ENERGY REDUCTION PLAN

1234 Any Street

Portland, Maine 04104

Owner:	Building Owner, Inc.
Audit Site Visit Date:	March 16, 2013
Partner:	Facility Management Group, Inc.
Report Date:	April 17, 2013

Revision #0 Based on Version 1.0 of the Multifamily Efficiency Program

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EXECUTIVE SUMMARY

A comprehensive energy assessment that evaluated a suite of potential measures to achieve the facility's performance target and improve the health, safety, comfort, and security of its residents and staff was conducted at 1234 Any Street. The findings and recommendations of this assessment are detailed in Sections I and II. Based on this initial assessment, a scope of work has been proposed in Section I in consultation with building ownership and management that will effectively achieve the energy savings. The energy reduction summary metrics and the detailed list of recommended measures are presented in Table 1 and Table 2.

This report contains an Energy Reduction Plan (ERP) which details specific steps to be taken by the ownership and management at 1234 Any Street to achieve the estimated energy savings.

This facility was benchmarked against other Housing and Urban Development (HUD) buildings to evaluate and compare its current energy consumption relative to similar buildings in the U.S. in the benchmarking database. The benchmarking results are presented in Table 3. 1234 Any Street achieved a benchmarking score of 44. 208-210 High Street's reduction target is 36% of the building's current source energy.

Table 1
Energy Reduction Plan Summary

Total Investment:	$21,474	**Payback Period (years):**	8.1
Annual Savings:*	$2,651	**Internal Rate of Return (IRR):**	9.97%
	174 MMBtu	**Net Life Cycle Savings:**	$17,845
	1,660 kWh	**Discounted at 3.0% over (yrs):**	19.9
Peak Demand Reduction:	36.4 kW	**Electric Reduction:**	**10%**
New Gas:**	0 MMBtu	**Fuel Use Reduction:**	**50%**

*million Btu figure includes all interactive effects, but excludes gas consumption of proposed cogen or conversions

**New purchases for conversions, etc.

Sample Modeling Path

Table 2
Detailed List of Recommended Measures

Detailed List of Recommended Measures

Discount Rate =	3.0%

*Partner fills in blue cells

	Measure Category	Measure Type	Measure Name	Quantity (if applicable)	Installed Cost (incl. design)	Annual Energy Savings		Demand Savings*	Annual Water/ Sewer Savings	Annual O&M Savings	Annual Cost Savings	Payback	S.I.R.	Life Cycle Savings	IRR	Measure Life*
					$	MMBtu	kWh	kW	1000 gals	$	$	years		$		years
Energy Savings Measures																
1	Building Envelope	Roof/Attic Insulation	Attic Insulation		5000	29	0	0.0	0		$372	13.45	1.46	$2,288	6.2%	30
2	Building Envelope	Floor/Foundation Insulation	Basement Insulation		2000	39	0	0.0	0.0		$503	3.98	4.92	$7,850	25.1%	30
3	Building Envelope	Wall Insulation	3rd Floor Wall Insulation		4000	35	0	0.0	0.0		$457	8.75	2.24	$4,957	10.9%	30
4	Building Envelope	Air Sealing	Whole Building Infiltration Reduction		3300	18	0	0.0	0.0		$233	14.14	0.75	-$818	-1.2%	13
5	Heating	Pipe Insulation	Heating Pipe Insulation		1750	30	0	0.0	53.7		$390	4.49	2.06	$1,856	19.0%	11
6	Refrigeration	Refrigerators	Refrigerator Replacement		1000	-2	1,660	36.4	0.0		$220	4.55	2.89	$1,893	21.1%	17
7	Water Heating	Low Flow Devices	Low Flow Devices		110	24	0	0.0	0.0	$0	$476	0.23	36.95	$3,954	433.1%	10
8					$0	0	0	0.0	0.0	$0	$0				0.0%	
9					$0	0	0	0.0	0.0	$0	$0				0.0%	
10					$0	0	0	0.0	0.0	$0	$0				0.0%	
11					$0	0	0	0.0	0.0	$0	$0				0.0%	
12					$0	0	0	0.0	0.0	$0	$0				0.0%	
13					$0	0	0	0.0	0.0	$0	$0				0.0%	
14					$0	0	0	0.0	0.0	$0	$0				0.0%	
15					$0	0	0	0.0	0.0	$0	$0				0.0%	
Heath & Safety Measures																
16	Health and Safety	her Health and Safety Measur	Gas Fired Ovens		$180											
17	Health and Safety				$0											
18	Health and Safety				$0											
19	Health and Safety				$0											
20	Health and Safety				$0											
			Total for Improvements		$17,340	174	1,660	36.4	54	$0	$2,651			$21,979		
			Partner Fees - ERP		$2,400											
			Partner Fees - Construction Period		$1,734											
TOTALS					**$21,474**	**174**	**1,660**	**36.4**	**54**	**$0**	**$2,651**	**8.10**	**1.83**	**$17,845**	**10.0%**	**23.91**

