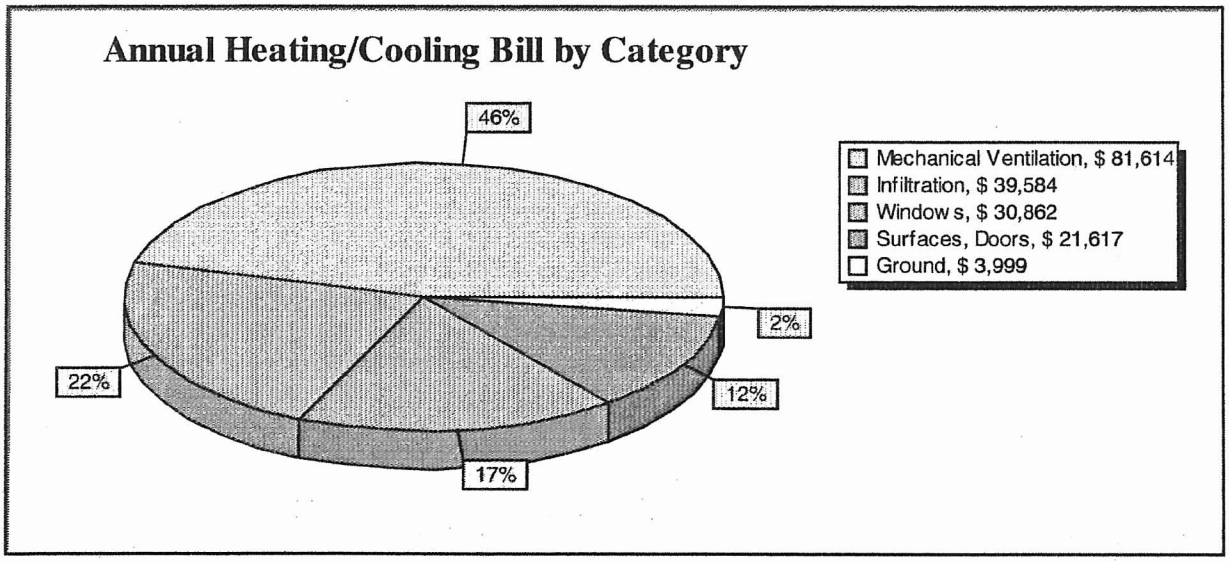
Notes:

1. The room heating/cooling loads do not include the equipment and distribution safety factor and distribution losses
2. The room distribution includes distribution safety factor.
3. The load on the room is the peak load for this room in a year.
4. Available equipment output capacity includes equipment efficiency.
5. Required equipment output capacity includes diversity, distribution losses and equipment safety factor.
6. Overall distribution CFM/GPM for heating/cooling includes equipment safety factor, distribution losses and diversity.

MODEL ENERGY REPORT FOR FANS OFF 8 HRDAY COMMON

NBHA Terrace Apts
For: NBHA
By:
Date: 8/25/2009





Note: Due to rounding, the sum of percentages may not be equal to 100.

Base Load Report

Customer Information

Customer Name: NBHA

Address: Terrace 6800 Columbia Avenue
North Bergen, NJ 07047

Billing Period: None

Auditor Information

Technician Name:

Company:

Phone Number:

Date: 8/25/2009

Model to Actual Comparison of Base Usage Per Year

Model Name: Fans Off 8 hrday Common

Billing Period Name: None

	Electricity		Natural gas			
	kWh	$	Therm	$		
Model	1,722,283	223,897	36,384	44,388		
Billing						
% Difference						

Note: No billing data is available because the model was not compared to a billing period

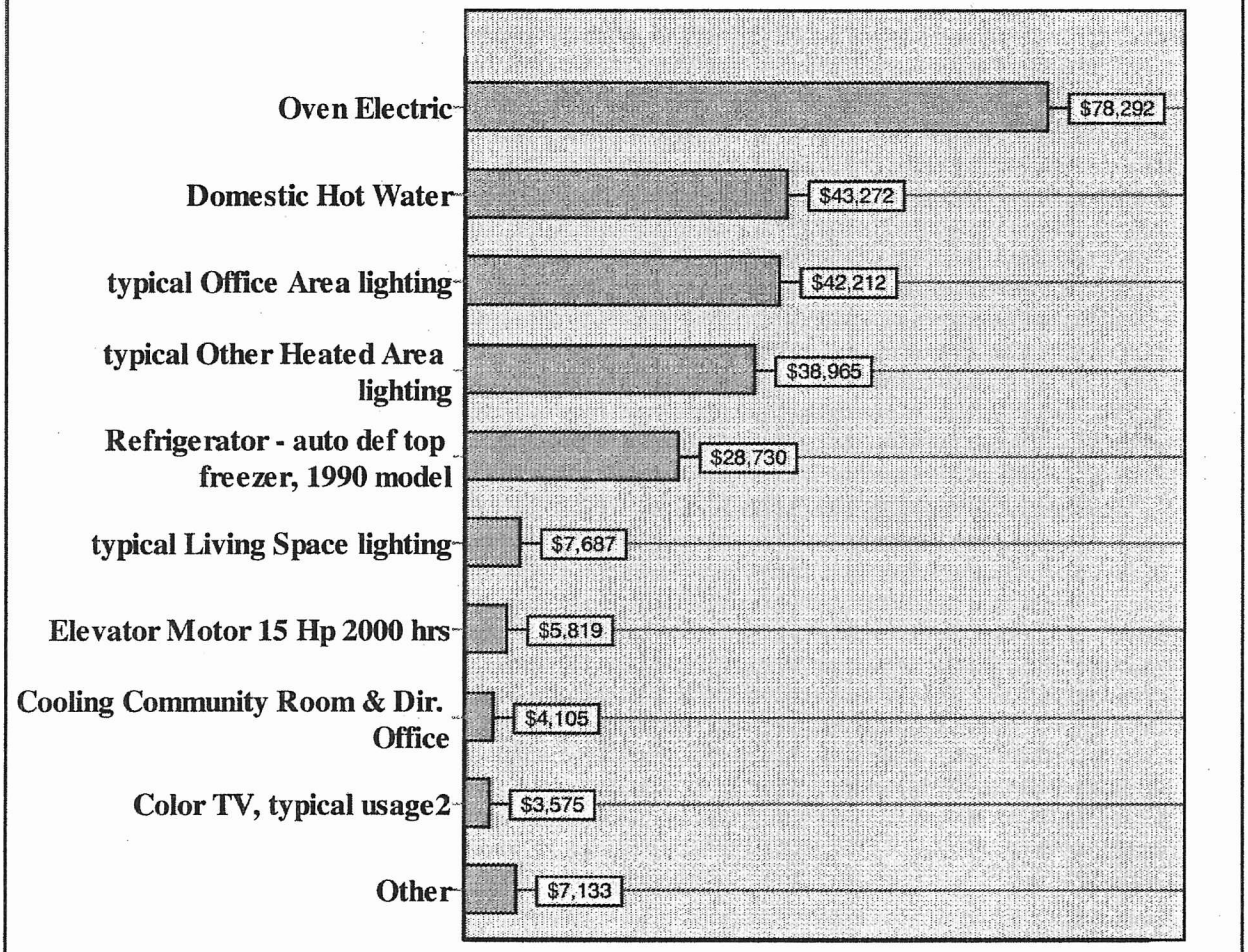
Annual Use of Domestic Hot Water, Appliances, and Lighting

Model Name: Fans Off 8 hrday Common

	Electricity $0.13 per kWh		Natural gas $1.22 per Therm				Total
	kWh	$	therms	$			$
1. Oven Electric	602,250	78,292	0	0			78,292
2. Domestic Hot Water	0	0	35,469	43,272			43,272
3. typical Office Area lighting	324,704	42,212	0	0			42,212
4. typical Other Heated Area lighting	299,732	38,965	0	0			38,965
5. Refrigerator - auto def top freezer, 1990	221,000	28,730	0	0			28,730
6. typical Living Space lighting	59,130	7,687	0	0			7,687
7. Elevator Motor 15 Hp 2000 hrs	44,760	5,819	0	0			5,819
8. Cooling Community Room & Dir. Office	31,574	4,105	0	0			4,105
9. Color TV, typical usage2	27,500	3,575	0	0			3,575
10. Other	46,284	6,017	915	1,116			7,133
TOTAL	1,656,934	215,402	36,384	44,388			259,790

Base Load Energy Users, $/year

Model Name: Fans Off 8 hrday Common



DETAILED PACKAGE DESCRIPTION AND WORKSCOPE FOR Fans Off 8 hrday Common

NBHA Terrace Apts

For: NBHA

By:

Date:8/25/2009

Improvement Information:

1. Fans Off 8hr/day Common Areas

Mechanical Ventilation Improvement

Ventilation Rate, CFM	Heat Recovery Efficiency	Ventilated Spaces	Type of Installation
5000	0	Base Common Area	Replace existing fan
20800	0	1st-10th Common Areas	Replace existing fan

Non-Energy Benefits: Improve indoor air quality, increase value of building.

Work Scope:

Comply with general conditions. Submit product information to owner for approval in writing prior to ordering. Patch and paint where existing equipment was removed to match existing surfaces. Perform complete ventilation sizing of the building prior to selecting equipment, using standard methods such as ASHRAE Standard 62. Size new equipment according to this sizing, and not according to the size of removed equipment. Provide a written copy of sizing and assumptions for approval by the owner prior to ordering equipment. Size distribution system according to standard methods. Install system securely and level. Securely fasten system to duct work with mechanical fasteners and seal. Install clean air filters. Duct sealing and insulation shall comply with standards described in the separate duct sealing and duct insulation work scopes. Balance distribution system by measuring air supply to all grilles and adjusting manual balancing dampers. Balancing dampers shall be of the locking type. Install defrost drainage per manufacturer's instructions. Provide air gap for drain pipe per building or local codes. Insulate all ductwork per energy code requirements. Insulation shall be mechanically fastened. Tape is unacceptable as a fastener. Install supply grilles in locations where cold entering air will not present a comfort problem. After installation is complete, measure and record entering and leaving air temperatures. Ensure that these measurements are within the manufacturer's requirements. Provide training to the owner in the use of the system and controls. Deliver to the owner users manual, including measurement reports, warranties, and approved submittals.

APPENDIX O

ECM-8 Energy Star Refrigerators

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM - 8 Replace Refrigerators with Energy Star Rated Units

Suggestions

Replace existing 15 C.F. refrigerators with new 15 C.F. Energy Star rated refrigerators.

Multipliers *	
Material:	1.00
**Labor:	1.22
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Replace all 15 C.F. refrigerators in Terrace Apartments with Energy Star rated units.	252	ea.	$ 600	$ 20		$ 151,200	$ 6,149	$ -	$ 157,349	Quotes from Home Depot and Lowes.
Disposal cost for each unit.	252	ea.		$ 35		$ -	$ 10,760	$ -	$ 10,760	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

* Mutipliers per RS Means Mechanical Cost Data for Newark, New Jersey

**Multiplier for Millwright Labor specific to the Newark, New Jersey area.

$ 168,109	Subtotal
$ 8,405	5% Contingency
$ -	0% Contractor O&P
$ -	0% Engineering
$ 176,515	**Total**

YOUR SUMMARY

This report addresses the key recommendations for improving the comfort, safety and efficiency of your home. You should use it as a guide for deciding what work you want to have done. Remember, your Home Performance Contractor is ready to complete these projects promptly, and the work is guaranteed.

