Juan Pifare Plaza

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary

- **Project Type:** Multifamily
- **Location:** San Francisco
- **Building Size:** 52,000 sq ft
- **Number of Units:** 30
- **Number of Stories:** 4

Total Investment:	$162,861	**Payback Period (years):**	8.3
Annual Savings:*	$15,857	**Savings to Investment Ratio:**	1.42
	405 million Btu	**Net Life Cycle Savings:**	$54,411
	61,385 kWh	**Discounted at 3.0% over (yrs):**	11.7
Electric Reduction:	25%	**Fuel Use Reduction:**	27%

Juan Pifare Plaza

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Detailed List of Recommended Measures

Juan Pifare Plaza

	Measure	Installed Cost (incl. design)	Annual Energy Savings		Annual Water/ Sewer Savings	Annual Cost Savings	Payback	S.I.R.	Life Cycle Savings	Years for LCC	Notes
			MMBtu	kWh	1000 gals	$	years		$	years	
Measures with SIR >1											
1	Install 2.0 GPM Showerheads and 1.5 GPM or Less Aerators	$1,270	125	0	81.0	$2,590	0.49	17.4	$20,821	10	2,3,4
2	Repair Heating Boiler Controls	$1,250	59	0	0.0	$637	1.96	4.7	$4,646	11	2,4
3	Replace T-12 Apartment Ballasts w/T-8	$2,012	-8	4308	0.0	$568	3.54	3.4	$4,764	15	2,4
4	Install Exterior Lighting Controls and Fixture Replacement	$7,064	0	8138	0.0	$1,367	5.17	2.3	$9,257	15	2,4
5	Replace Heating Circulators with VFD Pumps	$30,000	-8	29335	0.0	$4,842	6.20	1.9	$27,802	15	2,4
6	Replace Common Area Lighting Fixtures and Add Controls	$24,455	-35	19084	0.0	$2,828	8.65	1.4	$9,307	15	2,4
7	Install Demand Controlled Recirculation Pump	$2,500	16	520	0.0	$260	9.61	1.2	$606	15	2,4
8	Weatherstrip Select Doors and Air Seal Parking Garage Ceilin	$1,300	14	0	0.0	$151	8.60	1.1	$99	11	2,4
9	Insulate all DHW Piping in Boiler Room to R-6	$200	2	0	0.0	$22	9.26	1.0	$0	11	2,4
Measures with SIR <1											
10	Replace DHW Boilers with High Efficiency Sealed Combustion	$60,000	233	0	0.0	$2,516	23.84	0.6	-$22,562	20	2,4
11	Insulate DHW Tank with R-18 FSK Faced Insulation	$800	7	0	0.0	$76	10.58	0.6	-$329	7	2,4
TOTAL		$130,851	405	61,385	81.03	$15,857	8.25	1.42	$54,411	N/A	N/A
Additional Health and Safety Measures											1
12	Clean and Tune Stoves	$5,310									1
13	Install Hardwired CO Detectors (Apartments, Laundry, and Mechancial Room)	$7,750									1
14	Repair Dryer Venting System	$4,200									
15	Ventilation System Overhaul	$13,000									
16	Gas Leak Repair	$1,000									
17	Update/Replace Garage CO Sensors	$750									
TOTAL FOR ALL IMPROVEMENTS		$162,861.00	405	61,385	81	$15,857	8.25	1.42	$54,411	N/A	N/A

Juan Pifare Plaza

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: Heating Measures

- Heating Boiler: One (1) atmospherically vented, 78% AFUE 2-stage 1,010,000 BTU/h boiler (Teledyne Laars PH1010IN09K). 7.5 H.P primary circulator.

Issues

1. Boiler was set to maintain 190° supply water temperature. This is a low temperature radiant baseboard system, which can handle much lower supply water temps.
2. Outdoor reset control set to turn boiler off when outdoor temp exceeded 80°
3. Boiler control is a single stage control, but this is a 2-stage boiler, so it will always fire on high fire
4. Boiler design calls for primary circulator and the boiler to be interlocked, but instead the circulator is set to run continuously regardless of boiler operation.
5. The flow from the 7.5 HP circulator is being throttled back by 50% with balancing valves that have been installed. Electrical energy consumption for this building is twice that of this owners other buildings of equivalent size, primarily because of this.