Table 3
Benchmarking Results

Efficiency Maine Multifamily Efficiency Program Benchmarking Tool v1.0

This Benchmarking Tool was developed as part of the New York State Energy Research and Development Authority's (NYSERDA) Multifamily Performance Program. The tool quantifies the projected performance of a user-defined building relative to all HUD 5-plus unit multifamily residential buildings nationwide. A score of 75 denotes performance at the top 25th percentile of 5-plus unit multifamily buildings. A score of 50 denotes performance at the 50th percentile (the mid-point). To use this tool, you will need to calculate your building's annual energy consumption. Provide entries for your building in the "white cells" below. Click on underlined headings for help.

Building(s) Description

Project Name: Sample Modeling Project
5-digit Zip Code: 04101 *Not Sure?*
Mapping Location: *Portland, ME*

Entire Building Gross Floor Area (sqft)	Number of Family Units	Percent of Units with Laundry Hookups	Percent of Gross Floor Area Heated	Percent of Gross Floor Area Cooled
5,616	6		100.0	

Weather Description

	Typical	*Pre-Retrofit*	*Post-Retrofit*
Annual HDD:	7378	6115	
Annual CDD:	268	470	

IMPORTANT: Annual entries should correspond to the same time period as the pre-/post-retrofit annual consumptions reported below. Pre- or post-retrofit values must be provided to score your building.

Annual Energy Consumptions and Costs ----- IMPORTANT: Entries should represent 12 continuous months of consumption

	Pre-Retrofit				*Post-Retrofit*			
	Electricity	Natl Gas/Propane	Fuel Oil	District Steam	Electricity	Natl Gas/Propane	Fuel Oil	District Steam
Units:	kWh	Natl gas MMBtu	MMBtu	MMBtu	kWh	Natl gas therms	MMBtu	MMBtu
Energy	16,399	349						
Cost ($)	3,129	4,508						
No. of buildings	1	1						

IMPORTANT: Number of buildings represented by the reported energy use values above should always be equal for all reported fuels.

Calculated unit cost:	0.19 $/unit	12.92 $/unit	$/unit	$/unit	$/unit	$/unit	$/unit	$/unit

Results

	Pre-Retrofit		*Post-Retrofit*	
	Your Building	Average	Your Building	Average
Score Against Peers	44	50		50
Building Site Energy Use (MMBtu/year)	405	NA		NA
Building Source Energy Use (MMBtu/year)	552	526		458
Site Energy Use Intensity (kBtu/ft2-year)	72.1	NA		NA
Source Energy Use Intensity (kBtu/ft2-year)	98.4	93.7		81.6

Weather-normalized Percent Source Energy Use Reduction After Retrofit

Design Assistant

Projected Annual Energy Consumption

	Electricity	Natl Gas/Propane	Fuel Oil	District Steam
Units:	kWh	Natl gas MMBtu	MMBtu	MMBtu
Energy	14,739	175		

Projected Percent Source Energy Reduction	36%
Projected Score Against Peers	84
Projected Building Site Energy Use (MMBtu/year)	226
Projected Building Source Energy Use (MMBtu/year)	352
Projected Site Energy Use Intensity (kBtu/ft2-year)	40.2
Projected Source Energy Use Intensity (kBtu/ft2-year)	62.6

Table 4

Table 4: Financing Plan	
Item	**Amount**
Total Cost of Improvements	$17,340
Multifamily Efficiency Program Partner Fees	$4,134
TOTAL COSTS	**$21,474**
Anticipated Efficiency Maine Incentives	$9,600
Owner Contributions	$11,874
Bank Loan	$0
Other (Efficiency Maine Natural Gas Incentive)*	$0
TOTAL FUNDING	**$21,474**

SECTION I. RECOMMENDED MEASURES

Table 5 - Implementation Plan

The measures proposed in this scope of work will be installed per the following schedule. It is likely that this schedule will change after the bid selection process is complete. This is merely an estimate, given program schedule requirements.