Selected Packages

Measure Description	Non-energy benefits	Package1	Package2	Package3
Energy Star Refrigerator Replacement: Removed Appliances: 1 Refrigerator - auto def top freezer, 2 Refrigerator-auto def top freezer, 1990 model, 250 Refrigerator - auto def top freezer, 1990 model; Added Appliances: 1 Energy Star Refrigerator, 2 Energy Star Refrigerator 2, 250 Energy Star Refrigerator 1-10	Increase value of building, reduce environmental risk due to old ozone-depleting refrigerants.	$ 0		
Total Installed Cost		$ 0		
Annual Energy Cost Savings		$ 13,125		
Annual KWh Savings, KWh		100,965		
Total Energy Savings, MMBtu		344.5		
Simple annual payback, years		NA		
Savings to Investment Ratio		NA		

The following fuel prices were used to estimate annual energy cost savings, payback and savings to investment ratio:

- Natural gas: 1.2200 $/Therm
- Electricity: 0.1300 $/kWh

IMPROVEMENT PACKAGES

NBHA Terrace Apts

For: NBHA

By:

Date: 8/25/2009

Evaluated Packages:

Package Name	Cost $	Annual Savings, MMBtu	Annual Savings, $	Payback years	Cashflow $/year	SIR
Energy Star Refigerator	0	344.49	13,125	0	13,125	N/C

Package Description:

1. Energy Star Refigerator Replacement

Improvement Name	Cost ($)	Annual Savings MMBtu	Annual Savings ($)	Payback (years)	Cashflow ($/year)	Improve-ment Life (Years)	SIR in Package
Energy Star Refrigerator Replacement	0	344.49	13,125	N/A	13,125	15	N/C
Total for Package	0	344.49	13,125	0	13,125	N/A	N/C

Non-Energy Benefits:

1. Energy Star Refrigerator Replacement: Increase value of building, reduce environmental risk due to old ozone-depleting refrigerants.

DESIGN HEATING AND COOLING LOADS FOR ENERGY STAR REFIGERATOR REPLACEMENT

8/25/2009
Project Name: NBHA Terrace Apts

For: NBHA

By:

Date:

Primary Heating System:

Space Name	Load, Btu/Hr	Feet of Electric Baseboard
Boiler Room Base	81134	96
Comm Rm Kitchen & Store	113524	134
Base Common Area	342247	402
1st -10th Apts	2281389	2675
Base Floor Apts	45610	54
1st-10th Common Areas	0	0

Required Heating Equipment Output Capacity: 3150291 Btu/hr
Available Heating Equipment Output Capacity: 900000 Btu/hr
Baseboard Capacity: 250 Watt/Ft
Heating Equipment Efficiency: 100 %
Calculated Distribution Efficiency: 100 %
Heating Safety Factor: 1.10
HEATING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED HEATING LOAD.

Cooling System:

Space Name	Load, Btu/Hr	Distribution CFM
Boiler Room Base	0	0
Comm Rm Kitchen & Store	87763	3193
Base Common Area	0	0
1st -10th Apts	2204124	80177
Base Floor Apts	22337	813
1st-10th Common Areas	0	0

Required Cooling Equipment Output Capacity: 2559484 Btu/hr

Available Cooling Equipment Output Capacity: 450000 Btu/hr

Total flow: 84639 CFM

Cooling Equipment Efficiency: 9 SEER

Calculated Distribution Efficiency: 99%

Temperature Drop: 28 F

Cooling Safety Factor: 1.10

Distribution Safety Factor: 1.10

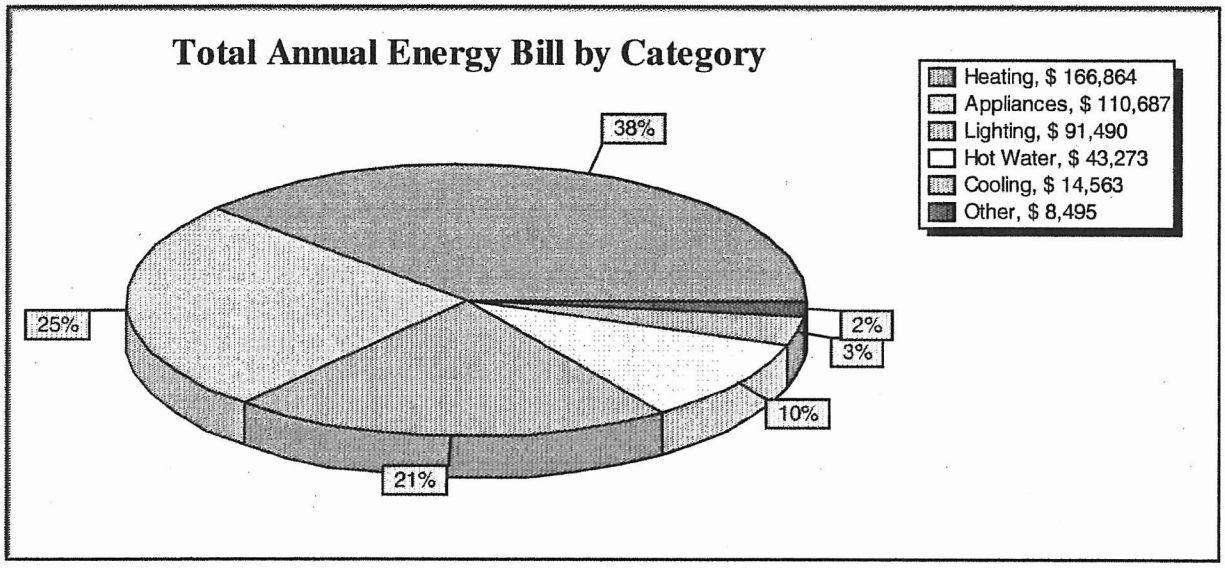
COOLING SYSTEM IS UNDERSIZED AND DOES NOT MEET THE REQUIRED COOLING LOAD.

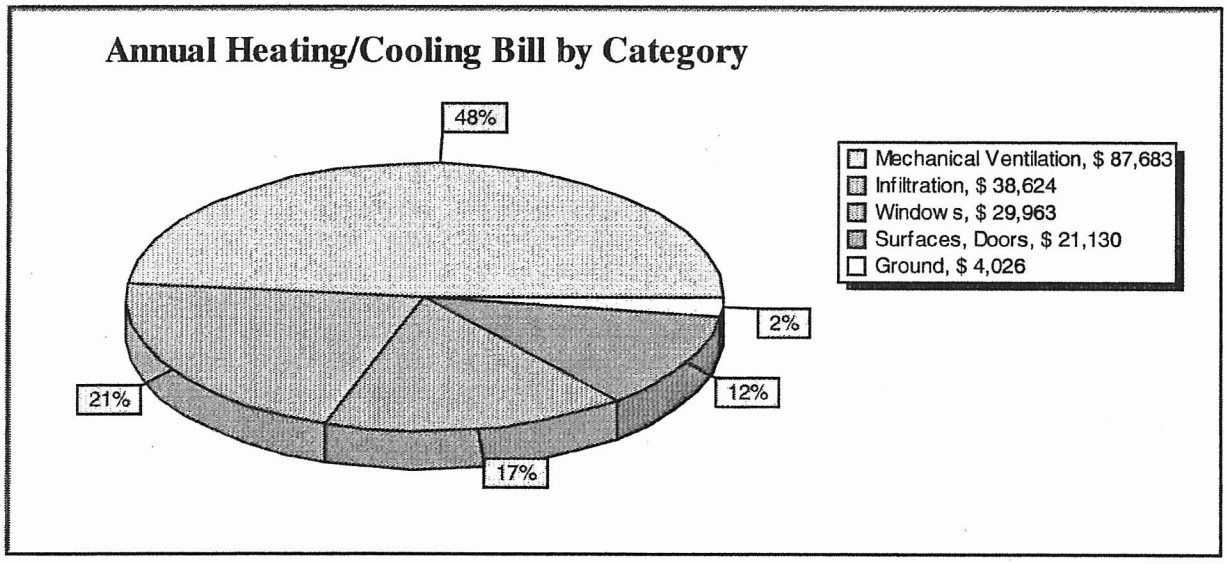
Notes:

1. The room heating/cooling loads do not include the equipment and distribution safety factor and distribution losses
2. The room distribution includes distribution safety factor.
3. The load on the room is the peak load for this room in a year.
4. Available equipment output capacity includes equipment efficiency.
5. Required equipment output capacity includes diversity, distribution losses and equipment safety factor.
6. Overall distribution CFM/GPM for heating/cooling includes equipment safety factor, distribution losses and diversity.

MODEL ENERGY REPORT FOR ENERGY STAR REFIGERATOR REPLACEMENT

NBHA Terrace Apts
For: NBHA
By:
Date: 8/25/2009





Note: Due to rounding, the sum of percentages may not be equal to 100.

Base Load Report

Customer Information

Customer Name: NBHA

Address: Terrace 6800 Columbia Avenue
North Bergen, NJ 07047

Billing Period: None

Auditor Information

Technician Name:

Company:

Phone Number:

Date: 8/25/2009

Model to Actual Comparison of Base Usage Per Year

Model Name: Energy Star Refigerator Replacement

Billing Period Name: None

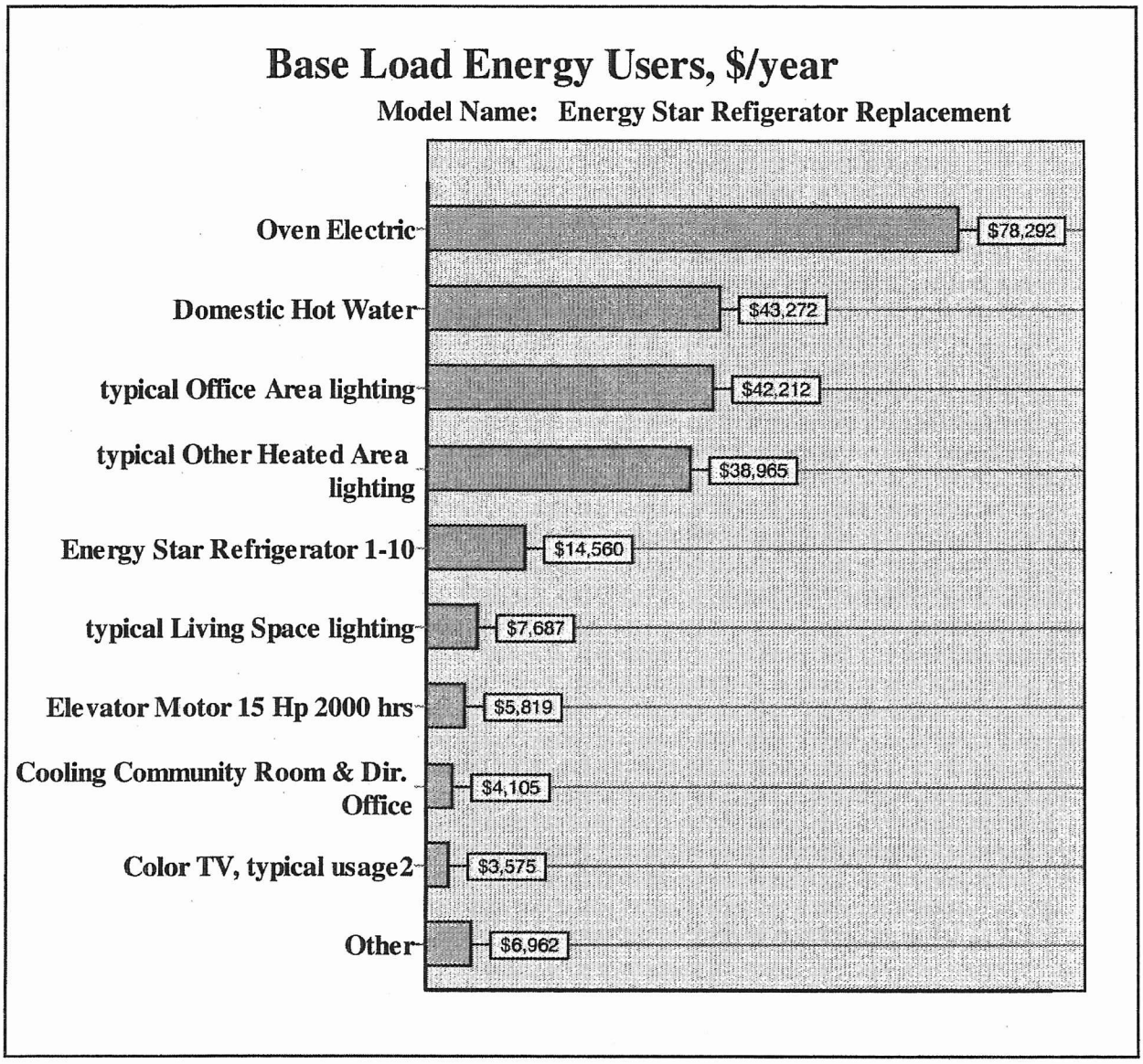
	Electricity		Natural gas			
	kWh	$	Therm	$		
Model	1,611,975	209,557	36,384	44,388		
Billing						
% Difference						