Single Stage Honeywell Control

Main Circulator Balancing Valves Closed 50%

Juan Pifare Plaza

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: DHW Measures

- Two (2) atmospherically vented, 80% efficient Laars Mighty Therm boilers (Model PW0400CN1) each with an input of 400,000 BTU/h.

Issues

1. The boilers are wired to a tank aquastat, but this control is overridden and the active boiler's circulator runs continuously regardless of tank temperature.
2. Recirculation control is set to turn the circulator off when the return water temperature drops below 160°, but the hot water set point 125°, so the circulator is forced to run continuously.
3. Opportunity for high efficiency condensing unit.

Existing DHW Boiler and Piping

The Midori

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary

- **Project Type:** Multifamily
- **Location:** San Francisco
- **Building Size:** 22,993 sq ft
- **Number of Units:** 77
- **Number of Stories:** 7

Total Investment:	$197,088	**Payback Period (years):**	12.9
Annual Savings:	$15,334	**Savings to Investment Ratio:**	1.00
	1,187 million Btu	**Net Life Cycle Savings:**	$0
Summer Peak	43,440 kWh	**Discounted at 3.0% over (yrs):**	16.5
Electric Reduction:	24%	**Fuel Use Reduction:**	47%

The Midori

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Detailed List of Recommended Measures

The Midori

	Measure	Installed Cost	Annual Energy Savings		Annual Water/ Sewer Savings	Annual Cost Savings	Payback	S.I.R.	Life Cycle Savings	Years for LCC
			MMBtu	kWh	1000 gals	$	years		$	years
Measures to be undertaken by buildings - savings accrue to building										
1	Water Heater Set Point Adjustment	$1	4	0	0.0	$23	0.04	105.33	$104	5
2	Installation of Low Flow Fixtures	$2,850	379	0	380.0	3567	0.80	10.68	$27,577	10
3	Lighting Replacement (Outdoor)	$217	-3	1,402	0.0	92	2.36	5.06	$881	15
4	Install 2" Fiberglass Insulation on Heating Pipes	$200	14	0	0.0	$134	1.49	6.20	$1,040	11
5	Install 1" Fiberglass Insulation on DHW Pipes	$500	15	0	0.0	144	3.47	2.66	$832	11
6	Lighting Replacement (CA)	$22,803	-68	36,216	0.0	2438	9.35	1.28	$6,301	15
7	Install High Efficiency Condensing DHW Boiler	$62,500	503	0	0.0	4724	13.23	1.12	$7,781	20
8	Install Vendisensor on Vending Machines	$500	-3	1,800	0.0	120	4.17	1.10	$50	5
9	Install Outdoor Reset System + Clean and Tune	$6,250	48	0	0.0	454	13.77	1.08	$504	20
10	Installation of TRV Air Vents	$14,250	131	0	0.0	1236	11.53	1.04	$505	15
Measures with SIR < 1										
11	Lighting Replacement (In-Unit CFL's)	$693	-7	3,710	0.0	297	2.33	0.82	-$125	2
12	Insulate Roof w/ 16" Loose Cellulose R-60	$8,800	53	0	0.0	500	17.60	0.85	-$1,361	20
13	Replace Mini Fridges	$600	-1	312	0.0	21	28.57	0.50	-$299	19
14	Replace Windows	$53,624	121	0	0.0	1584	33.85	0.44	-$30,058	20
Measures with no energy savings										
15	Replace Sump Pump	$500							-$500	0
16	Install Mechical Ventilation In Bathrooms	$22,800	Engineering assistance will be required to determine ferasibility of installing side wall ternimated exhaust ducts						-$22,800	0
TOTALS		$197,088	1,187	43,440	380	$15,334				

The Midori

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: Heating Measures

Heating Boiler: (1) Peerless cast iron sectional steam boiler (model 211A-04-WIS-1), input of 630,000 BTUH and the gross output of 504,000 BTU/h.