Measure	Start Date	Est. Completion Date
Attic Insulation	5/20/2013	5/25/2013
Basement Insulation	5/20/2013	5/25/2013
3rd Floor Wall Insulation	5/20/2013	5/25/2013
Whole Building Infiltration Reduction	5/20/2013	5/25/2013
Heating Pipe Insulation	5/20/2013	5/25/2013
Refrigerator Replacement	5/20/2013	5/25/2013
Low Flow Devices	5/20/2013	5/25/2013
Gas Fired Ovens	5/20/2013	5/25/2013

Measure #1 – Attic Insulation

Description of Improvement

Air seal and insulate the attic to R = 50. Apply air sealing spray foam Insulation as conditions require (see guide) and capping the attic area with cellulose insulation. This improvement includes: framing, plywood, and capping the existing double walk up stairwell and constructing an insulated removal hatch.

Existing Conditions

The attic is very poorly insulated R = 5 with a double wide uninsulated walk up stairwell, 3 large holes, many small holes and gaps and an average of less than 2 inches of cellulosed insulation. Overall the open stairwell and attic floor penetrations have rendered the insulation nearly useless.

Work Scope Details / Important Measurements Attic

The Attic will be air sealed prior to adding insulation. The intent of the attic insulation measure is to supplement not supplant the air sealing. The contractor will strictly adhere to "Guide to Attic Air Sealing" (article link). Adherence to the air sealing preparation work explained in the guide is necessary to meet the required project final ACH_{50}. This specification requires the contractor to show evidence that the whole building tested air leakage is less than 4.8 ACH (less than or equal to 4000 CFM) when tested with a blower door at a pressure of 50 Pascals.

Work Scope:

1. Air seal the entire attic prior to insulation.
2. Remove existing insulation and floor boards.
3. Construct stairwell cap and insulated hatch
4. Construct narrow walkway down the middle
5. Construct barrier around chimney, stairwell and hatch
6. Air Seal with two part foam the perimeter and all penetrations.
7. Blow 1,860 SF with 12"of cellulose insulation into attic flat.
8. Repair/construct a rigid barrier as conditions require at the interface of flat attic and slope roof around perimeter

Large opening #1 in attic floor

Less than two inch thick insulation on cardboard filler


Double stairwell opening to attic


Large opening #2 in attic floor

Measure #2 – Basement Wall Insulation

Description of Improvement

Maine Uniform Building and Energy Code (MUBEC) calls for an R-15 on basement (envelope) walls. Baysystem ® 215 closed cell foam has an aged value of R-6.9 per inch and is an air barrier at 1 inch and a class 1 vapor barrier at 2 inches. This proposal calls for a 2 inch average of Baysystem ® 215 closed cell foam with a state approved in tumescent thermal barrier applied over the foam.

1. Spray 2” of closed cell foam on the rim joists and upper sections of foundation walls (existing R=3), to a point equal to 2 feet below grade, in the both boiler room and laundry room basements totaling 1,279 SF.
2. Spray 1” of closed cell foam on the lower sections of foundation walls as conditions require of both boiler room and laundry room basements totaling 370 SF to air seal the loose rock foundation areas below grade.
3. Spray Intumescent paint (fire barrier) over all foam on foundation walls totaling 1,649SF.
4. Remove fiberglass from rim joist area and other obstacles prior to spray foam.



Field stone and brick foundation

Measure #3 – Third Floor Wall Insulation

Description of Improvement

1. Dense pack 1,680 SF of the (asphalt shingled mansard constructed) exterior walls (existing R = 5) of 3rd floor with cellulose insulation. This application will be installed from interior of house. Contractor to apply 1 (coat) rough patch of mud, homeowner responsible for sanding and finish.
2. Dense pack the top 92 SF of Dormers with 6" of cellulose insulation into tops of dormers.

Third floor asphalt shingle wall and dormers

Measure #4 – Air Sealing (Basement and Attic Air Sealing and Door and Window Frames)

Description of Improvement

Air sealing the attic and basement will be accomplished simultaneously with the insulation work scope in Measure # 1 Attic Insulation and Measure #2 Basement Insulation. Air sealing also includes weather stripping and adjusting the door latches for tight closure, and caulking the interior window frames and molding. This air sealing measure requires the contractor to reduce the blower door CFM_{50} from 5,800 to 4,350.

Existing Conditions

Air leakage and air infiltration are significant in the attic, through 3 very large holes (see photographs) and along the perimeter, at multiple utility and chimney penetrations, and around exterior doors. The perimeter of the windows and the molding are leaky and tenants have attempted corrective action with tape.