Note: No billing data is available because the model was not compared to a billing period

Annual Use of Domestic Hot Water, Appliances, and Lighting

Model Name: Energy Star Refigerator Replacement

	Electricity $0.13 per kWh		Natural gas $1.22 per Therm				Total
	kWh	$	therms	$			$
1. Oven Electric	602,250	78,292	0	0			78,292
2. Domestic Hot Water	0	0	35,469	43,272			43,272
3. typical Office Area lighting	324,704	42,212	0	0			42,212
4. typical Other Heated Area lighting	299,732	38,965	0	0			38,965
5. Energy Star Refrigerator 1-10	112,000	14,560	0	0			14,560
6. typical Living Space lighting	59,130	7,687	0	0			7,687
7. Elevator Motor 15 Hp 2000 hrs	44,760	5,819	0	0			5,819
8. Cooling Community Room & Dir. Office	31,574	4,105	0	0			4,105
9. Color TV, typical usage2	27,500	3,575	0	0			3,575
10. Other	44,976	5,846	915	1,116			6,962
TOTAL	1,546,626	201,061	36,384	44,388			245,449


Base Load Energy Users, $/year
Model Name: Energy Star Refigerator Replacement
Oven Electric
$78,292
Domestic Hot Water
$43,272
typical Office Area lighting
$42,212
typical Other Heated Area lighting
$38,965
Energy Star Refrigerator 1-10
$14,560
typical Living Space lighting
$7,687
Elevator Motor 15 Hp 2000 hrs
$5,819
Cooling Community Room & Dir. Office
$4,105
Color TV, typical usage2
$3,575
Other
$6,962

DETAILED PACKAGE DESCRIPTION AND WORKSCOPE FOR Energy Star Refigerator Replacement

NBHA Terrace Apts

For: NBHA

By:

Date:8/25/2009

Improvement Information:

1. Energy Star Refrigerator Replacement

Removed Appliances:

Appliance Name	Location	Quantity
Refrigerator - auto def top freezer	Comm Rm Kitchen & Store	1
Refrigerator - auto def top freezer, 1990 model	1st -10th Apts	250
Refrigerator-auto def top freezer, 1990 model	Base Floor Apts	2

Added Appliances:

Appliance Name	Location	Quantity
Energy Star Refrigerator	Comm Rm Kitchen & Store	1
Energy Star Refrigerator 1-10	1st -10th Apts	250
Energy Star Refrigerator 2	Base Floor Apts	2

Non-Energy Benefits: Increase value of building, reduce environmental risk due to old ozone-depleting refrigerants.

Work Scope:

Comply with general conditions. Submit product information and obtain Owner approval prior to ordering. Dispose of original refrigerator in compliance with state and local regulations. Remove refrigerant in compliance with EPA regulations. Set thermostat in refrigerator to its warmest position. After equilibrium, measure and record temperature in refrigerator. Deliver all owner's manuals, test results, and warranties to the Owner.

APPENDIX P

ECM-9 Photovoltaic Power Generation

North Bergen Housing Authority
CHA #20241
Building: Terrace Apartments

ECM - 9 Photovoltaic Panels

Cost of Electricity $0.1295 $/kWh

ECM-9 Photovoltaic (PV) Rooftop Solar Power Generation-50kW System

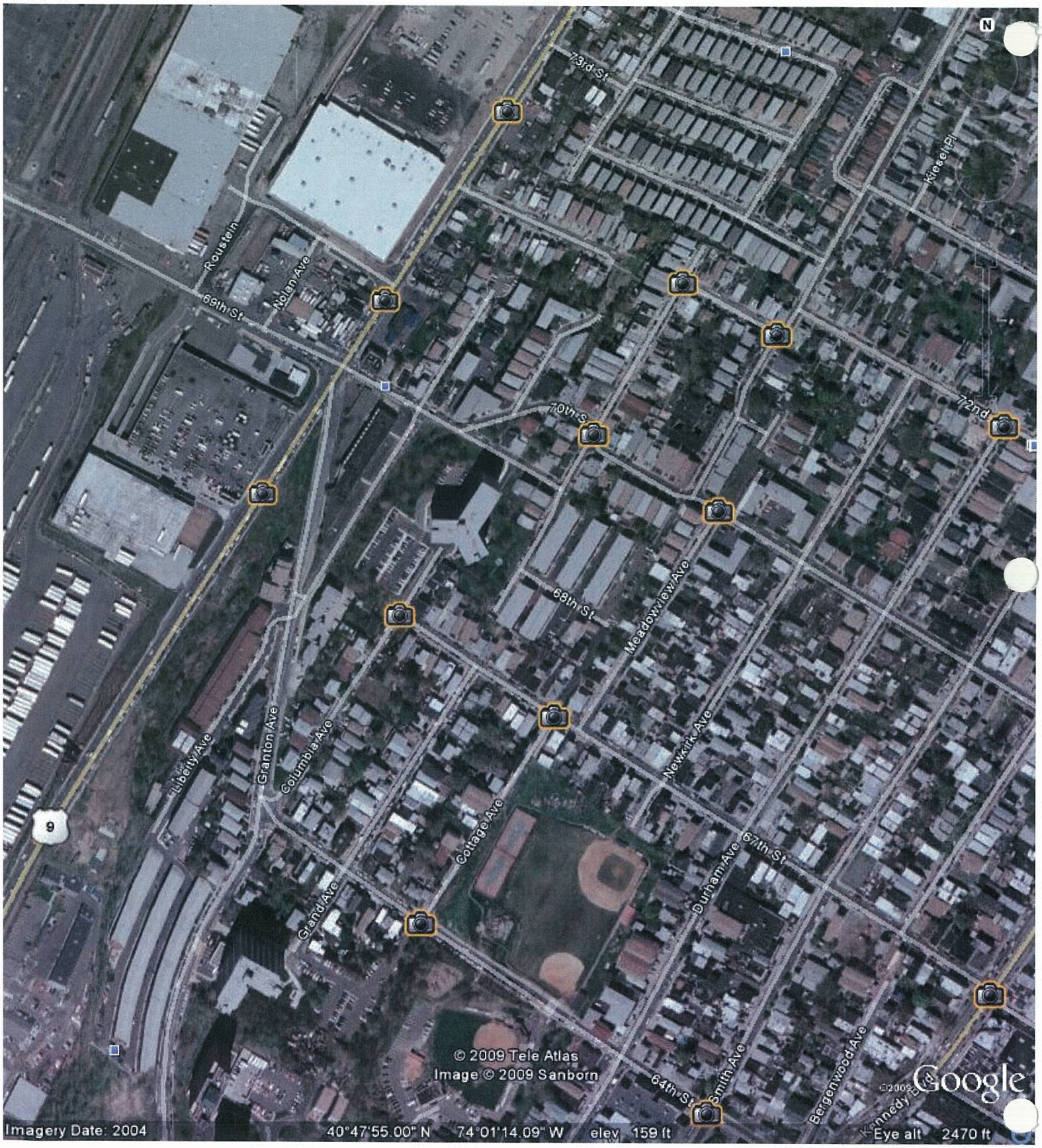
Budgetary	Annual Utility Savings				Estimated	Total	New Jersey Renewable	New Jersey Renewable	Payback	Payback
Cost					Maintenanc Savings	Savings	* Energy Incentive	** SREC	(without incentive)	(with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$500,000	**0.0**	**59,150**	**0**	**$7,660**	**0**	**$7,660**	**$50,000**	**$28,786**	**>30**	**12.3**

*Incentive based on New Jersey renewable energy program for non-residential applications(PV)= $1.00/W of installed PV system

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $487/1000kwh

Estimated Solar Renewable Energy Certificate Program (SREC) payments for 15 Years from RR Renewable Energy Consultants

Year	SREC
1	600
2	600
3	600
4	500
5	500
6	500
7	500
8	500
9	500
10	500
11	400
12	400
13	400
14	400
15	400
AVG	**487**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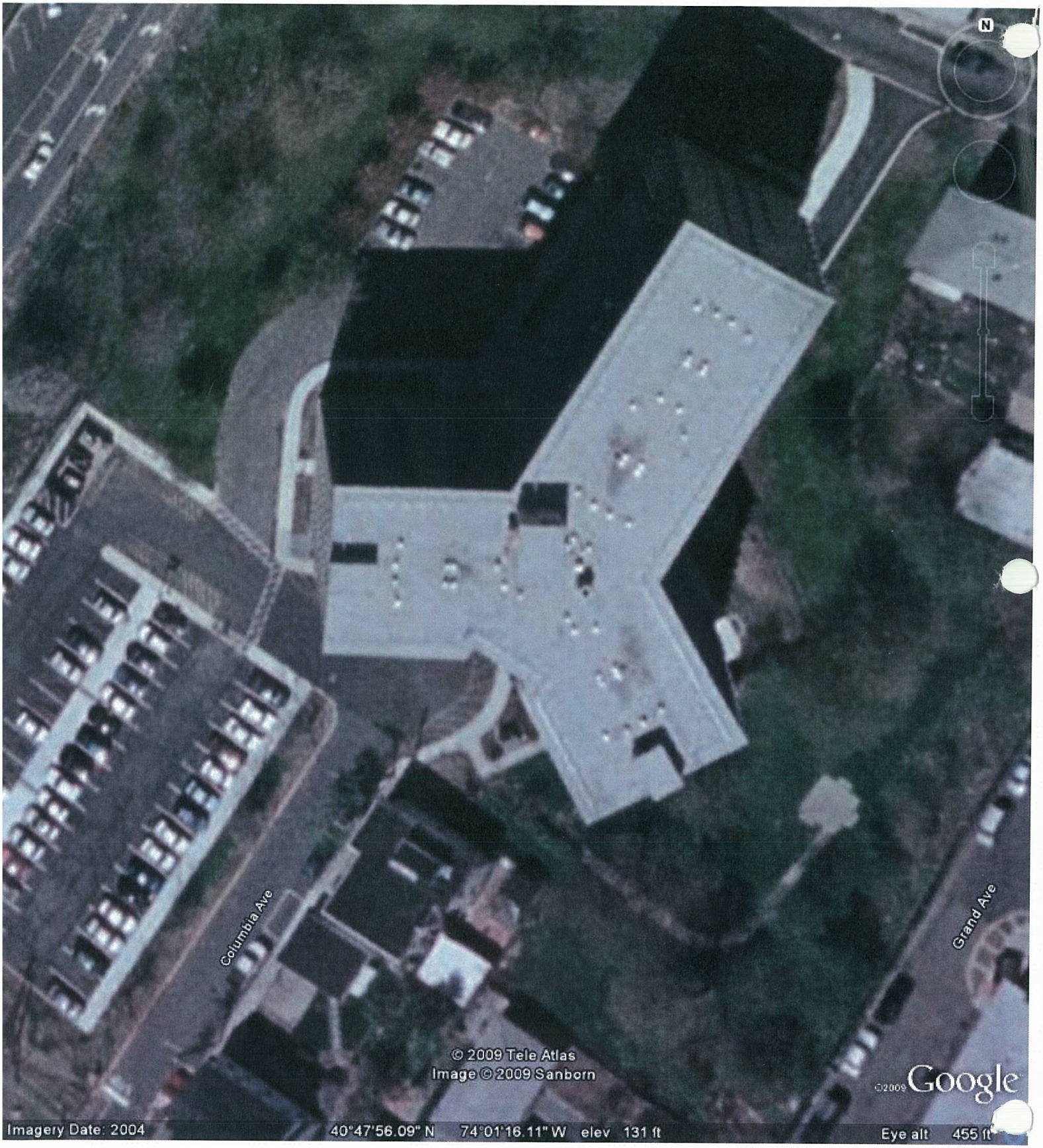
73rd St
Kiesel Pl
Roustein
Nolan Ave
69th St
70th St
72nd
68th St
Meadowview Ave
Newkirk Ave
Durham Ave
67th St
Liberty Ave
Granton Ave
Columbia Ave
Cottage Ave
Grand Ave
9
Smith Ave
64th St
Bergenwood Ave
Kennedy Ln
© 2009 Tele Atlas
Image © 2009 Sanborn
©2009 Google
Imagery Date: 2004
40°47'55.00" N 74°01'14.09" W elev 159 ft
Eye alt 2470 ft