Issues

1. Boiler is controlled by an analog time clock which turns the boiler off at 11:00 AM and back on at 6:00 PM. While the boiler is running it is operating only off of pressure controls and does not receive any feedback from the building or any outdoor temperature feedback. This lack of control results in short cycling of the boiler and inefficient operation.
2. Clean and Tune: Very high excess air levels, low combustion efficiency:

100% Firing Rate	
Temp Stack	405°
CO2	4.61
SSE	77%
Excess Air	136.8%
O2	12.7
CO	0 ppm
Temp Amb	76°

Existing Heating Boiler

3. Lack of adequate venting of steam mains, which leads to uneven heat distribution.
4. No form of control at the radiators (TRV's).
5. O&M: Boiler was waterlogged, header piping not designed properly (leading to carryover of wet steam).

The Midori

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: DHW Measures

- (1) A.O. Smith atmospheric hot water boiler (model HW-420-892), 420,000 BTU/h, feeding (2) 119 gallon hot water storage tanks. Existing Recirculation system with demand controls.

Issues

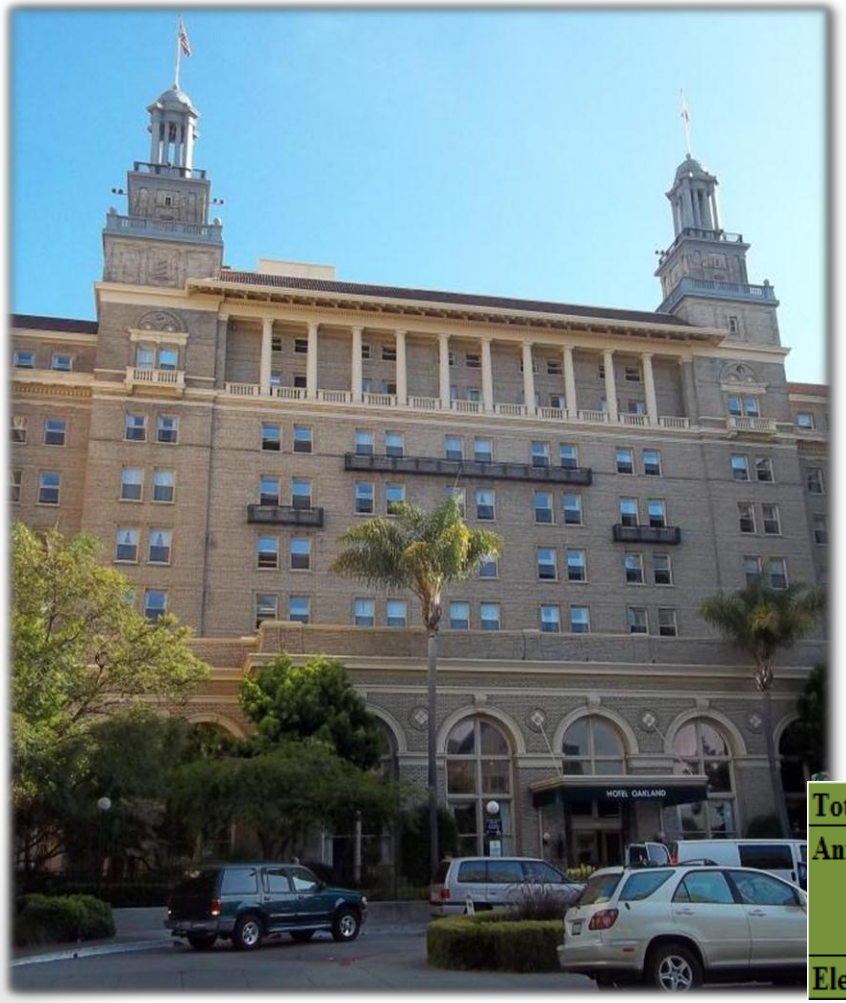
1. DHW Boiler has very high standby and stack losses, poor overall annual efficiency
2. DHW Boiler was set to maintain 140° water.
3. One of the two tanks is at the end of its useful life.
4. Uninsulated Pipe

Existing DHW Tanks and Piping

Existing DHW Boiler

Hotel Oakland

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.