Work Scope Details / Important Measurements

The first element of air sealing any basement must be to keep the groundwater and contaminants out. That means either collecting runoff from roofs and building surfaces using gutters, or the placement of a perimeter impermeable membrane and gravel to direct the water away from the foundation. The second objective may or may not be the introduction of a vapor barrier on the soil, crushed stone, for the control of moisture and/or the collection of radon gas. For this site, no ground water anomalies were observed. However, Radon testing should be completed. If radon is present above the EPA standard, the opportunity to seal the basement walls to the floor should be explored. For the purpose of this ERP, the generic basement insulation approach will provide interior spray foam insulation. Interior

spray foam insulation is known as the least risky insulation approach. (BSD-103: Understanding Basements)
The basement air sealing requires a 100% effective air barrier verifiable by third party inspection. Third party verifications of air sealing in the basement include but are not limited to: visual inspection, infrared camera inspection, and a multi-point blower door.

Work Scope:
1. One part foam all wire and pipe and chimney penetrations in basement ceilings.
2. In basement, use fire rated foam to close two penetrations connecting the two basements.
3. In basement, one part foam around entry door, and two windows.
4. Air Seal the interior perimeter of windows and molding with Caulk (clear).
5. Weather-strip all entry (6) doors and install door sweeps.

Measure #5 – Heating Pipe Insulation

Description of Improvement
Install 1 inch thick fiberglass pipe insulation and Zeston™ fittings on copper heating pipes. Where conventional pipe covering is prohibited apply 1 inch thick two-part spray foam to the Pex heating pipes.

Existing Conditions
All the heating pipes are bare and contribute to waste energy and heat loss.


Copper Pipe


Black Pex

Work Scope Details / Important Measurements
Install 1 inch thick two-part spray foam insulation on Pex heating supply and return piping where conventional heating pipe covering is prohibited. Locations of pipe insulation: Basement. Approximate sizes and quantities: ½ inch Pex @ 340 LF, ¾ inch Pex @ 180 LF, ½ inch copper @ 50 LF, and ¾ copper @ 325 LF. Submit a PDF document and manuals and warranties on pipe insulation to the qualified partner and obtain written approval prior to ordering. Insulation inside diameter shall match outside diameter of pipe. Maintain 6" clearance to flue pipe. Insulation shall be securely fastened per manufacturer's

instructions. Tape is unacceptable as a method of fastening unless supplied as an integral part of the insulation. Insulation shall be installed in a workmanlike manner, without loose edges or rough-cut ends. Insulate elbows, unions and other fittings.

Measure #6 – Refrigerator Replacement

Description of Improvement
Install two new energy star refrigerator/freezer 18 cubic feet to replace the two 18 cubic foot refrigerators that are inefficient and greater than 20 years old.

Measure #7 – Low Flow Devices

Description of Improvement
Install replacement domestic hot water shower head low flow device in each of the six units of the building in order to reduce fuel consumption for hot water while ensuring resident satisfaction with domestic hot water delivery. The new shower heads will have a maximum flow of 1.5 GPM. Install low flow aerators in 5 kitchen sinks and 5 bathroom sinks to reduce flow to a maximum of 1.5 GPM.

SECTION II: EXISTING CONDITIONS

This assessment consists of the following building at Sample Modeling Path and was assessed for purposes of developing an energy assessment and scope of work for this building type. As part of the comprehensive energy assessment 6 units of the apartment units were sampled.

Assessment Team	
Report Prepared By:	Facility Management Group, Inc.
Report Quality Control By:	Stephen Wintle
Site Auditors:	Stephen Wintle, Mark Burnett, Dan Jamison
Modelers:	Cory Johnson

On March 16, 2013, Stephen Wintle, Mark Burnette and Dan Jamison from Facility Management Group, Inc. visited the project site and conducted a detailed energy assessment of the property.

The building is a 3 story inner city structure located in a tight setting with other large commercial rental facilities. The building is a turn of the century building and is in above average condition. The building is a 6 unit multifamily comprising 5,616 Square feet

Building Ownership, Management, and Staffing

Building Owner:	Building Owner, Inc.
Management Company:	Building Owner, Inc.
Head Superintendent:	James Bond
Staff Size:	1

Maintenance & Operating Practices

The facility has a well-trained and experienced manager and the building is very well maintained. The heating system and electrical metering systems have been replaced.

Capital Improvements

There are not capital improvements planned for this property.

Energy Suppliers, Metering, and Electrical Systems

Refer to Appendix A for detailed historical utility data usage and costs.

Electric

Electric is provided by Central Maine Power.

Natural Gas

Natural Gas is supplied by UNITIL.