N
Columbia Ave
Grand Ave
© 2009 Tele Atlas
Image © 2009 Sanborn
©2009 Google
Imagery Date: 2004
40°47'56.09" N 74°01'16.11" W elev 131 ft
Eye alt 455 ft

APPENDIX Q

EPA Energy Star Portfolio Manager Report

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Terrace Apartments

Building ID: 1791077
For 12-month Period Ending: March 31, 2009[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: August 25, 2009

Facility
Terrace Apartments
6800 Columbia Ave
North Bergen , NJ 07047

Facility Owner
North Bergen Housing Authority
6121 Grand Ave.
North Bergen, NJ 07047

Primary Contact for this Facility
Ryan Leggio
6121 Grand Ave.
North Bergen, NJ 07047

Year Built: 1970
Gross Floor Area (ft²): 155,100

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

Site Energy Use Summary[3]

Natural Gas (kBtu)[4]	3,290,463
Electricity (kBtu)	9,254,891
Total Energy (kBtu)	12,545,354

Energy Intensity[5]

Site (kBtu/ft²/yr)	82
Source (kBtu/ft²/yr)	223

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	1,584

Electric Distribution Utility
PSE&G - Public Service Elec & Gas Co

National Average Comparison

National Average Site EUI	
National Average Source EUI	
% Difference from National Average Source EUI	
Building Type	Multifamily Housing

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
Ryan Leggio
6121 Grand Ave.
North Bergen, NJ 07047

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	Terrace Apartments	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Multifamily Housing	Is this an accurate description of the space in question?		☐
Location	6800 Columbia Ave, North Bergen , NJ 07047	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		☐

Terrace Apartments (Multifamily Housing)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	155,100 Sq. Ft.	Does the square footage include all supporting functions such as residential units, common areas, elevators, storage areas, vent shafts, lobbies, boiler room and basement, etc? Interstitial (plenum) space between floors should be excluded from the total.		☐
Number of units	N/A(Optional)	Is this the total number of occupied or unoccupied apartment units in the Multifamily Housing building? This should include apartments on every line of the building and of every floor plan type and the basement apartments. This should exclude storage or maintenance closets, boiler rooms, garbage compactor or receptacle rooms, management offices or laundry facilities.		☐
Total Number of Bedrooms	N/A(Optional)	Is this the total number of bedrooms located in each individual apartment unit? This should include any additions to the original floor plan performed by the owner. This should exclude in-unit common areas being used as bedrooms by tenants.		☐
Number of Floors	N/A(Optional)	Is this the total number of floors located within a Multifamily Housing Building? This number should include the total number of floors above the existing grade plane. This number should exclude interstitial space between floors or the roof.		☐
Percent of square footage devoted to individual units	N/A(Optional)	Is this the percentage of square footage that is devoted to occupied and unoccupied apartment units?		☐
Laundry in each unit	N/A(Optional)	Is this the total number of laundry hookups located in each individual apartment unit? The laundry facility should be accounted for if the machine is inoperable, operable or if there is a laundry hookup available.		☐
Laundry in common area	N/A(Optional)	Is this the number of laundry hookups located in a common area that are either coin-operated or subsidized by the building owner? The laundry facility should be accounted for if the machine is inoperable, operable or if there is a laundry hookup available.		☐

Dishwashers in each unit	N/A(Optional)	Is this the total number of dishwashers located in individual apartment units? The dishwasher should be accounted for if the machine is inoperable, operable or if there is a dishwasher hookup available.		
Percent Heated	N/A(Optional)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment? This includes the individual apartment units that are individually mechanically heated. The percent heated cannot be greater than 100%. The percent heated attribute is similar to the percent heated attribute for dormitories. The user should select from a drop-down-menu with options presented in bins of 10 (i.e. 0, 10, 20, 30?).		
Percent Cooled	N/A(Optional)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment? This includes the individual apartment units that are individually mechanically cooled. The percent cooled cannot be greater than 100%. The percent cooled attribute is similar to the percent cooled attribute for dormitories. The user should select from a drop-down-menu with options presented in bins of 10 (i.e. 0, 10, 20, 30?).		
Market Rate or Affordable Housing	N/A(Optional)	Select Affordable Housing when a Multifamily Housing building is regulated by a national, state or local housing agency and offers subsidized housing to lower and moderate income range households. Select Market Rate when a Multifamily Housing building has either no subsidized units or minimal units with allocated subsidies.		

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: PSE&G - Public Service Elec & Gas Co

Fuel Type: Electricity		
Meter: Electric (kWh (thousand Watt-hours)) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh (thousand Watt-hours))**
02/24/2009	03/30/2009	364,000.00
01/28/2009	02/23/2009	337,600.00
12/31/2008	01/27/2009	410,400.00
12/04/2008	12/30/2008	323,200.00
11/01/2008	12/03/2008	277,600.00
10/03/2008	10/31/2008	194,400.00
09/04/2008	10/02/2008	111,200.00
08/05/2008	09/03/2008	121,600.00
07/05/2008	08/04/2008	152,800.00
05/06/2008	07/03/2008	248,000.00
04/04/2008	05/05/2008	164,800.00
Electric Consumption (kWh (thousand Watt-hours))		**2,705,600.00**
Electric Consumption (kBtu)		**9,231,507.20**
Total Electricity Consumption (kBtu)		**9,231,507.20**
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)**
02/24/2009	03/30/2009	4,024.00
01/28/2009	02/23/2009	3,387.00
12/31/2008	01/27/2009	3,529.00
12/04/2008	12/30/2008	3,030.00
11/04/2008	12/03/2008	3,154.00
10/03/2008	11/03/2008	2,739.00
09/04/2008	10/02/2008	2,245.00
08/05/2008	09/03/2008	1,882.00
07/04/2008	08/04/2008	1,727.00
05/06/2008	07/03/2008	4,168.00

04/06/2008	05/05/2008	2,920.00
Gas Consumption (therms)		**32,805.00**
Gas Consumption (kBtu)		**3,280,500.00**
Total Natural Gas Consumption (kBtu)		**3,280,500.00**
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
Terrace Apartments
6800 Columbia Ave
North Bergen , NJ 07047

Facility Owner
North Bergen Housing Authority
6121 Grand Ave.
North Bergen, NJ 07047

Primary Contact for this Facility
Ryan Leggio
6121 Grand Ave.
North Bergen, NJ 07047

General Information

Terrace Apartments	
Gross Floor Area Excluding Parking: (ft²)	155,100
Year Built	1970
For 12-month Evaluation Period Ending Date:	March 31, 2009

Facility Space Use Summary

Terrace Apartments	
Space Type	Multifamily Housing
Gross Floor Area(ft²)	155,100
Number of units°	N/A
Total Number of Bedrooms°	N/A
Number of Floors°	N/A
Percent of square footage devoted to individual units°	N/A
Laundry in each unit°	N/A
Laundry in common area°	N/A
Dishwashers in each unit°	N/A
Percent Heated°	N/A
Percent Cooled°	N/A
Market Rate or Affordable Housing°	N/A

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 03/31/2009)	**Baseline** (Ending Date 03/31/2009)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft²)	82	82	0	N/A	N/A
Source (kBtu/ft²)	223	223	0	N/A	N/A
Energy Cost					
$/year	$ 392,339.04	$ 392,339.04	N/A	N/A	N/A
$/ft²/year	$ 2.53	$ 2.53	N/A	N/A	N/A
Greenhouse Gas Emissions					
$MtCO_2e$/year	1,584	1,584	0	N/A	N/A
$kgCO_2e$/ft²/year	10	10	0	N/A	N/A

Because more than 50% of your building is Multifamily Housing, your building is designated as Multifamily Housing within Portfolio Manager. This type of building is not eligible for an energy performance rating and does not have a reference national average.

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

APPENDIX R

Equipment Inventory

North Bergen Housing Authority
CHA Project No. 20241
Terrace Apartments
Equipment Inventory

Description	Manufacturer Name	Model No.	Equipment Type	Capacity/Size	Location	Date Installed	Useable Life Expectancy	Other Info.
HW Boiler #1	PVI	Nickelshield Model 1400N-250A-PV	Condensing Hot Water Boiler	1 MMBtu/hr (input) Natural Gas	Terrace Apts. Boiler Room	1990		
HW Boiler #2	PVI	Nickelshield Model 1400N-250A-PV	Condensing Hot Water Boiler	1 MMBtu/hr (input) Natural Gas	Terrace Apts. Boiler Room	1990		
HW Boiler #3	PVI	Nickelshield Model 1400N-250A-PV	Condensing Hot Water Boiler	1 MMBtu/hr (input) Natural Gas	Terrace Apts. Boiler Room	1990		
Fan Coil / Evaporator #1	Luxaire	HABA-T060SA	Cooling Unit	1.3 A / 1/4 H.P. Cooling Output - 60,000 BTUH	Community Room	1971		
Condenser Unit #1	Carrier	38CKCO60520	Condensing Unit	1.4 A / 1/4 H.P. Condensing Capacity - 60,000 BTUH	West Side of Community Room	1971		
Fan Coil / Evaporator #2	Luxaire	HABA-T060SA	Cooling Unit	1.3 A / 1/4 H.P. Cooling Output - 60,000 BTUH	Community Room	1971		
Condenser Unit #2	Carrier	38CKCO60520	Condensing Unit	1.4 A / 1/4 H.P. Condensing Capacity - 60,000 BTUH	West Side of Community Room	1971		
Fan Coil / Evaporator #3	Luxaire	HABA-T060SA	Cooling Unit	1.3 A / 1/4 H.P. Cooling Output - 60,000 BTUH	Community Room	1971		
Condenser Unit #3	Carrier	38CKCO60520	Condensing Unit	1.4 A / 1/4 H.P. Condensing Capacity - 60,000 BTUH	West Side of Community Room	1971		
Fan Coil / Evaporator #4	Luxaire	HABA-T060SA	Cooling Unit	1.3 A / 1/4 H.P. Cooling Output - 60,000 BTUH	Community Room	1971		
Condenser Unit #4	Carrier	38CKCO60520	Condensing Unit	1.4 A / 1/4 H.P. Condensing Capacity - 60,000 BTUH	West Side of Community Room	1971		
Air Conditioning Unit #5	Mitsubishi	PL24AK / EK	Split Air Conditioning Unit	24,000 BTUH Cooling Capacity	Managers Office			
Air Conditioning Unit #6	Mitsubishi	PL24AK / EK	Split Air Conditioning Unit	24,000 BTUH Cooling Capacity	Laundry Room			
Air Conditioning Unit #7	Mitsubishi	PL24AK / EK	Split Air Conditioning Unit	24,000 BTUH Cooling Capacity	Laundry Room			
Emergency Generator	Cummins	60-ENA (S/N J 960621389)	Emergency Generator	230 V - Natural Gas Fuel	Penthouse on the roof below the elevator room.			automatically exercised once per week for 1-hr
Clothes Washers (10)	Speed Queen	SWFF61WN	Front Loading Clothes Washer		Laundry Room			Typical of ten (10) units.
Clothes Dryers (10)	Speed Queen	STT30NNRB2G1W01	Front Loading Clothes Dryer	N.G. input - 146,00 Btu/hr	Laundry Room			Typical of ten (10) units.
Unit Heater	Reznor	V3TCOR52	Gas Fired Unit Heater	Used to heat intake air to Speed Queen Dryers. Natural Gas.	Plenum behind dryers.			1/20 fan H.P.
Roof Exhaust Fan	Greenheck	GB-90-4	Roof Mounted; Belt Driven Centrifugal Exhaust Fan.	1/4 H.P.; .25" W.C.; 1,000 CFM	Roof of Terrace Apartments	1971		Exhaust Fans K1-K4,K5,K7-K10, TE3, TE4, TE9 - TE12, TE14-TE16; K11; K13; K14; TE17 - TE22; K17 - K19; TE22B; TE24.