Project Summary

- **Project Type:** Multifamily
- **Location:** Oakland
- **Building Size:** 234,529 sq ft
- **Number of Units:** 315
- **Number of Stories:** 8

Total Investment:	$251,795	Payback Period (years):	8.6
Annual Savings:*	$19,356	Savings to Investment Ratio:	1.41
	1,473 million Btu	Net Life Cycle Savings:	$67,699
	22,682 kWh	Discounted at 3.0% over (yrs):	12.1
Electric Reduction:	2%	Fuel Use Reduction:	30%

Hotel Oakland

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Detailed List of Recommended Measures

Hotel Oakland

	Measure	Installed Cost (incl. design)	Annual Energy Savings		Demand Savings	Annual Water/ Sewer Savings	Annual Cost Savings	Payback	S.I.R.	Life Cycle Savings	Years for LCC	Notes
			MMBtu	kWh	kW	1000 gals	$	years		$	years	\
Measures with SIR >1												
1	**Low-Flow Showerheads and Aerators**	**$3,581**	**289**	**0**	**0.0**	**0**	**$3,121**	**1.15**	**7.1**	**$21,891**	**9.5**	**-**
2	Replace Incandescents with CFL in Apartments	$8,370	0	21787	0.0	0	$3,312	2.53	2.8	$14,877	8	-
3	Miscellaneous Air Sealing	$1,750	0	2517	0.0	0	$383	4.57	2.0	$1,790	11	-
4	**Install DHW H.E. Condensing**	**$125,000**	**1054**	**0**	**0.0**	**0**	**$11,349**	**11.01**	**1.4**	**$43,844**	**20**	**-**
5	**Install DHW Recirculation Pumps and Controls**	**$6,000**	**24**	**1750**	**0.0**	**0**	**$525**	**11.42**	**1.0**	**$270**	**15**	**-**
6	New EnergyStar Refrigerators	$4,500	0	2373	0.0	0	360.696	12.48	1.0	-$194	15	-
Measures with SIR <1												
7	Upgrade Common Area Lighting	$16,794	0	8422	0.0	0	$1,280	13.12	0.9	-$1,512	15	-
TOTAL		**$165,995**	**1,367**	**36,849**	**0**	**0**	**$20,330**	**8.16**	**1.49**	**$80,966**	**N/A**	**N/A**
Additional Health and Safety Measures												1
8	Replace Rooftop Supply Units (2)	$20,000										1
9	Seal and Balance Supply Ducts (2)	$14,400										1
10	Install Corridor Exhaust Ducts and CARs (3)	$50,400										1
11	Install Corridor Exhaust Rooftop Fans (3)	$6,000										1
12	Repair Crossover at Apartment Faucets (200)	$20,000										1
TOTAL		**$110,800**										1
TOTAL FOR ALL IMPROVEMENTS		**$250,795.00**	**1,367**	**36,849**	**0**	**0**	**$20,330**	**8.16**	**1.49**	**$80,966**	**N/A**	**N/A**

Hotel Oakland

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: DHW Measures

- Two (2) induced-draft, 82% efficient Raypak boilers (Model WH2-1223) each with an input of 1,222,500 BTU/h, which are approximately 10 years old. Both boilers feed one (1) common 120 gallon storage tank (Raypak AA Serial 2731), which appears to be original to the building and wrapped with a hard-shelled 1" fiberglass jacket (estimated R-3).

Issues

1. Each boiler is capable of 2-stages (for a total of 4 stages), which are set up to run on a lead-lag schedule by a Honeywell control (Model T775). The lead boiler is short-cycling, and the second stage of the lead boiler was disengaged to help prevent short cycling. Based on the current piping, tank, and control strategy, small DHW draws will cause the boilers to fire in approximately 600,000 btu/hr increments, which can cause short cycling conditions at each stage.
2. Boilers are in generally poor condition and are strong candidates for replacement with high efficiency condensing units.

Parkview Senior

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary

- **Project Type:** Multifamily
- **Location:** San Jose
- **Building Size:** 168,820 sq ft
- **Number of Units:** 140
- **Number of Stories:** 4

Parkview Senior

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Detailed List of Recommended Measures