Building Envelope

Building Envelope Construction

The building consists of full 2x4 framing with partially blown wall insulation with sheetrock and lath and plaster interior finish. The original clapboard siding has been covered with vinyl siding. The infrared camera found approximately 30 to 40% of the insulation has settled or is missing. The foundation is both field stone and brick and in good condition, but not insulated and leaky. The third floor walls are sloped and covered with asphalt shingles. The wall cavities are partially cellulose filled. The attic is very poorly insulated with many holes and gaps and an average of only 2 inches of insulation. Overall the open stairwell and attic floor penetrations have rendered the insulation useless.
Building Envelope Construction

The table below details the types of surfaces separating conditioned (i.e. heated or cooled) spaces in the building to either the outdoors, or to unconditioned areas.

Surface Type	Surface Location	Construction Description (list all material layers & total thickness)	Estimated R-value	Estimated, Reported, or Confirmed?	Notes
Wall	1st & 2rd Floor	2 x 4 some cellulose	7	Confirmed	30% - 40% filled
Wall	3rd Floor	2 x 4 some cellulose	5	Confirmed	30% - 40% filled
Wall	Foundation	Field Stone and brick	2	Confirmed	
Roof	Attic	Some cellulose	5	Confirmed	< 2 inches

Exterior Doors

The following exterior doors provide access to the building(s):

General Location	Material & Thickness	Glazing and % Glazed	Qty.	Weatherstripping (type and condition)	General Condition & Notes
Entry	Metal Insulated	25%	1	Yes	Fair-good
Entry	Metal Insulated	0%	5	Yes	Fair-good

Windows

The following windows are installed:

Location	Operation Type	Framing Material & Thermal Break	Glazing Type (# of Panes, if insulated, storm windows, Low-E, etc.)	Weatherstripping (type and condition)	Qty.	Notes
Whole Building	Double Hung	Vinyl	1/2inch thermopane	good	55	Interior frame needs caulking

Air Infiltration

	Location of Leakage	1 = Tight 2 = Slightly Leaky 3 = Moderately Leaky 4 = Excessively Leaky	Notes
In-unit windows			
	Frame	4	Greater than a third of the perimeter frame of each window leaks air
	Moving surfaces	1	
Exterior doors			
	Frame	1	
	Moving surfaces	1	
Laundry room			
	Dryer vent	2	
Attic			
	Double walk up stairs	4	
	Pipe penetrations	4	
	Electrical boxes	4	
	Electrical penetrations	4	
	Wall caps	4	

	Location of Leakage	1 = Tight 2 = Slightly Leaky 3 = Moderately Leaky 4 = Excessively Leaky	Notes
Apartment			
	Pipe penetrations	1	
	Electrical outlets	2	

Basement chimney penetrations to attic need air sealing

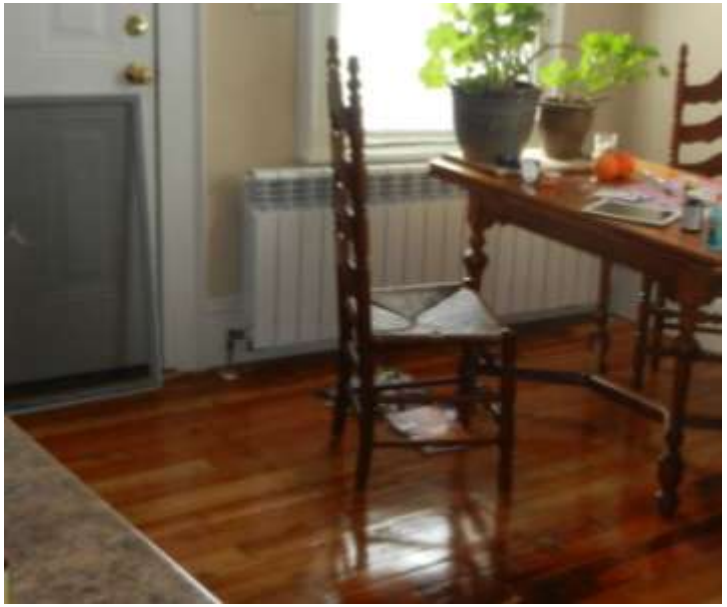

Typical interior window frame needs caulking to reduce infiltration

Mechanical Systems

Space Heating

Space heating is provided by one new (2011) Baxi – Lennar HT 1.33 Natural Gas Fired Condensing Boiler. One Grundfos circulation pump Model 15-62/BXH feeds the six heating apartment zones. The distribution system is the original hot water fin tube baseboard in 5 apartments. Only one new length of low temperature high output baseboard heat was added to hallway on the first floor. Apartment #2 has 8 new Pensotti radiant panels that are controlled by radiator valves. A Honeywell control system manages the room temperatures and setback and warm weather shut off. Only the hallway one room on the first floor is reportedly cool and it is anticipated that foundation insulation will reduce infiltration and conductive heat loss improve the comfort of that room with warmer floors. It is noteworthy that the building is located in a "wind protected " inner city area and the heating boiler output of 128,000 BTU/HR (divided by the building square footage of 5,616 SF = 22.7 BTU/SF) was reportedly satisfactory during the 2013 extreme cold weather.