North Bergen Housing Authority
CHA Project No. 20241
Terrace Apartments
Equipment Inventory

Description	Manufacturer Name	Model No.	Equipment Type	Capacity/Size	Location	Date Installed	Useable Life Expectancy	Other Info.
Roof Exhaust Fan	Greenheck	GB-121-4x-QD	Roof Mounted; Belt Driven Centrifugal Exhaust Fan.	1/4 H.P.; .25" W.C.; 1,200 CFM	Roof of Terrace Apartments	1971		Exhaust Fans TE-13 and TE23.
Roof Exhaust Fan	Greenheck	GB-101-4x-QD-R4	Roof Mounted; Belt Driven Centrifugal Exhaust Fan.	1/4 H.P.; .25" W.C.; 1,100 CFM	Roof of Terrace Apartments	1971		Exhaust Fan K16.
Roof Exhaust Fan	Greenheck	GB-200-7	Roof Mounted; Belt Driven Centrifugal Exhaust Fan.	3/4 H.P.; .25" W.C.; 4,000 CFM	Roof of Terrace Apartments	1971		Exhaust Fans CE1 and CE2.
Roof Exhaust Fan	Greenheck	GB-091-4X-QD-R3	Roof Mounted; Belt Driven Centrifugal Exhaust Fan.	1/4 H.P.; .25" W.C.; 1,000 CFM	Roof of Terrace Apartments	1971		Exhaust Fans TE1; TE2; TE5 - TE8; K6; K12; TE25.
Tower A East Elevator Drive Motor	Elevator #1 - Marathon Blue Max	EVJ284THTPA18376 AAL	TENV Motor; VFD Driven.	15 H.P.; 3600 RPM; 230/460V; 3 PH.; 60 Hz.; 91% Efficiency	Penthouse on the roof below the elevator room.	2008		New motor
Tower A East Elevator Drive Motor	Elevator #2 - Marathon Blue Max	EVJ284THTPA18376 AAL	TENV Motor; VFD Driven.	15 H.P.; 3600 RPM; 230/460V; 3 PH.; 60 Hz.; 91% Efficiency	Penthouse on the roof below the elevator room.	2008		New motor
Vending			Snacks		Community Room			
Vending			Pepsi		Community Room			
Vending			Snapple		Community Room			
Refrigerator	Hotpoint	HTR15ABMFRWW	Vertical Type	15 C.F.	Community Room			
Window Air Conditioning Units	Various	Various	Window Mounted Air Conditioning Units.	Various - 5,000 BTUH to 10,000 BTUH	Tower Apartments	Various	Various	Total of 258 Units.

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Domestic Hot Water Boilers

Application Terrace Apartments

DHWB #1

Manufacturer	**PVI**
Style	Nickelshield
Model Number	1400N-250A-PV
Serial Number	207120892
Energy Source	Natural Gas
Capacity	1 MMBH
Delta Temperature	40 °F to 120 °F
Medium	Potable Water

DHWB #2

Manufacturer	**PVI**
Style	Nickelshield
Model Number	1400N-250A-PV
Serial Number	207120893
Energy Source	Natural Gas
Capacity	1 MMBH
Delta Temperature	40 °F to 120 °F
Medium	Potable Water

DHWB #3

Manufacturer	**PVI**
Style	Nickelshield
Model Number	1400N-250A-PV
Serial Number	207120894
Energy Source	Natural Gas
Capacity	1 MMBH
Delta Temperature	40 °F to 120 °F
Medium	Potable Water

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Motors

Application	**Elevator Drive Motor - North Elevator**
Manufacturer	Marathon Blue Max
Model Number	EVJ284THTPA18376AAL
Horse Power	15 HP
Voltage	230/460 V
Frequency	60 Hz.
Phase	3
Design	A
Type	P
Frame	284T
RPM	3600
Amps	
Safety Factor	1
Power Factor	
NEMA Efficiency	91%
Gaureanteed Effic.	88.50%
Enclosure	TENV
Duty	Continuous
Inverter Duty	Yes

Application	**Elevator Drive Motor - South Elevator**
Manufacturer	Marathon Blue Max
Model Number	EVJ284THTPA18376AAL
Horse Power	15 HP
Voltage	230/460 V
Frequency	60 Hz.
Phase	3
Design	A
Type	P
Frame	284T
RPM	3600
Amps	
Safety Factor	1
Power Factor	
NEMA Efficiency	91%
Gaureanteed Effic.	88.50%
Enclosure	TENV
Duty	Continuous
Inverter Duty	Yes

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Split System Air Conditioning Units

Application **Terrace Apartments Community Room**

Air Conditioning Unit #1
Evaporator Unit

Manufacturer	Luxaire
Model Number	HABA-T060SA
Serial Number	WCLM008881
Voltage	208 V / 60 Hz.
Fan Amps	1.3 A / 1/4 H.P.
Cooling Output	60,000 BTUH
Refrigerant	R22 / 9 Lbs.- 7 Oz.

Condenser Unit

Manufacturer	Carrier
Model Number	38CKCO60520
Serial Number	4498E17989
Voltage	208 / 230 V / 60 Hz.
Comp. Fan Amps	1.4 A / 1/4 H.P.
Compressor Amps	16 A
Condensing Capacity	60,000 BTUH
Refrigerant	R22 / 9.89 Lbs.

Air Conditioning Unit #2
Evaporator Unit

Manufacturer	Luxaire
Model Number	HABA-T060SA
Serial Number	WCLM008881
Voltage	208 V / 60 Hz.
Fan Amps	1.3 A / 1/4 H.P.
Cooling Output	60,000 BTUH
Refrigerant	R22 / 9 Lbs.- 7 Oz.

Condenser Unit

Manufacturer	Carrier
Model Number	38CKCO60520
Serial Number	4498E17989
Voltage	208 / 230 V / 60 Hz.
Comp. Fan Amps	1.4 A / 1/4 H.P.
Compressor Amps	16 A
Condensing Capacity	60,000 BTUH
Refrigerant	R22 / 9.89 Lbs.

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Split System Air Conditioning Units

Application **Terrace Apartments Community Room**

Air Conditioning Unit #3
Evaporator Unit

Manufacturer	Luxaire
Model Number	HABA-T060SA
Serial Number	WCLM008881
Voltage	208 V / 60 Hz.
Fan Amps	1.3 A / 1/4 H.P.
Cooling Output	60,000 BTUH
Refrigerant	R22 / 9 Lbs.- 7 Oz.

Condenser Unit

Manufacturer	Carrier
Model Number	38CKCO60520
Serial Number	4498E17989
Voltage	208 / 230 V / 60 Hz.
Comp. Fan Amps	1.4 A / 1/4 H.P.
Compressor Amps	16 A
Condensing Capacity	60,000 BTUH
Refrigerant	R22 / 9.89 Lbs.

Air Conditioning Unit #4
Evaporator Unit

Manufacturer	Luxaire
Model Number	HABA-T060SA
Serial Number	WCLM008881
Voltage	208 V / 60 Hz.
Fan Amps	1.3 A / 1/4 H.P.
Cooling Output	60,000 BTUH
Refrigerant	R22 / 9 Lbs.- 7 Oz.

Condenser Unit

Manufacturer	Carrier
Model Number	38CKCO60520
Serial Number	4498E17989
Voltage	208 / 230 V / 60 Hz.
Comp. Fan Amps	1.4 A / 1/4 H.P.
Compressor Amps	16 A
Condensing Capacity	60,000 BTUH
Refrigerant	R22 / 9.89 Lbs.

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Split System Air Conditioning Units

Air Conditioning Unit - Office

Manufacturer	**Mitsubishi**
Evap. Model Number	PL24AK
Cond. Model Number	PV24EK
Voltage	115 V / 60 Hz.
Compressor Amps	15 A
Fan Amps	2.6 A
Cooling Capacity	
Refrigerant	R22 / Lbs.

Miscellaneous - Community Room Kitchen

Refrigerator

Manufacturer	**Hotpoint**
Model Number	HTR15ABMFRWW
Serial Number	ZF732500
Voltage	115 V / 60 Hz.
Capacity	15 CF

Microwave

Manufacturer	**Whirlpool**
Model Number	MW3600XS
Serial Number	
Voltage	115 V / 60 Hz.
Capacity	.8 CF
Output	650 Watts

Coffee Maker

Manufacturer	**Bunn**
Model Number	
Voltage	115 V / 60 Hz.
Output	1800 Watts

Water Cooler

Manufacturer	**Innowave UVF**
Model Number	950
Voltage	115 V / 60 Hz.

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Emergency Generator

Manufacturer	**Cummins**
Model Number	60 ENA
Serial Number	J960621389
Specification	84820F
Generator Fuel	Natural Gas
Voltage	230V
Frequency	60 Hz.
Phase	3
RPM	1800
Amps	208
Connection	WYE
KW	60
KVA	75.0
Ambient Temperature	40 °C

Laundry Room

Washers

Manufacturer	**Speed Queen**
Model Number	SWFF61WN
Serial Number	
Number of Units	10

Dryers

Manufacturer	**Speed Queen**
Model Number	STT30NNRB2G1W01
Serial Number	
Number of Units	10
Fuel Source	Natural Gas
Nat. Gas Input	146,000 BTUH
Dryer Capacity	14.6 CF

Unit Heater

Manufacturer	**Reznor**
Model Number	V3TCOR52
Number of Units	1
Fuel Source	Natural Gas
Fan Motor	1/20 HP

North Bergen County Housing Authority - Equipment Data - Terrace Apartments

Window Air Conditioning Units

Total	**258**

North Bergen County Housing Authority - Roof Fan Equipment Data - Terrace Apartments

Building	Fan Number	Manufacturer	Model Number	Serial Number	H.P.	Static Pressure	CFM	On / Off	Comments
Terrace North	TE-1	Greenheck	GB-091-4X-QD-R3	11340997	0.25	0.25	1000	On	Toilet Exhaust
Terrace North	TE-2	Greenheck	GB-091-4X-QD-R3	11340991	0.25	0.25	1000	On	
Terrace North	TE-3	Greenheck	GB-90-4	96K06601	0.25	0.25	1000	On	
Terrace North	TE-4	Greenheck	GB-90-4	96K06602	0.25	0.25	1000	On	
Terrace North	K1	Greenheck	GB-90-4	96K06574	0.25	0.25	1000	On	Kitchen Exhaust
Terrace North	K2	Greenheck	GB-90-4	96K06575	0.25	0.25	1000	On	
Terrace North	K3	Greenheck	GB-90-4	96K06576	0.25	0.25	1000	On	
Terrace North	K4	Greenheck	GB-90-4	96K06577	0.25	0.25	1000	On	
Terrace North	TE-5	Greenheck	GB-091-4X-QD-R3	04H12924	0.25	0.25	1000	On	Toilet Exhaust
Terrace North	TE-6	Greenheck	GB-091-4X-QD-R3	05B79975	0.25	0.25	1000	On	
Terrace North	TE-7	Greenheck	GB-091-4X-QD-R3	05D19594	0.25	0.25	1000	On	
Terrace North	TE-8	Greenheck	GB-091-4X-QD-R3	96K06606	0.25	0.25	1000	On	
Terrace North	K5	Greenheck	GB-90-4	96K06578	0.25	0.25	1000	On	Kitchen Exhaust
Terrace North	K6	Greenheck	GB-091-4X-QD-R2	04W04772	0.25	0.25	1000	On	
Terrace North	K7	Greenheck	GB-90-4	96K06580	0.25	0.25	1000	On	
Terrace North	K8	Greenheck	GB-90-4	96K06581	0.25	0.25	1000	On	
Terrace North	K9	Greenheck	GB-90-4	96K06582	0.25	0.25	1000	On	
Terrace North	K10	Greenheck	GB-90-4	96K06583	0.25	0.25	1000	On	
Terrace North	TE-9	Greenheck	GB-90-4	96K06607	0.25	0.25	1000	On	Toilet Exhaust
Terrace North	TE-10	Greenheck	GB-90-4	96K06608	0.25	0.25	1000	On	
Terrace North	TE-11	Greenheck	GB-90-4	96K06609	0.25	0.25	1000	On	
Terrace North	TE-12	Greenheck	GB-90-4	96K06610	0.25	0.25	1000	On	
Terrace SW	TE-13	Greenheck	GB-121-4X-QD	04L19006	0.25	0.25	1200	On	
Terrace SW	TE-14	Greenheck	GB-90-4	96K06593	0.25	0.25	1000	On	
Terrace SW	TE-15	Greenheck	GB-90-4	96K06594	0.25	0.25	1000	On	
Terrace SW	TE-16	Greenheck	GB-90-4	96K06595	0.25	0.25	1000	On	
Terrace SW	K11	Greenheck	GB-90-4	96K06584	0.25	0.25	1000	On	Kitchen Exhaust
Terrace SW	K12	Greenheck	GB-091-4X-QD-R3	03E06916	0.25	0.25	1000	On	
Terrace SW	K13	Greenheck	GB-90-4	96K06586	0.25	0.25	1000	On	
Terrace SW	K14	Greenheck	GB-90-4	96K06587	0.25	0.25	1000	On	
						Total	**30200**		