Parkview Senior

	Measure	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	Years for LCC	Notes
			MMBtu	kWh	kW	1000 gals	$	$	years		$	years	
Measures with SIR >1													
1	**Insulate all Bare DHW Piping**	**$315**	**19**	**0**	**0.0**	**0.0**	**$0**	**$222**	**1.42**	**7.5**	**$2,049**	**13**	**-**
2	Install Motion Sensor on Vending Machine	$500	-1	807	0.0	0.0	$0	$247	2.03	5.9	$2,443	15	3
3	Install Timer on Meeting Room Water Cooler	$100	0	321	0.0	0.0	$0	$103	0.97	4.7	$370	5	3
4	**Install DHW Recirculation Control**	**$2,500**	**10**	**2127**	**0.0**	**0.0**	**$0**	**$798**	**3.13**	**3.8**	**$7,022**	**15**	**3**
5	Replace CA Lighting	$22,822	-22	20524	0.0	0.0	$0	$6,310	3.62	3.3	$52,510	15	3
6	Weatherstrip Boiler Room Door	$125	0	61	0.0	0.0	$0	$20	6.40	1.4	$56	11	3
7	**Improve Existing DHW Controls**	**$1,000**	**0**	**363**	**0.0**	**0.0**	**$0**	**$116**	**8.61**	**1.2**	**$235**	**13**	**2,3**
8	**Replace Existing DHW Boilers**	**$65,000**	**371**	**0**	**0.0**	**0.0**	**$0**	**$4,341**	**14.97**	**1.0**	**-$421**	**20**	**-**
Measures with SIR <1													
9	Insulate Attic w/ Blown-in Insulation	$33,966	34	8046	0.0	0.0	$0	$1,637	20.75	0.9	-$1,882	30	-
10	Replace Existing PTACs w/ Heat Pump Models	$112,000	152	33809	0.0	$0	$0	$5,159	21.71	0.8	-$22,160	25	4
11	Replace In-Unit Lighting	$70,847	-31	26220	0.0	0.0	$0	$2,259	31.36	0.4	-$43,875	15	4
TOTAL		**$309,175**	**532**	**92,278**	**0**	**0**	**0**	**$21,211**	**14.58**	**0.99**	**-$3,654**	**N/A**	**N/A**
Additional Health and Safety Measures													1
12	Repair Compromised Attic Firewall	$500											1
13	Install On-Site Water Treatment System	$30,000											1
TOTAL FOR ALL IMPROVEMENTS		**$339,674.60**	**532**	**92,278**	**0**	**0**	**0**	**$21,211**	**14.58**	**0.99**	**-$3,654**	**N/A**	**N/A**

Parkview Senior

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: DHW Measures

- (2) Laars Mighty Therm boilers (Model PW0600 IN 09 C1 ABHG) with an input of 600,000 BTU/h.

Issues

1. DHW boiler circulators were set to run continuously regardless of tank temperature.
2. Opportunity for high efficiency condensing unit.
3. No control on the recirculation loop. Circulator running continuously regardless of return line temperature.
4. Uninsulated piping