8 sets of return/supply ½" Pex Piping to Apt. #2



Pensotti Radiant Panels

The following heating equipment was installed at the time of the site visit:

	Unit 1
Equipment Type	Natural Gas Boiler
Location	Basement
Locations served	Whole Building
Manufacturer & Model	Baxi – Lennar HT 1.33
Year manufactured	2011
Input	133,000
Output	128,000
Rated Efficiency	96%

Baxi – Natural Gas Boiler

Honeywell outdoor reset controller

Combustion Efficiency Testing:

Combustion efficiency tests were taken for the boilers with the following results:

	Building/Unit 1
Make	Baxi – Lennar HT
Size	133,000 BTU/HR
Fuel	Nat. Gas
Stack Temperature	99.1
% O_2	5.8%
% CO_2	8.4%
Solid State Efficiency	97.8%

Temperature Readings:

Location	Measured Temperature	Temperature Controls and Setpoints	Notes
Apt. #1	71	72	
Apt.#2	69	70	
Apt. #3	70	71	
Apt. #4 & 5	70	69	
Apt.# 6	70	71	
Outdoor Temperature at Time of Measurements		ºF 30	
Assumed Average Heating Season Indoor Temperature:		ºF 70	

Distribution System:

The distribution system is adequate for the building heating distribution. The new pex piping supply and returns include both ½ inch and ¾ inch piping and is closely mechanically fastened to the structure preventing easy application of pipe covering. The existing domestic hot water pipes and heating pipes are copper and include ½ inch, ¾ inch and 1 inch. The pipes were analyzed for the ERP and rejected due to the high cost of $4,825.00 and poor payback. The MMBTU savings =23.03, with annual savings of only $299.35 of natural gas, for a payback of 15.5 years. The owner will pursue the installation at a later date by himself and not outside contractor.

Domestic Hot Water

The domestic hot water heater is located in the basement boiler room. Domestic hot water is provided by one 41 gallon Boiler Mate and reportedly provides adequate hot water. The design water temperature is 120 F. There are no controls.
Water temperature measures were taken at the point of use with the following results:

Location	Temperature
Apt. 1 & 2	117
Apt. 3	120
Apt. 4 & 5 & 6	109

Ventilation

There is no fresh air ventilation system in the building. Only apartment #2, #4 and #5 has a bathroom is equipped with a fan of very low capacity < 25 cfm. The kitchens do not have exhaust fans.

Water & Sewer

The following types of showerheads and aerators were found installed during the site visit:

Location	Kitchen (GPM)	Bath (GPM)	Showerhead (GPM)	Notes (rated/measured)
Apartment 1	1.5	1.5	2	Measured
Apartment 2	2	2	2	Measured
Apartment 3	2.5	2	3	Measured
Apartment 4	2	2	3	Measured
Apartment 5	2	3	3	Measured
Apartment 6	2	2	2	Measured
Average:	2	2.1	2.5	

Lighting

Common Area Lighting

Location	Quantity	Code	Watts	Control	Hrs/Day
Laundry	2	F32T8	70	wall	8
Lanndry	1	CFL	14	pull	1
Boiler	1	CFL	14	pull	1
1-3 Hallways	3	CFL	14	wall	24
Basement hall	1	CFL	14	wall	1

Apartment Lighting

Location	Quantity	Code	Watts	Hrs/Day
Apt. 6	7	CFL	14	3
Apt. 5	10	CFL	14	3
Apt. 4	9	CFL	14	3
Apt. 3	8	CFL	14	3
Apt. 2	8	CFL	14	3
Apt. 1	7	CFL	14	3
Apt. 1	1	F32T8	70	3

Appliances

Apartment Appliances

Equipment Type	Location	Manufacturer & Model	EStar? (Y/N)	Qty.	Age	Size
Fridge	Kitchen	Frigidare FTR	Y	3	1	18
Fridge	Kitchen	RCA MTX	N	2	15	18
Fridge	Kitchen	MAGIC CHEF CTB	y	1	1	18
Range	Kitchen	Natural Gas	N	5	10	N/A
Range	Kitchen	Electric	N	1	10	N/A
TV	Whole Building	N/A	N	5		
Computer	Whole Building	N/A	N	4		

Laundry Equipment

Common Area Laundry

A common area laundry is located Basement. Dryers are electric.