North Bergen County Housing Authority - Roof Fan Equipment Data - Terrace Apartments

Building	Fan Number	Manufacturer	Model Number	Serial Number	H.P.	Static Pressure	CFM	On / Off	Comments
Terrace SW	TE-17	Greenheck	GB-90-4	96K06596	0.25	0.25	1000	On	Toilet Exhaust
Terrace SW	TE-18	Greenheck	GB-90-4	96K06597	0.25	0.25	1000	On	
Terrace SW	TE-19	Greenheck	GB-90-4	96K06598	0.25	0.25	1000	On	
Terrace SE	TE-20	Greenheck	GB-90-4	96K06611	0.25	0.25	1000	On	
Terrace SE	TE-21	Greenheck	GB-90-4	96K06612	0.25	0.25	1000	On	
Terrace SE	TE-22	Greenheck	GB-90-4	96K06588	0.25	0.25	1000	On	
Terrace SE	K16	Greenheck	GB-101-4X-QD-R4	11352657	0.25	0.25	1100	On	Kitchen Exhaust
Terrace SE	K17	Greenheck	GB-90-4	96K06590	0.25	0.25	1000	On	
Terrace SE	K18	Greenheck	GB-90-4	96K06591	0.25	0.25	1000	On	
Terrace SE	K19	Greenheck	GB-90-4	96K06592	0.25	0.25	1000	On	
Terrace SE	TE-22B	Greenheck	GB-90-4	96K06613	0.25	0.25	1000	On	Toilet Exhaust
Terrace SE	TE-23	Greenheck	GB-121-4X-QD	03D30940	0.25	0.25	1200	On	
Terrace SE	TE-24	Greenheck	GB-90-4	96K06614	0.25	0.25	1000	On	
Terrace SE	TE-25	Greenheck	GB-091-4X-QD-R3	05B19971	0.25	0.25	1000	On	
Terrace SE	CE1	Greenheck	GB-200-7	96K06576	0.75	0.25	4000	On	Hallway Exhaust
Terrace SE	CE2	Greenheck	GB-200-7	96K06577	0.75	0.25	4000	On	Hallway Exhaust
						Total	**22300**		

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
Existing Lighting

Cost of Electricity: **$0.112 $/kWh**
$9.62 $/kW

	Field Code	Area Description	No. of Fixtures	Standard Fixture Code	NYSERDA Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh	Notes
			EXISTING CONDITIONS									
		Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	
First Floor	4	Lobby/Halls	18	2B 34 R F 2 (u) (MAG)	FU2EE	72	1.3	Breaker	8760	None	11,353	No OCC for safety
	18	Manager Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	2600	OCC	582	
	4	Mail Room	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	2912	None	839	No OCC for safety
	18	Laundry	14	T 32 R F 4 (ELE)	F44ILL	112	1.6	SW	4368	C-OCC	6,849	
	2	Garage	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2912	None	932	No OCC for safety
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	C-OCC	5,032	Assumed 8 fixtures per breaker
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	C-OCC	5,032	Assumed 8 fixtures per breaker
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	C-OCC	5,032	Assumed 8 fixtures per breaker
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	C-OCC	5,032	Assumed 8 fixtures per breaker
	6	Community Room	8	T 34 R F 4 (MAG)	F44EE	144	1.2	Breaker	4368	C-OCC	5,032	Assumed 8 fixtures per breaker
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	None	1,258	No OCC for safety
	6	Community Room	2	T 34 R F 4 (MAG)	F44EE	144	0.3	SW	4368	None	1,258	No OCC for safety
	6	Community Room	1	T 34 R F 4 (MAG)	F44EE	144	0.1	SW	4368	None	629	No OCC for safety
	61	Men's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	OCC	239	
	61	Women's Room 1	1	T 34 R F 3 (MAG)	F43EE	115	0.1	SW	2080	OCC	239	
	61	Kitchen	4	T 34 R F 3 (MAG)	F43EE	115	0.5	SW	2912	OCC	1,340	
	61	Transportation Rm	2	T 34 R F 3 (MAG)	F43EE	115	0.2	SW	2000	OCC	460	
	117	Trash Compactor	3	CF 23	CFS23/1	23	0.1	SW	2000	None	138	No OCC for safety
	2	Mech/Elect Room	4	T 34 W F 2 (MAG) RL/RB	F42ES	80	0.3	SW	2000	None	640	No OCC for safety
	117	Mech/Elect Room	8	CF 23	CFS23/1	23	0.2	SW	2000	None	368	No OCC for safety
	17	Elevator 1	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	None	736	
	17	Elevator 2	3	2' 20 W F 1 (MAG)	F21SS	28	0.1	Breaker	8760	None	736	
2nd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	No OCC for safety
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	No OCC for safety
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	No OCC for safety
3rd Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
4th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
5th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
6th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
7th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
8th Floor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
oor	3	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
Existing Lighting

Cost of Electricity: **$0.112 $/kWh**
$9.62 $/kW

			EXISTING CONDITIONS								
		Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
	Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
9th Flo	**57**	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
10th Floor	**3**	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
11th Floor	**3**	Hallways	15	W 34 W F 1 (MAG)	F41EE	43	0.6	Breaker	8760	None	5,650	
	57	Stairways	3	S 34 C F 1 (MAG)	F41EE	43	0.1	Breaker	8760	None	1,130	
	28	Hallway Doors	3	CR 40 C F 1 (MAG)	FC16/1	35	0.1	Breaker	8760	None	920	
Apartments	**217**	W32CF4-E SW (T8, Occ)	250	W 32 C F 4 (ELE)	F44ILL/2	118	29.5	SW	2912	OCC	85,904	T8 (4ft-4bulbs per fixture)
	126	2CF23 Wall Mt 1 SW EA (Occ)	500	DC 23 C CF 2	CFQ22/2	48	24.0	SW	2912	OCC	69,888	2 bulbs per fixture (500 fixtures)
	222	W20CF1-Mag SW (T12)	250	W 20 CF1 (MAG)	F21SS	28	7.0	SW	2912	None	20,384	2-ft lighting under cabinet
Exterior	**225**	Outside Wallpacks	20	70 High Pressure Sodium	HPS70/1	95	1.9	Timer	4368	None	8,299	
	236	Outside Doors	6	MV 250	mv250/1	290	1.7	Timer	4368	None	7,600	
	237	Pole	6	WP 400 Po HPS	hps400/1	465	2.8	Timer	4368	None	12,187	
	189	Exit Signs	70	X 7.0 W 1	ECF7/1	10	0.7	Breaker	8760	None	6,132	
		Total	**1,428**				**88.3**				**341,150**	

Energy Audit of North Bergen Housing Authority
CHA Project No. 20241 Terrace Apartments
Existing Lighting

Cost of Electricity: **$0.112 $/kWh**
$9.62 $/kW

		EXISTING CONDITIONS									
	Area Description	**No. of Fixtures**	**Standard Fixture Code**	**NYSERDA Fixture Code**	**Watts per Fixture**	**kW/Space**	**Exist Control**	**Annual Hours**	**Retrofit Control**	**Annual kWh**	
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	Retrofit control device	(kW/space) * (Annual Hours)	Notes
71	I 60 (tenants' lamps)	400	I 60	I60/1	60	24.0	SW	500	None	12,000	Incandescent
93	I 75 (tenants' lamps)	750	I 75	I75/1	75	56.3	SW	500	None	28,125	Incandescent
	Total	**1,150**				**80.3**				**40,125**	

Terrace Apartments - Building 6800

Apartment #	# Bedrooms	Heating Type	Appliances	Washer/Dryer	Kitchen Equipment	Windows/Doors	Air Conditioning	Thermostats	Exhaust Fans	Lighting
1A	2	Electric Baseboard	(2)Sm. TVs, (2)Cable Boxes, Sm. Stereo System	Community Laundry Room	Hotpoint Fridge Mod.# HTH15BBRELWW, Premier Stove Mod.# EAK220WP01 8800 kW, Sm. Microwave, Toaster, Coffee Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Electrolux 8000BTU 10.8EER	(2) White Rodgers, No Setback	Central Exhaust System	(6)WCF23C-SW, W32CF4-E(T8)SW(2 Bulbs Out), (2)CF13 Plug-Ins
1B	1	Electric Baseboard	Med. TV, Sm. TV,Cable Box, (2)Sm. Radios, Humidifier	Community Laundry Room	Hotpoint Fridge Mod.# HTH15BBRELWW, Premier Stove Mod.# EAK220WP01 8800 kW, Lg. Microwave, Sm. Microwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Goldstar 6000BTU 9.7EER	(2) White Rodgers, No Setback	Central Exhaust System	(2)2CF23C-SW, W32CF4-E(T8)SW, (3)I75 Plug-Ins
2A	1	Electric Baseboard	Desktop Computer, Printer, Med. Flat Screen TV, (2)Cable Boxes, Med. TV, Air Cleaner/Fan, Breathing Machine	Community Laundry Room	Hotpoint Fridge Mod.# HTR16ABSERWW 6.5A, Premier Stove Mod.# EAK220WP01 8800kW, Sm. Microwave, Blender, Toaster	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Sunbeam 5850BTU 9.7EER	(2) White Rodgers, No Setback	Central Exhaust System	(2)2CF23C-SW, W32CF4-E(T8)SW, I75 Plug-Ins on SW in Bedrm, 3I20 Plug-In, 2I20 Plug-In
2C	1	Electric Baseboard	Sm. Radio, Sm. TV, Med. TV, (2)Cable Boxes, Lg. Stereo, DVD, Answering Machine	Community Laundry Room	New Hotpoint 4-Burner Stove, GE Fridge Mod.# GTS16BBSARWW 6.5A, (2)Blenders, Coffee Pot, Toaster, Sm. Microwave, G. Foreman Grill	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	GE Window 5050BTU 9.7EER	(2) White Rodgers, No Setback	Central Exhaust System	(2)2CF23C-SW, W32CF4-E(T8)SW, 5I60 Plug-In, I60 Plug-In
2G	1	Electric Baseboard	Med. TV, Sm. TV, Cable Box, DVD, Lg. Stereo, Fax Machine	Community Laundry Room	Larger 4-Burner GE Stove, Hotpoint Fridge Mod.# CTX14CAXKRWH 6.5A, Sm. Microwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Frigidaire 8000BTU 9.5EER	(2) White Rodgers, No Setback	Central Exhaust System, Range Hood: GE Mod.# JN3220V1WH	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, I60 on Range Hood, CF23 Clg Mt. & W17WF1-E(T8) on 1 SW in BR, (2)CF23 Plug-Ins, 5I75 Plug-In
2I	1	Electric Baseboard	Paper Shredder, Desktop Computer, Printer, Water Cooler, Lg. TV, (2)Cable Boxes, (2)DVD/VCR, Med. TV, Alarm Clock	Community Laundry Room	New Hotpoint 4-Burner Stove, GE Fridge Mod.# GTS16BBSARWW 6.5A, Dicer, Coffee Pot, Toaster Oven, Sm. Microwave, G. Foreman Grill	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	(2)Kenmore 5300BTU 10.8EER	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (4)CF13 Plug-Ins
2J	1	Electric Baseboard	Lg. TV, VCR, DVD, Cable Box, Sm. Radio, Pedistal Fan, (2)Alarm Clocks, Answering Machine, Playstation	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800 kW, GE Fridge Mod.# GTS16BBSARWW 6.5A, Toaster Oven, Lg. Microwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	GE Window 8000BTU 9.8EER	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (4)I60 Plug-Ins