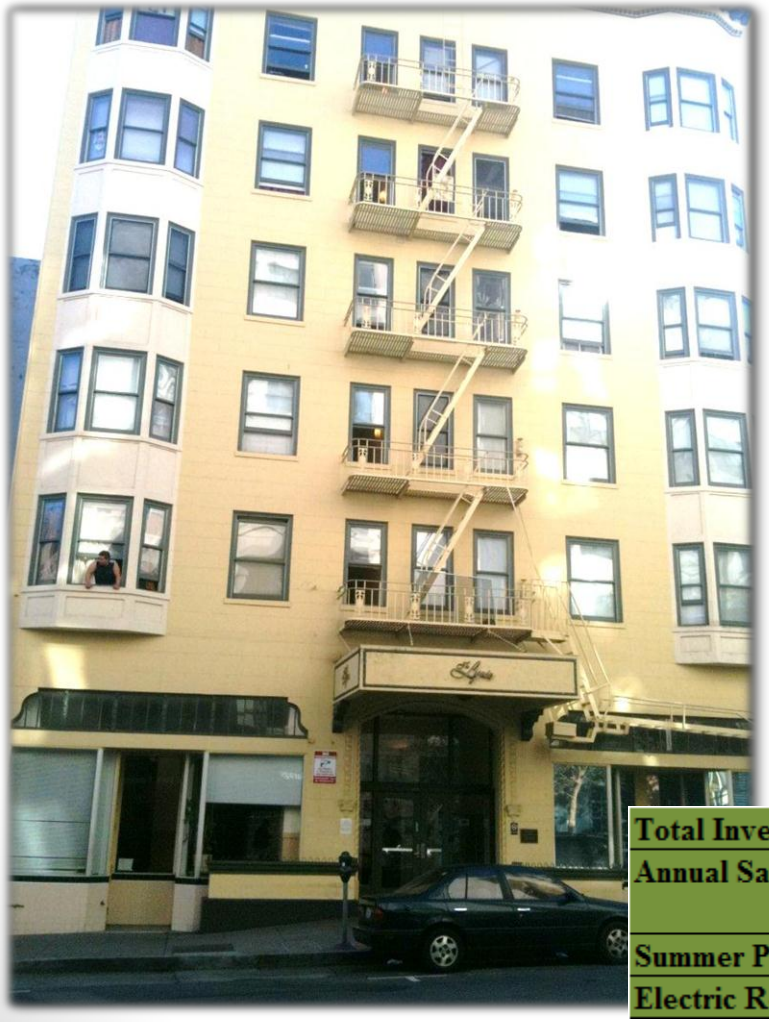
Existing DHW Tank

DHW Boilers

Boiler Controls

The Lyric

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.



Project Summary

- **Project Type:** Multifamily
- **Location:** San Francisco
- **Building Size:** 24,090 sq ft
- **Number of Units:** 58
- **Number of Stories:** 6

Total Investment:	$41,094	**Payback Period (years):**	7.0
Annual Savings:*	$5,837	**Savings to Investment Ratio:**	1.72
	546 million Btu	**Net Life Cycle Savings:**	$29,528
Summer Peak	4,107 kWh	**Discounted at 3.0% over (yrs):**	15.3
Electric Reduction:	2%	**Fuel Use Reduction:**	29%

The Lyric

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Detailed List of Recommended Measures

The Lyric

	Measure	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	Years for LCC
			MMBtu	kWh	kW	1000 gals	$	$	years		$	years
Measures with SIR >1												
1	Adjust Boiler Controls	$600	125	0	0.0	0.0	$0	$1,246	0.48	30.9	$17,937	20
2	Insulate all Bare Heating Piping w/ 2.5"	$250	34	0	0.0	0.0	$0	$388	0.64	16.5	$3,876	13
3	Insulate all Bare DHW Piping w/ 1"	$210	32	0	0.0	0.0	$0	$325	0.65	16.5	$3,246	13
4	Replace Lighting - Exterior	$1,297	0	2445	0.0	0.0	$0	$196	6.62	1.8	$1,043	15
5	Improve Recirculation Control	$1,487	16	762	0.0	0.0	$0	$198	7.51	1.6	$877	15
6	Install High Efficiency Condensing DHW boiler	$34,000	342	0	0.0	0.0	$0	$3,442	9.88	1.1	$2,606	13
Measures with SIR <1												
7	Install Vendimiser on Soda Machine	$250	-3	900	0.0	0.0	$0	$42	5.95	0.8	-$58	5
Measures with no energy savings												
8	Repair disconnect in laundy exhaust	$0										0
9	Assessment of Ventilation System	$3,000										0
TOTALS		$41,094	546	4,107	0.0	0	$0	$5,837	7.04	1.72	$29,528	

The Lyric

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: Heating Measures

- One (1) Peerless Steam Boiler (LC-05-W/S) with an input of 881,000 BTU/h. The burner is a Webster Cyclonetic (model Jb1G-03-RM7895A-H.12-UL) low-high-low burner.

Issues

1. Burner modulation arm was non-operational, firing in high-fire only
2. Boiler outdoor reset control was not wired or setup properly. As a result the boiler operated off of pressure controls and was found to be rapidly short cycling (5 cycles in 15 minutes).

Existing Steam Heating Boiler

Outdoor Reset Controls

The Lyric

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

Project Summary: DHW Measures

- One Teledyne Laars Mighty Therm hot water boiler which feeds (1) 119 gallon glass-lined hot water storage tank produced by Rheem Commercial Storage Tank (Model #ST-120). The domestic hot water boiler has an input rating of 325,000 BTU/h.

Issues

1. Lack of recirculation controls (running circulator 24/7)
2. Aquastat on the storage tank found to be non-operational.

Existing DHW Boilers

Existing DHW Tank