Equipment Type (washer/dryer)	Manufacturer & Model	E Star? (Y/N)	Leased? (Y/N)	Qty.	Frequency of Use (loads/week)
Washer	Whirlpool HD Commercial	Y	N	1	25
Dryer	Whirlpool HD Commercial	Y	N	1	25

SECTION III: HEALTH AND SAFETY

Health & Safety

There are not current health & safety conditions in the building. The carbon monoxide detectors are wall plug in's and the smoke detectors are hard wired.

Health and Safety Recommendations

The following recommendations are made to address health and safety concerns in the property.

Measure #1- Gas Fired Oven

Description of Improvement
Service the gas fired ovens in apartment #1 and #2 to reduce the CO from 136 ppm and 131 ppm, respectively, to a more appropriate level below 100 ppm.

SECTION IV: OTHER RECOMMENDATIONS

There are no other recommendations.

Operations & Maintenance

The most important operations & maintenance recommendation includes regular inspection and maintaining of a log of the heating boiler supply and return water temperature and flue gas temperatures.

Training & Resident Education

Notify all occupants: management encourages all tenants to report any building anomalies such as unusual space temperatures, water leaks, equipment or building material damage, in order to improve occupant comfort, safety, and reduce energy use.

DISCLAIMER

The energy conservation opportunities included in this report have been reviewed for technical accuracy. However, as energy savings ultimately depend on behavioral factors, the weather, and many other factors outside its control, Facility Management Group, Inc. does not guarantee the energy or cost savings estimated in this report. All energy savings were based on the energy use for a 12-month period of actual energy utility bills. Facility Management Group, Inc. shall in no event be liable should the actual energy savings vary from the savings estimated herein.

The estimates are based on the auditors' professional experience and judgment.

Estimated installation costs are developed based on similar past projects; local contractors' job cost estimates, vendors' prices, and cost handbooks.

Actual installation or savings costs may vary due to unforeseen conditions inherent within the structure and increases of product price. Facility Management Group, Inc. does not guarantee installed cost estimates and in no event can be held liable should actual installed costs differ from estimated costs.

APPENDIX A: UTILITY BILL ANALYSIS

Utility History Summaries are provided for the following utilities:

- Electricity
- Natural Gas

PRE-CONSTRUCTION ELECTRIC				
Billing Period Start Date	Meter Read Date	Days in Billing Period	Total Consumption (kWh)	Total Consumption (MMBtu)
12/29/11	1/26/12	28	929	3
1/26/12	2/28/12	33	1,102	4
2/28/12	3/27/12	28	903	3
3/27/12	4/27/12	31	1,023	3
4/27/12	5/25/12	28	1,009	3
5/25/12	6/27/12	33	1,429	5
6/27/12	7/26/12	29	2,049	7
7/26/12	8/27/12	32	2,167	7
8/27/12	9/27/12	31	1,591	5
9/27/12	10/29/12	32	1,484	5
10/29/12	11/29/12	31	1,348	5
11/29/12	12/28/12	29	1,365	5
		365	**16,399**	**56**

PRE-CONSTRUCTION GAS				
Billing Period Start Date	Meter Read Date	Days in Billing Period	Total Consumption (Therms)	Total Consumption (MMBtu)
12/29/11	1/26/12	28	523	52
1/26/12	2/28/12	33	627	63
2/28/12	3/27/12	28	590	59
3/27/12	4/27/12	31	354	35
4/27/12	5/25/12	28	226	23
5/25/12	6/27/12	33	159	16
6/27/12	7/26/12	29	74	7
7/26/12	8/27/12	32	70	7
8/27/12	9/27/12	31	66	7
9/27/12	10/29/12	32	96	10
10/29/12	11/29/12	31	233	23
11/29/12	12/28/12	29	477	48
		365	**3,495**	**349**

APPENDIX B: DESCRIPTION OF MODELING APPROACH

The result of the analysis of energy efficiency measures is presented in this section. This analysis was conducted using the TREAT energy modeling software.

A. The energy cost savings were calculated with the TREAT modeling software and were taken directly from the modeling tool generated.

B. Windows were put into the modeling software as a single size, using an average surface area. Walls, floors, and roofs were generated by R-value.