Terrace Apartments - Building 6800

Apartment #	# Bedrooms	Heating Type	Appliances	Washer/Dryer	Kitchen Equipment	Windows/Doors	Air Conditioning	Thermostats	Exhaust Fans	Lighting
2L	1	Electric Baseboard	Med. TV, Answering Machine, Lg. Stereo, Sm. Stereo, VCR, (2) Alarm Clocks, Sm. TV, Cable Box	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800 kW, WCI Fridge Mod.# ATN130WK2 3.75A, Toaster Oven, Toaster, Sm. Microwave, Blender	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	(1) Frederich 10000BTU 9.8EER (1)Whirlpool 7500BTU Low EER	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (5)CF13 Plug-Ins
2P	1	Electric Baseboard	Recip. Fan, Answering Machine, Lg. TV, DVD/VCR, Cable Box	Community Laundry Room	New Hotpoint 4-Burner Stove, Kenmore Fridge Mod.# 2539333010 3.75A	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Whirlpool Window 10000BTU	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, 22W&32WFRing(T8)SW, I60 Plug-In on SW in Bedrm.
2R	1	Electric Baseboard	(2) Alarm Clocks, Recip. Fan, (3)Sm. TVs, VCR, (2)Cable Boxes, Sm. Radio, Lg. Stereo	Community Laundry Room	Magic Chef Stove Mod.# CEL1110AAH 8.1kW, Frigidaire Fridge Mod.# FRT15B3AW1 4.5A, Toaster Oven, Sm. Microwave, Blender, G. Foreman Grill	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Panasonic 12000BTU 10.8EER	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (4)I100 Plug-Ins
2S	1	Electric Baseboard	(3)Alarm Clocks, Breathing Machine, (2)Med. TVs, Mini Fridge, (2)Cable Boxes, (2)VCRs, (4)Stereos(1Sm3Lg), Paper Shredder, DVD, (2)Recip. Fans, Fax	Community Laundry Room	White Westinghouse Stove, Sears Fridge Mod.#2539333010 3.75A, G. Foreman Grill, (3)Toaster Ovens, Toaster, Croc Pot, Coffee Pot, Lg. Microwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	(1)Old Whirlpool: 10000BTU Low EER (1)Goldstar: 5050BTU 9.7EER	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (8)I75 Plug-Ins
2V	0	Electric Baseboard	Med. TV, Cable Box, Alarm Clock	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800 kW, Hotpoint Fridge Mod.# HTR15ABRFRWW 6.5A, G. Foreman Grill, Blender, Croc Pot, Sm. Microwave, Coffee Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Maytag 6000BTU 9.7EER	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, CF23 Plug-In, 2CF23 Plug-In, "Fish Tank" Plug-In
2W	0	Electric Baseboard	(2) Med. TVs, Desktop Computer, Sewing Machine, Sm. Radio, Alarm Clock, (2)DVD/VCR, (2)Cable Boxes, Lg. Stereo	Community Laundry Room	GE Stove Mod.# J247305WH Not Used, White Westinghouse Fridge Mod.# RTG123GCW2A 3.75A, G. Foreman Grill, Toaster Oven, Sm. Microwave, Coffee Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Goldstar 5000BTU 9.7EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (2)I60 Plug-In, 5I60 Plug-In
2Y	1	Electric Baseboard	Med. TV, (3)Sm. TVs, Dehumidifier, (2)Cable Boxes, Paper Shredder, Lg. Box Fan, Answering Machine, Desktop Computer, Breathing Machine	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800 kW, Maytag Fridge Mod.# CTB1502ARW 3.5A, Water Cooler, Coffee Pot, Med. Microwave, Toaster, Infrared Oven-Nuwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	(1)Samsung 7500BTU (1)Delonghi Floor Standing Unit W/ Flex Duct Thru Window	(2) White Rodgers, No Setback	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (2)I60 Plug-In 1 on SW in Bedrm.

Terrace Apartments - Building 6800

Apartment #	# Bedrooms	Heating Type	Appliances	Washer/Dryer	Kitchen Equipment	Windows/Doors	Air Conditioning	Thermostats	Exhaust Fans	Lighting
3B	0	Electric Baseboard	Laptop Computer, Lg. TV, Cable Box, Air Purifier 8W/12V, VCR	Community Laundry Room	Admiral Fridge Mod.# NT15H4 4A, GE Stove Mod.# J247305WH 9.5kW/220V, Med. Microwave, Croc Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Sharp Window 8300BTU 10.0EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (3)I60 Plug-Ins
3D	0	Electric Baseboard	(2)Med. TVs, Cable Box, Lg. Stereo, (2)Recip. Fans, Oxygen Machine, Sm. Radio	Community Laundry Room	Kenmore 4-Burner Stove, Admiral Fridge Mod.#NT15H4 4A, Sm. Microwave, Toaster Oven, (2)Coffee Pots, Toaster	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	None	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (3)I100 Plug-Ins, 3I100 Plug-In
3E	0	Electric Baseboard	Record Player, Med.TV, Cable Box, VCR, Lg. Box Fan, Alarm Clock, Window Fan	Community Laundry Room	Kenmore 4-Burner Stove, Kenmore Fridge Mod.# 2539333010 3.75A	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	None	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (5)I75 Plug-Ins
3F	0	Electric Baseboard	(2)Sm. TVs, DVD/VCR, Lg. Stereo, CD Player	Community Laundry Room	White Westinghouse Fridge Mod.# RTO123GNW2A 3.75A , Premier Stove Mod.# EAK220WP01 8800 kW, Croc Pot, G. Foremen Grill, Sm. Microwave, Blender	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Sharp Window 6000BTU 9.7EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (2)I75 Plug-Ins
3H	0	Electric Baseboard	Lg.Box Fan, 52" Flat Sc. TV, Cable Box, DVD Player, Sm. Radio/CD Player	Community Laundry Room	White Westinghouse 4-Burner Stove, White Westinghouse Fridge Mod.# RTG123GCW2A 3.75A, Sm. Microwave, Toaster, Blender, Coffee Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	GE Window 9900BTU 9.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, I60 Plug-In

Terrace Apartments - Building 6800

Apartment #	# Bedrooms	Heating Type	Appliances	Washer/Dryer	Kitchen Equipment	Windows/Doors	Air Conditioning	Thermostats	Exhaust Fans	Lighting
3M	0	Electric Baseboard	Sm. TV, Cable Box, Tape Player/Radio, Alarm Clock, Recip. Fan	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800W Burners Removed, Sears Fridge Mod.# 2538692310 3.75A, Med. Microwave, Coffee Maker, Toaster, Coffee Grinder	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Sharp Window 5000BTU 8.0EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, I100 Plug-In, I20 Plug-In
3N	0	Electric Baseboard	Sewing Machine, (2)50" TVs, Recip. Fan, (2)Cable Boxes, Air Cleaner, (3)Phone/Answeing Machines, Alarm Clock, Window Fan	Community Laundry Room	Hotpoint Fridge Mod.# HTR16ABSERWW 6.5A, Premier Stove Mod.# EAK220WP01 8800kW, Sm. Microwave, Croc Pot, G. Foreman Grill	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	None	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, "Fish Tank" Plug-In, (2)I100 Plug-Ins, I75 Plug-In
3O	0	Electric Baseboard	(2)Med. TVs, VCR, Sm. Radio/Tape Player, Recip. Fan, Alarm Clock, (2)Plug In Phone Docks	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800W, GE Fridge Mod.# TBX18IADBRWW 7.0A, Croc Pot, G. Foreman Grill, Toaster Oven, Med. Microwave, Blender	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Electrolux 12000BTU 10.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (3)I75 Plug-Ins, 4I60 Plug-In, W17WF-E(T8) Plug-In
3Q	0	Electric Baseboard	Box Fan, Med. TV, Cable Box, Iron, Alarm Clock, Answering Machine/Phone, Wireless Net Modem	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800W, Kenmore Fridge Mod.# 2539333010 3.75A, Sm. Microwave, Croc Pot, G. Foreman Grill, Toaster Oven	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Window A/C 7500BTU Low EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (2)I75 Plug-Ins, W17WF-E(T8) Plug-In
3T	0	Electric Baseboard	Med. TV, Answering Machine, Paper Shredder, Cable Box, Alarm Clock	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800W, White Westinghouse Fridge Mod.# RT123GCWA 3.75A, Toaster, Toaster Oven, Sm. Microwave, Coffee Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	LG Window 12300BTU 9.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (6)I60 Plug-Ins
3U	0	Electric Baseboard	Alarm Clock, Sm. TV, Med. TV, Lg. 4-Speaker Stereo, Answering Machine, VCR, Sm. Radio, DVD	Community Laundry Room	Kenmore 4-Burner Stove, Small Welbilt Fridge Max 10W	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Coldstar 5250BTU 9.7EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (4)I60 Plug-Ins

Terrace Apartments - Building 6800

Apartment #	# Bedrooms	Heating Type	Appliances	Washer/Dryer	Kitchen Equipment	Windows/Doors	Air Conditioning	Thermostats	Exhaust Fans	Lighting
3V	0	Electric Baseboard	Lg. Radio/CD Player, Med. TV, Cable Box, DVD/VCR, Sm. Radio	Community Laundry Room	GE 4-Burner Stove, Magic Chef Fridge Mod.# CEL1110AAH 8.1kW, Toaster Oven, Med. Microwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Haier Window 10000BTU 9.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (3)I60 Plug-Ins
3W	0	Electric Baseboard	Med. Flat Sc. TV, Cable Box, DVD/VCR	Community Laundry Room	Premier Stove Mod.# EAK220WP01 8800W, Kenmore Fridge Mod.# 25363712302 4.5A, Sm. Microwave, Coffee Pot, Blender, Sm. Radio	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Kenmore Energy Star Window 10000BTU 10.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (3)I60 Plug-Ins
3X	0	Electric Baseboard	Lg. Radio, Sm. Radio, Med. TV, VCR	Community Laundry Room	Frigidaire Fridge Mod.# FRT13CRHWO 3.75A, White Westinghouse 4-Burner Stove, Coffee Pot, Toaster, Blender, Sm. Microwave	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Sharp Window 6000BTU 9.7EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (2)I60 Plug-Ins

Building Averages

Apartment #	# Bedrooms	Heating Type	Appliances	Washer/Dryer	Kitchen Equipment	Windows/Doors	Air Conditioning	Thermostats	Exhaust Fans	Lighting
Average	0	Electric Baseboard	(2)Med. TVs, (2) Cable Boxes VCR, Sm. Radio/Tape Player, Recip. Fan, Alarm Clock, (2)Plug In Phone Docks	Community Laundry Room	Hotpoint Fridge Mod.# HTR16ABSERWW 6.5A, Premier Stove Mod.# EAK220WP01 8800kW, Sm. Microwave, Croc Pot, G. Foreman Grill	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	7500BTU 9.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (5)I75 Plug-Ins
Average	1	Electric Baseboard	Med. TV, (3)Sm. TVs, Dehumidifier, (2)Cable Boxes, Paper Shredder, Lg. Box Fan, Answering Machine, Desktop Computer, Breathing Machine	Community Laundry Room	Hotpoint Fridge Mod.# HTR16ABSERWW 6.5A, Premier Stove Mod.# EAK220WP01 8800kW, Med. Microwave, Blender, Toaster	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	10000BTU 9.8EER	Honeywell Chronotherm 4+, Not Programmed	Central Exhaust System	W32CF4-E(T8) SW, (2)2CF23Wall Mt. 1SW EA, W20CF1-Mag(T12)SW, (4)I60 Plug-Ins
Average	2	Electric Baseboard	(2)Sm. TVs, (2)Cable Boxes, Sm. Stereo System	Community Laundry Room	Hotpoint Fridge Mod.# HTH15BBRELWW, Premier Stove Mod.# EAK220WP01 8800 kW, Sm. Microwave, Toaster, Coffee Pot	3/4" Commercial Grade Double Glazed in Good Condition, Steel Insulated Doors W/Weatherstrip	Electrolux 8000BTU 10.8EER	(2) White Rodgers, No Setback	Central Exhaust System	(6)WCF23C-SW, W32CF4-E(T8)SW(2 Bulbs Out), (2)CF13 Plug-Ins