C. A single energy model was used and found to be representative.

D. There are no certain aspects of the building that are not represented in the model.

E. If multiple measures from the modeling tool are combined into a single energy efficiency measure in the ERP, provide the name of the individually modeled measures that comprise the measure reported in the ERP: None apply

F. If the energy savings for a single measure from the modeling tool are apportioned to multiple energy efficiency measures in the ERP (e.g. infiltration reduction), please explain how the savings were apportioned: None apply.

G. The name of the package of improvements for the proposed scope of work is “Owner’s Package.”

H. Provide the names of improvements from the modeling tool that represent the energy efficiency measures that were evaluated but not recommended: None apply.

APPENDIX C: ADDITIONAL MEASURE ANALYSES

Calculations for additional water savings corresponding to the installation of low flow showerheads are as follows:

$$\textbf{Water Savings (1000 gal)} = \frac{(GPM_{base} - GPM_{ee}) \times MIN \times USES \times 365}{1{,}000}$$

Assumptions:

MIN (Duration of faucate usage per use in minutes)	0.5
USES (Number of uses per day)	30
Days per year	365
Water Cost ($/1000 gal) =	$3

Quantity of Units Proposed (Restrooms)	5
Existing GPM per Faucet (Restrooms)	2
Proposed GPM per Faucet (Restrooms)	1.5
Restroom - Annual Water Savings (Gallons)	**13,688**

Quantity of Units Proposed (Kitchens)	5
Existing GPM per Faucet (Kitchens)	2
Proposed GPM per Faucet (Kitchens)	1.5
Kitchen - Annual Water Savings (Gallons)	**13,688**

Bathroom + Kitchen: Total Annual Water Savings (1000 gal)	**27.4**
Low Flow Aerators - Water Cost Savings	**$82.13**

$$\textbf{Water Savings (1000 gal)} = \frac{(GPM_{base} - GPM_{ee}) \times TF \times MIN \times USES \times 365}{1{,}000}$$

Assumptions:

MIN (Duration of faucate usage per use in minutes)	8
USES (Number of uses per day)	2
TF (Typical throttle factor of showerhead)	0.75
Days per year	365
Water Cost ($/1000 gal) =	$3

Quantity of Units Proposed	6
Existing GPM per Showerhead	2.5
Proposed GPM per Showerhead	1.5
Showerheads - Annual Water Savings (Gallons)	**26,280**

Showerheads - Annual Water Savings (1000 gal)	**26.3**
Low Flow Aerators - Water Cost Savings	**$78.84**

The water cost savings of $78.84 and $82.13 was added to the annual cost savings generated by TREAT to get the annual costs savings value of $476 found in Table 2.

Appendix D: Financing Summary for Lenders

Owner:
Building Owner, Inc.
James Bond
1234 Any Street
Portland, Maine 04104

Facility:
Sample Modeling Project
1234 Any Street
Portland, Maine 04104

Partner:
Facility Management Group, Inc.
46 Firefly Lane Dexter, Maine 04930
Dexter, Maine 04020

Audit Site Visit Date:	March 16, 2013
ERP Report Date:	April 17, 2013

Building Features:

Year Built:	1900
Size (sq. ft):	5,616
# of Units	6
Heating Type:	Gas

Table 4: Financing Plan

Item	Amount
Total Cost of Improvements	$17,340
Multifamily Efficiency Program Partner Fees	$4,134
TOTAL COSTS	$21,474
Anticipated Efficiency Maine Incentives	$9,600
Owner Contributions	$11,874
Bank Loan	$0
Other (Efficiency Maine Natural Gas Incentive)*	$0
TOTAL FUNDING	$21,474

**Unitil Service Territory only*

Project Work Scope Summary

Energy Efficiency Improvements	Qty	Installed Cost	Annual Cost Savings	Payback (years)	IRR
Attic Insulation	0	$5,000	$372	13.4	6.2%
Basement Insulation	0	$2,000	$503	4.0	25.1%
3rd Floor Wall Insulation	0	$4,000	$457	8.8	10.9%
Whole Building Infiltration Reduction	0	$3,300	$233	14.1	-1.2%
Heating Pipe Insulation	0	$1,750	$390	4.5	19.0%
Refrigerator Replacement	0	$1,000	$220	4.6	21.1%
Low Flow Devices	0	$110	$476	0.2	433.1%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
0	0	$0	$0	0.0	0.0%
Health & Safety Improvements					
Gas Fired Ovens		$180			
0		$0			
0		$0			
0		$0			
0		$0			
Partner Fees - ERP		$2,400			
Partner Fees - Construction Period		$1,734			
TOTAL		$21,474	$2,651	8.1	10.0%