Apartment Averages

	Appliances	Kitchen Equipment	Air Conditioning	HA Lighting	Lamps
1-Bed	1 Med. TV	1 Hotpoint Fridge	1 10000 BTU, 9.8 EER	1 W32CF4-E SW (T8, Occ)	4 I60
	3 Sm. TVs	1 Premier Stove		2 2CF23 Wall Mt 1 SW EA (Occ)	
	2 Cable Boxes	1 Toaster		1 W20CF1-Mag SW (T12, OCC)	
	1 Paper Shredder	1 Med. Microwave			
	1 Box Fan	1 Blender			
	1 Answering Machine				
	1 Desktop Computer				
	1 Breathing Machine				
	1 Dehumidifier				
	Appliances	Kitchen Equipment	Air Conditioning	HA Lighting	Lamps
2-Bed	2 Sm. TVs	1 Hotpoint Fridge	1 8000 BTU, 10.8 EER	6 CF23C SW (Occ)	2 CF13
	2 Cable Boxes	1 Premier Stove		1 W32CF4-E SW (T8, Occ)	
	1 Sm Stereo System	1 Sm. Microwave			
		1 Toaster			
		1 Coffee Pot			

Ground Floor Totals: 1 2-Bed APT 1 1-Bed APTs 0 0-Bed APTs

	Appliances	Kitchen Equipment	Air Conditioning	HA Lighting	Lamps
1-Bed	1 Med. TV	1 Hotpoint Fridge	1 10000 BTU, 9.8 EER	1 W32CF4-E SW (T8, Occ)	4 I60
	3 Sm. TVs	1 Premier Stove		2 2CF23 Wall Mt 1 SW EA (Occ)	
	2 Cable Boxes	1 Toaster		1 W20CF1-Mag SW (T12, OCC)	
	1 Paper Shredder	1 Med. Microwave			
	1 Box Fan	1 Blender			
	1 Answering Machine				
	1 Desktop Computer				
	1 Breathing Machine				
	1 Dehumidifier				
	Appliances	Kitchen Equipment	Air Conditioning	HA Lighting	Lamps
2-Bed	2 Sm. TVs	1 Hotpoint Fridge	1 8000 BTU, 10.8 EER	6 CF23C SW (Occ)	2 CF13
	2 Cable Boxes	1 Premier Stove		1 W32CF4-E SW (T8, Occ)	
	1 Sm Stereo System	1 Sm. Microwave			
		1 Toaster			
		1 Coffee Pot			

Totals

Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps	
1	Med. TVs	2	Hotpoint Fridge	1	10000 BTU, 9.8 EER	2	W32CF4-E SW (T8, Occ)	2	CF13
5	Sm. TVs	2	Premier Stove	1	8000 BTU, 10.8 EER	2	2CF23 Wall Mt 1 SW EA (Occ)	4	I60
4	Cable Boxes	2	Toaster			1	W20CF1-Mag SW (T12, OCC)		
1	Paper Shredder	1	Sm. Microwave			6	CF23C SW (Occ)		
1	Box Fan	2	Toaster						
1	Answering Machine	1	Coffee Pot						
1	Desktop Computer	1	Med. Microwave						
1	Breathing Machine	1	Blender						
1	Dehumidifier								
1	Sm Stereo System								

Apartment Averages

		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps
0-Bed	1	VCR	1	Hotpoint Fridge	1	7500 BTU, 9.8 EER	1	W32CF4-E SW (T8, Occ)	5	I75
	2	Med. TVs	1	Premier Stove			2	2CF23 Wall Mt 1 SW EA (Occ)		
	2	Cable Boxes	1	Sm. Microwave			1	W20CF1-Mag SW (T12, OCC)		
	1	Sm. Radio	1	Croc Pot						
	1	Recip. Fan	1	G. Foreman Grill						
	1	Alarm Clock								
	2	Phone Docks								
		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps
1-Bed	1	Med. TV	1	Hotpoint Fridge	1	10000 BTU, 9.8 EER	1	W32CF4-E SW (T8, Occ)	4	I60
	3	Sm. TVs	1	Premier Stove			2	2CF23 Wall Mt 1 SW EA (Occ)		
	2	Cable Boxes	1	Toaster			1	W20CF1-Mag SW (T12, OCC)		
	1	Paper Shredder	1	Med. Microwave						
	1	Box Fan	1	Blender						
	1	Answering Machine								
	1	Desktop Computer								
	1	Breathing Machine								
	1	Dehumidifier								
		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps
2-Bed	2	Sm. TVs	1	Hotpoint Fridge	1	8000 BTU, 10.8 EER	6	CF23C SW (Occ)	2	CF13
	2	Cable Boxes	1	Premier Stove			1	W32CF4-E SW (T8, Occ)		
	1	Sm Stereo System	1	Sm. Microwave						
			1	Toaster						
			1	Coffee Pot						

Floor 1-10 Totals:

0 2-Bed APT **100 1-Bed APTs** **150 0-Bed APTs**

		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps
0-Bed	150	VCR	150	Hotpoint Fridge	150	7500 BTU, 9.8 EER	150	W32CF4-E SW (T8, Occ)	750	I75
	300	Med. TVs	150	Premier Stove			300	2CF23 Wall Mt 1 SW EA (Occ)		
	300	Cable Boxes	150	Sm. Microwave			150	W20CF1-Mag SW (T12, OCC)		
	150	Sm. Radio	150	Croc Pot						
	150	Recip. Fan	150	G. Foreman Grill						
	150	Alarm Clock								
	300	Phone Docks								
		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps
1-Bed	100	Med. TV	100	Hotpoint Fridge	100	10000 BTU, 9.8 EER	100	W32CF4-E SW (T8, Occ)	400	I60
	300	Sm. TVs	100	Premier Stove			200	2CF23 Wall Mt 1 SW EA (Occ)		
	200	Cable Boxes	100	Toaster			100	W20CF1-Mag SW (T12, OCC)		
	100	Paper Shredder	100	Med. Microwave						
	100	Box Fan	100	Blender						

	100	Answering Machine									
	100	Desktop Computer									
	100	Breathing Machine									
	100	Dehumidifier									
		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps	
	0	Sm. TVs	0	Hotpoint Fridge	0	8000 BTU, 10.8 EER	0	CF23C SW (Occ)	0	CF13	
2-Bed	0	Cable Boxes	0	Premier Stove			0	W32CF4-E SW (T8, Occ)			
	0	Sm Stereo System	0	Sm. Microwave							
			0	Toaster							
			0	Coffee Pot							
		Appliances		Kitchen Equipment		Air Conditioning		HA Lighting		Lamps	
	400	Med. TV	250	Hotpoint Fridge	100	10000 BTU, 9.8 EER	250	W32CF4-E SW (T8, Occ)	400	I60	
	300	Sm. TVs	250	Premier Stove	150	7500 BTU, 9.8 EER	500	2CF23 Wall Mt 1 SW EA (Occ)	750	I75	
	500	Cable Boxes	150	Sm. Microwave			250	W20CF1-Mag SW (T12, OCC)			
	100	Paper Shredder	100	Med. Microwave							
	100	Box Fan	150	Croc Pot							
	100	Answering Machine	150	G. Foreman Grill							
Totals	100	Desktop Computer	100	Blender							
	100	Breathing Machine	100	Toaster							
	100	Dehumidifier									
	150	VCR									
	150	Sm. Radio									
	150	Recip. Fan									
	150	Alarm Clock									
	300	Phone Docks									

PERCENTAGE IMPROVEMENT REPORT

Project Name: NBHA Terrace Apts

For: NBHA

By:

Date: 8/25/2009

Package Name	Annual Energy Use of All Fuels, MMBtu	Percentage
Base Building	14244.74	100.0
Cooling AC Units to 12 EER	14155.47	99.4
Thermostates Apartments	14014.64	98.4
Energy Star Refigerator Replacement	13900.25	97.6
Fans Off 8hrday Apartments	13744.33	96.5
Fans Off 8 hrday Common	14178.19	99.5

PERCENTAGE IMPROVEMENT REPORT

Project Name: NBHA Terrace Apts

For: NBHA

By:

Date: 8/25/2009

Package Name	Annual Energy Use of All Fuels, MMBtu	Percentage
Base Building	14244.74	100.0
Energy Star Refigerator Replacement	13900.25	97.6

IMPROVEMENT PACKAGES

NBHA Terrace Apts

For: NBHA

By:

Date: 8/25/2009

Evaluated Packages:

Package Name	Cost $	Annual Savings, MMBtu	Annual Savings, $	Payback years	Cashflow $/year	SIR
Cooling AC Units to 12 EER	0	89.27	3,401	0	3,401	N/C
Energy Star Refigerator	0	344.49	13,125	0	13,125	N/C
Fans Off 8 hrday Common	0	66.55	2,536	0	2,536	N/C
Fans Off 8hrday Apartments	0	500.42	19,066	0	19,066	N/C
Thermostates Apartments	0	230.1	8,767	0	8,767	N/C

Package Description:

1. Cooling AC Units to 12 EER

Improvement Name	Cost ($)	Annual Savings MMBtu	Annual Savings ($)	Payback (years)	Cashflow ($/year)	Improve-ment Life (Years)	SIR in Package
Cooling System A/C Units to 12 EER 1	0	89.27	3,401	N/A	3,401	15	N/C
Total for Package	0	89.27	3,401	0	3,401	N/A	N/C

Non-Energy Benefits:

1. Cooling System A/C Units to 12 EER 1: Increase value of building.

2. Thermostates Apartments

Improvement Name	Cost ($)	Annual Savings MMBtu	Annual Savings ($)	Payback (years)	Cashflow ($/year)	Improve-ment Life (Years)	SIR in Package
Thermostat Common & Apartments	0	230.10	8,767	N/A	8,767	15	N/C
Total for Package	0	230.1	8,767	0	8,767	N/A	N/C

Non-Energy Benefits:

1. Thermostat Common & Apartments: Improve comfort, improve convenience.

3. Energy Star Refigerator Replacement

Improvement Name	Cost ($)	Annual Savings MMBtu	Annual Savings ($)	Payback (years)	Cashflow ($/year)	Improvement Life (Years)	SIR in Package
Energy Star Refrigerator Replacement	0	344.49	13,125	N/A	13,125	15	N/C
Total for Package	0	344.49	13,125	0	13,125	N/A	N/C

Non-Energy Benefits:

1. Energy Star Refrigerator Replacement: Increase value of building, reduce environmental risk due to old ozone-depleting refrigerants.

4. Fans Off 8hrday Apartments

Improvement Name	Cost ($)	Annual Savings MMBtu	Annual Savings ($)	Payback (years)	Cashflow ($/year)	Improvement Life (Years)	SIR in Package
Fans Off 8 hrs/day Apartments	0	500.42	19,066	N/A	19,066	20	N/C
Total for Package	0	500.42	19,066	0	19,066	N/A	N/C

Non-Energy Benefits:

1. Fans Off 8 hrs/day Apartments: Improve indoor air quality, increase value of building.

5. Fans Off 8 hrday Common

Improvement Name	Cost ($)	Annual Savings MMBtu	Annual Savings ($)	Payback (years)	Cashflow ($/year)	Improvement Life (Years)	SIR in Package
Fans Off 8hr/day Common Areas	0	66.55	2,536	N/A	2,536	20	N/C
Total for Package	0	66.55	2,536	0	2,536	N/A	N/C

Non-Energy Benefits:

1. Fans Off 8hr/day Common Areas: Improve indoor air quality, increase value of building.